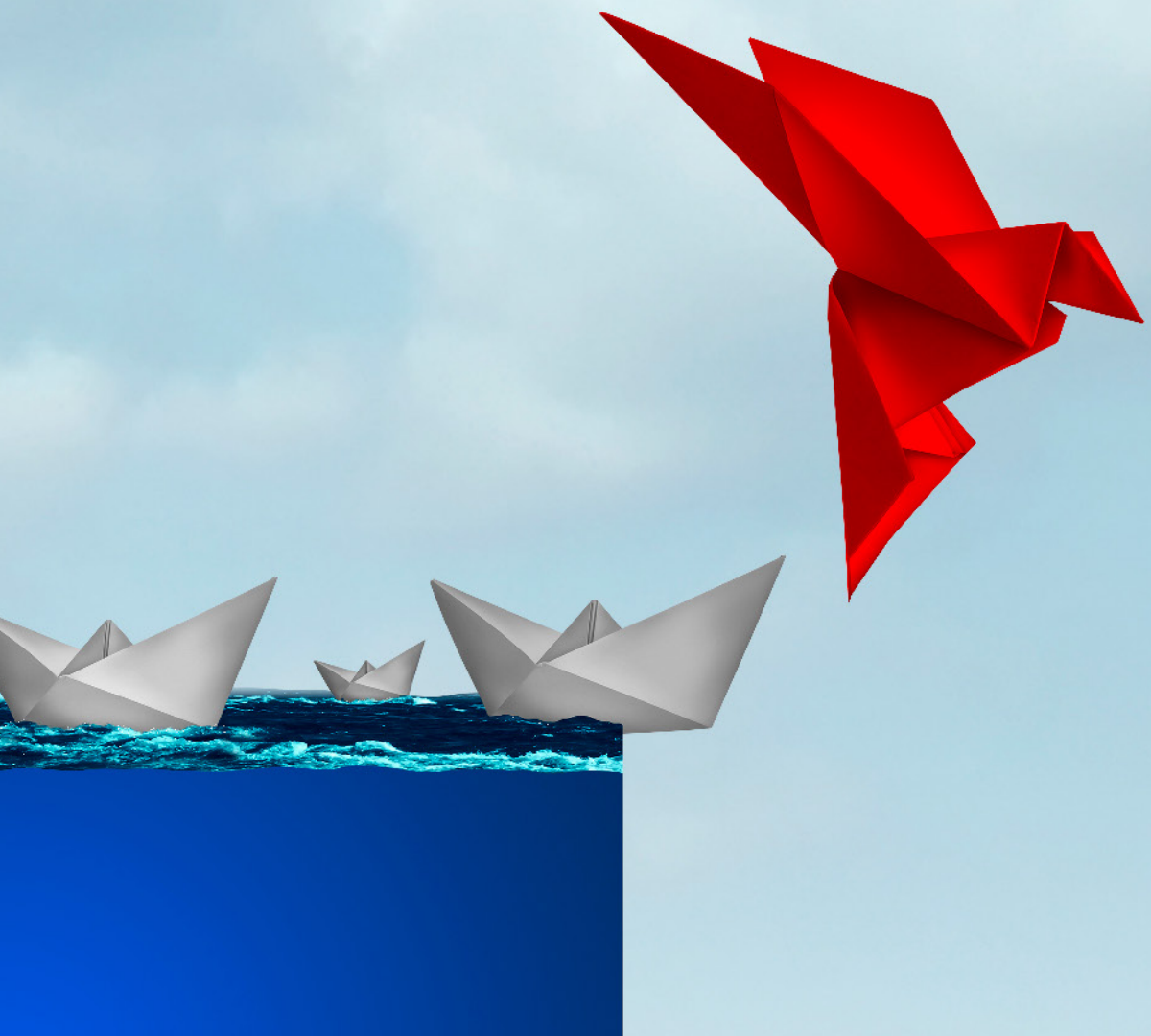
POLICIES FOR ENHANCING PRODUCTIVITY WITH NEW SKILLS



The Asian Productivity Organization (APO) is an intergovernmental organization that promotes productivity as a key enabler for socioeconomic development and organizational and enterprise growth. It promotes productivity improvement tools, techniques, and methodologies; supports the National Productivity Organizations of its members; conducts research on productivity trends; and disseminates productivity information, analyses, and data. The APO was established in 1961 and comprises 21 members.

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POLICIES FOR ENHANCING PRODUCTIVITY WITH NEW SKILLS

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Policies for Enhancing Productivity with New Skills

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FOREWORD

Digital transformation is reshaping the labor market in unprecedented ways, creating new opportunities for workers and employers as well as new challenges and risks. This poses questions such as how to harness the potential of digital technologies to enhance productivity, innovation, and inclusion while ensuring that workers have the skills and competencies to adapt to the changing demands and expectations of the digital economy. For policymakers, concerns over the design and implementation of effective policies and programs to support skill development and labor market transitions are also raised.

These are some of the issues that this publication addresses, based on the latest research and evidence from 11 APO economies. It analyzes the impact of digital transformation on the labor market, focusing on the three dimensions of employment, wages, and skills. It examines how digital technologies affect the quantity, quality, and distribution of jobs as well as the supply of and demand for skills. It also discusses how different groups, such as women, youth, older workers, low-skilled workers, and migrants, are affected by digital transformation.

Policies for Enhancing Productivity with New Skills provides a comprehensive overview of policies and recommendations to enhance productivity in the digital era. It covers four principal areas: education and training; labor market regulation; social protection; and social dialogue. The importance of developing holistic policy frameworks to address the multiple dimensions and challenges of skill development and labor market adaptation is addressed, along with the need for collaboration and coordination among government agencies, employers, workers, educators, and civil society.

The APO hopes that this publication will inspire policymakers, productivity practitioners, researchers, and all interested in skill development and labor market policies in the context of digital transformation. Policies for Enhancing Productivity with New Skills is also an invitation to readers and policymakers to share their own views and experiences on this critical issue. By working together, we can create a more productive, innovative, inclusive labor market for the future.

The APO extends sincere gratitude to the chief and national experts who conducted the research and wrote this publication.

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Tokyo

OVERVIEW

DIGITAL TRANSFORMATION AND LABOR MARKET

Introduction

The rise of digital economy is driving digitization of various industries, gradually affecting all social structures and lifestyles and leading to the development of disruptive and innovative emerging services. According to an analysis of the World Economic Forum (WEF) [17], digital innovation may use digital technology to practice different types of innovative business-and-operation models in various application industries in future. This development, called 'digital transformation,' covers professional services, retail, telecommunications, automotive, healthcare, manufacturing, and other industry sectors. Also, in the digital economy, the cost of science and technology is gradually reduced as the technology matures, and the application of new technology is gradually popularized, driving the combined effect of artificial intelligence (AI), cloud computing, and the internet of things (IoT), resulting in many breakthroughs. These include: digital transformation of the industry; enhancement in added value of products and services under the development of new lifestyles; and construction of innovative service applications. These have prompted enterprises to accelerate the adjustment of their work organizations and gradually change their organizational cultures, and begin paying attention to digital skills development needs of their employees.

With rapid development, the digital economy has driven various industries to use digital technologies and automation to create new job opportunities and new ways of working. Coupled with the maturing of technologies such as big data, cloud computing, and the IoT, the global economy has entered a new era of development. As pointed out in the Digital Economy report released by the United Nations Conference on Trade and Development [14], automation will have an increasing impact on service-based jobs and the need for emerging digital skills. Based on a report by Oxford Economics [11], robots will replace up to 20 million factory jobs by 2030. Forbes also reported on 27 October 2020 that the USA would need to replace 85 million jobs by 2025 due to automation, apart from an estimated more than 60 million jobs lost during the COVID-19 pandemic [18]. In September 2018, Cisco Systems and Oxford Economics [12] conducted a joint research and forecasted that by 2028, 6.6 million jobs across the six largest ASEAN economies of Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam would be made redundant through more widespread adoption of technology. These studies indicate that, due to the impact of technological development, there is a problem of technological unemployment. Therefore, the issue of meeting the supply and demand ends of the labor market must be addressed as soon as possible.

On the whole, the development and application of digital technology will inevitably have an impact on the labor market, regardless of the industry. This has caused considerable discussion, especially with regard to the emergence of new types of job opportunities, changes in the working environment, and changes in the labor market. Regulatory conditions need to be improved in order to make changes in employment demand, create flexibility in employment patterns, and promote equality in income distribution. New types of talents for the development of digital trends in future, big data analyses, and other information-related processing are required. To avoid technology-driven

structural unemployment, member countries will require skill adjustments, policies, and programs commensurate with the evolving demands of the labor market. Many current labor force skills are likely to become irrelevant in the near future, with new, more specialized ones emerging.

In light of the above, this research will investigate changing labor market demands and suggest how policymakers, governments, and relevant stakeholders should prepare the workforce in a timely manner. This research aims at examining policies and programs that will prepare the labor force to meet the changing labor market demands for new skills. Specifically, this research focuses on enabling policymakers to cope with fluid labor market dynamics in member countries. In doing so, experts from each selected member country evaluate the labor supply-and-demand situation under the digital economy trend, to (1) serve as a reference for the content of vocational training and employment services for meeting the functions or abilities required by the domestic industries; (2) strengthen the training-course service information; and (3) improve various employment service measures to strengthen the vocational training and employment services required for the industry.

Definition and Trends in Digital Transformation

Since around 2010, the development of various information and communication (ICT) technologies such as cloud computing, mobile technology, and social networks has been driving a paradigm shift in business models. These shifts have generated new market rules, brought up new business opportunities and models, and caused changes in the interests of the industry. As early as 2016, a Citibank research report [4] proposed five global digital disruptions, namely the IoT, social media, mobile, analytics, and cloud. These five digital disruptions have caused major changes in the consumption habits and environments. In order for the industry to grow profitably and maintain considerable competitiveness, continuous investments in industrial innovation, which is a key requisite for digital transformation, is necessary. WEF [15] indicates that digital transformation can have direct impact on the competitiveness, industrial economy, and enterprise development of various countries. All industries must engage in digital transformation and adopt corresponding digital tools and technologies to innovate and transform their respective products and services to embrace new business models under the digital wave.

Definition of Digital Transformation

The definition of digital transformation varies widely, while mainly emphasizing the changes in business investment caused by innovative technologies. For example, digital transformation is the use of digital technology to transform a service or business by replacing non-digital or manual processes with digital ones or by replacing older digital technologies with newer ones. In particular, the new technologies developed by the ICT industry have become the core driving the development of the digital economy and have a direct impact on the digital transformation of the industry. In addition to increasing efficiency through automation, digital technology solutions can also enable new types of innovation and creativity, rather than simply enhancing and supporting traditional approaches [6].

OOSGA [10] points out that digital transformation is often discussed in conjunction with digitization. Digitization refers to the process of digitizing information, which can include text, picture, audio, etc. Transformation represents the process of combining digital technology with existing operational processes. Thus, it can be understood that digital transformation refers to a broader concept that is applied at all levels of the organization, through integration of innovative technologies, to improve process efficiency, including operational processes, for supporting functions such as marketing and sales, research and development, etc. In addition, from the

perspective of the process and purpose of digital transformation, the definition of digital transformation is "using innovative technology to change existing business or operation models to create new value and sustainable business advantages." In order to achieve the goal of transformation, it basically needs to go through four stages: (1) understanding the unique digital transformation opportunities of the industry; (2) conceiving the overall digital transformation strategy of the enterprise; (3) connecting the digital strategy of the front, middle, and back offices of the enterprise; and (4) reshaping the corporate culture. At the same time, it is customer oriented and provides the best customer experience. Through the integration of strategies, tools, and culture of front-end, middle-end, and back-end services, it gradually leads to a "connected enterprise."

Mugge, *et al* [7] pointed out that digital transformation is to digitize and unify the processes between the management, marketing, business, customer service, human resources, IT, and other departments of the enterprise, so that the processes between different units can be digitized and unified. Each unit can thus provide better service quality and user experience in its respective domain. Therefore, Hanelt, *et al* [5] hold that digital transformation is not just the introduction of high-tech or digital technology for product sales or service provisioning. Instead, it is necessary to combine the overall operations strategy of the enterprise and the mutual application of digital technology to create maximum value through products and services. With more efficient and accurate services, enterprises can deliver greater customer experiences in a win-win manner.

From a broader perspective, digital transformation not only emphasizes digital technology and the purpose of transformation, but also involves the overall transformation of an organization. WEF [16] pointed out that digital transformation is the process of bringing new business opportunities. With the gradual development of various digital technologies and continuous reduction in costs, companies use emerging technologies to completely change their business models and create new business models, operational processes, and digital products and services. According to OOSGA [10], digital transformation is a process of combining digital technology and existing business models, from business processes, value propositions, customer experience, and digital culture, to complete transformation into an extremely sensitive organization that is constantly updated and transformed with experience as its core.

Since the meaning of digital transformation varies across industries, it is difficult to pin down a complete definition that fits all. Generally speaking, digital transformation is defined as the application of digital technology to a business area, resulting in a fundamental change in the way the business operates and delivers value to customers. Beyond that, digital transformation is also a cultural change that requires organizations to constantly challenge the status quo, experiment frequently, and adapt to failure. This means that organizations need to abandon long-established business processes in favor of changing models [13]. In other words, digital transformation is an enterprise-wide transformation, and involves a comprehensive change management project. The failure or disruption of digital transformation is often a cultural issue rather than a technical dilemma. As Bughin, *et al* [2] pointed out in McKinsey's "Why digital strategies fail" report, imperfect planning, uncoordinated goals, and unclear strategies are the main reasons for a failed digital transformation project in most companies.

Overall, digital transformation should include digital technology applications and innovative business models. In addition to the application and development of various digital technologies, it also covers the destructive changes and transformations caused by internal processes, strategy formulation, service development, and product design of the organization. The corresponding

product or service innovations are continuous transformation processes to improve profitability and growth. Therefore, in terms of innovative business models, the focus and sequence of digital transformation vary with the attributes of various industries. In industries that rarely interact with customers, organizations may first transform operational processes; simplify the management of the organization and the business flows between departments by integrating digital technologies; and introduce new technologies to make engineering processes more efficient. In contrast, in industries with high levels of customer interaction, organizations may apply digital transformation for value proposition. They may discuss the products and services being provided from a fundamental level and focus more on the level of delivery and customer experience [10].

Trends in Digital Transformation

Many major countries in the world have made digital transformation a policy priority. For example, Japan's Society 5.0 [19] and Singapore's Smart Nation [20] both focus on the digital transformation of industry, government, and society driven by forward-looking technologies. The EU plans to accelerate digital transformation of EU companies with Invest EU [21], Digital Europe [22], Horizon Europe, and other programs, trying to improve the digital capability of people. From the perspective of digital policies in EU, digital transformation has become a top policy priority at national levels. At the same time, the wave of digital transformation is emerging in the world. In addition to the active promotion of digital transformation strategies by governments, industries are also embracing emerging technologies, developing new types of products or services, and grasping the huge business opportunities brought about by digital transformation.

Digital transformation is gradually changing the face of the world. Governments and global enterprises are eager to understand the impact of the development of widely used technologies. However, these technologies are quite different from the ones that industries would apply for their manufacturing processes or service provisioning. It is difficult for government policymakers to rely on past experiences to assess the potential impacts or benefits of these emerging technologies. Based on these considerations, the OECD [9] has proposed nine actions in response to the dilemma of measuring and evaluating digital transformation in the digital age, so as to grasp the development of social, economic, and industrial digitalization. Snapshots of the nine action plans for digital transformation proposed by the OECD report are given below:

Action 1: Make the Digital Economy Visible in Economic Statistics

This action plan argues that relevant indicators suitable for measuring digital transformation and its impact should be established to complement existing indicators. Examples include, classifying and defining industries, enterprises, and transactions under digital transformation; measuring a country's GDP under digital transformation; and measuring international trade flows. On the basis of existing statistical surveys, OECD recommends, strengthening the survey with usage of digital products and platforms by enterprises and individuals, the trend of enterprises and consumers using e-commerce for sales and consumption, the habits of people using online platforms, etc.

Action 2: Understand the Economic Impacts of Digital Transformation

The adoption of digital technologies is a part of the production process of an enterprise that drives labor and capital production efficiency of the enterprise. The OECD recommends that the adoption of emerging ICT and digital technologies, appropriate classification and definition adjustments, etc., should be regularly reviewed and investigated; and differences in various aspects should be analyzed to understand the general situation of technology adoption in different sectors, along with the gaps with respect to government policies. All kinds of data

should be connected in series to maximize the benefits of data. At the same time, while ensuring the reliability and safety of data, as many people as possible should be able use it for research and analyses.

Action 3: Encourage Measurement of Digital Transformation's Impacts on Social Goals and People's Well-being

Digital transformation affects all aspects of people's lives, and governments around the world hope to achieve their vision-and-development goals through digital transformation. However, there is still insufficient evidence for the impact of digitization on social well-being, such as on mental health, social life experience, etc. The OECD suggests that existing surveys should include surveys on digital usage behavior to form cross-sectional panel data to understand the causal relationship between various factors. It also suggests developing new statistical tools, methods, and surveys to understand discussions on issues such as dissemination of disinformation and hate speech and the resulting impacts on adults as well as children.

Action 4: Design New and Interdisciplinary Approaches to Data Collection

The scale and scope of digitization is not easy to define, but many online actions leave behind a 'trace' of usage. Therefore, a variety of different tools can be used to filter, collect, and organize information. While these tools can help crawl information across different platforms, there are still doubts about the quality of their statistics. The OECD recommends that national statistical offices, regulatory agencies, internet service providers (ISPs), experts, scholars, international organizations, etc., should work together to develop a unified international framework or standard to facilitate the collection and consolidation of data and to improve the availability of follow-up data as well as their applicability.

Action 5: Monitor Technologies Underpinning Digital Transformation , notably IoT, AI, and Blockchain

The application of IoT is quite extensive, and it is expected to show exponential growth in future. AI has the potential to revolutionize production patterns and help address global challenges such as health, transportation, and environmental sustainability. Blockchain also has the potential to transform business models in industries such as finance, transportation, agriculture, and supply chain management. These digital data tools should have a unified framework to define and understand data flows and quantify their socioeconomic impact. The OECD recommends that international uniform definitions and classification standards for AI and blockchain should be developed, along with the policies needed for their evaluation and measurement. In terms of IoT, it is recommended that there should be a classification standard for its application fields, as well as the evaluation of the most important factors affecting IoT and the construction of its related indicators. At the same time, it is suggested that stakeholders in the ecosystem should actively engage in discussions to facilitate the collection and subsequent analysis of relevant data. In addition, policymakers are encouraged to develop tools and methodologies to measure the diffusion benefits of these key technologies, as well as their impact on productivity.

Action 6: Improve the Measurement of Data and Data Flows

The scale of data usage and its impact on business models and production processes is a growing concern. Digitization makes the flow of data faster and cheaper, and different units can use the data simultaneously (even across borders) without detracting others from the use of data for their desired analyses. The value of data is further enhanced as it gets widely used. The OECD recommends that the roles and characteristics of data in business models and production processes should be studied, methods of measuring data flows and stocks should be developed, and methods of measuring knowledge assets should be improved, including data and its impact on production, productivity, and competitiveness.

Action 7: Define and Measure Skills Needs for Digital Transformation

The development of the digital economy and applications may result in skills requirements such as big data analysis, cloud computing, and mobile device applications. It may also lead to new business models, work models, and job types, thereby making it more complex to manage human resources. The OECD recommends that a country's statistics, whether collected by its public sector or private sector, on skills, occupations, and industries should be leveraged and made more consistent with classification. At the same time, it encourages the use of existing multinational datasets and strengthening the correlation data between employers and employees, such as personal work skills, job nature, and content. It also suggests using online job search databases to analyze the time it takes for vacancies related to digitalization to be filled, and consequently understand the labor market's supply-and-demand dynamics for related jobs. At the same time, expert opinion should be solicited to understand the new skills that these emerging jobs may require and the differences that exist between countries in terms of such skills.

Action 8: Measure Trust in Online Environments

As many activities of individual enterprises and governments have moved to the internet, risk management related to information security and privacy has become an important issue in policymaking. At present, network security is measured by various firewall records, cookies, and browser-side security software statistics, but the measurement method still needs further development. The OECD recommends that a more reliable and comprehensive dataset on data security and digital risks should be developed, along with a database of information security incidents that both public and private sectors can trust and share in an open manner. In addition, further research should be done on consumer attitudes and behaviors to strengthen trust in online interactions. Further, internet-based statistics should be explored to measure network reliability and actively improve the quality of statistical data.

Action 9: Establish an Impact Assessment Framework for Digital Governments

Governments all over the world have adopted digital methods to provide various innovative services. The use of digital technology can improve the efficiency of the government, increase the willingness of the people to participate in public policies, and garner feedback on policies more quickly. The OECD recommends that governments should prioritize the establishment of a framework for assessing the impact of digitalization and the development of new statistical tools to assess the impact of digital technology on the relationship between the government and its people and businesses. Particularly, consideration should be given to the extent to which specific groups are affected (such as the elderly, low-income families, single parents, the disabled, etc.) for understanding the benefits of the digital government for the public. At the same time, measures should be formulated for evaluating the impact of the adoption of emerging technologies (such as AI and blockchain) on government services and finding ways for promoting data sharing in the public sector. The possible consequences of digital integration within the government, along with the obstacles, should be actively evaluated.

On the whole, the digital economy is gradually changing the appearance of the world. The development of widely applied technologies such as the IoT, cloud computing, and AI is completely different from the industrial manifestation of traditional product manufacturing or service provisioning. Therefore, it is difficult for government policymakers to rely on past experience to assess the possible impacts or benefits of these emerging technologies. In the face of the digital age, governments around the world need more open, reliable, flexible, and internationally comparable statistical data and systems to support their policy planning and impact assessments, so as to have a more comprehensive understanding of their development and dynamics. In particular,

we would like to highlight several points in the action strategy in the aforementioned OECD report: (1) use public- and private-sector statistics on skills, occupations, and industries to establish consistent classification standards; (2) use datasets to strengthen the correlation data between employers and employees, such as personal work skills, job nature, and content; (3) analyze the time it takes to fill vacancies in jobs related to digitalization, and understand the labor market of related jobs, to have an overview of supply and demand; and (4) through the collection of expert opinions, understand new skills that may be required for emerging jobs. It can be seen that the emerging issues of occupation and employment arising from digital transformation are worthy of in-depth exploration and investment by governments.

The Digital Economy and its Impact on Work Capability

The development of digital technology has profoundly affected the development of various industrial fields. It is necessary to understand the impact of the digital economy on jobs as a result of digital transformation.

Implications of Digital Economy

According to the Bureau of Economic Analysis of the US Department of Commerce, the digital economy is defined as the digital transformation of the economy, i.e., the economic activities carried out or facilitated by digital computing technology, including infrastructure supporting the operation of digital technology, and user-generated digital content in transactions and economic activities [1]. From the point of view of digital innovation, the OECD [8] stated that "the use of information and communication technology can lead to changes in production processes, marketing methods or organizational behaviors, thereby bringing opportunities and challenges to economic activities such as life, employment, and productivity." The digital economy includes the application of information and communication technology and the combination of cross-domain technology to drive major changes in production, marketing, and business models. The models, mainly sharing economy, platform economy, and digital economy, are described as follows:

Sharing Economy

The sharing economy allows individuals or groups to reactivate their existing resources, whether tangible or intangible, through technology, providing services to others and also earning income. This model makes up for the shortcomings of traditional business models and satisfies consumers' demand for new types of services. It also creates new jobs and new business opportunities. The term sharing economy has been widely circulated since Uber was founded. In addition to car sharing, bike sharing and hotel sharing have also taken off.

Although the sharing economy has not yet matured, it is becoming more and more prosperous. In addition, the sharing economy has the characteristics of relatively low entry barriers and high service innovation, which is very beneficial to the development of many small and medium-sized enterprises (SMEs). However, it is worth noting that the sharing economy is worrisome because it disrupts the existing industry. For example, anyone can now provide taxi services through apps. This will have a certain impact on incumbents in the market.

Platform Economy

Due to the rapid growth of internet giants such as Amazon, Facebook, and Google, the success of these large platforms has led to new business models, thereby giving rise to the platform economy. These platforms, being rich in data and information, are able to provide matches between supply

and demand quite efficiently. Examples of such platforms include restaurant reservation service platforms, electronic payment service platforms, travel expert tour guide service platforms, laundry service platforms, etc. The platform generates a new ecosystem to provide consumers with better services. The value of the platform economy lies in the attraction of users both at the supply side and the demand side, with transactions getting facilitated by the platform. The more the number of users is on one side, the higher the value that is brought to users on the other side.

Digital Economy

The current development trend of the global data economy mainly offers three major business models:

(1) **Data suppliers:** The industry introduces popular products or service platforms to the market, attracts the attention of a large number of users, and generates a large amount of usage data. The players earn profits through advertising channels or by providing data authorization.

(2) **Data collection and trading platforms:** Such companies may collect data from data suppliers or other channels through multiple parties, and then provide customers with a single portal to access multiple data sources. Their role is to provide consumers with multiple data sources, thus making data easier to use or otherwise adding value to it.

(3) **Products and services:** Product and service providers collect and analyze a large amount of data and provide application services required by customers according to their needs by specific fields, in order to increase customer service experience, assist managers in making decisions, and strengthen risk control.

Impact on Workers

Digital development will change the nature of work. The division of traditional work tasks will gradually shift to automation and intelligence, and the demand for digital skills in the labor market will grow significantly [14]. Workers displaced by digitalization will find it difficult to re-enter the workforce without retraining. In the process of digital transformation, workers are not opposed to new technologies such as automation or AI, but must think how to supervise and assist machines to perform work with corresponding new skills.

WEF [16] pointed out that automation will gradually replace repetitive, monotonous, and low value-added jobs. However, work that requires a high degree of communication, coordination, and creative thinking is still not easily replaced, and the proportion of work that requires human–machine collaboration will gradually increase in future. The augmentation strategy proposed by WEF [16] refers to workers improving work productivity with the assistance of machines and AI. Creative thinking of the worker will still have its superiority, and with the assistance of the machine, the worker can simplify complicated operational procedures.

Regarding the definition of the skill, the OECD [9] report pointed out that skills are the ability to help a person use knowledge and achieve goals. Their three main attributes are:

(1) **Cognitive and metacognitive skills:** These include thinking strategies, including verbal and non-verbal, numbers, as well as critical thinking, creative thinking, and self-discipline and self-learning abilities.

(2) **Social emotional competence:** This comprises a set of thinking, feeling, and behavioral patterns that help one develop oneself and build relationships at home, school, work, and society. It includes empathy, responsibility, self-efficacy, teamwork, cooperation, etc.

(3) **Practical and physical skills:** These include a series of functional practical skills, including the ability to use new technologies, programming, data science, etc., as well as daily-life skills such as sports, living, selfcare, etc.

Bughin, *et al* [3] proposed in the McKinsey report, *Skill shift: Automation and the future of the workforce,* that as AI develops, the needs for future job skills change. Bughin, *et al* first defined 25 skills required by various industries (see Table 1), and then predicted the future demand trends of each skill. By 2030, the demand for technical skills will increase by 60%, the demand for social and emotional skills will increase by 26%, and the demand for higher cognitive skills will increase by 9%. In contrast, the need for physical and manual skills will drop by 11% while the need for basic cognitive skills will come down by 14%.

TABLE 1

SHIFTS IN SKILL NEEDS IN 2030.

Skill category	Skills	Representative occupations	2030 needs
Physical and manual skills	General device operation-and-navigation skills	Drivers, production line workers	Down 11%
	General equipment maintenance and mechanical skills	Car and truck mechanics	
	Process and technical skills	Masons, roofers, electricians	
	Fine motor skills	Nursing physicians, food conditioners	
	Gross motor skills and strength	Machine feeder workers, cleaning machine workers, packing machine workers	
Basic cognitive skills	Basic literacy, numeracy, and communication skills	Cashiers, customer service representatives	Down 14%
	Basic data entry and processing skills	Typists, data entry operators, accountants	
Advanced cognitive skills	Advanced literacy skills	Editors, paralegals, writers	Up 9%
	Quantitative and statistical skills	Financial analysts, accountants	
	Critical thinking and decision-making skills	Doctors, insurers	
	Project management skills	Purchasing agents, front line supervisors	
	Processing and interpretation of complex information-related skills	Market research analysts, lawyers	
	Creativity	PR specialists, music composers	

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Skill category	Skills	Representative occupations	2030 needs
Social and emotional skills	Advanced communication and negotiation skills	Sales representatives, real estate agents	Up 26%
	Interpersonal skills and empathy	Counselors, social workers, therapists	
	Leadership and management skills	Managers, executives	
	Entrepreneurship and initiative-taking skills	Business development personnel, strategists	
	Adaptive and continuous learning skills	Emergency responders, case workers	
	Teaching and training skills	Teachers, lecturers, trainers	
Professional technology skills	Basic digital skills	Administrative assistants, computer manufacturers	Up 60%
	Advanced IT skills and programming	Software development, network administrator	
	Advanced data analysis and mathematical skills	Statisticians, business research analysts	
	Technical design, engineering, and maintenance skills	Engineers, robotics, product designers	
	Scientific research and development skills	Scientists	

Source: Revised from Bughin, *et al* [3].

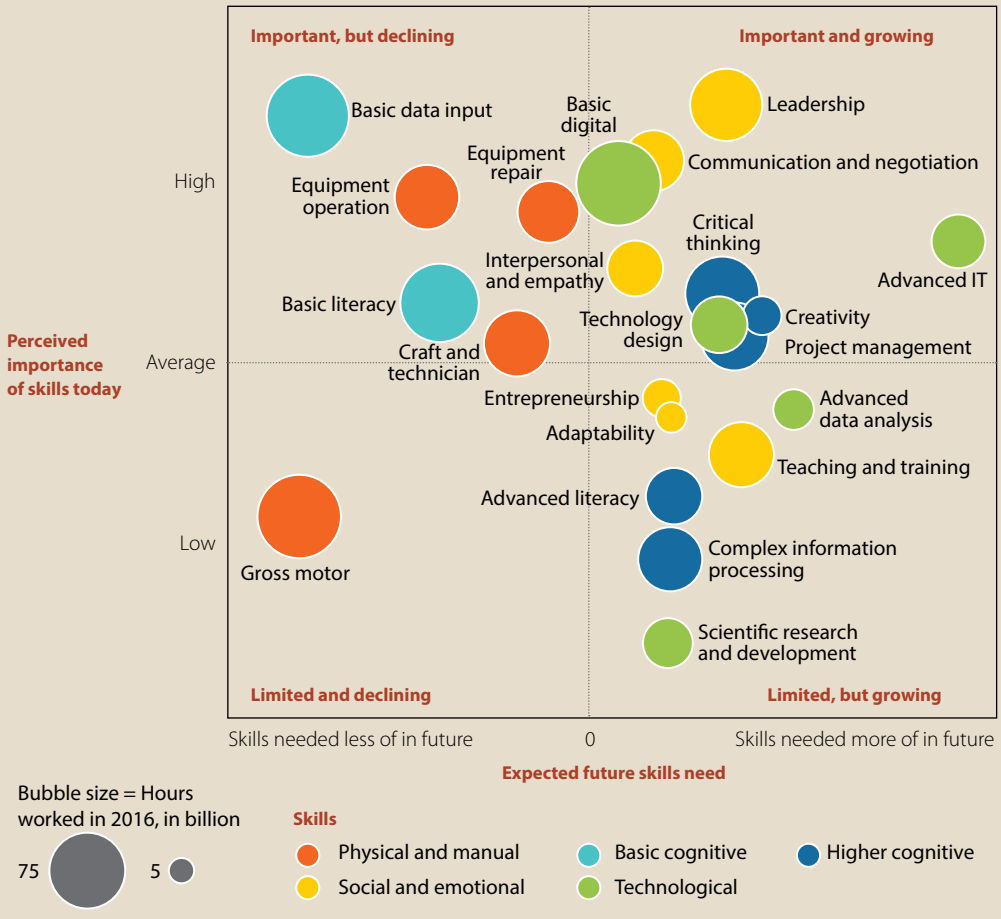
Further, Bughin, *et al* [2, 3] predict the skill shift based on the current (Y-axis) and future (X-axis) skill needs (see Figure 1), to estimate the direction of training and transformation toward future skills. Among them, the first quadrant in the upper right corner pertains to job skills that are of high importance at present and need to grow in future, including leadership skills, high-level communication and negotiation skills, high-level IT technical skills, and critical thinking. The fourth quadrant in the lower right corner is about the job skills that are currently low in importance but need to grow in future, including advanced data analysis capabilities, complex information processing capabilities, teaching and training, and scientific research and development capabilities. Most importantly, the competencies in this quadrant provide the direction of future work training and transformation. In addition, the other two quadrants are the ability to work with declining demand in future. The second quadrant in the upper left corner represents skills that are currently the most important, such as typing, basic reading and writing, and equipment operation and maintenance. The third quadrant on the bottom left comprises work abilities that are no longer important and will not be needed in future, such as gross motor skills and strength.

Others like UNCTAD [14] propose a "digital skills pyramid," which includes the lowest digital user skills, the middle digital specialist skills, and the top electronic skills or e-business skills:

Digital user competencies: These cover basic to advanced competencies, including competencies required to effectively use ICT tools, systems, and equipment to support non-ICT tasks or functions. User capabilities also include the use of the internet, apps, basic and advanced software, and specialized tools that support business-specific functions. Also included are basic digital literacy and digital information literacy.

FIGURE 1

DEMAND TRENDS FOR FUTURE WORK CAPABILITIES.



Source: Bughin, *et al* [3].

Digital expert competencies: These are competencies required to research, develop, design, strategically plan, manage, produce, consult, market, sell, integrate, install, manage, maintain, support, and service ICT software and systems.

E-business competency: This includes business competency and technical savviness or technical competency, business acumen, and communication skills. This competency identifies how technology creates new business opportunities, new business models, and new ways of doing existing things. At the same time, one should be able to communicate business cases with banks and investors to raise funds. With these skills, one could become an e-leader or digital entrepreneur who can transform, embrace, and manage innovation through change.

Conclusion and Proposed Analysis Framework

According to the relevant literature's review, as well as OECD recommendations, conducted in this chapter, some key points can be summarized as an important basis for follow-up research. The first is the definition of digital transformation. This research holds that digital transformation should

include digital technology applications and innovative business models. In terms of digital technology applications, they mainly involve various ICT technologies such as cloud computing, mobile technology, IoT, big data, and AI. These technologies underpin innovative business models that facilitate innovations in organizational process transformation, service development, product design, and customer service through the introduction of digital technology. Therefore, digital transformation not only pays attention to the introduction and application of digital technology but also to the possibility of innovations in internal processes, products, and services. The result of these product or service innovations can increase profits and spur sustainable business growth.

Second, in the development of the digital economy guided by digital transformation, it is necessary to understand the impact of digital transformation on the workforce. This includes analyzing the likelihood of filling vacancies in digitally related jobs, understanding the labor market supply and demand profiles for jobs facing digital transformation, and understanding new skills that may be required for emerging jobs. It can be seen that the emerging issues of occupation and employment arising from digital transformation are worthy of in-depth exploration and investment by governments.

Furthermore, the relevant definition of the digital economy is "the use of information and communication technology to drive changes in production processes, marketing methods or organizational behaviors, thereby bringing opportunities and challenges to economic activities such as life, employment, and productivity." Based on this, digital economy also includes the application of ICT, but the point is that this combination can underpin production, marketing, and business models that are very different from the traditional ones.

Also, such a transition will have an impact on job and skill demands. As Bughin, *et al* [3] and UNCTAD [14] have pointed out, the focus of future job skills training and transformation includes leadership, high-level communication and negotiation skills, high-level IT technical skills, and critical thinking. High-level data analysis capabilities, complex information processing capabilities, teaching and training, and scientific research development capabilities, etc. are also important skills for the future. On the other hand, skills with declining demand include skills such as typing, basic reading and writing, and equipment operation and maintenance. In addition to the effective use of ICT tools, systems and equipment, the digital functions of the future will also include the ability to use the internet, apps, basic and advanced software, and professional tools that support business-specific functions. Even basic digital literacy is required. A more advanced digital function is the ability to develop and design digital applications and services. In addition to digital proficiency, the ability to create innovative business models is also required.

Based on the above, we propose a research framework as given in Figure 2, to better understand skill adjustments, policies, and programs commensurate with the evolving demands of the labor market in member countries. An inventory of the national training and reskilling strategies is the foundation of our work, followed by conduction of research, both quantitative and qualitative, to understand how technology meets shifting industry dynamics and the impacts on tasks, jobs, and workers. Finally, lessons learned and insights are generated through the collection of ideas from national experts, summarized as follow:

Bangladesh

Considering the large number of unemployed youth and other socioeconomic conditions, Bangladesh needs more resilient human-centered future of work. To ensure this, the country should apply the right national policies to deliver real benefits for all. Moreover, it should think for

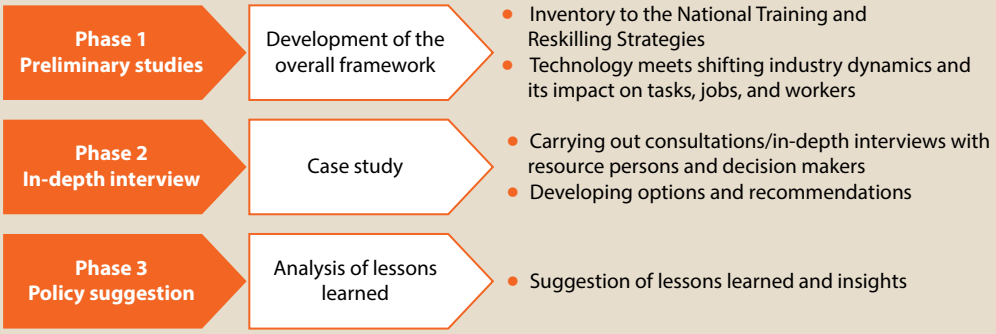
establishing strong linkages between education, trainings, and jobs. The state should put importance on demand-based technical education. The number of quality training institutes should be increased. The government is making efforts to address the issues, which are praiseworthy.

Cambodia

Aiming to improve the quality of labor forces, the government has put more effort, especially in the current mandate, to improve the education and skills of labor forces by setting out several national and sectoral policies. From the demand side, there was also a structural shift in demand from agriculture to manufacturing and service sectors even during the pandemic period in 2020 and 2021. For instance, in the current labor market, employment has shifted from the less productive to more productive sectors and moved toward more skilled and higher-paid occupations. Given that, TVET needs a strong and modern system to supply labor forces as demanded by the market.

FIGURE 2

RESEARCH AND ANALYSIS FRAMEWORK.



Source: Bughin *et al* (2018, p. 19).

Fiji

The challenges of the Fiji labor market of the twenty-first century are rooted in the legacy of the colonial economic structure and human resource development. International economic demands have impacted Fiji's economy to expose skill shortages and mismatches, especially of the youth and an enlarged informal sector. Skill mismatches include soft skills at workplaces. Critical responses in human resource development led by efforts to expand and extend TVET education appear to be the only strategic way forward to ensure economic growth and productivity. While labor migration to Australia and New Zealand contributes to addressing increasing unemployment, this appears insufficient to ensure economic development, the increasing volume of remittances notwithstanding. Investments in technologies for green jobs will impact the labor market with demands for new skills. Recent assessment of 'Green employment in Fiji' (GGGI, 2019) provides indications for employment creation in different sectors of the economy. This is underscored by demonstrable efforts by employers from all sectors to introduce climate friendly and energy-saving technologies. The enduring question will continue to be the availability of requisite skills and skills training from educational institutions to meet new labor market demands.

India

The government has made rapid and substantial responses to this crisis thus far with far-reaching policy changes to cope with the significant challenges to the labor market. As support to jobs via

job retention schemes is gradually wound down and more permanent structural demand shifts become evident, the challenge will be to ensure that the policies that are currently implemented are sufficient. This encompasses both the coverage of the individuals they reach and the extent to which investment in reskilling matches labor market needs. The latter will require good tools to identify the skills in demand and a strong dialog with the social partners and businesses, now and in future. Moreover, the effectiveness of new and adapted measures will also depend on their successful implementation.

IR Iran

Considering the favorable effects of the plans of the active labor market policy program in creating employment and consequently reducing the unemployment rate, to achieve the maximum goal of increasing employability for young people and university graduates requires coordination of higher education policies with economic policies, employment policies, science and technology policies, and industrial and commercial policies. To achieve this, the executive apparatus and relevant organizations must avoid sporadic actions in the field of job creation. At the same time, the basis of active policies is based on the use of unused capacities of existing workshops or the restoration of the capacity of workshops damaged by economic problems and the coronavirus disease. Given the limited capacity of unused economic workshops, this policy can in no way replace the development of employment through the creation or development of economic infrastructure capacity. Therefore, a part of the employment development goals should continue to be pursued through government support for the creation of new capacities, especially for the creation of new businesses and startups and entrepreneurial activities.

Nepal

Nepal aspires to achieve the aim of graduating from the least developed country (LDC) status by 2022 and becoming an upper middle-income-country (MIC) by 2030. In addition to various other strategies, special priority has to be given to improve skills and productivity of laborers to achieve the target faster. It is important to consider the important sectors for development like ICT, tourism, agro, and light manufacturing for increasing growth and productive employment. Employment opportunities should be provided to all for a safe, healthy, and competitive market. Vocational training and education should be top priorities in any sector so that the baseline of any labor is strong. Policy support to offer incentives for skills training programs including work-based learning under partnership with business and industry should be developed. Universities should be encouraged to offer degrees in occupational education or TVET, and organizational capacity should be enhanced to produce quality human resources. The government should also allocate budget for on-the-job training in partnership with the private sector.

Pakistan

The Government of Pakistan is also aiming to address this, and a program was initiated as Pakistan Talent Hunt Program as the Prime Minister had nominated 2022 as the Youth Year. Some of the initiatives taken in this regard included contracts with international athletes to train the youth of Pakistan. However, this should not be limited to just sports and other skilling areas should also be considered. A lot of training programs and training providers are in the market, but training is still fragmented with less provision in remote areas. Additionally, the quality of training is uneven. The government takes initiatives and develops strategies and programs, but several hazards exist for their implementation. One of the biggest problems is political turmoil and inconsistency in the implementation of strategies due to regime changes.

The Philippines

In the Philippines, a few years ago, the most significant catalyst for workplace change advanced in the form of digitalization or digital transformation. Many Filipino workers were alarmed that jobs would be replaced by AI, automation, or robots, and unemployed workers would increase. Those changes caused by digitalization have not gone away. Also, the COVID-19 pandemic has taken the future of work on a new path, a direction that is virtual and remote rather than physical and centralized, where an eight-to-five job and a five-day workweek are suddenly hard to imagine. Even before the pandemic, it would have been innocent to think that technology would continue to motivate changes in our daily lives and our workplaces, with the question always being how we respond to the changes brought about by disruptions. Industry 4.0 and the unexpected global health crisis have brought the pre-crisis vision of equitable, relevant, and quality skills development into more sharp focus, adding unanticipated urgency to the calls for reforms, specifically in labor policies while combining technology and innovation. Developing and enhancing skills (new skills, reskilling, and retooling) can contribute to structural transformation and economic growth by improving employability and labor productivity and becoming more competitive. Investments in learners and workforces can create a virtuous process, wherein relevant and quality skills boost productivity growth and foreign direct investment (FDI). This may result in more and better jobs, job offers for the incoming and current workforce of the country, and more public and private investments in the education and training system.

These challenges require government and business leaders to handle uncertainty, emotions, individuality, and vulnerability; and engage. We are already hearing about those who have risen to the challenge and their decisions concerning their workforce. How businesses and leaders behave during this challenging time will measure their future success. People do not forget how organizations and leaders behave in the most difficult times.

Sri Lanka

Vocational education and training (VET) for the labor market is discussed in depth. The Vocational Training Authority (VTA) is spearheading the delivery of relevant training in the country. Moreover, in Sri Lanka, there are a number of government ministries and agencies involved in VET training. Among them are the Ministry of Skills Development and Vocational Training, the Tertiary and Vocational Education Commission, the National Apprentice and Industrial Training Authority, the Department of Technical Education and Training, the Vocational Training Authority, and the National Youth Services Council. Further, the report conducts an evaluation of Sri Lanka's vocational training development strategy. In doing so, it has discussed the market transition opportunities like school-to-work transitions, labor market transitions, and occupational transition. Further, in this study, the impact of recent COVID-19 pandemic on Sri Lanka's labor market gaps is also assessed.

Thailand

Thailand has been working hard on human resource development. However, some challenges related to workforce preparation remain and even emerge more over time. In terms of skill development and trainings, an emphasis should be placed on both quantity and quality. The government should expand access to training opportunities to reach vulnerable groups including the poor, the elderly, and the women. At the same time, adequate training should be provided to upskill the Thai workforce to work in the 21st century. More advanced technology or STEM courses as well as soft-skill courses must be encouraged more. As the manpower policy involves multiple government organizations, efficient collaboration between relevant organizations will

enable Thailand to get prepared for these rapidly changing demands. There needs to be an effective platform that connects data on population, education, labor market, and training. Currently, the E-Workforce Ecosystem is aiming to address that. Yet the output and outcome of such a system is still invisible. Moreover, partnership with the private sector is crucial to ensure that trainings are provided with high quality and can serve the market demand. Finally, since Thailand's strategies are moving to lifelong learning, active policies should be initiated to encourage learning through measures such as learning subsidies or more incentives for learners and training providers.

Vietnam

Understanding the important role of human resources in socioeconomic development, the Vietnamese Communist Party has advocated a strategic breakthrough in human resource development (HRD). In order to concretize the Party's viewpoint, the National Assembly promulgated the Law on Higher Education in 2012 (amended in 2018); the Law on Vocational Education in 2014; the Labor Code in 2019; the Education Law on Education in 2019; the Law on Public Officials; and the Law on Public Officials. Lots of legal documents guiding the implementation of the laws as well as mechanisms and policies on HRD have been issued by the government. In addition, the Prime Minister approved the Vietnam Human Resource Development Strategy for the 2011–20 period and the Vietnam Human Resource Development Master Plan for the 2011–20 period, as well as the Vocational Training Development Strategy for 2011–20 period. These documents have created the legal framework and the driving force for HRD in terms of both quantity and quality. Vietnam continues to properly implement mechanisms and policies for development of vocational education and a skilled workforce and for further carrying out digital transformation and online training. There is a focus on training and retraining the workforce to bring about great changes in terms of size, quality, and efficiency of vocational education; ensure that learners acquire professional skills, digital skills, soft skills, entrepreneurship skills, languages, etc. required by the labor market; and strive to reach the vocational education level of ASEAN-4 countries by 2030 and of G20 countries by 2045. Also, there is a focus to increase communications activities and change the social consensus and mindset about development of vocational education and the position and role of the skilled workforce to mobilize participation and resources from the whole society. Particularly, enterprises' cooperation in developing a skilled workforce for Vietnam's development is sought.

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BANGLADESH

Introduction

Historically, the invention of steam engine transformed the agrarian economy into an industrial economy. The first industrial revolution started in the 1760s when water was identified as the main source of power. Subsequently, the second industrial revolution started 1870 onward with electrification, innovations in chemistry, and use of telegraphs and railroads, among other things. The third industrial revolution was triggered in the 1950s with the advent and use of computers and information and communication technologies (ICTs). Now, the whole world is talking about global convergence of internet of things (IoT) and advanced automation where machines will replace humans. In this situation, the existing labor market needs newly skilled and reskilled people for the future of work. That is why, minimizing skill gaps in the context of forth industrial revolution (4IR) is now a globally important issue.

All national governments formulate suitable policies to achieve economic progress and boost productivity. Labor market policies are formulated to facilitate inputs for raising productivity. These policies keep in view the size of a country's population and technology preparation; and are aligned with other policies such as education policy, women-and-children policy, and other macro and microeconomic policies.

Bangladesh is a developing country housing a huge population in a comparatively small area of land. The government has laid special emphasis on digitization and automation. Long-term policies like the Perspective Plans and Five Year Plans have been addressing the issue for the last one decade. As advanced automation is changing the nature of work worldwide, the government has to formulate proper labor policies to meet the market demands. It has already started to analyze the situation and is getting ready to face the challenges. Already, the Prime Minister's Office and the Cabinet Division of the country have started appropriate policymaking activities and are coordinating with the ministries so that they can be on board to address the 4IR challenges.

Country Profile, Demographic Trends, and Labor Force Characteristics

Bangladesh is a middle-income south Asian country that has recently been having high economic growth. It has a small area of around 247,677 sq km with a population of 169.31 million. The per capita GDP of the country was USD2097 in FY2020–21. The GDP growth rate was 6.2% in 2020–21, in spite of the COVID-19 pandemic. Its per capita GNI was USD2227 in 2020–21. Bangladesh has a very strong readymade garments (RMG) sector and is the largest exporter to the USA as well as some EU countries. Although there are some automated factories, manufacturing organizations are mostly labor-intensive. The country has been showing stable macroeconomic features for the last decades.

Bangladesh celebrated its 50th birthday in 2021. It also celebrated the birth centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman in the same year. Therefore, holistic efforts are on to achieve the 'Golden Bangladesh' dream of the Father of the Nation. The country has successfully achieved the UN Millennium Development Goals (MDGs) and executed its 1st Perspective Plan 2010–21. It has prepared the Delta Plan to address climate change issues and the 2nd Perspective Plan to graduate as a developed country within 2041. It has already started to implement these plans.

Bangladesh has to transform its huge population into human resources to achieve growth and development. The country should prepare its future employees according to market demand. Moreover, advanced automation and global convergence of internet of things (IoT)-driven technologies are rapidly changing the world of work, with the COVID-19 pandemic having expedited the pace. If we analyze Table 1, we will find that around 2.6 million unemployed youth are joining the total population of the country each year.

TABLE 1

LABOR FORCE CHARACTERISTICS OF BANGLADESH.

Labor force characteristics	2010	2013	2015	2016–17
Economically active population (aged 15+)	56.7	60.7	62.1	63.5
Employed population (aged 15+)	54.1	58.1	59.5	60.8
Unemployed population	2.6	2.6	2.6	2.7

Source: Labour Force Survey 2016–17 [1].
Note: Population is in millions.

Table 2 shows that the total labor force of Bangladesh is 63,504,000 whereas the total youth labor force aged 15–19 is 20,100,000, i.e., around one-third of the total labor force. This large population of youth is a demographic dividend that may offer a great opportunity for Bangladesh if the country can really transform it into skilled human resources. The state should pay attention toward this end.

TABLE 2

YOUTH LABOR FORCE IN BANGLADESH.

Category	Male, in '000	Female, in '000	Total, in '000
Working age population	54,080	54,974	109,054
Total labor force	43,528	19,976	63,504
Total youth labor force (aged 15–19)	13,100	7,000	20,100
Employed	42,182	18,646	60,828
Unemployed	1,347	1,330	2,677
Not in labor force	10,551	34,998	45,549

Source: Labour Force Survey 2016–17 [1].

Table 3 displays employment of youths aged 15 or more by major occupations.

TABLE 3

EMPLOYED YOUTHS AGED 15 OR OLDER, BY MAJOR OCCUPATIONS.

Major occupation	Male, in '000	Female, in '000	Total, in '000
Managers	889	107	996
Professionals	1,898	1,035	2,933
Technicians and associates	961	170	1,131
Clerical support work	756	140	896

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Major occupation	Male, in '000	Female, in '000	Total, in '000
Service and sales workers	9,101	922	10,023
Skilled agricultural, forestry, and fisheries	10,039	9,644	19,683
Craft and related traders	7,114	3,254	10,368
Plant and machine operators	3,750	411	4,161
Elementary occupation	7,531	2,954	10,485
Others	143	8	152
Total	**42,182**	**18,646**	**60,828**

Source: Labour Force Survey 2016–17 [1].

Foreign remittance is one of the main earning sources of Bangladesh. Table 4 outlines the overseas employment of Bangladesh for the period 2014 to 2018. Due to COVID-19 pandemic, data for the period 2019 to 2021 was not available.

TABLE 4

OVERSEAS EMPLOYMENT.

Year	Employment	Remittance in million USD	Remittance in crore BDT
2014	425,684	14,942.57	115,969.62
2015	555,881	15,270.99	119,363.62
2016	757,731	13,609.77	107,294.60
2017	1,008,525	13,526.84	110,246.67
2018	734,181	15,544.68	129,897.66

Source: Labour Force Survey 2016–17 [1].

Development Plans of Bangladesh

The government of Bangladesh has articulated two perspective plans (PPs) to implement its development visions and to be a developed country. The first PP (2010–21) made Bangladesh a middle-income country having tremendous advancement/progress in digitization and in the IT sector. Bangladesh successfully implemented the MDGs and has had success in interim implementation of Sustainable Development Goals (SDGs). The country is now set to graduate from a least developed country (LDC) status to a developing country status as it has fulfilled all criteria for the graduation. The first PP (2010–21) also aimed to have a nation of creative skilled human resources and to be a globally integrated regional commercial hub. This type of digital and industrial development has an influence on the world of work.

The second PP (2021–41) has been adopted in line with the first PP (2010–21) to ensure uninterrupted developmental progress and to build a 'Sonar Bangla' as dreamt by the Father of the Nation Bangabandhu Sheikh Mujibur Rahman.

This 20-year plan aims Bangladesh to be an upper-middle-income country by 2031 and to eradicate poverty on way to becoming a developed country by 2041. This vision document has also put emphasis on human resource development, innovations in economy through ICT and

scientific research, industrialization, export diversification, and employment generation. These courses of action are necessary for Bangladesh to have high growth, high per-capita income, modern agriculture for more production, and latest technologies in factories for reducing time and cost and increasing quality production.

Emerging Technologies That Will Lead the Future Labor Market

The term I4.0 was first publicly introduced in 2011 by a group of representatives from different fields (business, politics, and academia) as part of the initiatives to enhance German competitiveness in manufacturing industries. Next, 4IR as a term was coined in 2016 by Klaus Schwab, Founder and Executive Chairman of the World Economic Forum (WEF). After that, the ILO adopted the Centenary Declaration for the 'Future of Work' in June 2019. Nowadays, this term has become popular in the wake of the global technological convergence.

It has been assumed that some future technologies that will lead the future world are: (1) advanced/nano materials; (2) cloud technology; (3) autonomous vehicles including drones; (4) synthetic biology; (5) virtual and augmented reality; (6) artificial intelligence (AI); (7) robotics (8) blockchain (9) 3D printing; (10) big data; (12) autonomous vehicles; and (11) internet of things (IoT). These technologies will hugely influence the future job market. Machines will replace many workers, and many manual types of work will change to digital works. These technologies are listed and briefly described in Table 5.

TABLE 5

TECHNOLOGY PRIMER FOR THE SECOND MACHINE AGE.

Technology	Details
Mobile technology	It entails use of mobile data to access internet and related services.
Cloud computing	The cloud technology allows for storage capacity, enabling the creation and delivery of apps and tools with limited local computing power and software.
Digital platforms	Platforms allow for smaller firms and individuals to access shared services that were previously available only to large organizations.
Artificial intelligence (AI) and machine learning (ML)	AI and ML use advanced computing power, big data, and algorithms to provide analysis that previously required a human mind. These include but are not limited to speech recognition and computer vision.
Big data	It involves huge quantities of data that are too big for conventional computer programs to process. So, computers with significantly higher computing power are required.
Internet of things (IoT)	It is about the ability to use computers to manage everyday objects and industrial equipment while collecting a large quantity of data that further refines systems based on patterns of use.
Robotics	It corresponds with automated assembly lines and smart factories.
Advanced manufacturing and 3D printing	Technologically advanced manufacturing technologies use computer power and build objects drawing from a digital master design file.

Source: Brynjolfsson and McAfee [2].

Why I4.0 ?

The main objectives of the fourth industrial revolution are to increase quality, efficiency, and flexibility (see Figure 1). The interconnectivity of raw materials and machines decides the production processes that are highly flexible, individualized, and resource friendly. The automated machine-dependent processes rapidly adopt the market changes to adjust with the shorter product cycle.

FIGURE 1

THE MAIN OBJECTIVES OF I4.0.

Some other reasons for embracing the fourth industrial revolution, globally, are:

- global flow;
- higher productivity;
- increased efficiency;
- enhanced performance; and
- alternatives to human resources to address the scarcity of manpower.

Problem Statement

Being a middle-income developing country, Bangladesh has targeted to be a developed nation by 2041. The country has clear vision, mission, and perspective plans to achieve the goal. Every year, around 2 million unemployed youth are being added to its population. Therefore, Bangladesh must address the unemployment issue to sustain and increase growth. The country should critically analyze its employment performance and develop specific plans and strategies to explore areas for accommodating the unemployed youth.

No Specific Organization Working for Generating Employment

According to the Allocation of Business 1996, the Ministry of Labour and Employment (MoLE) is responsible for creating jobs and ensuring decent works in the job market of the country. However, even though the name of the ministry includes the word 'employment,' employment generating activities are missing from its activities. Recently the ministry has decided to establish an 'employment directorate' to address the issue.

Skill Gaps in Workplaces

It is assumed that there are already skill gaps in the job market, and majority of the people engaged in domestic and overseas employment are semi-skilled. Through observation, we can see that many foreigners are working at top-level managerial positions of several Bangladeshi companies because of nonavailability of qualified resources locally. As Bangladesh has already envisioned to be a higher-middle-income country by 2030 and a developed country by 2041, and has committed to build a 'Sonar Bangla' dreamt by the Father of the Nation, the country must increase its productivity at all levels for ensuring maximum outputs with minimum inputs. It should focus on the capacity, skills, and attitudes of its human resources. The country should be carefully aware regarding the current changes happening in the labor market and should be ready to embrace those changes, including I4.0.

Low Linkages between Education and Job Skills

There is a low linkage between education and job skills. Earning gaps between education and wages are also high due to a high unemployment rate and skill gaps. Opportunities for technical education and vocational training are limited. The societal perception about technical education is negative because people think that achieving higher educational degrees is more prestigious than receiving technical education and the former are more likely to widen the chances to get jobs. The society and parents believe that the less meritorious students, when the path of general education has been closed, should go for technical and vocational education. Overall, people put less importance on training. The perception about training is also not very good.

Compliance and Decent Work for All

Labor market policies in the country always emphasize labor rights and safety, according to the Bangladesh Labor Law, 2006 and the Bangladesh Labor Rules, 2015. Bangladesh formulated the National Tripartite Plan of Action (NTPA) in 2013 and the National Action Plan on Labor Sector of Bangladesh (NAP) 2021–26 to improve working conditions and ensure decent work in the country. MoLE is working hard to ensure compliance and provide decent work for all. According to the ILO, decent work involves opportunities for work, workplace security, social protection, personal development and social integration, collective bargaining, freedom for people to express their concerns, organize and participate in the decisions that affect their lives, and equal opportunities for all women and men [3]. The factory owners have to be more aware regarding workplace safety and labor rights, and should work along with the government to ensure world-standard compliance in their industries. A teamwork of the government, owners' associations, and labor organizations can build decent workplaces for all workers and also formulate the right labor market policies for employees. Decent work is the right of workers, and its components can play a vital role in the labor market.

Worldwide Convergence with I4.0

The whole world is now welcoming I4.0 for achieving better results and higher productivity with minimum inputs. Therefore, the job nature is changing day by day, and there will be a dramatic change in future works. A minimum number of highly skilled people will be required for the fully automated

future factories where decisions will be taken through augmented reality. Bangladesh has to be prepared for facing the consequences, and the country has already started its journey to address the issue.

In the Science and Technology Fellowship Award Programme on 5 March 2022, the Prime Minister of Bangladesh, Sheikh Hasina said, "Technologies of fourth-generation industries are knocking at the door. We have to build skilled manpower to face the challenges of fourth-generation industries." She also said that we have to modernize our agriculture by using technologies, and side by side we have to flourish our industries as well. This statement articulates the commitments of the Bangladesh government to build skilled workforces for the services, manufacturing, and agriculture sectors according to the demand of the time.

Another important dimension is that Bangladesh has a large young population. Every year, 2 million or more unemployed youths are joining the population. Therefore, employment generation for youths is another great challenge for the government. On one hand, the government has to balance between generating employment for a huge number of unemployed youths on one side, which requires labor-intensive factories and establishments. On the other hand, it has to cope with global convergence toward automated and IoT-driven factories and service provider organizations that need very minimum number of human resources.

Huge Population and Unemployed Youth

The population of Bangladesh was 166.0 million in 2020, according to the BBS survey. There were 62.1 million people who were economically active (aged 15 years or more) whereas the number of employed people (aged 15 years or more) was 60.8 million and the number of unemployed people was 2.6 million. The unemployment rate in Bangladesh stood at 4.2%.

The Most Vulnerable Sections of Society

Humans will be replaced by machines due to the fourth-generation technologies. Products will find their production processes independently. Raw materials and machines will be interconnected with each other through IoT. They will communicate with each other and cooperate for production. Everything in fourth-generation technologies will be connected wirelessly, and therefore there will be little need for human assistance. We will see human-free factory spaces that will certainly cut down the jobs of humans. However, the majority of people across various segments do not have access to digital devices or training in digital skills. This will make digital divide among people very wide. One should take these things into consideration when thinking of inclusive development, especially at the time of policy implementation and execution. In this context, the following sections of the society will be more vulnerable in the age of I4.0:

- poor people;
- street children;
- the proletariat;
- the illiterate and unaware unemployed youth;
- laborers who have skill-and-knowledge gaps; and
- laborers who are unable to acquire soft skills.

Research Questions

This study attempts to find answers to the following questions:

1. What are the existing labor market policies that Bangladesh has?
2. What are the preparations that Bangladesh is doing to face the challenges of I4.0?
3. What are the recommendations from the lessons learned from the study?

Research Methodology and Design

In this study, the research design consists of the following four sources of data collection:

1. review of published material;
2. getting pre-tested questionnaire filled up by key personnel, along with interviews of relevant government ministries and organizations that are involved in policy formulation and execution; and
3. interviews of relevant domestic and international organizations such as the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) and the ILO.

Sample Size

As the study attempts to know Bangladesh's preparedness for I4.0 challenges and the labor market policies of the country to address the changing job market, we have tried to focus on both the supply and demand sides. Since the government formulates all the public policies and works as the main supplier of the workforce by providing education and training, it is essential to know their views and current activities. The list of these organizations is given in Table 6.

The study has searched information from the demand side as well. It has included factories that have already started implementation of I4.0 as well as factories that are still labor-intensive and are waiting to adopt new advanced technologies. Being on the demand side, the owners' association such as BGMEA, Bangladesh Knitwear Manufacturing and Exporters' Association (BKMEA), and some NGOs who are providing skill development trainings have also been interviewed.

TABLE 6

GOVERNMENT ORGANIZATIONS ENGAGED IN LABOR MARKET POLICYMAKING.

S. No.	Organization's name
1	Cabinet Division
2	Ministry of Labor and Employment
3	Ministry of Commerce
4	Ministry of Industries
5	Technical and Vocational Education Division of the Ministry of Education
6	Ministry of Women and Children Affairs

(Continued on next page)

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S. No.	Organization's name
7	Ministry of Social Welfare
8	Social Welfare Division
9	Ministry of Science and Technology
10	Ministry of Information and Communication Technology
11	Ministry of Expatriates Welfare and Overseas Employment
12	Ministry of Youth and Sports
13	Youth Development Board
14	NSDA
15	BFMEA
16	ILO

Including all, the total sample size was 200. The number of offline respondents was 40, while online (e-mail, Zoom, WhatsApp, and mobile phone) respondents were 166.

The following government policy making organizations were interrogated for this research:

From the demand side, 11 factories that are already operating through fourth-generation technologies were interviewed. These were selected on a random basis. Their list is given in Table 7.

TABLE 7

LIST OF DEMAND-SIDE SAMPLE ORGANIZATIONS.

S. No.	Organization's name
1	Team Group
2	Urmi Group
3	Snowtex Group
4	Beximco Group
5	DBL Group
6	SQ Group
7	Cute Dresses Ltd.
8	Mohammadi Group
9	Tusuka Group
10	Pacific Jeans Ltd.
11	Fakir Fashions

Questionnaires

Two types of questionnaires were developed for the study. One was for the government group to learn about the existing policies and plans, while the other was for the private sector, i.e., basically the demand-side group for identifying suitable skills to address the changes with time.

SAMPLE OF QUESTIONNAIRE FOR THE GOVERNMENT GROUP:

Questionnaire for research on **'Labor Market Policies for Changing Market Demand'**

Dear Respondent,

Asian Productivity Organization (APO), Japan has entrusted us to carry out a Nationwide Survey of Industries, on the theme **"Research on Labor Market Policies for Changing Market Demands"** with the purpose to identify gaps in policies, demand, and practices in Asian countries including Bangladesh.

There are a few questions that need to be answered for this research. It will take a few of your minutes and oblige us. This information will be used only research purpose.

1. Name (optional):
2. Designation:
3. Organization/office:
4. Have you heard about Forth Industrial Revolution (I4.0)?
5. Does your organization have any activities to address this issue (I4.0)?
6. Does your organization organize any training to address the demand of the labor market?
7. If the answer to question 6 is yes, please mention (the details) below:
8. How many youths are covered in the training in your organization?
9. Do you have any ongoing activities to address the issue?
10. Does your organization have any future plan or policies to address the changing market demand?

SAMPLE OF QUESTIONNAIRE FILLED BY RESOURCE COMPANIES

Questionnaire for the research on **'Labor Market Policies for Changing Market Demand'**

Dear Respondent,

Asian Productivity Organization (APO), Japan has entrusted us to carry out a Nationwide Survey of Industries, on the theme **"Research on Labor Market Policies for Changing Market Demands"** with the purpose to identify Gaps in Policies, demand and practices in Asian countries including Bangladesh.

There are few questions needs to be answered for this research. It will take few of your minutes and oblige us. This information will be used only research purpose.

1. Your name and designation

2. What is the nature of the operation/product?

3. Are you in favor of introducing new technology in your sector?

4. Kindly identify the technical gap in your organization considering the world standard.

5. In which area your employees need training and new technical skills for that? How will you manage that?

6. Technology can improve your output and your business profit as well. Don't you think it will be beneficial for everyone?

7. What are your ideas about introducing new technologies in your business sector?

8. What technological changes you have introduced in the last 10 years or before to improve your business operation for productivity improvement?

9. What challenges have you faced when you have introduced new technology in your business in the past?

10. How has your team responded to the technological changes? Are they comfortable or not?

11. Outline the three best things that you like about your business to introduce.

12. What is the impact of COVID-19 on your business?

13. How does technology help you to overcome the challenges of this pandemic situation?

14. What are your future plans for introducing new technology in your sector?

15. Are you satisfied with your current employees and their expertise? What are your expectations?

16. Did you organize any training program for your employees to gain knowledge and expertise? How did they respond?

17. After the training, did the program result in their productivity improvement?

18. What are your suggestions for the government to improve the productivity of your employee?

19. On a scale of 1–10, how do you rate the current labor policies and implementations in improving productivity?

20. What training structure should be implemented to improve the knowledge and technical work experience of the employee?

21. Ideally, what is the first and foremost quality that you will look for in your employees?

Findings of the Research

Preparedness of the Government to Face the Future of Jobs

Cabinet Division: The Cabinet Division of Bangladesh is conducting a series of meetings with relevant ministries and private sector's stakeholders to face the challenges of the fourth industrial revolution. Already, the Cabinet Division has instructed all the relevant ministries to take necessary measures to prepare for the coming changes in the labor market. It has also instructed the Federation of Bangladesh Chamber of Commerce and Industry (FBCCI) and BGMEA to build a separate cell or standing committee so that it can make sector-wise plans and help and monitor member organizations.

Ministry of Labour and Employment (MoLE): MoLE is responsible for ensuring decent work and occupational and workplace safety for workers. It upholds labor rights across the country. It executes the Bangladesh Labour Act 2006, the Bangladesh Labour Rules 2015, the National Child Labour Elimination Policy 2010, the Domestic Workers' Protection and Welfare Policy 2015, the National Plan of Action for Eliminating Child Labour 2021–25, and the National Action Plan on Labour Sector of Bangladesh 2021–26. It is conducting regular meetings to address the future of work with the stakeholders. The ministry is working to establish an 'employment directorate' to supply demand-based workforces to the job market. The directorate will provide skills training to potential youths of the country to meet the domestic demand. The ministry is now planning to implement blended education and skills training programs.

The Ministry of Commerce: As the Ministry of Commerce (MoC) works to increase exports and minimize the trade gaps, it has already started to provide skill training to face the challenges of I4.0.

The Ministry of Youth and Sports: The Ministry of Youth and Sports (MoYS) has skills development training centers in all districts of Bangladesh. After completing skill trainings, the youths can take loans to start entrepreneurships.

The Ministry of Social Welfare: Like the MoYS, the Ministry of Social Welfare (MoSW) is also having different types of training programs, especially for disadvantageous people and backward and vulnerable sections of the society such as women or disabled persons. Its offices also provide small soft loans after completion of the training, if anybody wants to avail such loans.

The Ministry of Expatriates' Welfare and Overseas Employment Ministry (MoEWOE): A large number of Bangladeshi people work around the world. This ministry looks after the welfare of the expatriate Bangladeshis. However, as the world of works is changing rapidly due to technological advancement and automation, new or updated skills are needed for future works. To address this, MoEWOE is conducting training programs in its 77 technical training centers (TTCs) all over the country.

Ministry of Education: The Technical and Madrasa Education division of the Ministry of Education (MoE), through its Technical Education Board, Technical Education Directorate, and Vocational Training Institutes, is providing technical and vocational education to the potential unemployed youths. The Technical Education Directorate develops common standards for specific trade according to the demands of the private sector. It also provides registration of the nongovernment training institutions, gives them certificates, and monitors their activities.

The National Skill Development Authority (NSDA): The National Skill Development Authority (NSDA) of the Prime Minister's Office is now responsible for bringing all the skill development

initiatives under one umbrella. It has been established through the National Skill Development Act, 2018. It is working in coordination with all government and non-government stakeholders, including the Technical Education Directorate. It aims to develop an improved version of the curriculum and better-quality training methods for creating skilled manpower to address the demands of globalization.

The Ministry of Women and Children Affairs: The Ministry of Women and Children Affairs is also providing different types of training to women, including computer education and skills for different types of cottage industries. It also provides small soft loans to encourage self-employment of women. This ministry has different types of projects to deliver skill training to women through its 'Women Affairs Directorate' and *'Jatio Mohila Sangstha.'*

Ministry of Jute and Textile: The Ministry of Jute and Textile (MoTJ) conducts awareness building meetings, workshops, and seminars to dissimilate information and to embrace the new changes coming to job world.

a2i: a2i, a multinational digital transformation organization founded in Bangladesh, accelerates the inclusive digitization of public services, thereby widening access and decentralizes delivery. It evolved from the flagship 'Aspire to Innovate' program of the government's Digital Bangladesh Vision 2021 initiative. Supported by the UNDP, a2i has organized several seminars to assess the preparedness of the RMG sector and done a study on "Tomorrow's Skills to get Ready for Fourth Industrial Revolution."

Preparedness of the Private Sector

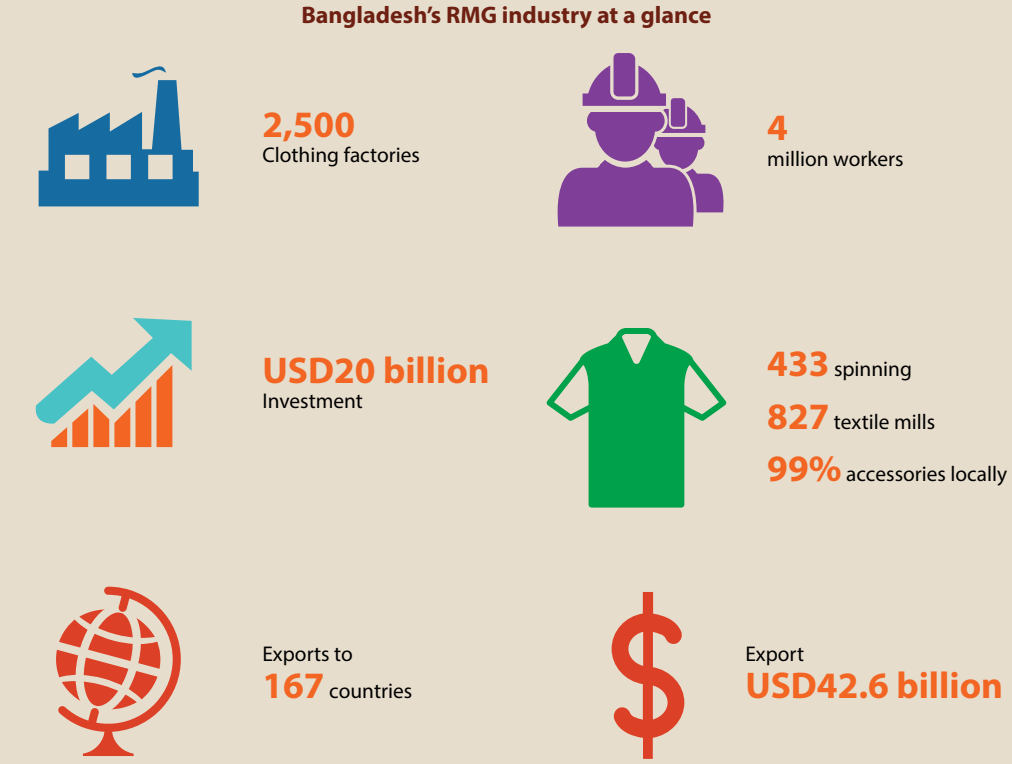
As cheap labor is available in Bangladesh, the private sector generally makes a comparative analysis between the labor-intensive productions and new technology installations. Besides, everyone does not embrace the new change. Nevertheless, some factory owners have identified that installing automation and robotic technology has dramatically increased their production and it is easier than human resource management. Therefore, advanced automation is rising day by day. However, some enterprises are still experimenting with the changes. Around 100 RMG factories have already adopted fourth-generation technologies and they are successfully operating and getting better production results.

The Bangladesh Garments Manufacturers and Exporters' Association (BGMEA) and Bangladesh Knitwear Manufacturers and Exporters' Association (BKMEA) are the two major factory owners' associations in Bangladesh. Among around 5,000 export-oriented factories, around 2,000 RMG factories are associated with the BGMEA. Besides, some textile and composite factories are also attached with the BGMEA. Bangladesh exports readymade garments, pharmaceuticals, leather goods, shrimp, footwear, ceramic, glass, etc. to the global market. Figure 2 depicts the information about the export-oriented industries of Bangladesh:

As BGMEA is the largest owners' association, it has significant responsibility to plan and take steps to face the new technological revolution. BGMEA and BKMEA have their own skill development training programs to upskill and reskill the existing labor forces. However, these training programs are insignificant compared with the need. So far, BGMEA, BKMEA, FBCCI or any other business owners' association do not have any specific research or study to address the issue. However, as these business organizations have realized that the I4.0 is a global flow and it is not possible to stand alone and hinder the flow, and as there is a comparative advantage of I4.0 over

FIGURE 2

EXPORT-ORIENTED INDUSTRIES OF BANGLADESH.



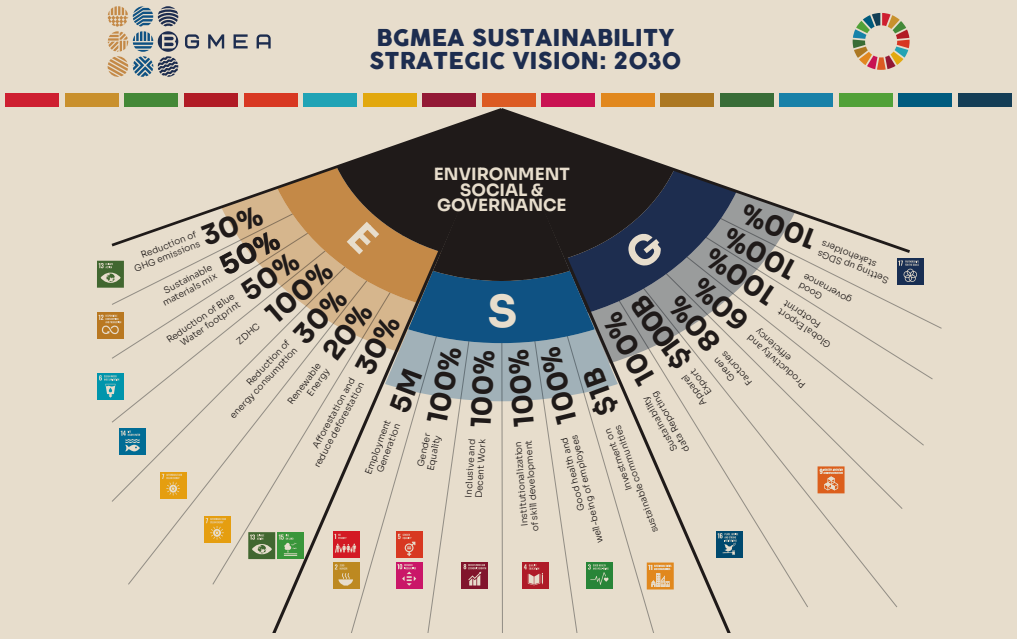
Source: BGMEA.

the manual works, they have to accept it today or tomorrow. Moreover, as Bangladesh is aiming to graduate from the LDC status in 2026, the country will lose the LDC quota in the global market including the EU and the USA, and it has to face open competition. Therefore, the government and the private sector of Bangladesh have to prepare themselves to face the challenges and plan for sustainable business activities to secure the exports. The BGMEA has formulated a strategic roadmap named "BGMEA Sustainability Strategic Vision 2030" for the sustainability of the business. The roadmap has three basic components: environment, social, and governance. The roadmap at a glance is showed in Figure 3.

The BGMEA has already recognized the skill gaps within existing personnel for transforming to IoT-driven advanced automated technologies. Therefore, it has established an 'innovation center' to allow and facilitate all kinds of innovative ideas across the industries. The organization has also established a need-based modern 'training center.' Already, the physical establishment of the training center, including the installation of modern machineries, has been completed. It was scheduled to be opened in November 2022 and be fully operational by January 2023. To conduct this need-based training program, the BGMEA will conduct a need-analysis study every year. This training program will basically accommodate the employed human resources and focus on upskilling and reskilling activities. Besides, the BGMEA has started cloud-based digital data management for the export-oriented RMG factories.

FIGURE 3

BGMEA SUSTAINABILITY STRATEGIC VISION 2030.



Source: BGMEA.

Challenges in Providing Skill Training in Bangladesh

There are some challenges for providing skill training and implementing the fourth-generation technologies in Bangladesh. These are:

- weak linkage between education and job skills;
- weak linkages between the academic study and jobs;
- unavailability of skills training opportunities before joining the job for potential youth workforce to minimize the skill gap after joining the job;
- inadequate actions to address the existing skills gaps in the jobs;
- high level of informality in work;
- limited social protection for the vulnerable or jobless people;
- inadequate bandwidths and scarcity of power for uninterrupted IoT;
- insufficiency of capable institutions to carry out quality training programs and implement I4.0;
- workers' unawareness regarding changes in the job market's demand;
- employees having low motivation to participate and low trust in skill development and trainings;
- employers having low motivation to organize and low trust in skill development activities;

- weak linkages between supply and demand of skills; and
- Bangladesh adding 2 million unemployed young people to its population every year.

Has COVID-19 Accelerated I4.0?

During the COVID-19 period, everybody emphasized working from home by using digital devices. Throughout the world, people used e-mail, e-file, WhatsApp, Zoom, Google Meet, Google apps, and other online apps to work. As a consequence, many people who worked physically or manually, unfortunately lost their jobs. On one hand, COVID-19 accelerated the technological revolution, but on the other hand, it made the poor workers more vulnerable.

Saadia Zahidi, Managing Director, World Economic Forum, said:

"Millions of jobs have been lost through the pandemic, while accelerating automation and digitization mean that many are unlikely to return. We need new investments in the jobs of tomorrow, the skills people need for moving into these new roles and education systems that prepare young people for the new economy and society. Initiatives like the Reskilling Revolution hold the key to converting ideas into action and creating the necessary coordination between the public and the private sectors. There is no time to waste."

Source: WEF [4].

Therefore, the state has to consider the poor, semi-skilled, half-literate jobless people and take actions to accommodate them. The government has taken many steps to address the issue. It has provided soft loans to vulnerable factory owners for the sake of paying the monthly salaries of laborers, so that they are not removed from jobs. Besides, different types of social safety net allowances are distributed among the needy workers.

Analysis of the Findings

If we analyze the findings, we will see that the preparation of Bangladesh to embrace fourth-generation technologies is still at an initial stage. Although there are hundreds of RMG factories and some ceramic and glass factories that have already been operating through fourth-generation technologies, I4.0 is still a vision for Bangladesh like many other countries.

The government has already grasped the idea and is taking many steps to identify the proper courses of actions to address the issues. However, the country needs more private-sector involvement and civil-society participation to produce the skilled manpower as per the need.

In short, the existing major labor market policies to address changing market demands in Bangladesh are:

- NSDA established in 2018 under the PMO;
- BTEB under the Ministry of Education;
- skill development training (for 74 trades); micro-credit (for individuals and groups); self-employment and entrepreneurship development; and public-private partnership programs by Department of Youth Development (DYD) under the Ministry of Youth and Sports;

- 70 TTCs under the MoEWOE;
- skill development training centers under 'city social service activities' of the Ministry of Social Welfare;
- private organizations and NGOs providing training;
- factory owners' associations such as BGMEA, BKMEA providing training as well;
- National Employment Strategy and Proposed Employment Directorate, decent work ensuring activities, implementing labor laws by the MoLE;
- training programs and meetings, and seminars by other ministries;
- the a2i catalyst program for I4.0; and
- Cabinet Division coordinating, motivating, and monitoring across various ministries.

However, there are some challenges in providing skill training and fully implementing I4.0, as already mentioned earlier. Besides, the country has to address the COVID-19-related issues that accelerated I4.0 and led to a rise in the number of jobless people.

Suggestions

It is not possible to stay isolated from the global flow. Therefore, we have to embrace the new flow of automation and technological advancement. However, as Bangladesh has huge number of unemployed people, the government has to formulate the right policies to balance between technological advancement and unemployment. The adoption of advanced automation will take away jobs of several people. Therefore, new policies are needed to accommodate these jobless people. In some cases, social security should also be increased. On one hand, new youths should be prepared with technical skills that future job market would need. On the other hand, existing job holders should be upskilled and reskilled.

The country should establish linkages between academic studies and jobs. More emphasis should be put on technical and vocational education. Need-based training should be provided to fresh graduates as well as to existing employees.

Both public and private sectors should work together to provide demand-based skills training in order to build skilled workforces in the country on the lines of polytechnic institutes in Singapore and other countries.

All trainings must focus on the job-market demand. Training should be practical and fruitful. The country should establish demand-based training curricula, and create more modern, capable, and demand-based training institutions. Demand-side players should be involved in preparing training curricula and supplying machineries for practical learning in the training centers.

The World Bank [4] has suggested the following three pillars for preparing Bangladesh for tomorrow's jobs market:

Pillar 1: Improving institutional capacity for better linkages between supply and demand sides of skills toward a more adaptive skills development system.

Pillar 2: Reorienting skills supply to prepare youths for unpredictable skill demands and uncertain economic environments.

Pillar 3: Greater involvement of the demand side players, e.g., private sector's participation, in skills development.

Limitations of the Study

As very little time was allocated for the study and the researcher has conducted it along with a full-time job, time constraint was the first limitation of the study. Moreover, as the study was conducted during COVID-19, free movement was restricted, and in some cases online interviews and data collection processes have been used for the research.

Conclusion

Like many other countries, fourth industrial revolution is still a vision for Bangladesh. However, the country has started its journey. Considering the large number of unemployed youths and other socioeconomic conditions, Bangladesh needs more resilient human-centered future of work. To ensure this, the country should apply the right national policies to deliver real benefits for all. Moreover, it should consider establishing strong linkages between education, trainings, and jobs. The state should put importance on demand-based technical education. The number of quality training institutes should be increased. The government is making efforts to address the issues, which are praiseworthy.

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CAMBODIA

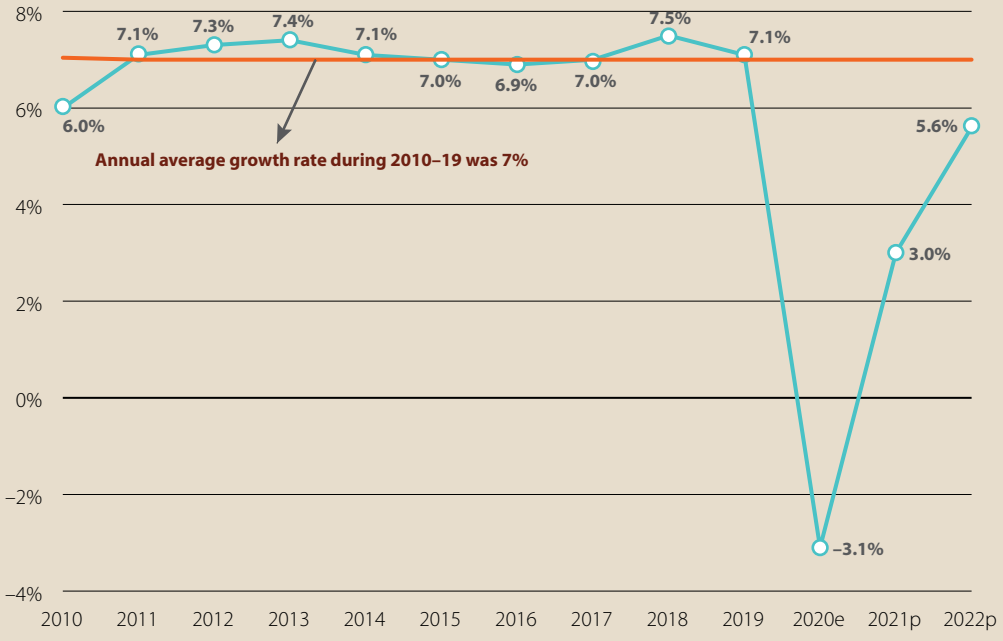
Economic Overview

Cambodia has been one of the few fast-growing economies in the last two decades. It had an average annual GDP growth rate of 7.0% from 2010 to 2019 (see Figure 1), driven by garment, textile, and footwear, tourism, and construction sectors. The country is aiming to attain upper-middle-income status by 2023 and high-income status by 2050.

However, since early 2020, the COVID-19 pandemic continued to hit Cambodia's economic development, being especially pronounced in the first quarter of 2021. In response, the government intensified some measures like travel restrictions and community lockdowns in the most affected areas from an early stage. The prolonged outbreak of COVID-19 caused some businesses to close or experience partial or full suspension ranging from one week to four weeks; domestic consumption decreased; and number of tourist arrivals dropped to a bottom. This led to an economic slowdown of up to a –3.1% growth rate in 2020. To tackle this problem, the government exhibited a clear vision. It took 10 rounds of measures from early 2020 till the end of 2021 in supporting the needs of workers and families and ensuring the sustainability of businesses through different fiscal and monetary interventions. The government also successfully rolled out a vaccination program, vaccinating its people free of charge. By mid-December 2021, almost 89% of the total population (16 million) had been vaccinated. Due to these interventions, the economy started to recover with a projected GDP growth rate of 3.0% in 2021 and 5.6% in 2022 [1, 2].

FIGURE 1

ANNUAL GDP GROWTH RATE, 2010–22P.

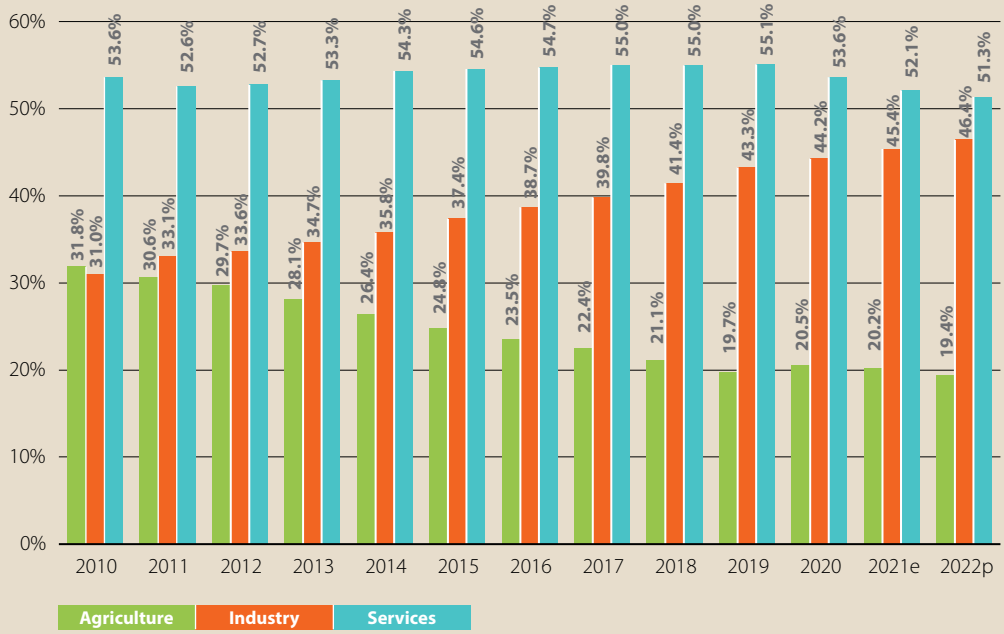


Source: Ministry of Economy and Finance, 2022 [1].

Having sustained strong growth before the pandemic, Cambodia was blessed with a dynamic change in its economic structure, among other things. Back in the 1990s, the GDP share of the agricultural sector was almost 50%, but that decreased over time. In 2010, the share of this sector became 31.8% and further dropped to less than 19.4% in 2022 (see Figure 2). At the same time, the share of the services sector fluctuated between 51% and 55% during the same period, while there was a gradual increase in the share of the industrial sector from 31% in 2010 to 46.4% in 2020. The industrial sector's contribution to the GDP in Cambodia mainly depends on the construction and manufacturing subsectors, especially the garment, textile, and footwear subsectors, which have so far accounted for almost 80% of Cambodia's total exports in the last decades and around 57% even in 2020 [1].

FIGURE 2

GDP SHARE BY SECTOR, 2010–22P.



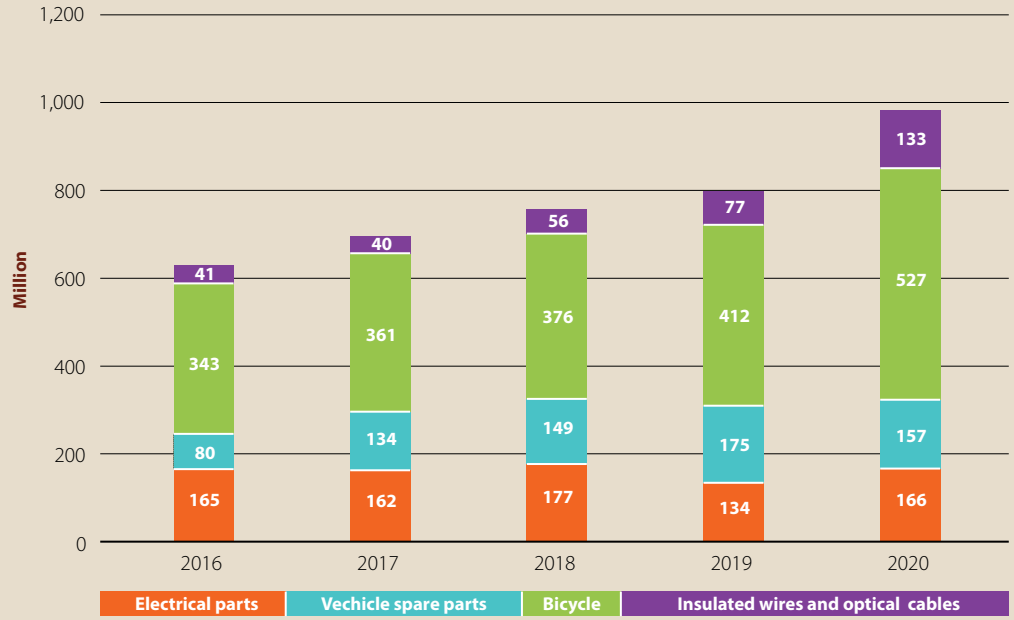
Source: Ministry of Economy and Finance, 2021 [1].

In recent years, the export of non-garment manufacturing products has increased, especially for bicycles, insulated wires, and optical cables. As shown in Figure 3, the value of exports of four non-garment manufacturing products increased by more than 56% from around USD629 million in 2016 to USD983 million in 2020 [1]. Due to COVID-19, the demand for electrical parts, insulated wires, and optical cables from Cambodia was jumping, though there was a slight decrease in demand for vehicle spare parts. This signals that there is more demand for medium- and high-skill workforces in production, thus reflecting the need for a greater role of TVET institutions in preparing a larger and quality workforce equipped with such skills, given that this demand trend may continue even after the pandemic.

Such structural transformation will guarantee the sustainability of the economy, along with a strengthened role of governance; capacity of public institutions; infrastructural improvement; technological advancement; and qualified, young, and dynamic labor forces. As reflected in Figure 4, Cambodia has almost 73% of its population aged 39 and below, while 34.7% of its population is aged between 15 and 34 years [3]. This can be a superb opportunity for Cambodia if these working-age

FIGURE 3

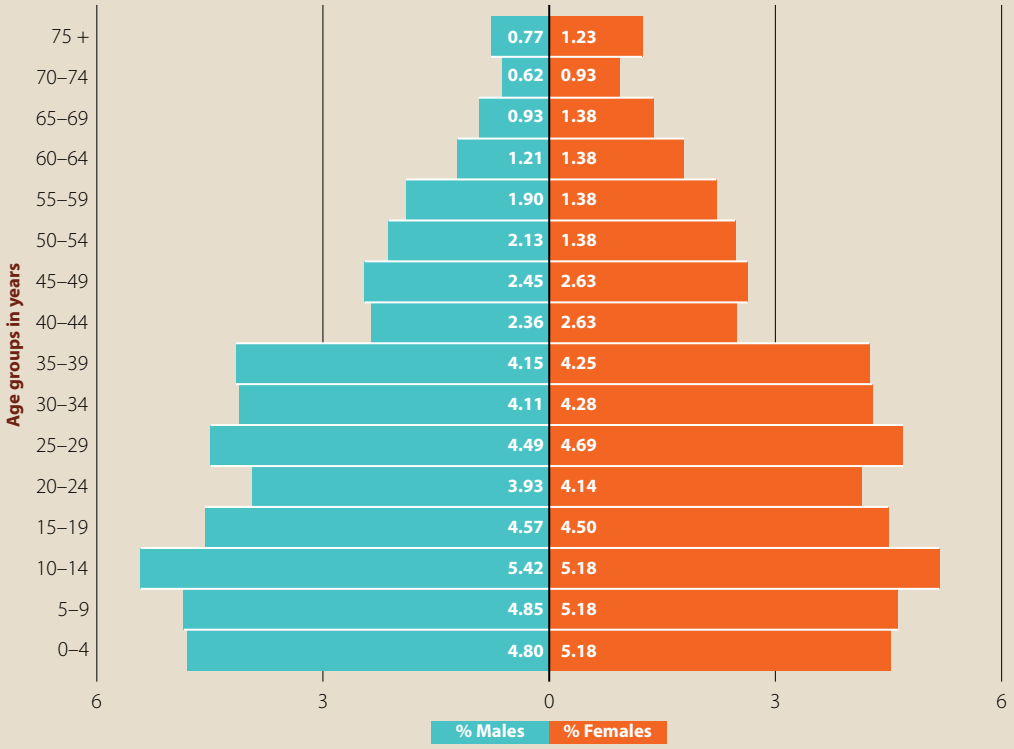
CAMBODIA'S EXPORTS OF SELECTED NON-GARMENT MANUFACTURING PRODUCTS, IN USD.



Source: Ministry of Economy and Finance, 2021 [1].

FIGURE 4

POPULATION STRUCTURE BY AGE AND GENDER IN CAMBODIA, 2019.



Source: National Institute of Statistics, 2020 [3].

groups have up-to-date skills required by the labor market amidst the rapid changes in the global economy. It will be particularly beneficial to adapt to the technological advancement during and after the COVID-19 pandemic.

Review of National Labor Training and Reskilling Strategies

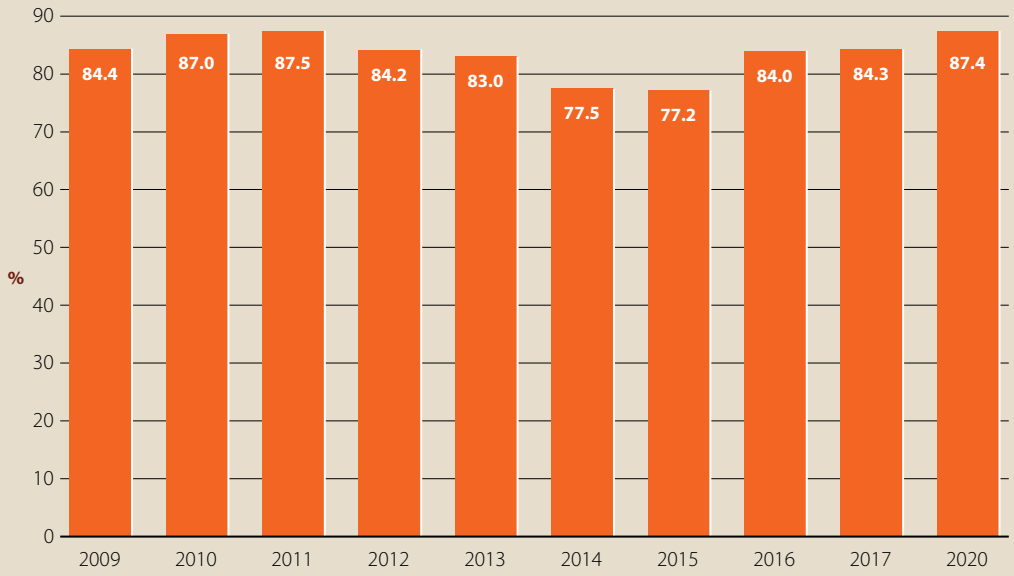
Labor Supply

Labor Force

Owing to its young population, Cambodia has a high labor force participation rate (LFPR). According to Cambodia Socio-Economic Survey (CSES) 2009–19/20 of the National Institute of Statistics (NIS), LFPR has hovered around 80% [4], as shown in Figure 5. This reflects that Cambodia has a large pool of labor supply available to engage in the production of goods and services in the country. It also signals that most of the Cambodian labor forces are engaged actively in the labor market. Thus, with this high number, in order to have good labor market outcomes, any employment and training policies should be considered diligently.

FIGURE 5

LABOR FORCE PARTICIPATION RATE, 2009–20.



Source: NIS, 2009–20 [4].
Note: The CSES data for 2018 was not available while the 2020 survey was conducted in the second semester of 2019 and the first semester of 2020.

Lately, the Cambodian government has set out several policies to improve the quality of education in Cambodia. This is also a clear vision and commitment toward improving the quality of the labor force. As shown in Table 1, the labor force with none or low education decreased from around 20% in 2009 to only 2.9% in 2017, though it increased to 12.4% in 2020 [4]. Also, the number of labor forces with upper-secondary and post-secondary education improved over time. However, there is still a gap to fill as a majority of the Cambodian labor force still have low education levels of 'primary school completed' and 'not completed.' A higher education level can improve the chances of being employed and having a better employment status. As stated by the International Labour

Organization (ILO), labor forces with higher educational levels have a very high probability to be employed as paid employees [5].

TABLE 1

EDUCATIONAL LEVELS OF THE LABOR FORCE, 2009–20.

Year/ education level	None or only some education	Primary school not completed	Primary school completed	Lower secondary completed	Upper secondary completed	Post-secondary education	Do not know
2009	20.2	35.1	26.1	11.9	4.6	2.1	0.1
2010	17.7	35.2	26.5	13.3	5.2	2.1	0.0
2011	15.0	34.4	27.3	15.1	5.7	2.5	0.0
2012	14.0	34.6	28.0	14.3	6.2	2.8	–
2013	13.1	35.4	27.2	13.8	6.8	3.6	0.0
2014	8.3	24.7	40.7	21.4	3.2	1.7	
2015	4.9	25.2	46.6	19.6	2.7	1.0	–
2016	9.7	32.3	28.9	15.1	7.3	6.7	–
2017	2.9	25.2	40.7	24.4	5.5	0.7	0.5
2020	12.4	31.8	26.4	14.9	7.2	7.4	–

Source: NIS, 2009–20 [4].

The Cambodian government has committed to continue improving the education level of labor forces. Human resource development is a priority field in the Rectangular Strategy Phase IV while the Ministry of Education Youth and Sports is committed to improving the quality of education by focusing on: (1) improving teachers' qualifications with concrete incentives; (2) expanding the scope of schools by investing in building schools at the village level; (3) strengthening comprehensive inspections to ensure the quality of education; (4) promoting technical education in upper secondary schools; (5) promoting skills education for the job market; and (6) developing comprehensive curricula and textbooks [6].

Employment and Unemployment

The employment-to-population ratio (EPR) of Cambodia was more than 80% between 2009 and 2020 as shown in Table 2. This means that a high proportion of Cambodia's working-age population was either employed or involved directly in market-related activities. Based on the international definition, employed labor forces include those who worked for at least one hour during the reference period.

TABLE 2

EMPLOYMENT-TO-POPULATION RATIO BY GEOGRAPHICAL DOMAIN.

Year	Cambodia	Phnom Penh	Other urban	Other rural
2009	84.3	68.5	77.0	87.6
2010	86.7	70.1	81.7	89.7
2011	87.3	69.3	83.3	90.7

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Year	Cambodia	Phnom Penh	Other urban	Other rural
2012	84.1	76.5	79.6	86.1
2013	82.8	73.9	76.6	85.2
2014	82.4	77.8	78.6	83.9
2015	82.6	78.0	78.0	84.2
2016	83.9	78.6	80.4	85.4
2017	84.2	74.8	80.4	86.6
2020	85.4	77.5	85.1	87.7

Source: NIS, 2009–20 [4].
Note: The population taken into consideration was aged 15–64 years.

Employed labor forces could be classified into paid employment and unpaid employment. The latter includes self-employment, unpaid family work, apprenticeship, or non-market production. In Cambodia, the EPR is higher in rural areas where most people are employed in agricultural activities as own-account workers, self-employed, or unpaid family workers, which are categories of vulnerable employment as per the ILO [7].

Cambodia's unemployment rate was between 0.1% and 0.3% before the COVID-19 crisis and was not different between men and women (see Table 3). In 2020, when Cambodia was hit by the pandemic, the unemployment rate jumped to 2.4% and more women tended to lose jobs than men. This rate was still lower than the global unemployment rate of 6.5% during the same period [7]. In most developed countries, the unemployment rate is an important indicator of the labor market's performance as it is a key measure of labor underutilization. However, in developing countries like Cambodia, due to the absence of unemployment insurance systems or social safety nets, persons of working age normally engage in some forms of economic activities, which leads to a low unemployment rate.

TABLE 3

UNEMPLOYMENT RATE BY GENDER.

Year	Both genders	Women	Men
2009	0.1	0.1	0.2
2010	0.3	0.3	0.4
2011	0.2	0.1	0.3
2012	0.2	0.2	0.1
2013	0.3	0.3	0.3
2014	0.1	0.1	0.1
2015	0.1	0.1	0.0
2016	0.2	0.1	0.2
2017	0.1	0.1	0.1
2020	2.4	3.7	1.1

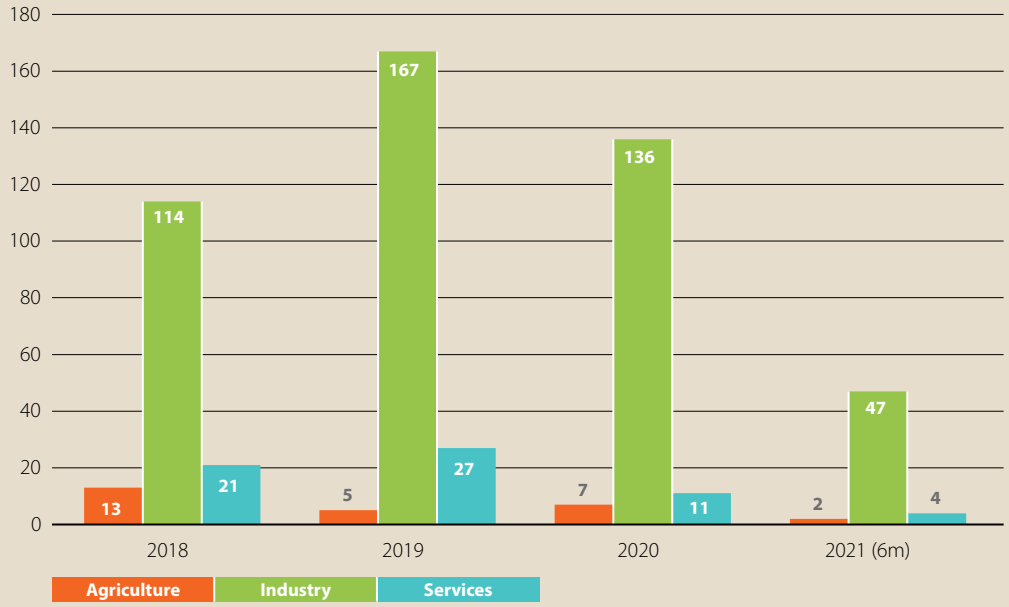
Source: NIS, 2009–20 [4].
Note: The population taken into consideration was aged 15–64 years.

Labor Demand

On the demand side, as per the available data, there is also a structural shift in labor demand among the three main sectors. The qualified investment projects (QIPs) approved by the Cambodian Investment Board of the Council for the Development of Cambodia (CDC) could be a good proxy to estimate the demand for labor by sector. The majority of investment projects were in industry, followed by the services sector, while the projects in the agricultural sector had smaller numbers. Before the pandemic, in 2018, there were 114 and 21 QIPs in the industry and service sectors, respectively. The numbers continued to increase for the two sectors in 2019 [8]. Even though the overall number of QIPs decreased during the pandemic, investments in these two sectors had larger shares (see Figure 6). This reflects the relatively higher labor demand in these sectors.

FIGURE 6

NUMBER OF QUALIFIED INVESTMENT PROJECTS BY SECTORS.



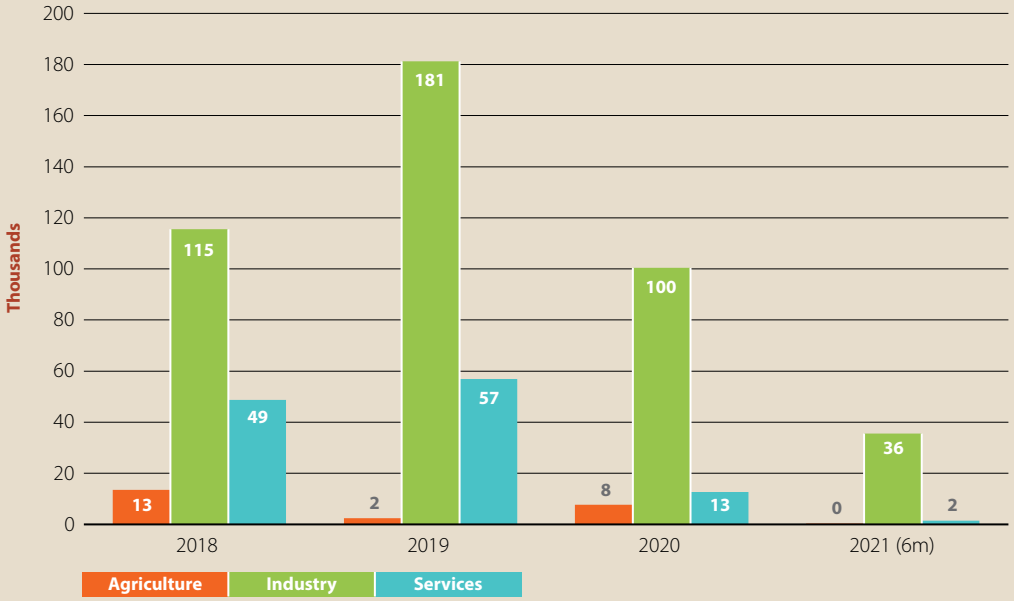
Source: CDC, 2021 [8].

Labor demands share similar trends. The highest number of demand was in the industrial sector, at 115,000 in 2018, which increased to 181,000 in 2019. The demand for labor in the services sector also increased from 49,000 workers in 2018 to 57,000 workers in 2019 [8]. Due to the pandemic, in 2020, the overall labor demand decreased, yet the industrial sector needed more labor (see Figure 7).

Another proxy can be the number of job vacancies collected by the National Employment Agency (NEA). Based on this data, from January 2019 to June 2021, the top three open vacancies were: (1) plant and machine operators and assemblers; (2) technicians and associate professionals; and (3) craft and related trades workers [9], as shown in Table 4. These occupations required certain medium skills to perform a range of tasks and duties according to the International Standard Classification of Education (ISCED). The medium skills listed in Table 4 refer to skill level 2, which is equivalent to lower-secondary education.

FIGURE 7

NUMBER OF VACANCIES BY SECTOR.



Source: CDC, 2021 [8].

TABLE 4

JOB VACANCIES BY SKILL LEVELS AND OCCUPATIONS.

Broad skill level required		Occupation (ISCO Level 1)	2019	2020	2021 (6m)
High skills	1.	Managers	2,939	3,990	66
	2.	Professionals	8,709	7,044	643
	3.	Technicians and associate professionals	15,450	45,617	6,334
Medium skills	4.	Clerical support workers	11,432	10,640	1,194
	5.	Service and sales workers	24,895	21,675	2,394
	6.	Skilled agricultural, forestry and fishery workers	2,457	1,874	N/A
	7.	Craft and related trades workers	18,765	31,054	5,565
	8.	Plant and machine operators, and assemblers	17,512	39,369	10,690
Low skills	9.	Elementary occupations	10,559	28,864	3,994

Source: NEA, 2021 [9].

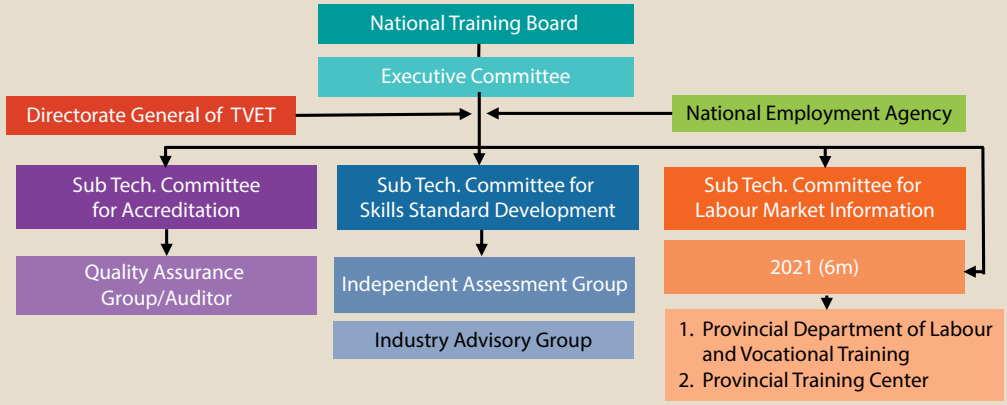
Reviewing the Status of the TVET System in Cambodia

Skills Training and Education System

The skills training and education system in Cambodia can be divided into three streams: general education, TVET, and higher education. While general education and higher education (academic stream) are managed by the Ministry of Education, Youth and Sports, the TVET stream is managed by the Directorate General of Technical Vocational Education and Training (DGTVET). DGTVET (see Figure 8) acts as a secretariat of the National Training Board (NTB), an apex body for TVET policy formation and approval of policies and their implementation.

FIGURE 8

TVET GOVERNANCE SYSTEM.



Source: United Nations Development Programme, 2019 [10].

In Cambodia's education system, there are eight levels of qualifications for TVET training. The first four levels (vocational certificate, and technical and vocational certificates 1, 2, and 3) are equivalent to secondary education, while other four higher levels are considered equivalent to post-secondary education. In order to nationally consistently recognize the outcomes achieved at each level, and to make flexible education pathways, the NTB approved the Cambodia National Qualification Framework (CNQF) in 2012. The CNQF not only provides a comparison of academic and training standards but also tries to ensure an equivalency comparison between the national and regional standards of qualifications (see Table 5). It has also provided the foundation for the establishment of the Competency-Based Assessment and Certification System (CBACS) in 2017 which includes Recognition of Prior Learning (RPL), and Recognition of Current Competency (RCC) [11]. This allows those labor forces who learn through work experiences or obtain certificates from outside the formal education-and-training system to be validated with a nationally recognized qualification. Thus, this system allows those workers who obtained non-formal education or training to access further formal education and training as stated in the CNQF.

TABLE 5

EQUIVALENCY OF TVET AND ACADEMIC EDUCATION SYSTEM IN CAMBODIA.

Level	Technical and vocational education and training	Higher education	Minimum credit hours
8	Doctoral Degree of Technology/Business Education	Doctoral degree	54
7	Master's Degree of Technology/Business Education	Master's degree	45
6	Bachelor's Degree of Technology/Business Education	Bachelor's degree	120
5	Higher Degree of Technology/Business Education	Associate degree	60
4	Technical and Vocational Certificate 3		30
3	Technical and Vocational Certificate 2		30
2	Technical and Vocational Certificate 1		30
1	Vocational Certificate		30

Source: National Cambodia Qualification Framework, 2014 [11].

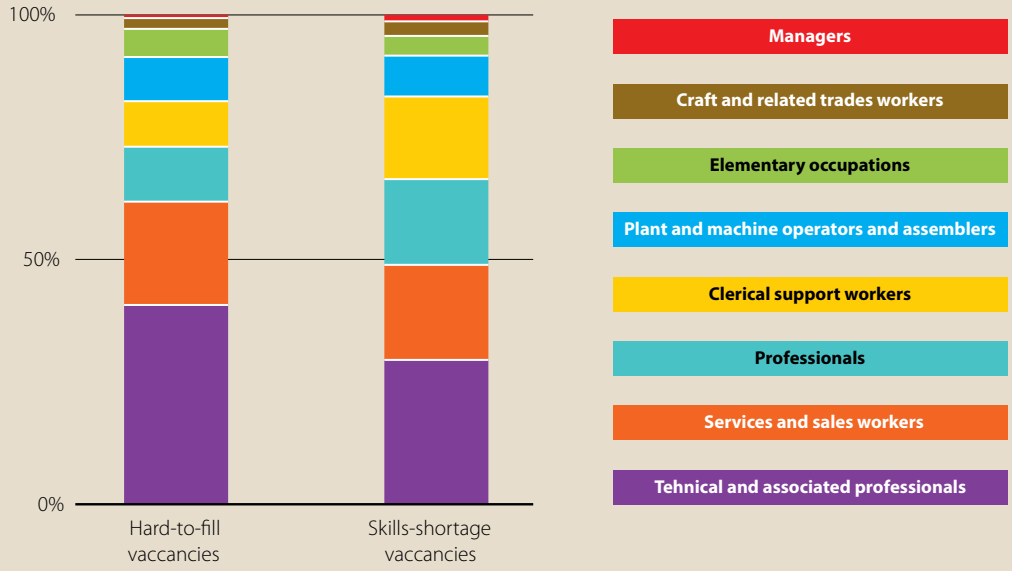
The Remaining Challenges: Training Quality and Labor Market Demand

A well-designed TVET system is considered a crucial driving force for economic development in a country. TVET is an important element of education in Cambodia. The Royal Government of Cambodia (RGC) has been keeping education and training as a priority, especially in the current mandate, by focusing on human resource development. This includes the improvement of the TVET system to meet the demands of the labor market for poverty alleviation and improvement of livelihoods of Cambodia's population as well as to sustain economic development.

Thanks to the RGC, educational attainment in Cambodia has been improving over time at all levels. However, in spite of the achievement that it has gained so far, training quality is still a prominent challenge. The technical skills have not yet been fully responsive to the current and future labor market demands. As per employers' perceptions, skills shortages and gaps remain. According to an employers' survey conducted by NEA in 2017, the majority of employers claimed that they found it difficult to recruit new staff because some occupations were hard to fill. These especially included technical and associate professionals (41%); service and sales workers (21%); and professionals (11%), among others. At the same time, these three occupations were also reported to have skills shortages as shown in Figure 9 [12]. The hard-to-fill vacancies could be either due to the quality or the number of vacancies or both, while skills shortages could be due to the lack of skills, qualifications, and experiences. This reflects that Cambodia needs to reskill or upskill its current labor forces and produce more skilled labor forces for the labor market.

FIGURE 9

HARD-TO-FILL AND SKILLS-SHORTAGE VACANCIES BY OCCUPATIONS.



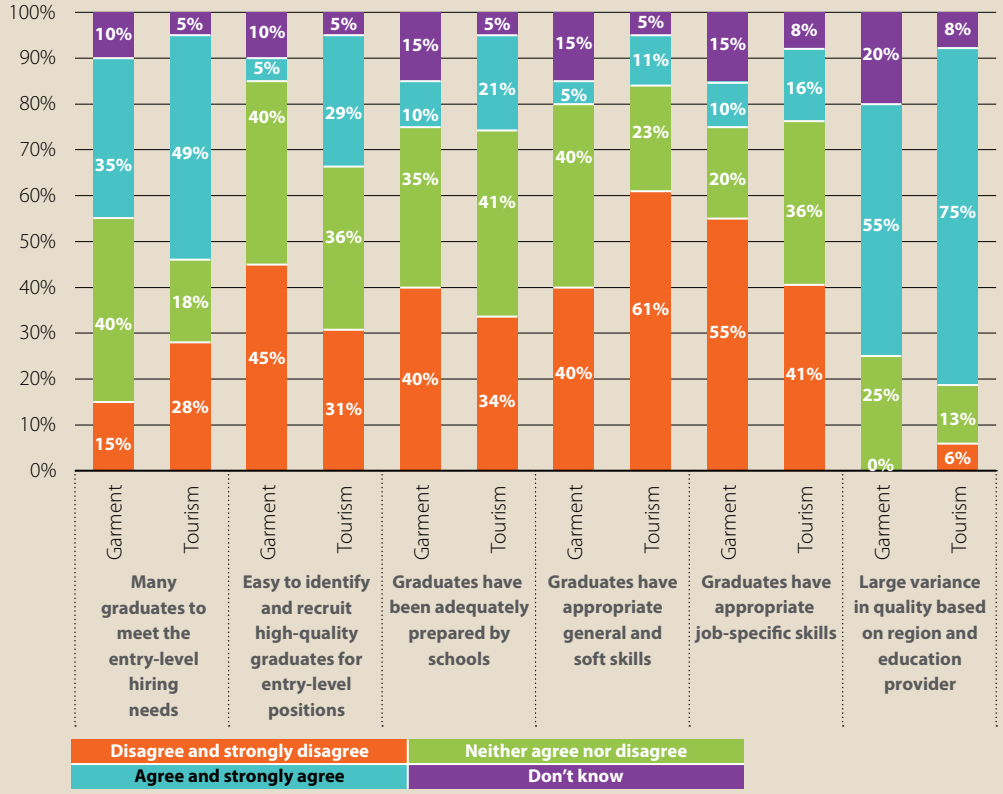
Source: NEA, 2017 [12].

An employers' survey conducted by the ADB in 2021 in two of Cambodia's comparatively advantaged sectors shows a bit of detail on skill mismatches and skill gaps in Cambodia. For instance, employers in garment manufacturing (55%) and tourism (41%) sectors reported that graduates hired in the past year did not have appropriate job-specific skills. The majority of employers in the tourism sector claimed that numerous graduates (61%) did not have proper general

and soft skills. At the same time, the perception that graduates were well-prepared by schools or training institutions was also low (See Figure 10) [13].

FIGURE 10

SKILL MISMATCHES AND SKILL GAPS IN GARMENT AND TOURISM SECTORS.



Source: ADB, 2021 [13].

What is more, soft skills are regularly also regarded as the main concern for employers, but it has a great demand in the current labor market. That is the reason why some people give soft skills other names such as employability skills or workable skills. The question is, "why are those skills important?" Most experts claimed that individuals with these skills can constantly and easily learn and apply new knowledge and skills, and that these skills are also critical to lifelong learning. For instance, an employee with strong communications skills can build positive relationships with colleagues and other stakeholders, leading to productivity growth and business prosperity. Some employers in Cambodia also claimed that they recruited employees, especially for low and medium skills, by giving more priority to soft skills because technical skills can be imparted at work.

However, for the current workforce, both general education and TVET graduates are lacking these skills. The employers survey in 2017 showed that the majority of establishments reported foreign languages (45.6%); oral communication (31.3%); teamwork (27.9%); problem-solving (27.2%); and basic digital skills (19.7%) among the top skill shortages among job seekers [12]. This had not improved much in 2021. As shown in Table 6, most of the employers in both ICT and non-ICT firms claimed that communication skills, languages, digital, and leadership-and-management skills

were among the top skill shortages among their current labor forces, based on a recent survey conducted by Cambodia Development Resource Institute (CDRI) [14].

TABLE 6

SKILLS GAPS BY TYPES OF ESTABLISHMENTS.

Skills	ICT firms		Non-ICT firms	
	ICT employees	Non-ICT employees	ICT employees	Non-ICT employees
General attitude to work	6%	8%	7%	11%
Communication skills	16%	15%	10%	13%
Self-management	6%	9%	10%	7%
People-skills	5%	6%	7%	7%
Problem solving	12%	10%	13%	14%
Literacy	1%	2%	3%	3%
Numeracy	1%	2%	0%	3%
Technical/job specific skills	9%	8%	9%	7%
Teamwork	7%	5%	7%	5%
Leadership and management	11%	14%	6%	8%
Digital skills	13%	9%	7%	9%
Languages	15%	14%	20%	15%

Source: Cambodia Development Resource Institute, 2021 [14].

This is expected to improve due to high commitments from the government. The NTB has approved the competency-based learning materials for soft skills and numeracy skills from CQF level 1 to 4 to apply to all training institutions nationwide. These materials were already uploaded to the e-learning platform of DGTVET so that all schools could access and apply them. The six modules in each CQF level aim at addressing problems facing the labor market, namely, communication, problem-solving, leadership and management, teamwork, and numeracy skills (see Table 7) [15].

TABLE 7

COMPETENCY-BASED MATERIALS FOR SOFT SKILLS AND NUMERACY SKILLS BY CQF LEVEL.

Module/CQF Level	CQF Level 1	CQF Level 2	CQF Level 3	CQF Level 4
Module 1	Receiving and responding to workplace communication	Participating in workplace communication	Leading workplace communication	Utilizing advanced and interactive communication
Module 2	Demonstrating competencies in the use of basic mathematical concepts and techniques	Use more complex mathematical concepts and techniques	Solving problems related to work activities	Applying problem-solving techniques in the workplace

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Module/CQF Level	CQF Level 1	CQF Level 2	CQF Level 3	CQF Level 4
Module 3	Demonstrating work value	Practice career professionalism	Working in a team environment	Developing teams and individuals
Module 4	Practicing basic housekeeping procedures	Prioritizing and organizing work	Planning group tasks	Supervising the implementation of work
Module 5	Working with others	Demonstrating awareness of OSH procedures	Practicing OSH procedures	Monitoring and planning OSH, gender, and social equity
Module 6	Practicing environmental protection	Participating in sustainable development related activities	Using relevant technologies to attain sustainable development	Promoting environment and individual protection

Source: Department of Standard and Curricular, Ministry of Labour and Vocational Training (MLVT), 2021 [15].

The Remaining Challenges: Misperception of TVET

In developing countries in general, TVET has been given low social value, and Cambodia is no exception. Students, parents, and the society at large perceive the TVET track as a choice for those who are academically less qualified, or as a second chance for those who have failed to achieve higher education or dropped out of schools, rather than as a backbone of economic growth. More importantly, most people view TVET as a field for men. So far, the government has been promoting TVET programs by carrying out many social marketing events around TVET. Under the supervision of DGTVET and NEA, many actions have been taken so far, including roadshows at the provincial level, school visits and fairs, and career guidance for TVET students, especially for women. In recent years, Cambodia has also conducted the National TVET Day in order to raise awareness and increase the enrollments for TVET.

Training Outcomes

By the end of 2021, Cambodia had 199 TVET institutions providing training to around 60,000 students each year. Among all, there were 38 public TVET institutions while another 161 institutions were being run by the private sector, nongovernmental organizations, and associations. As shown in Table 8, the number of graduates from public TVET institutions has increased in recent years. For instance, in the last two years before the pandemic, the number of graduates increased from 38,159 in the academic year 2017–18 to 52,807 in the academic year 2018–19. In 2019–20, the number decreased to around 41,000, which may be because the schools were closed due to the COVID-19 pandemic [16].

TABLE 8

STUDENTS GRADUATED FROM PUBLIC TVET INSTITUTIONS.

Year		Master's degree	Bachelor's degree	Higher diploma	Certificates 1, 2, 3	Vocational certificate	Total
2013–14	Total	48	4,144	1,830	1,246	63,034	70,302
	Female	13	1,119	413	314	35,697	37,556

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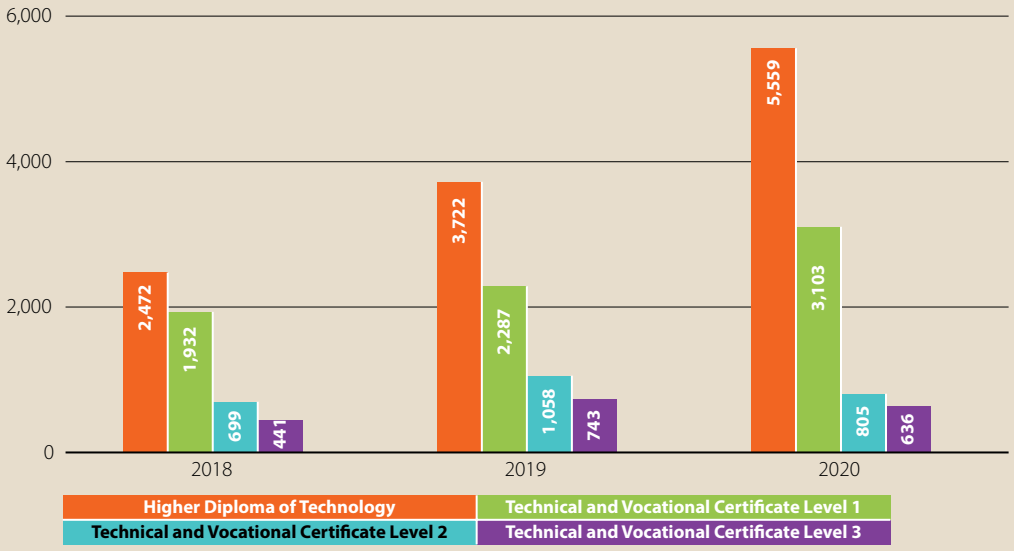
Year		Master's degree	Bachelor's degree	Higher diploma	Certificates 1, 2, 3	Vocational certificate	Total
2014–15	Total	6	2,588	1,650	714	27,686	32,644
	Female	–	622	250	123	15,605	16,600
2015–16	Total	–	2,811	1,688	1,229	17,800	23,528
	Female	–	709	244	79	9,612	10,644
2016–17	Total	18	6,427	3,525	2,135	16,233	28,338
	Female	1	1,860	906	599	7,755	11,121
2017–18	Total	27	4,696	4,133	2,168	27,135	38,159
	Female	2	1,830	1,020	550	15,932	19,334
2018–19	Total	104	5,321	5386	3,178	38818	52,807
	Female	20	1,383	1,481	747	20,018	23,649
2019–20	Total	123	4,916	3,786	4,610	27,697	41,132
	Female	23	2,428	1,204	1,328	13,687	18,670

Source: Internal Report of MLVT [16].

In recent years, the government has set six priority sectors, namely, construction, mechanical, electrical and electronics, manufacturing, refrigeration and heating, and business and ICT. The number of graduates in these sectors has increased at both certificate level (levels 1, 2, and 3) and higher level (see Figure 11). The number of graduates with higher diplomas of technology (associate degrees) almost tripled between 2018 and 2020 [17]. This is a good sign for the labor market as it narrows the gap between labor supply and demand.

FIGURE 11

NUMBER OF TVET GRADUATES IN SIX PRIORITY AREAS BY CERTIFICATION LEVELS.



Source: Internal Report of MLVT, 2021 [17].

With the limited capacity and budget of the government, in order to develop demand-driven labor forces, there is a need for involvement from the private sector in building a sustainable skills development system in the country. The involvement can be in areas of curriculum development, funding, and providing work-based learning at the respective enterprises, among others. According to the report on "Skills Shortages and Skills Gaps in the Cambodian Labour Market: Evidence from Employer Survey 2017," the involvement of the private sector in the development of the labor force was relatively limited. Among 4,571 establishments responding to the survey, only around 16% had reserved funds or provided some forms of training to their employees in 2017, and only around 18% of the establishments providing training had both budget and training plans for employees in 2018 [12]. The low number of firms providing training to their employees may be due to a lack of financial resources, especially among small and medium-sized firms. Another reason could be the lack of well-functioning training services in Cambodia. During some public events, some employers also claimed that the trained employees with higher skills and productivity were normally attracted by other companies providing higher wages, which could be another reason why most employers did not provide training. The Royal Government of Cambodia saw this challenge and understood the need for partnership with the private sector in building skilled labor forces. It took many measures to improve the skills of labor forces through policies and projects implemented by relevant government agencies and ministries, especially the MLVT; Ministry of Education Youth and Sports (MEYS); and Ministry of Economy and Finance (MEF). In the National TVET Policy 2017–25, the government set out to establish the national Skills Development Fund (SDF) to promote public–private partnership and mobilize resources for a sustainable skills development system. Supported by development partners including the Asian Development Bank (ADB) and the *Agence Française de Développement* (AFD) and managed by a team of MEF, the SDF ran its pilot program in 2018 as a cofinancing model through which the private sector and training institutions could submit joint proposal to the SDF to get funds for both upskilling their current employees as well as for providing pre-employment training to new employees, using agreed key performance indicators.

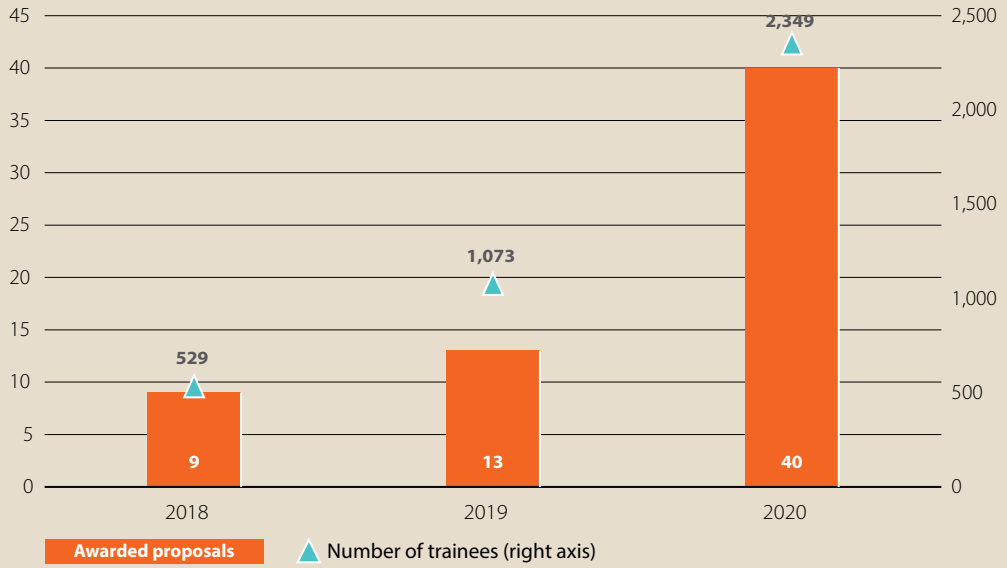
The SDF gives priority to training proposals in five sectors: manufacturing, construction, electronics, ICT, and tourism, as well as to high-demand skills in the labor market. The unit cost that can be requested from the SDF is up to around USD2,000. The duration of the training should not be more than 1.5 years, after which trainees could be awarded the CQF certificate or a joint company–school certificate. The number of both awarded proposals and trainees significantly increased. When the program first started in 2018, only nine proposals were awarded and more than 500 trainees benefitted from the program, while in 2020 40 proposals were awarded and more than 2,300 trainees were benefited [18], as shown in Figure 12. Even though the numbers were still small, they showed the progress and commitment from both the government and the private sector in jointly developing skilled labor forces in the country in response to the demand of the labor markets.

There are some other commitments and initiatives as well from the private sector. For instance, RMA Cambodia Plc., a Ford vehicle distributor, has a training plan and curriculum for its staff, and also works closely with some training institutions in Cambodia for setting up technical training workshops. It also provides internship opportunities to TVET students to learn new skills and technologies used in the automobile industry [19].

Similarly, the Garment Manufacturers Association in Cambodia (GMAC) set up its training center called the "Cambodian Garment Training Institute (CGTI)" in 2016 to respond to the needs of skilled labor forces in the fashion industry and to narrow the gap between training and job

FIGURE 12

NUMBER OF AWARDED PROPOSALS AND TRAINEES ENROLLED UNDER THE SKILLS DEVELOPMENT FUND.



Source: Internal Report of SDF, 2021 [18].

requirements in Cambodia. CGTI currently provides both short and long courses (diploma and advanced diploma) to labor forces who are currently working in the apparel industry or those who are inspired to work in this industry (see Table 9). The short courses are in streams such as labor law and leadership, as well as in technical areas for the fashion industry, while the long courses include areas such as industrial engineering, apparel merchandising, design, and products development, among others [20].

TABLE 9

NUMBER OF ENROLLMENTS IN CGTI.

Academic year	Short course	Long course/diploma	Total
2017	550	15	565
2018	1,667	16	1,683
2019	1,933	19	1,952
2020	951	25	976
Total	5,101	75	5,176

Source: Internal report of CGTI [20].

Industrial Revolution 4.0 and Labor Market Transition

Industrial Revolution 4.0 and Its Relevance for Skills Development in Cambodia

The Industrial Revolution 4.0 (IR4.0) is a catalyst and driver for sustainable growth, productivity improvement, and competitiveness, especially for small and medium-sized enterprises, which are

the mainstays of jobs creations and income generation in a developing country like Cambodia. The concept of IR4.0 is new to Cambodia, and this notion may not be well understood by both employers and employees. This can be an obstacle to adopting IR4.0 or adapting to it, as it requires lot of effort to raise awareness around digital technology and its benefits at an early stage. At the same time, as a developing country, Cambodia faces relatively more challenges in adopting new technologies compared with the more advanced countries. This is due to the nature of its businesses, human resources with relatively limited capacity, and some other existing conditions; and is reflected in two recent reports. First, the Global Innovation Index (GII) 2021 captures the innovation ecosystem of the country's performance regarding innovation landscapes. The definition used in this report is the ability to reap the benefits of a new technological combination by focusing on seven pillars as shown in Table 10 [21]. In 2021, Cambodia was ranked 109 among 132 economies, while ranking just above Lao PDR and Myanmar among ASEAN economies [22]. This means that Cambodia needs to strengthen its capacity to adopt new technologies.

TABLE 10

GLOBAL INNOVATION INDEX 2021.

Country	Overall GII	Pillar						
		1	2	3	4	5	6	7
Singapore	8	1	9	15	5	3	13	17
Malaysia	36	41	39	51	30	39	31	37
Thailand	43	64	63	61	27	36	40	55
Vietnam	44	83	79	79	22	47	41	42
Philippines	51	90	80	86	86	33	24	65
Brunei Darussalam	82	24	52	46	106	84	130	85
Indonesia	87	107	91	68	57	110	74	91
Cambodia	**109**	**111**	**109**	**107**	**69**	**117**	**111**	**98**
Lao PDR	117	130	113	123	103	70	127	90
Myanmar	127	123	108	113	124	132	89	131

Source: World Intellectual Property Organization, 2021 [21].
Notes: (1) Pillars: 1=institutions; 2=human capital and research; 3=infrastructure; 4=market sophistication; 5=business sophistication; 6=knowledge and technology output; and 7=creative outputs.
(2) The GII includes 81 indicators, with a smaller number indicating that the country has a higher GII.

This is also reflected in the report by the United Nations Conference on Trade and Development (UNCTAD) on the "Readiness for Frontier Technologies Index 2021," where Cambodia is ranked 109 among 158 economies (see Table 11). The capacity of the country to adopt and adapt to new technologies is limited compared with other countries on almost all selected frontiers. The level of ICT infrastructure, including the percentage of the population who can access the internet, is relatively low. The readiness for technology adoption can also be measured by the skill levels of the labor force. The number of adjusted years of schooling for Cambodia was only 6.8 while for neighboring countries like Vietnam and Thailand, it was 12.7 years and 15.0 years, respectively, in 2020 [22]. What is more, the majority of labor forces were not in high-skill employment.

TABLE 11

READINESS FOR FRONTIER TECHNOLOGIES INDEX 2021.

Country	Total ranking	ICT	Skills	R&D	Industry
Singapore	5	4	9	18	4
Malaysia	31	29	65	33	12
Philippines	44	88	46	2	52
Thailand	46	57	91	40	34
Vietnam	66	74	111	66	22
Brunei Darussalam	69	50	36	93	111
Indonesia	82	101	113	49	51
Cambodia	109	122	140	95	26
Lao PDR	127	127	129	133	52
Myanmar	121	104	144	83	94

Source: UNCTAD, 2021 [23].
Notes: ICT: percentage of the population using the internet and download speed.
Skills: expected years of schooling, and percentage of high-skill employment
R&D: number of scientific publications and patents filled on frontier technology.
Industry: percentage of high-tech manufacturing exports and digitally deliverable services exports.

Industry-level Barriers

There are some barriers for industries in Cambodia to adopt and adapt to IR4.0. According to ADB reports published in January 2021 on Reaping the Benefits of Industry 4.0 through Skills Development in Cambodia, the majority of employers in the garments manufacturing sector confirmed that the cost of the IR4.0 technology was significant for companies to adopt, while some others stated the lack of knowledge about IR4.0. Enterprises in the tourism sector faced similar challenges, though more enterprises in this sector had plans to adopt new technologies, compared with enterprises in the garments manufacturing sector [13].

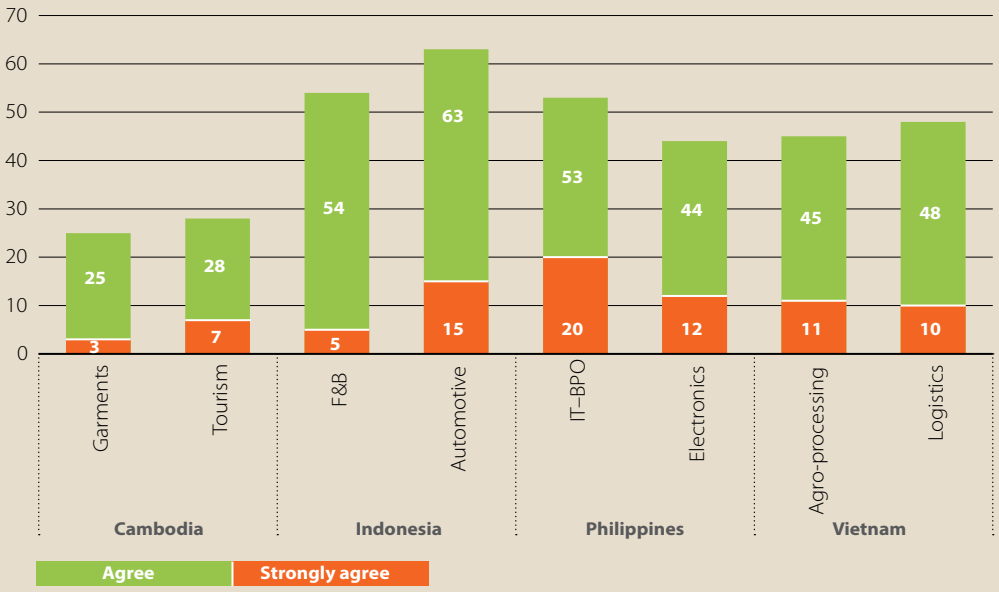
From the perspective of economic theory, technological advancement in an enterprise is an increment of capital intensity, which leads to the efficiency of production and labor productivity in multifactor productivity. Technological changes in the current context, combined with the use of more machines (or automation), can produce more outputs. Yet, enterprises in Cambodia had the least understanding of IR4.0. Figure 13 shows that only 28% and 35% of enterprises in the garment and tourism sectors, respectively, understand IR4.0. This reflects the low level of knowledge of firms in Cambodia compared with other countries in the region.

At the same time, a small number of enterprises believed that IR4.0 technology might not have much impact on their operations (productivity improvement) in the next five years. Compared with 31% of enterprises in agro-processing in Vietnam to 76% of enterprises in the automotive sector in Indonesia, only 12% and 19% of enterprises in garments and tourism sectors in Cambodia said they expected technologies to impact productivities of their firms (see Figure 14). Even though different sectors have been selected for the countries, this information is still indicative of the level of readiness of enterprises in adopting new technologies in high-growth industries of each country.

There is no doubt that the adoption of IR4.0 technologies is a process, and some fundamental barriers will need to be addressed in terms of both technological infrastructure and skills. However, the understanding of the concepts and their benefits for the industry itself are the preconditions and far more important.

FIGURE 13

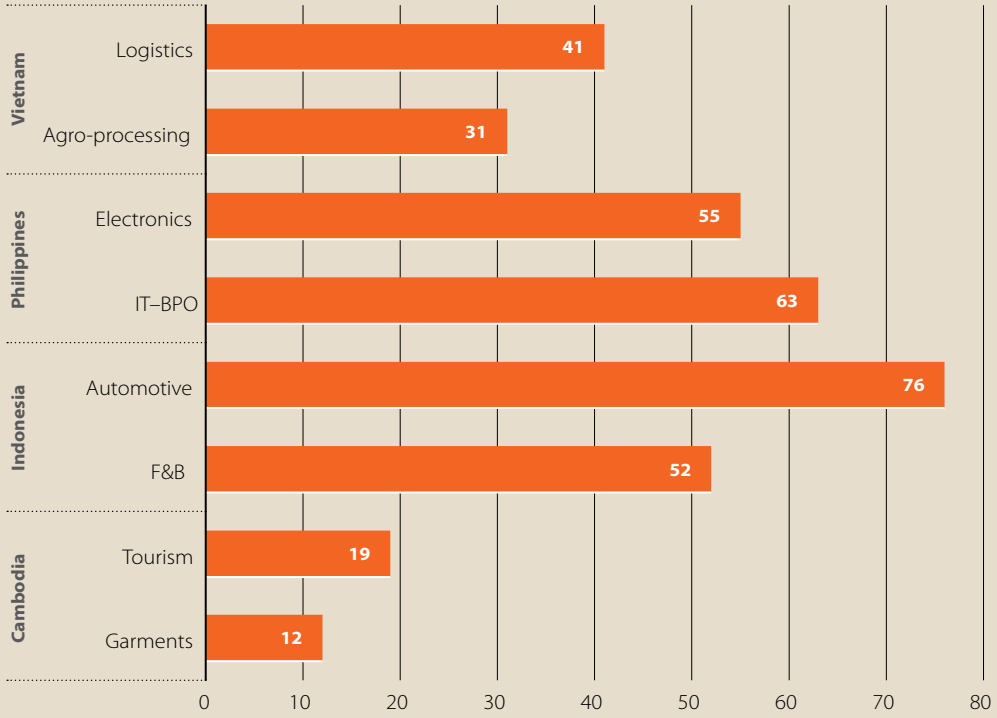
UNDERSTANDING OF IR4.0 BY SECTORS AND COUNTRIES (% OF ENTERPRISES).



Source: ADB, 2021 [13].
Note: F&B: Food and beverage; IT-BPO: Information technology and business process outsourcing.

FIGURE 14

PRODUCTIVITY IMPROVEMENT EXPECTATION FROM IR4.0 IN FIVE YEARS BY SECTORS AND COUNTRIES (% OF ENTERPRISES).



Source: ADB, 2021 [13].

Opportunities

The evidence mentioned above shows current challenges, which can also be translated into opportunities for Cambodia. The country can reduce the gap with more advanced countries in the region by improving its economic structure and quality of labor force in order to adopt and adapt to new technologies, especially during and after the COVID-19 crisis. On one hand, the pandemic has had a negative impact on socioeconomics in general. On the other hand, it has accelerated the deployment of new technologies more than ever before. In the last two years, Cambodia has increased the use of mobile apps for e-commerce and e-learning, among other things. Also, this crisis has provided a lot of opportunities for Cambodia, especially for businesses in agro-tech, mobile, and fintech to learn and adopt new skills and technologies.

There has been a positive trend in distance learning in Cambodia, with students and teachers using new technologies during and after COVID-19. For instance, the DGTVET of the MLVT, in December 2020, approved the use of 'Principle for Distance Learning and Training' for TVET institutions that allow around 60,000 TVET students affected by school closedowns to be able to learn by using digital platforms such as Google Classroom, Zoom, Microsoft Teams, and other applications. It also provides the opportunity for trainers to produce online training content for students. Later in November 2021, the MLVT took another step forward by launching the National TVET E-Learning Platform, including web-based learning (tvet-elearning.com) and mobile application (TVET E-Learning). The process of teaching and learning via this platform is similar to some American massive open online course (MOOC) providers like edX and Coursera, where the teaching video is recorded, and students can register and learn from the platform. This is a new TVET training enabling environment that provides a wider opportunity for skills development including upskilling and reskilling of Cambodian workforces. By the end of November 2021, this platform was used by 57 TVET training institutions with 3,522 training materials and 31,529 student enrollments [24].

Employment Transition

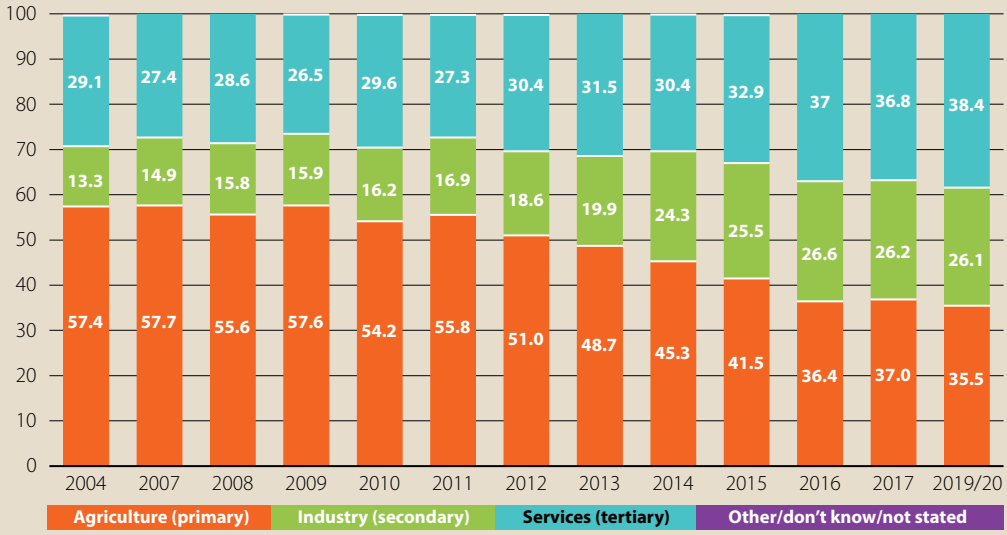
While there has been a change in the economic structure, especially during the COVID-19 pandemic, the employment structure has also shifted (see Figure 15). From a general perspective, many countries have experienced a similar trend of declining proportion of workers in agriculture throughout the development process. This sectoral composition of employment changes for two main reasons. First, there is a structural change in global production. The global share of agricultural (agriculture, forestry, and fishing) value added in GDP fell from 9.9% in 1994 to 3.8% in 2019 [25]. In lower-middle-income countries, this share fell from 22.7% to 15% during the period. Globally, the structure of economic production has changed from agriculture to industry and services. Second, the productivity of agricultural workers has increased as new technologies have been adopted, and therefore the labor demand in agriculture has decreased. Cambodia is no exception to this trend. The employment share of agriculture gradually decreased from 57.4% in 2004 to only 35.5% in 2019 while the employment shares of both services and industry sectors increased [4]. In spite of these relative declines, the agricultural sector continued to be an important source of employment in Cambodia, especially during 2020 and 2021, because the sector is believed to have absorbed employees who temporarily lost their jobs in the services and industry sectors due to the pandemic's impact. For the industrial sector, the share of employment rapidly increased between 2014 and 2019, which may be due to the speed of economic and industrial transformation in the country.

Status of Employment

Table 12 shows that the employment status in Cambodia has gradually changed from own-account workers, self-employed, and unpaid family workers to paid employees. In 2009, paid employees

FIGURE 15

EMPLOYMENT STRUCTURE BY SECTORS, 2004–20 (IN %).



Source: NIS, 2009–20 [4].

accounted for only around 27% while vulnerable employment accounted for almost 73%. In 2017, based on the available data before the COVID-19 pandemic, the share of paid employees had increased to 51% while that of vulnerable employees had decreased to 49% [4]. This is because the government has been working with all partners to frame the right policies for increasing decent work for all, including women, men, youth, and vulnerable groups.

TABLE 12

STATUS OF EMPLOYMENT FOR GROUPS AGED 15–64 YEARS BY EMPLOYEE STATUS DURING 2009–20.

Year	Employed population (in thousand)	Paid employees (percent)	Employers (percent)	Own account workers/ self-employed (percent)	Unpaid family workers (percent)	Other/do not know (percent)
2009	7,469	26.9	0.3	49.2	23.5	0.1
2010	7,675	29.8	0.2	50.4	19.4	0.2
2011	7,891	31.4	0.0	53.4	15.1	0.1
2012	7,706	35.8	0.0	55.1	9.0	0.0
2013	7,951	40.6	0.0	54.7	4.7	-
2014	8,245	44.4	0.2	49.6	5.6	0.2
2015	8,352	48.9	0.1	47.3	3.7	-
2016	8,607	50.3	0.1	44.4	5.2	-
2017	10,416	51.0	0.1	44.5	4.3	-
2020	4,149	47.1	0.4	37.8	14.6	0

Source: NIS, 2009–20 [4].

TABLE 13

OCCUPATIONAL TRANSITION, 2009–20.

Occupation/year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2020
					Number					
0: Armed forces occupations	49,979	60,262	60,762	65,664	59,442	66,132	69,508	73,910	78,149	92,276
1: Managers	39,223	39,853	45,625	55,368	70,480	69,169	75,209	72,852	65,522	101,191
2: Professionals	188,868	210,405	174,359	194,961	234,022	215,755	264,161	298,694	302,593	335,048
3: Technicians and associate professionals	66,253	65,740	60,409	74,487	71,740	92,341	111,922	78,058	127,180	204,294
4: Clerical support workers	145,623	181,835	183,720	198,887	238,156	318,123	302,697	401,400	423,878	311,711
5: Service and sales workers	1,098,938	1,282,165	1,235,765	1,251,223	1,338,821	1,260,601	1,343,067	1,616,337	1,572,904	1,620,622
6: Skilled agricultural, forestry and fishery workers	3,582,420	3,384,782	3,544,622	3,215,471	3,161,076	3,120,153	2,813,884	2,657,930	2,670,428	2,670,925
7: Craft and related trades workers	891,516	979,041	1,030,678	1,127,233	1,313,807	1,676,260	1,966,660	1,981,384	2,100,445	2,012,088
8: Plant and machine operators, and assemblers	222,073	253,236	212,722	254,281	288,679	322,624	325,304	413,255	361,537	405,834
9: Elementary occupations	1,184,468	1,217,628	1,336,785	1,268,532	1,174,280	1,103,514	1,079,924	1,014,120	1,063,806	1,051,988
Total	7,469,360	7,674,946	7,885,447	7,706,108	7,950,503	8,244,672	8,352,335	8,607,939	8,766,443	8,805,976
					Percentage					
0: Armed forces occupations	0.7%	0.8%	0.8%	0.9%	0.7%	0.8%	0.8%	0.9%	0.9%	1.0%
1: Managers	0.5%	0.5%	0.6%	0.7%	0.9%	0.8%	0.9%	0.8%	0.7%	1.1%

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Occupation/year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2020
2: Professionals	2.5%	2.7%	2.2%	2.5%	2.9%	2.6%	3.2%	3.5%	3.5%	3.8%
3: Technicians and associate professionals	0.9%	0.9%	0.8%	1.0%	0.9%	1.1%	1.3%	0.9%	1.5%	2.3%
4: Clerical support workers	1.9%	2.4%	2.3%	2.6%	3.0%	3.9%	3.6%	4.7%	4.8%	3.5%
5: Service and sales workers	14.7%	16.7%	15.7%	16.2%	16.8%	15.3%	16.1%	18.8%	17.9%	18.4%
6: Skilled agricultural, forestry, and fishery workers	48.0%	44.1%	45.0%	41.7%	39.8%	37.8%	33.7%	30.9%	30.5%	30.3%
7: Craft and related trades workers	11.9%	12.8%	13.1%	14.6%	16.5%	20.3%	23.5%	23.0%	24.0%	22.8%
8: Plant and machine operators, and assemblers	3.0%	3.3%	2.7%	3.3%	3.6%	3.9%	3.9%	4.8%	4.1%	4.6%
9: Elementary occupations	15.9%	15.9%	17.0%	16.5%	14.8%	13.4%	12.9%	11.8%	12.1%	11.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: NIS, 2009–20 [4].

Occupational Transition

Many factors have transformed the economic and employment structures in countries. Of these, two main factors are globalization and technology. In Cambodia, as a developing country, net employment growth has so far been positive, and this trend will continue in the future. Yet, in terms of skills demand, the trend has changed. As discussed in the previous section, employment growth took place in the industrial and service sectors while there was a declining trend in the agricultural sector. This reflects that the current labor market is gradually demanding more medium and high-skilled workers. The number of occupations that require high skills increased more than twofold between 2009 and 2020 (see Table 13). Occupations that require semi-skilled workers grew at a different rate, but overall, there was around 18.2% net growth. Occupations such as plant-and-machine operators, assemblers, and clerical support workers grew more than double while occupations in skilled agriculture, forestry, and fishery decreased by around 25% during the same period. At the same time, occupations that require low skills (elementary occupations) also decreased by around 11% [4]. Tasks in elementary occupations generally include selling goods in streets and public places, providing various street services, cleaning, collecting garbage, doing simple farming, fishing, and hunting, among others. This shifting trend may reflect that more formal technical vocational training is required to equip those who move from one occupation to another, especially in occupations that require high skills.

Sectoral Transition

The structural shift of employment away from agriculture, along with the internal rural-to-urban migration trend, has resulted in services and manufacturing sectors absorbing many low-skilled workers. For instance, in 2009, the combined employment in crops, livestock, forestry, and fishery was around 4.3 million or 58% of the total employment (see Table 14). This number significantly dropped to 3.1 million or 36%, only in 2020 [4]. At the same time, employment significantly increased in the two main sectors, namely garments and construction. While these two sectors are believed to absorb low-skilled workers, they are also the main sectors that provide the most formal employment in the country, especially the garments sector. At the same time, in recent years, employment shares in other emerging manufacturing sectors have also increased, thanks to the government's efforts to set various policies to diversify Cambodia's industries and exports, both in terms of products and destinations. With the three new signed free trade agreements (FTAs), namely, Regional Comprehensive Economic Partnership (RCEP); Cambodia–PR China FTA; and Cambodia–ROK FTA; the employment in new emerging sectors, especially in non-garment manufacturing, digital, and ICT, are expected to increase. This means that TVET needs to play a more effective role in building skilled labor forces in response to the demand of the labor market.

Some labor forces shifting away from agriculture may be unable to find jobs in other sectors. These labor forces may end up in informal employment in some industry or service sector like trade or hotel and restaurant. Thus, formalizing informal employment and informal sectors is also important, and the government is on track in doing this work with its new initiative for online business registration.

TABLE 14

SECTORAL TRANSITION, 2009–20.

Sector/year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2020
					Number					
A: Crops	3,021,463	2,752,091	2,786,337	2,793,818	2,937,043	2,723,408	2,565,463	2,164,718	2,244,809	2,128,342
B: Livestock	744,769	826,721	921,597	681,941	573,524	632,242	643,436	731,485	658,064	702,923
C: Forestry	269,994	353,486	346,489	246,070	167,414	119,570	118,763	97,519	142,686	99,373
D: Fishery	267,351	223,933	340,424	208,523	192,306	256,108	142,609	136,440	196,091	193,555
E: Mining	22,792	16,299	23,398	44,308	42,205	32,297	19,082	20,323	11,861	30,683
F: Food, beverages, and tobacco	146,460	132,766	154,618	126,326	126,376	148,832	104,628	145,676	173,653	130,233
G: Garments	433,834	500,399	616,312	606,308	723,481	958,730	1,021,428	1,054,906	1,039,673	975,802
H: Wood paper and publishing	141,573	118,703	74,000	83,410	69,502	109,817	127,193	117,254	88,744	86,511
I: Rubber	0	0	1,325	0	3,344	14,411	5,180	2,450	9,211	2,212
J: Other manufacturing	92,239	83,856	85,997	124,522	113,520	137,926	153,050	178,098	192,558	247,799
K: Construction	260,654	298,330	280,631	356,074	462,026	563,586	661,029	723,952	736,573	773,026
L: Electricity, gas, and water	86,846	96,145	89,888	91,212	38,747	38,897	42,134	47,889	48,821	52,990
M: Trade	850,817	993,766	982,146	1,016,277	1,003,546	919,635	988,567	1,191,045	1,185,743	1,294,480
N: Hotels and restaurants	208,665	218,923	156,638	202,702	291,657	268,478	295,207	343,591	340,880	338,217

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Sector/year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2020
O: Transport and communications	265,175	325,472	295,207	335,290	337,455	364,226	416,310	461,214	390,823	436,368
P: Finance	22,215	22,790	30,422	28,416	32,452	65,295	56,505	75,010	72,843	124,491
Q: Public administration	201,980	214,841	207,405	232,939	240,877	251,173	244,933	285,337	281,395	290,299
R: Real estate and business	143,360	172,280	226,721	209,111	244,511	271,566	360,517	427,246	462,484	414,641
S: Other services	289,175	324,143	265,892	318,861	350,516	368,474	386,301	403,788	489,530	484,032
Total	7,469,360	7,674,946	7,885,447	7,706,108	7,950,503	8,244,672	8,352,335	8,607,939	8,766,443	8,805,976
Percentage										
A: Crops	40.5%	35.9%	35.3%	36.3%	36.9%	33.0%	30.7%	25.1%	25.6%	24.2%
B: Livestock	10.0%	10.8%	11.7%	8.8%	7.2%	7.7%	7.7%	8.5%	7.5%	8.0%
C: Forestry	3.6%	4.6%	4.4%	3.2%	2.1%	1.5%	1.4%	1.1%	1.6%	1.1%
D: Fishery	3.6%	2.9%	4.3%	2.7%	2.4%	3.1%	1.7%	1.6%	2.2%	2.2%
E: Mining	0.3%	0.2%	0.3%	0.6%	0.5%	0.4%	0.2%	0.2%	0.1%	0.3%
F: Food, beverages, and tobacco	2.0%	1.7%	2.0%	1.6%	1.6%	1.8%	1.3%	1.7%	2.0%	1.5%
G: Garments	5.8%	6.5%	7.8%	7.9%	9.1%	11.6%	12.2%	12.3%	11.9%	11.1%
H: Wood paper and publishing	1.9%	1.5%	0.9%	1.1%	0.9%	1.3%	1.5%	1.4%	1.0%	1.0%
I: Rubber	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%	0.0%	0.1%	0.0%

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Sector/year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2020
J: Other manufacturing	1.2%	1.1%	1.1%	1.6%	1.4%	1.7%	1.8%	2.1%	2.2%	2.8%
K: Construction	3.5%	3.9%	3.6%	4.6%	5.8%	6.8%	7.9%	8.4%	8.4%	8.8%
L: Electricity, gas, and water	1.2%	1.3%	1.1%	1.2%	0.5%	0.5%	0.5%	0.6%	0.6%	0.6%
M: Trade	11.4%	12.9%	12.5%	13.2%	12.6%	11.2%	11.8%	13.8%	13.5%	14.7%
N: Hotels and restaurants	2.8%	2.9%	2.0%	2.6%	3.7%	3.3%	3.5%	4.0%	3.9%	3.8%
O: Transport and communications	3.6%	4.2%	3.7%	4.4%	4.2%	4.4%	5.0%	5.4%	4.5%	5.0%
P: Finance	0.3%	0.3%	0.4%	0.4%	0.4%	0.8%	0.7%	0.9%	0.8%	1.4%
Q: Public administration	2.7%	2.8%	2.6%	3.0%	3.0%	3.0%	2.9%	3.3%	3.2%	3.3%
R: Real estate and business	1.9%	2.2%	2.9%	2.7%	3.1%	3.3%	4.3%	5.0%	5.3%	4.7%
S: Other services	3.9%	4.2%	3.4%	4.1%	4.4%	4.5%	4.6%	4.7%	5.6%	5.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: NIS, 2009–20 [4].

School-to-work Transition

According to the ILO, the school-to-work transition is defined as "the passage of a young person (aged 15 to 29 years) from the end of schooling (or entry to the first economic activity) to the first stable or satisfactory job." There are three stages of transition [26]:

- Transited: A young person who is currently employed in
  - a stable job (either satisfactory or non-satisfactory)
  - a satisfying job but temporary or satisfying self-employed job.
- In transition: A young person who is currently
  - employed or unemployed and in school (in the labor force)
  - unemployed and not in school
  - employed in a non-satisfactory job or unemployed and not in school
  - not in school and not in employment but wants to look for work later
- Transition not yet started: A young person who is currently
  - in school and inactive
  - inactive and not in school with no intention of looking for work.

Table 15 shows that a majority of the young Cambodian population (53.4%) had already completed the transition with stable employment or were satisfied with temporary or self-employment [27]. Among those who had already "transited" or were "in transition," there were more males than females.

TABLE 15

SCHOOL-TO-WORK TRANSITION BY STAGE AND GENDER (IN THOUSANDS AND %).

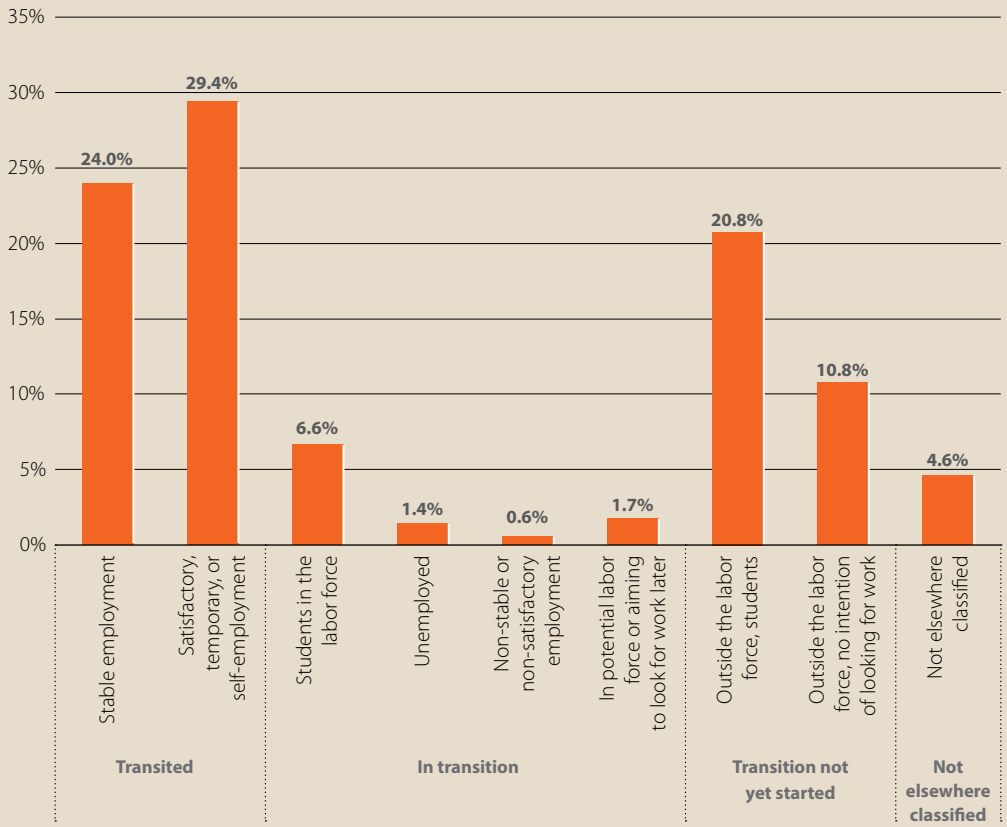
Stage of transition	Total		Male		Female	
	Number	(%)	Number	(%)	Number	(%)
Transited	2,168	53.4%	1,078	55.4%	1,090	51.5%
In transition	423	10.4%	213	11.0%	209	9.9%
Transition not yet started	1,282	31.6%	547	28.1%	735	34.7%
Not elsewhere classified	188	4.6%	107	5.5%	81	3.8%
Total	**4,060**	**100.0%**	**1,945**	**100.0%**	**2,115**	**100.0%**

Source: ILOSTAT of ILO calculated from Cambodia's Labour Force Survey (LFS) 2019 [27].

By looking at detailed forms of transition, most youth (29.4%) were satisfied with their early career even though most of them were having temporary or self-employment, while another 24% had stable employment (see Figure 16). The term stable employment is defined by proof of written contract with a duration greater than 12 months while the term "satisfactory" is defined by the willingness to stay in a job [26].

FIGURE 16

FORMS OF SCHOOL-TO-WORK TRANSITION.



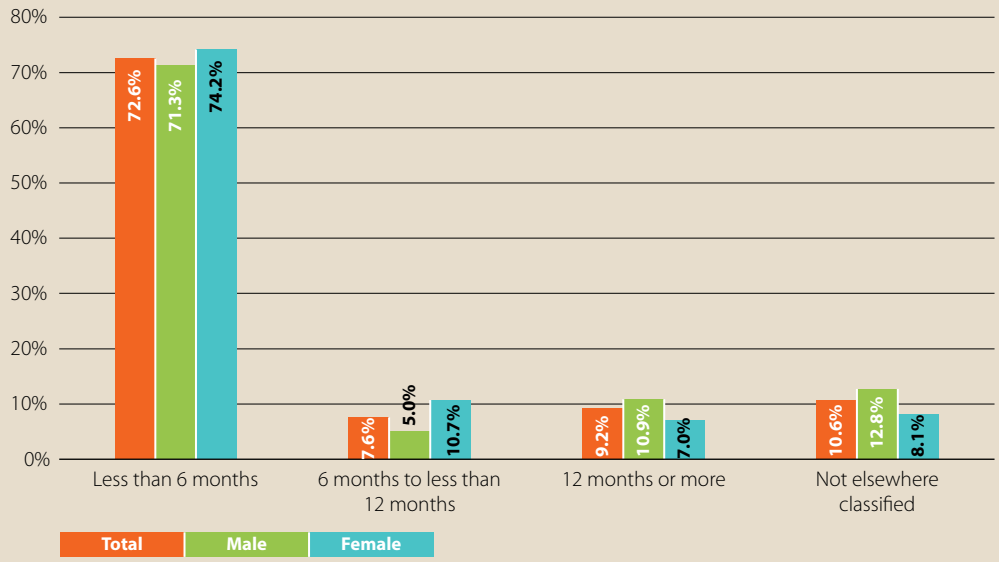
Source: ILOSTAT of ILO calculated from Cambodia's LFS 2019 [27].

For the "in transition" category, the majority of the young population were students who were in the labor force, which means that they were either employed or unemployed but available and looking for a job. This is a good signal for the labor market because students can gain some working experience before leaving school, and in general, they will have more potential for getting satisfactory employment and wages. Another form of the "in transition" stage is the unemployed youth population, which was 1.4% [27]. However, the majority of them were in this status for only a short period of time (less than six months), as shown in Figure 17.

The majority of those in the category of "transition not yet started" were still in school. It is reflected in the LFS that the proportion of youth participating in the labor force decreased in 2019 compared with 2012, while the percentage of youth attending the school increased during the same period. Staying longer in the school was an investment to achieve stable and decent employment at a later stage.

FIGURE 17

UNEMPLOYMENT PERIOD OF YOUTH AGED 15–29 YEARS.



Source: ILOSTAT of ILO calculated from Cambodia's LFS 2019 [27].

Strategic Policy Directions for Cultivating New Talent for Future

National Policy Review

Cambodia has crafted various policies aimed at building quality labor forces to achieve the goal of becoming an upper-middle-income country by 2030 and a high-income country by 2050. In the Rectangular Strategy Phase IV for "Growth, Employment, equity and Efficiency," which is the top socioeconomic policy agenda of the fifth legislature of the National Assembly (2018–23), human resource development is the first priority. One of the four strategic goals is to "create more jobs, in terms of both quality and quantity aspects, especially for the youth through skills training, provision of job market information, improvement in working condition, and promotion of business and investment." As part of this strategy, the government seeks new growth sources to ensure high and sustainable economic growth, and to ensure the readiness to grab new technologies in the era of digital economy as well as to grab opportunities and overcome potential challenges in the context of IR4.0. In this top national strategy, the RGC set its goals to ensure that "each youth specialized at least one skill in life." This Rectangular Strategy paves the way for specialized ministries or government agencies to set out specific policies and strategies for the Industrial Development Policy, National Employment Policy (NEP); National Technical Vocational Education and Training Policy (NTVET); TVET Strategic Action Plan 2019–23; and lastly, the Cambodia Digital Economy and Society Policy Framework.

Industrial Development Policy 2015–25

The Industrial Development Policy (IDP) 2015–25 set its vision to transform and modernize Cambodia's industrial structure from a labor-intensive industry to a skill-based industry by 2025. With this vision, the government is continuing to (1) diversify labor-intensive industries such as manufacturing and agroindustry; (2) diversify productions; and (3) undertake further changes by way of specialization based on sciences and technology development and innovation. To achieve these objectives, the government has set policy measures and actions to improve the quality of technical

vocational education and training by (1) improving curriculum based on industrial development and labor market demand; (2) increasing the number of enrollments for technical skills training in priority sectors (see Table 16); (3) expanding on-site training by focusing on factory workers; and (4) promoting trilateral training among government, training institutions, and companies or factories [28].

TABLE 16

PRIORITY SECTORS SET BY IDP.

N	Priority sectors	Details
First	Emerging industries or manufacturing sectors	Machinery assembly, mechanic, electronic, electric equipment assembly, transport assembly, and natural resource processing.
Second	SMEs in all sectors	Healthcare subsectors (drugs and medical equipment), construction materials, packaging equipment serving experts, furniture manufacturing, and industrial equipment.
Third	Agro-industrial sectors	Agro-industrial production for exports
Fourth	Garment and tourism supporting sectors	Backward-linkage industries for garment sectors, production of spare parts, and assembling of other semi-final products.
Fifth	Other supporting sectors	ITC, energy, heavy industries, handicraft, and green technology

Source: IDP 2015–25 [28].

National Employment Policy 2015–25

Another policy to support the Rectangular Strategy is National Employment Policy (NEP) 2015–25. The NEP is aimed at increasing decent employment opportunities, increasing labor productivity, promoting skills and human resource development, and enhancing labor market governance. Within this policy framework, the government is committed to improving the quality of skills training in compliance with national, ASEAN, and international standards. The government is doing that by developing competency standards (CS), competency-based curriculum (CBC), and competency assessment package (CAP) by benchmarking against ASEAN standards and adapting them to Cambodia's context. The involvement of experts from government and industries ensures that the materials being produced are responding to the labor market [29]. By the end of 2020, CS of 44 occupations with 119 qualifications were developed and approved by the NTB [30]. Soon, the government also aims to develop mutual recognition for skills programs within the ASEAN region, so that skilled labor forces from Cambodia can move to work in the region with a recognition of their skills. In addition, the policy also aims to promote decent and productive employment by formalizing workers from informal economic activities. This is done by facilitating the business registration process (as the government is doing now through CamDX); improving accessibility to formal and informal skills training programs; and increasing work-based learning activities to improve the relevance of training to labor market demands. What is more, this policy also aims to enhance and expand the development of soft skills that are usually seen as challenges from firms' perspectives.

National Technical Vocational Education and Training Policy 2017–25

In line with the aforementioned policies, the National Technical Vocational Education and Training (TVET) Policy 2017–25 set out the framework to develop a TVET strategy for labor forces with better responsiveness to the demands of current and future labor markets. The policy also contributes to industrial diversification and creation of decent jobs while ensuring high quality and productivity of labor forces to better compete with other competitive countries in the region and beyond. The National TVET policy lays

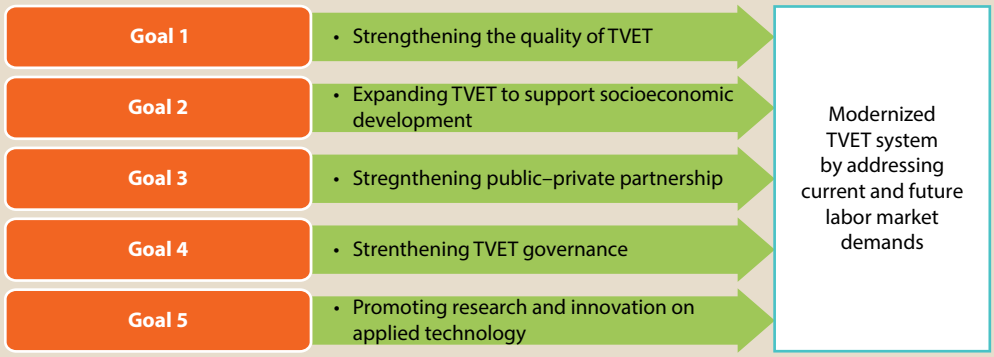
out four goals: (1) to improve the quality of TVET to meet national and international standards; (2) to increase access to TVET for job creation; (3) to promote public–private partnership and engage with relevant stakeholders for sustainable TVET system; and (4) to improve the governance of TVET [31].

TVET Strategic Action Plan 2019–23

Building upon the above-mentioned national policies, and the achievements of the TVET Strategic Plan 2014–18, DGTVET under the MLVT has set up the TVET Strategic Action Plan 2019–23, aimed at addressing the labor market demands by outlining five main goals as demonstrated in Figure 18 [32].

FIGURE 18

FIVE GOALS OF TVET STRATEGIC ACTION PLAN.



Source: MLVT, 2019 [32].

To make sure that this policy is on track, the DGTVET has stated 15 key performance indicators as shown in Table 17.

TABLE 17

KEY PERFORMANCE INDICATORS FOR MODERNIZING TVET SYSTEM, 2019–23.

N.	Key performance indicators	Target	Time frame
G1: Strengthening the quality of TVET			
1	Promulgating TVET Law	Finish by 2023	By 2023
2	Completion rate of TVET of CQF 2 to 4 in priority areas	From 94% to 96.5%	2018–23
3	Graduates who transit to work or study	Increase 1% per year	2018–23
4	Trainers completed CTB	Increase 18% per year	2018–23
5	Trainers with industry experiences	Increase 10% per year	2018–23
G2: Expanding TVET to support socioeconomic development			
1	Number of enrollments of TVET for CQF 2 to 4	From 2,886 to 8,399 per year	2018–23
2	Women's enrollment rate for CQF 2 to 4 (in total enrollments)	From 23% to 30%	2018–23
3	Number of enrollments in short course	From 34,850 to 27,000 per year	2018–23

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N.	Key performance indicators	Target	Time frame
4	Number of participants for qualification assessment through RPL or RCC	From 100 to 400 per year	2020–23
G3: Strengthening public–private partnership			
1	Number of MoUs signed with private sectors	15 to 75 per year	2018–23
2	Number of TVET students doing internships at industries	From 1,754 to 2,500 per year	2018–23
G4: Strengthening TVET governance			
1	Share of total government budget	From 0.63% to 2.34%	2018–23
2	Reliable TVET management information system	Finish by 2020	By 2020
G5: Promoting research and innovations in applied technology			
1	Design and on-going research projects	6 by 2023	By 2023
2	Research finding use for informing policy, strategy, and private-sector investment	3 by 2023	By 2023

Source: MLVT, 2019 [32].

Last, but not least, in 20201, the government adopted the Cambodia Digital Economy and Society Policy Framework 2021–35. It aimed at building a vibrant digital economy and society by laying the foundations to promote digital adoption and transformation across all social actors including the state, citizens, and businesses, to accelerate new economic growth and promote social welfare in the new normal. One of the policy directions is to "build digital citizens" by focusing on promoting digital skills training, while providing guidance on digital skills and careers ranging from leaders to the general public to catch up with the development of digital technology in current and future labor markets [33].

Conclusion

Cambodia experienced a high economic growth rate in the last decade prior to the COVID-19 pandemic. The average annual GDP growth rate was around 7.0% between 2010 and 2019. However, due to the impact of the pandemic, the GDP growth rate dropped to –3.1% in 2020. It was expected to bound back to 2.4% and 4.8% in 2021 and 2022, respectively. The agriculture, industry, and service sectors all contribute to the country's GDP growth rate. While the share of the agricultural sector in GDP has decreased over time, the share of the industrial sector has increased from around 31.0% to 46.4% between 2010 and 2022p. Moreover, industry and export diversifications have been observed in recent years. While garment, textile, footwear, and travel goods are still the main exports from Cambodia, there are signs of increase in the export of non-garment products such as electrical products, electronics, vehicle spare parts, bicycles, and insulated wires and optical cables, among others. This diversification signals that Cambodia, with its young and dynamic population, currently as well as in the short run needs labor forces with medium and high skills, in terms of both quality and quantity. Currently, the education levels of the labor forces are low, which can deter the change toward workers being employed as paid employees or in formal sectors, even though some less educated labor forces have been absorbed by labor-intensive sectors like garment manufacturing.

Aiming to improve the quality of labor forces, the government has put in more efforts, especially in the current mandate to improve the education and skills of labor forces by setting out several national and sectoral policies. From the demand side, a structural shift in demand from agriculture to manufacturing and service sectors has continued to take place even during the pandemic period in 2020 and 2021. For instance, in the current labor market, employment has shifted from the less productive to more productive sectors as well as toward more skilled and higher-paid occupations. Given this, TVET needs a strong and modern system to supply labor forces as demanded by the market.

Currently, the TVET system in Cambodia is under the management of the Directorate General of TVET with the supervision and direction of the National Training Board (NTB). The number of TVET graduates has increased in recent years, especially in priority fields like electronics, electrics, mechanics, IT, and business. To create an enabling environment, the DGTVET of the Ministry of Labour and Vocational Training launched a distance learning principle and most recently an e-learning platform to assist learning and teaching during and after the pandemic. These initiatives are expected to contribute toward increasing both the quantity and quality of TVET graduates.

With this positive trend, however, some challenges remain regarding skill gaps and skill shortages in the labor market for both technical skills and soft skills. To tackle these challenges, both government and private sectors are working together, aiming to cultivate qualified labor forces. For instance, Skill Development Fund (SDF), a public–private partnership platform, was created and provides funding to join training projects in selected priority sectors. The government also develops soft-skills training materials and introduces them to all TVET training institutions to apply. Moreover, some firms in the private sector also conduct training programs to fill the gaps in the labor markets. However, skills development is a long-term investment that involves proper planning and implementation. More commitments from the private sector are also needed, given that not many employers in Cambodia, except some large companies, have provided training to their employees.

In the era of IR4.0, the role of technology is accelerated. However, both at the firm level and the country level, technology and digital adaption and adoption are still low. Raising the awareness for technology and its benefits is needed. At the same time, TVET training providers also need to work with the private sector in order to produce skilled labor forces, especially those with technical and soft skills, as well as those with ICT and digital skills.

In its latest mandate, the government has put human resources development as the first priority in the Rectangular Strategic Plan Phase IV. Many human resource development-oriented policies have been developed and implemented by different government agencies and ministries to transform the country into a skills-driven economy, and to attain the status of a lower-middle-income country by 2030 and a high-income country by 2050.

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FIJI

Abstract

Fiji's economy and prospects of growth and prosperity continue to face challenges with relevant skill supply and youth transition to the labor market, leading to unemployment and a swelling of the informal economy. These are, in part, due to an apparent mismatch between the education system and the demands of the employment market, characterized primarily by tourism and agriculture (which has witnessed decreasing investments) and manufacturing, and political instability. Migrant labor schemes from the 1960's continue to provide pathways to employment of youth and skilled labor and professionals. Government efforts in responding to this challenge, with support from development partners include the expansion and intensification of skill building through Trade and Vocational Education and Training (TVET) as well as strategies to increase productivity.

Introduction

Prior to Fiji's independence in 1970, unskilled labor supply for copra, sugarcane, and gold mining were the foundation of the country's economy and society. Labor market policies and institutions were limited to, and designed for, the constricted nature of the economy. These were supported by legislative instruments to constrain workers while making limited efforts at skilling or reskilling labor. Management, technical, and enterprise-level expertise and skills were provided by European expatriates, even after independence for some time. Demands by increasingly vocal labor forces in response to working conditions and changing international political context yielded worker unions and associations that made decisive impact on labor relations in Fiji, as noted by Plange [1] and Hince [2]. By the middle of the 1960s, the narrow economic base yielded unemployment as it was unable to absorb the growing working-age population. Rather than reinvestments, particularly from sugar profits, to expand the economy and create employment, a bilateral arrangement for a seasonal labor supply from Fiji to New Zealand was arranged in 1966 [3]. Post-independence optimism and economic development strategies, in response to changing international and local markets, provided the platform for new labor legislations and establishment of labor market institutions [2]. The Trade Disputes Act of 1973 and the Trade Unions Recognition Act of 1976 provided a role for unions in negotiations and their recognition, respectively [2]. Adding to these were deliberate strategies for skills development through expansive education policies. The 1969 Education Commission is iconic in the historical development of education for development in Fiji [4].

This paper explores Fiji's labor market policies and changing market demands. It adopts an analytical framework that privileges the critical roles of governments, labor activists, and unions as agents of change within the structure of colonial and post-colonial economies and societies. This allows for an analysis of the changes in Fiji's economy over time, and at specific periods and events, with implications to and effects on the economy, the labor market, and employment. The methodology allows for an engagement with the Fiji National Archives in combination with desk research and analysis of contemporary government and corporate reports and interviews of relevant individuals, along with key informants from selected industries, economic sectors, and manufacturing houses.

Fiji's economy remains susceptible to adverse outcomes determined by multiple factors. These include its geography and environment; international commodity prices; changes and crises in advanced economies and international trade agreements; and the internal issue of indigenous land ownership with implications for land use. An inherited colonial economy with limited diversification from sugarcane production and export of raw sugar exposed Fiji's economy to unprecedented natural disasters with a damaging effect on the sugar industry as a whole [5, 6]. Strident post independent efforts at diversification of the economy, especially with tourism and manufacturing, has broadened the economic base. These are nevertheless impacted by perennially unmet labor market challenges and demands due to skill shortages and mismatches between education and industry [5] and limited productivity. Agriculture, nevertheless, remains significant in the country's economy and society with a share of total national employment of over 40%. More recently, the export sector has expanded to include fisheries, garments, and niche products such as bottled water and cosmetics.

Of relevance to Fiji's development strategies, with implications for a fragile labor market, are the existential threat of climate change and the required skills to complement and sustain new adaptation-and-mitigation technologies for the economy [6]. There is also the nagging issue of deficit of skills, partly due to an enduring migration [6] and a demonstrable 'youth bulge' with limited skills [6]. The policy challenge for economic growth and development is 'skilling and reskilling.' This pertains, especially to the youth, to meet changing labor market demands with skillsets for new technologies in a 'just transition' to a low-carbon or green/blue economy with corresponding jobs and opportunities for innovation and entrepreneurship [6].

Demography, Society, and Economy

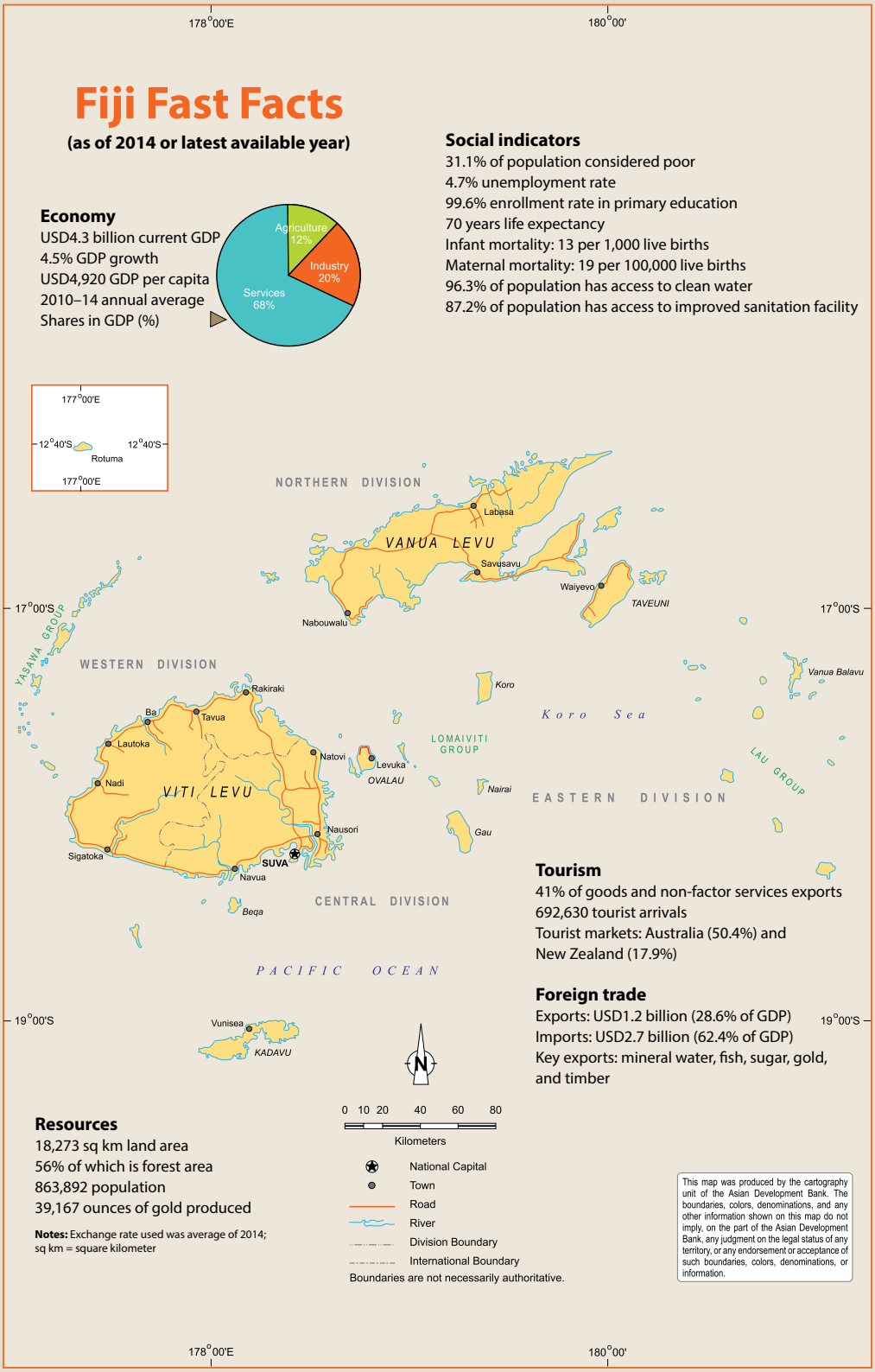
Fiji is a small island developing state (SIDS), geographically remote and distant from the economic centers of the world. It has a total land area of about 18,000 sq km and consists of 332 islands. Two of the islands, Viti Levu and Vanua Levu, are the most inhabited, accounting for around 80% of the country's total population. Altogether, over a hundred other small islands that make up the country are inhabited. Fiji is also a multi-ethnic cultural society of primarily indigenous, Indo–Fijian, and other small categories of people of mainly Pacific Islander and other communities.

The total national population was estimated to be 879,164 in 2014 [7], comprising 51% males and 49% females. The population increased significantly between 1966 and 2007 (from 476,000 to 843,000), particularly since 1986, at the rate of 0.8% (see Figure 1). In 1996, 35% of the population was aged under 15 but by 2007 this percentage declined to 29%. The drop was attributed to a combination of high migration rate and low fertility rate. The experience of a demographic transition in Fiji [8] also resulted in the rise of population aged 65 years and above from 3.2% to 4.6% between 1986 and 1996, and currently around 8%. The outcome is a greater share of working-age population (aged 15 years or more), which rose from 61% in 1996 to 66% by 2007. By 2021, over half of the population was below 30 years of age [9]. For the economy, this is a potential labor force, and a "demographic bonus, but only if most of the working-age population are able to find productive employment" [8, 10].

With a relatively large population and economy built on natural resources of fish, forests, and minerals, the country has emerged as the main economic hub and gateway of the Pacific. The 'Fiji tourism' brand, defined by aspects of natural environment, cultural practices, and friendliness of the people, has

FIGURE 1

COUNTRY PROFILE OF FIJI.



Source: Asian Development Bank,xiii,2015.

continued to grow and offer employment among rural communities. In 2014 and 2017, tourist arrivals reached almost 700,000 and over 840,000, respectively, with corresponding increase in the average length of stay [5, 6]. The government aimed to increase the number of arrivals to over 900,000 by 2021 [11]. Three main sectors, namely, agriculture, fisheries, and services, including tourism, as shown in Figure 1, constitute the backbone of the formal economy. Manufacturing is slowly emerging to contribute to economic growth and employment opportunities. Informal work, including subsistence agriculture, remains dominant in Fiji and provides the source of livelihood for many.

The economy benefits from, and is supported by, a high literacy rate of 98.7% and spoken English with a clarity and quality that has recently attracted the establishment of international call centers in the country [12].

TABLE 1

COUNTRY PROFILE.

Population in 2017	884,887
GDP (current FJD billion) in 2017	10.9
GDP (current USD billion) in 2017	5.31
GDP per capita (FJD) in 2017	12,310
GDP per capita (USD) in 2017	6,000
Export (current FJD billion) in 2017	2.03
Export (current USD billion) in 2017	0.99
Import (current FJD billion) in 2017	4.93
Import (current USD billion) in 2017	2.40
Poverty rate (% of population) in 20131	28.10%
HDR ranking in 2017	92nd out of 189
DBR ranking in 20192	101st out of 190

Source: Fiji Bureau of Statistics, National Development Plan, WDI, HDR 2018, and DBR 2019.

FIGURE 2

POPULATION GROWTH RATES, 2010–20.

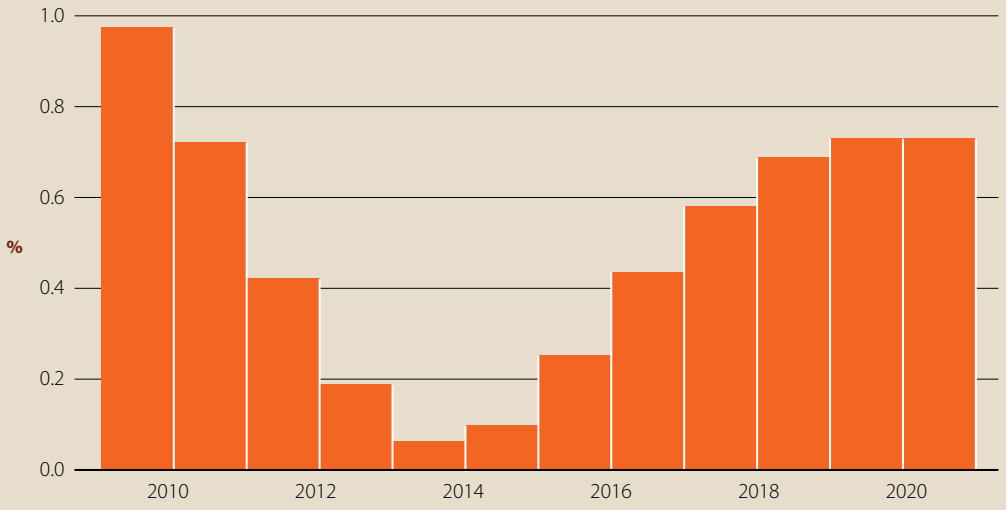
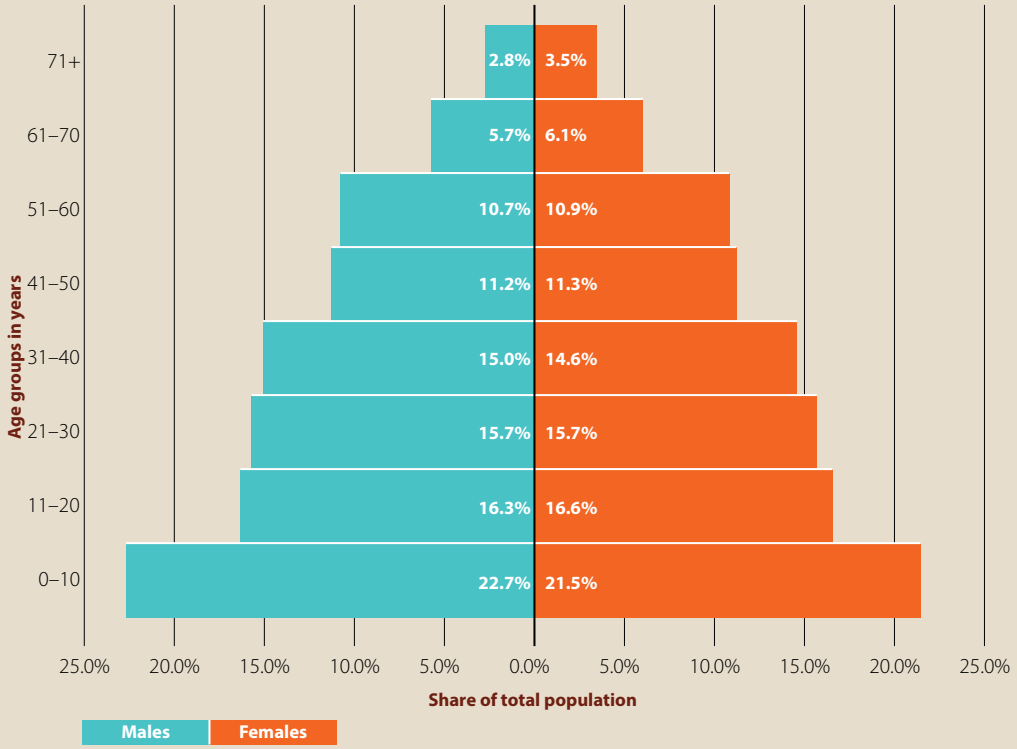


FIGURE 3

FIJI'S POPULATION PYRAMID.



Source: Fiji Household and Income Survey Report, 2021.

TABLE 2

DEMOGRAPHIC STRUCTURE AND EMPLOYMENT, 1966–2011.

	Census year					EUS year	
	1966	1976	1986	1996	2007	2004/05	2010/11
Categories							
Age 15–64 (%)	51.2	56.6	58.9	61.2	66.4	66.3	68.2
Child age (0–14) (%)	46.5	40.9	38.0	35.6	29.1	29.5	26.9
Old age (65+) (%)	2.4	2.5	3.1	3.2	4.5	4.2	5.0
Female (%)	49.0	49.3	49.4	49.4	48.8	48.9	48.7
Average age	20.85	22.43	23.57	25.15	28.29	28.04	37.99
Years of schooling	...	4.62	5.66	6.46	7.53	...	...
Categories							
iTaukei (%)	42.5	44.6	46.0	50.0	57.3	52.8	55.1
Indo–Fijian (%)	50.4	49.2	48.9	44.5	37.1	42.3	40.3
Urban (%)	...	...	39.0	...	50.7	49.8	51.7

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	Census year					EUS year	
	1966	1976	1986	1996	2007	2004/05	2010/11
Regional division							
Central (%)	32.3	35.9	36.7	38.2	40.9	40.4	42.9
East (%)	8.4	6.7	5.8	5.2	4.7	4.7	2.8
North (%)	17.6	16.3	17.9	18.2	16.2	16.3	17.1
West (%)	41.7	41.2	39.6	38.4	38.1	38.6	37.2
Migration (last 5 years)							
Internal (%)	...	15.7	14.9	14.0	14.7	22.2	21.4
External (%)	...	1.5	1.3	1.4	1.6	...	...
Total population	475,790	572,140	721,580	773,820	843,230	817,952	819,416

Source: Fiji: Creating Quality Jobs: Employment Diagnostic Study, ADB/ILO, 2015, 39.

Economy, Labor Force Status, and Market Trends

Fiji's efforts at economic development and growth with intended positive outcomes for the population have been accompanied, since independence, by a series of political upheavals and external shocks, with adverse effects on growth. These continue to have critical implications for the labor market. Military coups between 1987 and 2006, accompanied by regulations and decrees to deregulate the labor market and reform labor market institutions, have contributed to the volatile growth of the economy. From import substitution policies immediately after independence in 1970 [13] through structural adjustment strategies from 1984, and aggressively outward looking market-oriented policies from 2006, Fiji continues to search for a development path with positive growth and job creation [3, 5]. These efforts continue to be affected by damaging natural disasters, including the recent COVID-19, leading to downward spiral of the GDP as shown in Table 1. This is more so because the driving sectors of Fiji's economy are all primary-resource based, with high exposure to environmental and climate variability [6]. The economy had a moderate growth and a real GDP rate between 1971 and 1981 of about 3.8% per annum but was severely affected by the oil shocks of 1981–82 and 2008 [14]. A shift to a more outward looking strategy contributed to labor market demands and opportunities for employment in the textile and tourism sectors, especially for women. Again, external shocks due to the Asian financial crisis of 1997, combined with the global financial crisis of 2009–10 and natural disasters, negatively impacted investments and the structure of production [14].

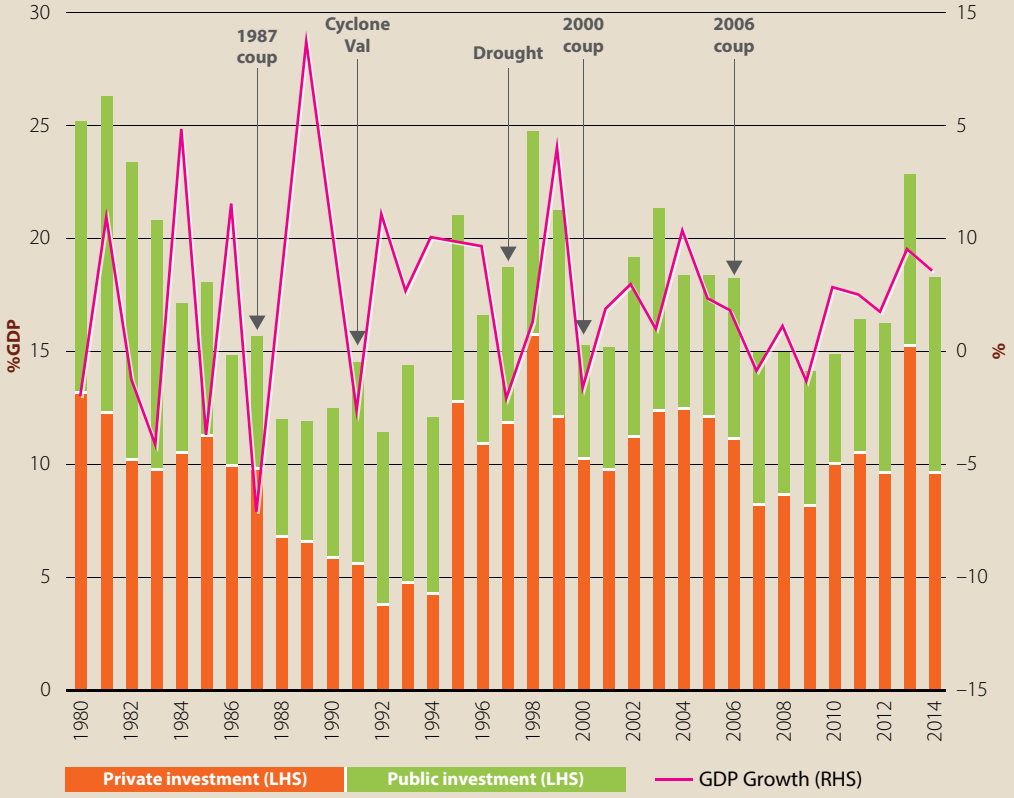
Evidently, the trajectory of Fiji's economy and growth since 2000 presents an unsettled path with mixed performance. The government, nevertheless, has remained proactive in incentivizing and setting an aspirational investment of 25% of GDP [14]. Additionally, in collaboration with the private sector, it has remained active with human resource development to ensure 'economic growth and improving living standards' [1, 15].

The Development Challenge

The critical challenges of Fiji's economy are rooted in the country's mono-cultural colonial economy with the dominance of sugarcane production. Significant, and related, aspects of the

FIGURE 4

INVESTMENTS AND ECONOMIC GROWTH.



Source: World Bank, 2015,9.

emerging labor market and trends (e.g., employment situation) at independence, are relevant for this study. These are: (1) demographic (a growing working-age population); (2) labor market/labor supply (including a pattern of seasonal labor migration to New Zealand, agreed upon between the governments of Fiji and New Zealand); and (3) skill building and productivity (efforts to build skills and to improve on productivity) of the labor force. The latter included, from around 1966 onward, an improvement in the education system with the establishment of technical and vocational education, The Derrick Technical Institute (later to become Fiji Institute of Technology and more recently integrated with other institutions into a Fiji national University) with a mandate to provide skills in building, civil, mechanical, and electrical engineering and courses in apprenticeship. This added to other vocational institutions in nursing, agriculture, and medicine. In response to unemployment, as mentioned above, an agreed upon seasonal supply of unskilled labor, to meet demands in New Zealand, provided a temporary reprieve to the government; and by 1987, over 10,000 Fijians had been part of this scheme [3]. Evidently, seasonal work schemes with either New Zealand, Australia, or both have remained critical and defining characteristic of Fiji's economy and labor market challenges with increasing policy modifications in recent times [16].

Contemporary Issues in Employment, and the Labor Market

Fiji's efforts at economic growth, with projected equity and positive employment outcomes and shares by population, have been mixed. Military coups and instability had exacerbated an already

fragile labor market characterized by increased skilled emigration. It is estimated that more than 60,000 people emigrated during 1985–90 and almost the same number of people emigrated during 2000–06, with over 60% of them being skilled, i.e., having post-secondary education [5, 30]. Economic restructuring, in response to globalization, with tax-free incentives and changes in labor market institutions, produced a burgeoning category of casual labor, and by 1995, the tax-free factories (TFFs) made significant contribution to employment, accounting for an estimated 12.8% of total waged/salaried employment [17]. Characteristically, these contributed to a demonstrable shift toward a low-wage economy with an increase in the labor force participation of women [17], albeit comparatively low due to enduring traditional values and norms in contemporary Fiji.

A slow decline in the garments industry by the year 2000 was compensated for by manufacturing of newly identified products. These included furniture; mining (copper and silver); and cosmetics. These developments were, however, insufficient to yield positive outcomes in the labor market, especially for around 20% of the workforce (mostly Indo–Fijian) that relies on sugar production for employment [18].

Labor Supply Trends and Challenges

Within the context of lackluster economic growth, informal economic activity has remained a key aspect of Fiji's economy. This has been accompanied by increasing unemployment and underemployment, low youth employment, and a large subsistence sector. COVID-19 and its negative impact on employment contributed significantly to increase in informal paid and unpaid work, with gender disparities, and a growing category of working poor.

TABLE 3

LABOR FORCE TO POPULATION RATIO (LFPR), 1996 AND 2007.

Age groups	1996 census			2007 census		
	LF	Population	LFPR (%)	LF	Population	LFPR (%)
10–14	–	–	–	7,799	82,384	9.5
15–19	24,438	83,682	29.2	18,656	79,518	23.5
20–24	42,413	66,955	63.3	47,221	80,352	58.8
25–29	42,462	61,660	68.9	49,346	73,487	67.1
30–34	42,811	60,841	70.4	43,063	63,535	67.8
35–39	40,068	55,779	71.8	38,466	56,552	68.0
40–44	31,856	44,180	72.1	37,749	56,274	67.1
45–49	25,347	37,081	68.4	32,662	50,322	64.9
50–54	18,661	28,683	65.1	23,779	40,009	59.4
55–59	12,863	22,245	57.8	15,830	31,161	50.8
60–64	8,033	15,459	52.0	9,218	24,120	38.2
65–69	4,801	10,761	44.6	5,563	16,808	33.1
70–74	2,323	6,357	36.5	2,781	10,110	27.5
75+	1,694	7,230	23.4	2,654	11,902	22.3
Total	297,770	775,077	38.4	334,787	837,271	40.0

Source: Ministry of Strategic Planning, National Development and Statistics, August 2011.

While there was an annual average growth of 2.5% in the labor force, from 153,868 in 1970 to 330,000 in 2008, only 40% of this was absorbed into formal employment as wage earners [14, 15]. Labor force participation rate increased from 58% in 2004–05 to 64.5% in 2010–11 [5, 22]. Between 1996 and 2007 too, the labor force participation rate had grown from 38.4% to about 40% [15], as shown in Table 3, with around 128,000 engaged in wage and salary work by 2007. Census data also show an increase in those working in the money economy between 1996 and 2007, though there was also a corresponding increase in those unemployed, from 11,124 to 28,014. Moreover, there were urban/rural differences and differentiations in employment categories with notable gender and income disparities (see Tables 4, 5, 6, and 7).

TABLE 4

LABOR FORCE AND EMPLOYMENT STATUS, 1996 AND 2007.

Labor force category	1996 census	2007 census
In-money economy	219,314	252,399
Subsistence (without money)	67,332	46,575
Unemployed	11,124	28,014
Total labor force	297,770	326,988

Source: Ministry of Strategic Planning, National Development and Statistics, 2011

TABLE 5

POPULATION AGED 15+ YEARS AND LABOR FORCE/LABOR FORCE PARTICIPATION RATE, 2004/11.

	2004/05			2010/11		
	Male	Female	Total	Male	Female	Total
Population (aged 15+)	292,383	284,499	576,882	307,532	291,870	599,402
Labor force	231,631	102,797	334,428	250,488	135,901	386,390
Labor force participation rate (%)	79.2	36.1	58.0	81.5	46.6	64.5
Employment	222,195	96,584	318,779	239,114	129,003	368,118
Employment/WAP rate (%)	76.0	33.9	55.3	77.8	44.2	61.4
Unemployment	9,437	6,212	15,649	11,374	6,898	18,272
Unemployment rate (%)	4.1	6.0	4.7	4.5	5.1	4.7

Sources: Estimates from Fiji Bureau of Statistics. Employment and Unemployment Survey (EUS) of 2004/05 and EUS 2010/11.
Note: Estimates are based on a seven-day reference period.

TABLE 6

EMPLOYMENT AND OCCUPATIONAL CATEGORIES, 1996 AND 2007.

Occupational groups	1996 census (percentage of employment)	2007 census (percentage of employment)
Legislators, senior office managers	4.0	4.31
Professionals	8.0	13.26
Professional technical and related workers	5.0	11.63
Administrative and managerial workers	–	–
Clerical and related workers	8.0	14.07

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Occupational groups	1996 census (percentage of employment)	2007 census (percentage of employment)
Service workers and shop and market sales workers	10.0	16.90
Agricultural, animal husbandry and forestry workers and fishermen	21.0	0.88
Craft and related workers	12.0	10.16
Production workers, transport equipment operators, and laborers	10.0	10.04
Elementary occupations	21.0	14.99
Armed forces	–	3.74
Workers not classified	1.0	–
NEC	–	0.03

Source: Ministry of Strategic Planning, National Development and Statistics.

TABLE 7

OCCUPATIONAL DISTRIBUTION OF PAID EMPLOYMENT BY GENDER, 2007.

	Legislators, senior officials and mangers	Professionals	Technicians and associates	Clerks	Service worker and shop and market sales worker	Skilled agriculture and fishery worker	Craft and related worker	Plant and machinery operators and assemblers	Elementary occupations	Armed forces	NEC
M	3,830	7,925	8,617	7,063	12,416	996	10,680	7,436	13,985	4,273	18
F	1,194	7,544	4,946	9,343	7,299	36	1,169	4,272	3,495	86	12
T	5,024	15,469	13,563	16,406	19,715	1,032	11,849	11,708	17,480	4,359	30

Source: Ministry of Strategic Planning, National Development and Statistics, 2011

TABLE 8

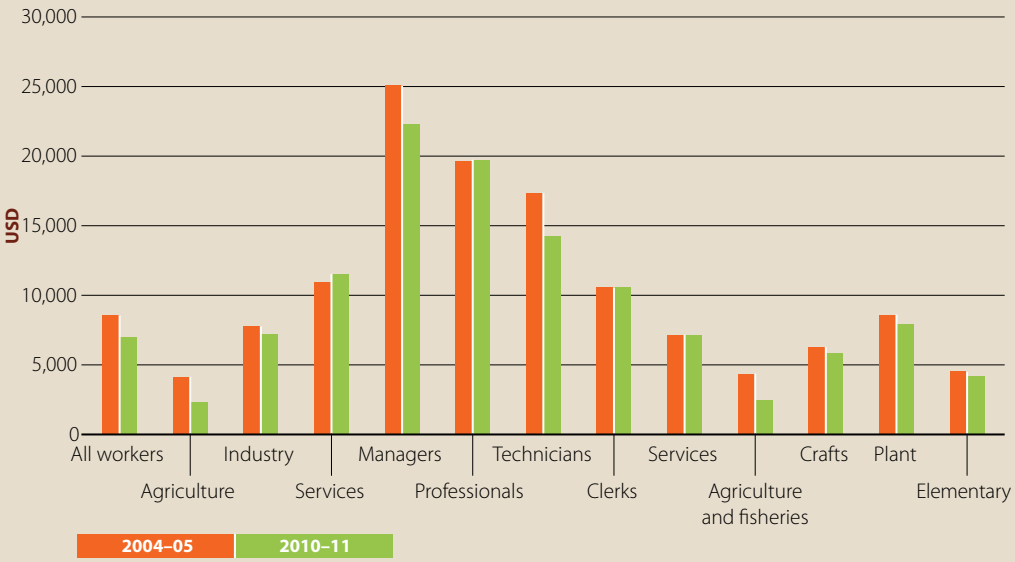
HOUSEHOLD INCOMES.

	Combined household incomes					Individual incomes		
	1st job annual income	Total annual income	Equivalized annual income	Annual weekly income	Equivalized annual weekly	1st job annual income	All job annual income	Annual weekly income
Average income (FJD)								
2004/05	18,674	24,811	10,753	17,633	7,568	4,785	6,431	4,491
2010/11	16,150	17,761	9,019	17,507	8,891	4,382	4,829	4,760
Change (%)	(13.5)	(28.4)	(16.1)	(0.7)	17.5	(8.4)	(24.9)	6.0
Gini coefficient								
2004/05	0.503	0.487	0.480	0.443	0.431	0.729	0.717	0.701
2010/11	0.543	0.504	0.490	0.523	0.512	0.746	0.722	0.738
Change (%)	7.9	3.6	2.2	18.1	18.7	2.3	0.7	5.4

Source: ADB/ILO, 2015,39

FIGURE 5

AVERAGE ANNUAL EARNINGS BY SECTOR, 2010–11 PRICES.



Source: Fiji Bureau of Statistics; Employment and unemployment survey (EUS) 2004/05 and EUS 2010/11.

By 2010, the working-age population was around 600,000 [5, 7], which was almost 71% of the total population. Of this, around 368,000 were employed, with males and females making 81.5% and 46.6%, respectively; and total unemployment stood at 4.7% [5, 7]. Among those employed, about 60% were categorized as having informal employment [5, 7]. Among those working for money, 53.1% were salaried workers; 11.4% were self-employed; and around 35% were subsistence and other workers. It is estimated that there is an annual entrance of about 20,000 school leavers to the labor market for just about 10,000 formal positions [10, 37]. There is also a significant gender disparity in the labor market with a gap of 39.9% in labor force participation rate. In 2010–11, the unemployment rate for women stood at 5.1%, which was an increase of about 10% from 2005 [5, 8]. For the majority of women, informal employment in subsistence and household work amounted to their participation in the labor force. Additionally, there are skill-shortage issues with the rural labor market. The ADB/ILO [5] report noted that 'informal employment in the rural areas,' at about 78%, is much higher, almost double the informal unemployment of 38% in urban areas. Further, only 8% of the working population in rural areas had post-secondary education [5, 7].

Of significance to Fiji's efforts at economic growth is the chronic and enduringly low employment rates of young people, especially young women. Unemployment rates in population aged 15–24 years has remained high at about four times higher than in the population aged 25–24 years and 14 times than in population aged 45–64 years [5, 8]. The situation is acute for young women for whom the rate of unemployment was almost 20% compared with 13% for young men. These negative labor supply issues underline the observation that the challenge for labor market associations, and indeed for the government, is to bring significant proportions of the socially excluded groups into the formal sector through human resource development interventions. By 2014, the rate of unemployment stood at 6.2%, with remarkable youth and gender disparities. Particularly concerning was the rising unemployment of the educated youth. For example, the rate of unemployment of

youth with post-secondary education increased from below 10% in 2004–05 to almost 20% in 2010–11. It was also estimated that around 40% of the youth in employment had jobs that were not complementary to their qualifications [5, 28].

As indicated earlier, an aspect of labor supply and employment trends in Fiji has, since the 1960s, included export of labor, and migration, to New Zealand and Australia. Available data show there were a total of 64,000 migrants from Fiji during the period 1987–99, with different skill levels. These included technicians, senior managers, legislators, and administrative workers [13, 16].

TABLE 9

YOUTH AND EMPLOYMENT BY GENDER.

	2004/05			2010/11		
	All	Males	Females	All	Males	Females
Youth population (aged 15–24 years)	162,108	83,487	78,621	147,208	77,788	69,420
(Percentage)						
In education	46.3	44.9	47.8	50.2	48.3	52.4
Employed	35.1	47.6	21.7	32.2	42.9	20.1
Unemployed	4.3	4.1	4.6	5.7	6.3	5.0
Other	14.3	3.3	25.9	11.9	2.5	22.4
By ethnicity						
iTaukei	82,190	43,866	38,323	85,453	45,328	40,124
In education	45.2	45.0	45.3	47.9	44.6	51.6
Employed	35.8	47.0	22.9	33.8	46.1	20.0
Unemployed	3.7	3.8	3.5	6.2	6.6	5.8
Other	15.4	4.1	28.3	12.1	2.8	22.6
Indo-Fijian	71,471	34,852	36,619	55,578	29,149	26,428
In education	46.5	43.6	49.2	52.1	52.3	51.8
Employed	34.8	49.0	21.3	30.3	39.0	20.9
Unemployed	5.0	4.7	5.3	5.0	6.2	3.7
Other	13.7	2.7	24.1	12.7	2.5	23.7
Other ethnicities	8,447	4,768	3,679	6,177	3,310	2,867
In education	56.0	53.4	59.5	65.6	62.5	69.1
Employed	30.9	41.1	17.6	26.3	35.0	16.2
Unemployed	3.6	2.6	4.9	4.3	2.5	6.3
Other	9.5	2.9	18.1	3.9	0.0	8.4

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	Education level			Education level		
	Primary	Secondary	Post secondary	Primary	Secondary	Post secondary
Aged 15–24 years	97,307	46,260	18,340	82,825	44,267	20,027
(Percentage)						
In education	42.3	53.7	48.5	54.7	52.1	27.4
Employed	37.0	29.2	40.3	29.6	29.1	49.7
Unemployed	4.2	4.9	4.0	4.1	5.4	13.0
Other	16.6	12.2	7.1	11.6	13.4	10.0

Source: Adapted from ADB/ILO, 2015.

Government strategies to reconfigure the direction of the economy to create opportunities for employment have been constrained by relatively low levels of investments, along with uncertainties within the body politic. The government's aspiration and objective of achieving an investment-to-GDP ratio of 25% was last met in 1981 but has since been in a decline, from 18% in 2000–05 to 13% in 2005–10 [3, 7, 14]. A World Bank enterprise survey showed that 45% of businesses noted political instability as a concern while unpredictable legislative environment was also mentioned by some [18, 11]. The economy was also affected, severely, by the termination of preferential price regimes for garments and sugar. Even more challenging, with severe implications on the economy and employment opportunities, were the global economic crisis and the associated financial crisis. These had negative impacts on job creation and led to growing poverty in the country which, by 2010, stood at 35.2%. The government's proactive response, with broad social protection schemes, was effective in reducing poverty to around 25%, but was adversely affected by COVID-19, thereby leading to an official estimate of increase in the poverty rate to almost 30% [8], while anecdotally, the increase was put at almost 40%. The immediate labor-market-related effect of COVID-19 preventive measures was primarily on the services industry, including tourism, where employment was the highest, especially among women [18].

Enhancing Employment for Economic Growth: Rethinking Education and TVET

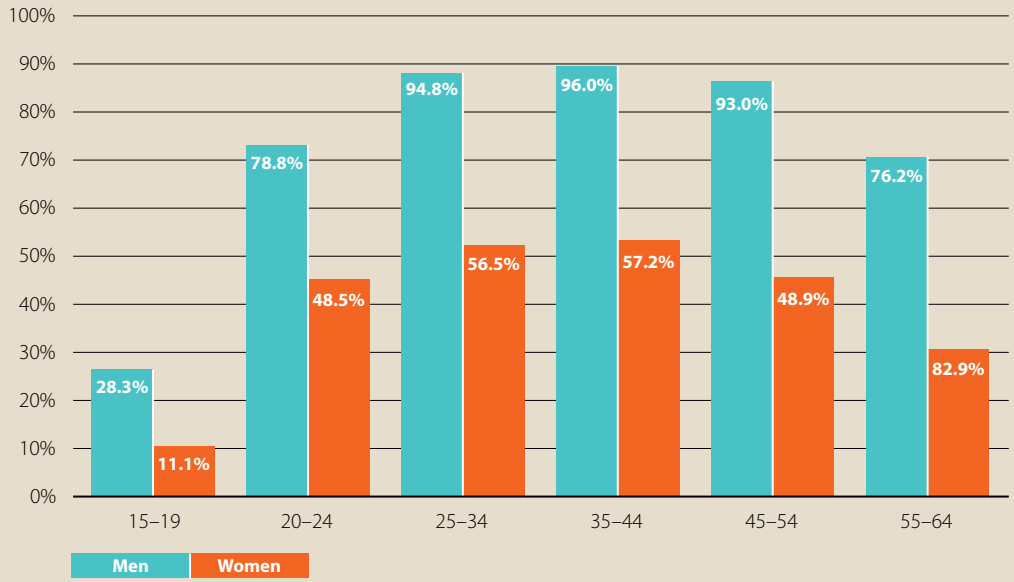
Government strategies for enhancing the skills and capabilities of the youth for employment were underscored with the establishment of a new tertiary institution, The Fiji National University, in 2009. It is a dual-sector tertiary institution (TVET and higher education) with an added incentive scheme, called Toppers, to attract high-achieving students. A Tertiary Education Loans Scheme (TELS) capped the government's policy direction in response to skilling the youth for the future. The rethinking embraced TVET training as essential for economic growth [19]. The scheme allowed students, without minimum requirements for higher education, to opt for the technical colleges established by government in 2014. These policy initiatives preceded a robust five-year and 20-year National Development Plan with a vision to 'transform Fiji' [20]. The realization of this would inevitably require, and depend on, multiplicity of available technical and vocational skills. Skilling the youth to enhance effective transitioning to the labor market has always been a primary objective for successive governments in Fiji, with the pathways running through primary to tertiary education, including TVET training. This is demonstrated by, as of 2016, 79 primary schools; 176 secondary schools; 17 special schools (including six vocational schools); and three

universities [5]. There are also 24 TVET facilities, which include four government, 16 private, and four regional institutions [5] and village- or community-level institutions that provide informal training in farming and other relevant skills (see Appendix 1). Additional government efforts at improving access to education and skilling of youth include the Free Education Policy, were introduced in 2013–14 [21] to remove the burden of cost on poor parents.

These policy directions were taken amidst a continuing report on, and concerns with, the quality of education. These reports consistently referenced acute skill gaps, shortages in the industry, and mismatches of skills. Additionally, data from employer surveys and consultations with industry representatives suggested a critical need to strengthen the quality of basic education and training systems to meet labor market demands [5, 9]. By 2011, for example, youth unemployment (age group 15–24 years) stood at 15% and significantly higher than that of the age group of 25–44 years, and, as noted by an ADB/ILO [5, 8] report, was almost 14 times higher than the age group of 45–64 years. Comparatively, young women fared worse in this scenario, with an unemployment rate of around 20% compared with 12% for young men. In spite of an increase in the labor force participation rate by 2019–20, women continued to fare worse than men across all age groups and particularly in the age group 15–24 in actual employment rates (see Figures 4 and 5).

FIGURE 6

LABOR FORCE PARTICIPATION BY AGE GROUP AND GENDER.



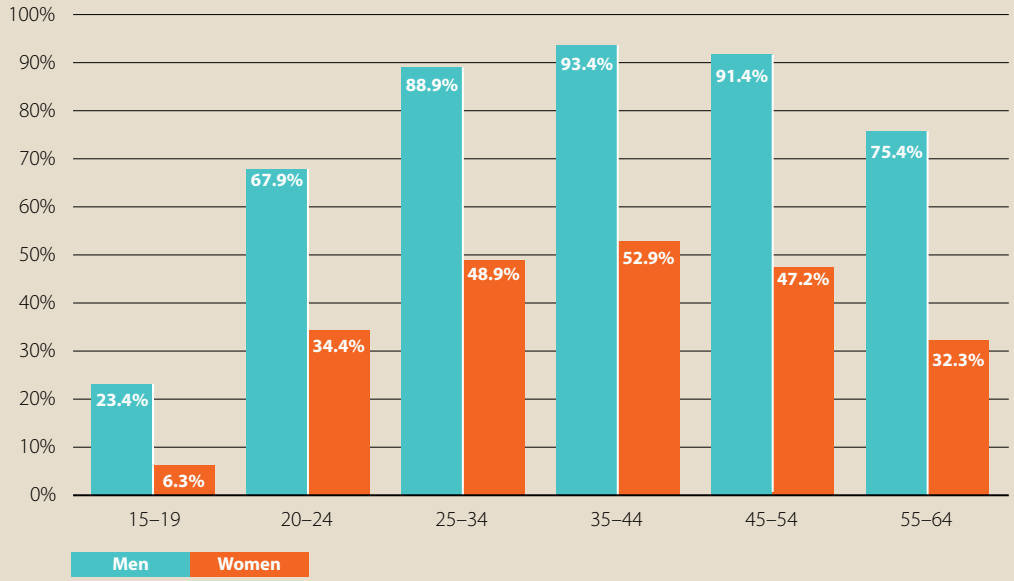
Source: Government of Fiji , HIES, 2021.

Resetting Education to Enhance Employment and Productivity with TVET

Vocational education as an aspect of youth education for transition to the labor market in Fiji is not new. A nagging problem has been the prejudice with an education system that has an accent on higher education embedded with skills and aspirations for a white-collar job, as noted by Tagicakiverata [22] and Ward [23], along with gendered counseling and school subject choices [24]. Among the decision makers, even in education, TVET continues to be seen as a 'fall back' option for lack of success with higher education. By 2014, for example, few students, and still fewer girls, in secondary schools were opting for TVET programs as pathways to employment.

FIGURE 7

EMPLOYMENT BY AGE GROUP AND GENDER.



Source: Government of Fiji , HIES, 2021.

Against the concerns of increasing youth unemployment and industry complaints, this presented a challenging situation for the economy as a whole, especially to the demographic situation represented in what is now called 'the youth bulge,' i.e., a demographic phenomenon that shows a widening of the youth section in the population pyramid.

Efforts to reset TVET education were revitalized with a government policy paper, 'Technical, Vocational, Enterprise Education and Training in 2007' [25]. This was meant to provide standards for the many TVET providers and a 'clear, manageable, and quality-assured structure for the effective delivery of technical and vocational enterprise education and training programs in schools, private institutions, nonformal training providers, relevant ministries, and tertiary institutions' [25]. The renewed strategy requires TVET providers to administer programs that meet the established criteria to

- meet national standards of accreditation;
- allow learners to achieve optimal holistic education and training outcomes;
- address community, resource utilization, labor market and business needs; and
- promote lifelong learning, and address equity, inclusion, and access issues across genders, people with disabilities, etc.

These were set against the backdrop of failures in TVET education 'despite numerous curriculum reforms promoting vocational education and training….' [26] even though TVET 'has the potential to contribute to sustainable development, education for all, knowledge society and citizenship.' [26] The critical challenge for TVET education at this stage included, as highlighted by Tuisawau [26],

an effective coordinating authority for policy, planning, management, implementation, assessment, and supervision. This underpinned the establishment of the Fiji High Education Commission (FHEC) with a mandate to provide 'quality assurance in the post-secondary school education training sector, including TVET delivery, and to develop the Fiji Qualification Framework (FQF)' [27]. To affect a new attitude and perception toward TVET, a name change was introduced in 2013, when TVET became Technology Employment Skills Training (TEST). Other strategies included the mainstreaming of TVET subjects within the secondary school curriculum to enhance their availability and reduce the stigma attached to them. The establishment of the Fiji National University in 2009, described as entailing 'the most significant TVET reforms' in Fiji [5] was a demonstrable government objective to enhance the stature and visibility of TVET education. With its five colleges and as a dual sector with over 30,000 students, it provided a pathway from TVET to higher-degree programs with 'university accreditation' [5].

FIGURE 8

PATHWAYS TO THE LABOR MARKET AND WORLD OF WORK.

Source: Adapted from ADB/ILO, 2016.

Critical support from development partners, especially Australia, contributed to enable an effective TVET training in Fiji (and the South Pacific region). The National Employment Policy, 2018, endorsed the revitalization of TVET education with the suggestion for a more effective alignment between education and training providers and employers. The policy also recognized the need for skills training to take advantage of the new technologies that would drive the climate-change-induced 'green economy' and 'green jobs' as the country sought to enhance sustainable development through its key sectors.

TABLE 10

GOVERNMENT EXPENDITURE ON TVET EDUCATION, 2012–13.

TVET providers	Personnel	MOOE	Overhead	Total recurrent	Capital	Scholarships	Total
FNU	36,454	15,485	21,331	73,270	–	–	73,270
Ministry of Education	3,753	2,513	–	6,265	148	–	6,413
MoYS	200	207	–	407	46	–	453
Other government agencies	418	911	–	1,329	–	–	1,329

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TVET providers	Personnel	MOOE	Overhead	Total recurrent	Capital	Scholarships	Total
Private providers	1,907	2,429	–	4,336	–	–	4,336
APTC	4,676	3,660	8,143	16,480	730	4,126	21,336
Other regional providers	1,013	430	–	1,444	–	–	1,444
PSC scholarships	–	–	–	–	–	3,399	3,399
Total	48,421	25,636	29,474	103,531	924	7,525	111,980

Source: Adapted from ADB/ILO, 2015.

The availability of, and access to, skills training as a 'pathway' or transitioning to the labor market has been problematic as 'students' career aspirations do not match available jobs in the labor market' [5, 10], thus leading to underemployment and unemployment. There are also mismatches or misalignments between qualifications and industry demands, along with deficits in workplace experience and what are now referred to as 'soft skills' [5]. This is in spite of increased efforts by the government through budgets and welfarist policies to enhance access to education and relieve the burden of cost on parents. Assistance has been in forms such as free bus fares, scaled-up scholarships, etc. Recent evidence, however, suggests a glimmer of hope for these policy initiatives as "traditional pathways are changing, and girls and women are slowly enrolling in previously male-dominated training programs such as engineering, architecture, plumbing, carpentry, and joinery" [5, 9].

TABLE 11

TVET GRADUATES FROM FIJI NATIONAL UNIVERSITY BY PROGRAM AND GENDER, 2012.

Graduates from colleges of engineering	Females	Males
Advanced Diploma in Civil Engineering	2	22
Advanced Diploma in Engineering (Electrical and Electronics)	3	6
Advanced Diploma in Mechanical Engineering	2	12
Diploma in Industrial Laboratory Technician	14	5
Diploma in Agricultural Engineering	2	4
Diploma in Applied Fisheries Technology	5	6
Diploma in Architectural Technology	3	21
Diploma in Automotive Engineering	1	15
Diploma in Civil Engineering	4	21
Diploma in Electrical Engineering (Computer and Control)	1	1
Diploma in Electrical Engineering (Electrical and Renewable Energy)	8	41
Diploma in Electrical Engineering (Telecommunication and Networking)	4	27
Diploma in Industrial Laboratory Technology	14	6

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Graduates from colleges of engineering	Females	Males
Diploma in Mechanical Engineering	4	24
Diploma in Plant Engineering	2	24
Diploma in Quantity Surveying	1	13
Trade Certificate in Agricultural Engineering	2	3
Trade Certificate in Aircraft Maintenance Engineering (Mechanical)	2	18
Trade Certificate in Electrical Engineering	6	23
Trade Certificate in Heavy Mobile Plant	2	11
Certificate I in Ships Operations (Class 5 Masters)	1	2
Certificate in Electrical Serviceman	2	16
Certificate IV in Electrical Engineering	2	13
Total graduates from the TVET programs listed above	87	334
% by gender	21%	79%

Source: Adapted from ADB/ILO, 2015.

Fiji government's response to these apparent challenges emerging from youth labor force participation rates and the gender and rural disparities was the development of a National Strategic Human Resource Plan, 2011–15 [10]. The plan was informed by the thinking that "human resource development is vital for economic growth and improving standards…and that in a small island state this is critical, given the existence of many physical and economic challenges" [1, 10]. Significant aspects of this plan included the establishment of 'Fiji National Qualification (FNQ) System' to streamline the activities and trainings offered by the numerous vocational training institutions and the 'Labor Market Reform.' A mandate [10, 22] was given for the operations of the former embraced activities such as:

- to develop, apply, and carry out regular reviews of vocational competency standards relating to qualifications specified in the FNQ framework;
- to arrange for the accreditation and registration of training providers and trainers and to approve regular reviews of such accreditation and registration;
- to administer and conduct national examinations and tests for trades; and
- to coordinate an accessible and flexible qualifications system, the standards of which are recognized internationally, to meet national needs.

The mandate and its execution became part of the remit of the Fiji High Education Commission, established in 2010, which now engages with higher education institutions in the country to ensure the development and maintenance of respective quality and acceptable standards across different levels of the higher education system while promoting international recognition of the qualifications offered in Fiji.

Among labor market reforms, different initiatives culminating in action for interventions of the labor market were endorsed. These covered those such as:

- Occupational health and Safety Reform, 1991 and 2001;
- Employment Relations Reform, 1996–2003 and 2003–09;
- Productivity Reform, 2009–11;
- Wages Reform, 2008–11;
- Employment Creation Reform, 2009–11; and
- Workers Compensation Reform, 2009–11.

Of most significance was the creation, by Decree 2009, of the National Employment Centre with an "objective to boost employment creation and improve productivity nationwide through a better governance framework...and to consolidate all employment creation agencies into a one-stop-shop quality service for all unemployed" [10, 23]. An expanded set of objectives of the center include:

- life skills and employment skills training and work attachment for absorption in formal local employment;
- entrepreneurial skills training and creation of small businesses locally through seed funding and technical support service;
- promotion and facilitation of overseas employment opportunities;
- participation in Fiji's National Volunteer Scheme for those wishing to promote civic responsibilities to various sectors in Fiji, in the Pacific region, and elsewhere overseas;
- undertake skills training and re-retraining or upskilling of unemployed persons and workers;
- collation and analysis of labor market supply and demand data to facilitate the effective delivery of NEC's core business; and
- registration, professional counseling, and aptitude assessment.

Additionally, the National Training and Productivity Centre (NTPC) [28], now as part of Fiji National University, collaborates with industry to meet their needs through in-service as well as training outside the formal education system. Its continuing liaison with industry through meetings and dialogs provides opportunities for gap analyses and training assessment needs, some of which were undertaken in 2014. To date, the NTPC engages with over 78 government agencies and companies to have a deeper understanding of their needs for training and reskilling [28].

These initiatives remain challenged by other inherent factors in Fiji's society and economy. These include the migration of skilled professionals and technicians in response to opportunities available in international labor markets, the enduring problem of youth unemployment and underemployment,

and critical issues with productivity. Fiji's unit labor cost in manufacturing has been noted to be higher than in most of the fast-growing countries of east Asia, e.g., the Philippines, Indonesia, and Malaysia. Also, in agriculture, productivity has been found to be limited, having been zero over the past 45 years [29]. Then there is the persistent migration of teachers, doctors, and nurses from Fiji to Australia and New Zealand, which increased after the military coup of 1987 and has remained part of Fiji's political economy. While part of the logic of migration includes a possible return with skills, the ADB/ILO report observed that the skills acquired for overseas job prospects do not necessarily meet the needs of the local labor market [5].

Going forward, the national Human Resource Plan [10] has noted the need for more technical and vocational training to address the shortages of skills in industries and professions, a phenomenon that was exacerbated by Fiji's recent history of political instability [10, 31]. The plan suggested four thematic areas in which policy initiatives could be directed to achieve a series of objectives that would enhance economic growth. These are:

- minimizing imbalances in the labor market, primarily to stimulate an increased number of income-earning opportunities aimed at absorbing those entering the labor force in the 2011–15 period;

- improving the functioning of the labor market, i.e., improving people's chances of getting decent jobs that match their skills and reward the acquisition of those skills; and

- improving the productivity of Fiji's workforce, which is primarily the promotion of productivity and generation of higher incomes in the informal sector.

In 2018, the National Employment Policy, informed by the issues and recommendations from the National Strategic Human Resource Plan, 2011–15, the ILO Decent Work Agenda, and extensive consultation with stakeholders, was designed for implementation. Subtitled as 'Moving forward,' its focus was "to improve employment opportunities for young men and women in Fiji" [31]. In a foreword to the policy document, the Permanent Secretary, Minister for Employment, Productivity and Industrial Relations, noted the government's efforts "to bring about the maximum benefits to the Fijian labor market in terms of decent employment opportunities to Fijians" [30]. The NEP noted that "labor markets, left alone, often function in imperfect ways, resulting in market failures" [8, 30], and that "economic growth alone is not enough to meet the challenge of increasing employment opportunities...(and that) meeting this challenge involves ensuring economic growth creates paid work for those who want to earn an income...it involves helping those in work to move to better jobs and improving the working conditions of existing job holders" [8, 30].

Moving Forward

The NEP was a diagnostic effort to identify critical issues of the economy that were not growth friendly to which relevant responses could be designed as a 'way forward.' The exercise included a forensic analysis of Fiji's economy and job situation, along with its nexus with demographic variables, to provide insights into Fiji's labor market challenges. To 'move forward,' the NEP identified 'fault lines' within the structure of the economy in need of response. These were laid out by the National Employment Policy [8, 30] as:

- low GDP growth over the period 1971–2015, at an annual average of 3%;

- decline in the share of agriculture in GDP;
- the extent of informal paid work;
- the extent of reliance on subsistence work;
- growth of the working poor; and
- limited labor market opportunities for the youth in spite of improvements in educational attainment.

These are related issues, as the downturn in agriculture, especially in the sugar industry and the associated land lease issues, drove farmers out of their lands into the informal sector. Additionally, slow growth resulting from low levels of investment amounted to limited jobs with skill requirements that were acutely deficient among the youth in spite of their educational attainments.

Trained Incapacity: Fiji's Economy and Youth Unemployment

'Trained Incapacity' describes the educational situation of Fiji's youth and labor market demands. In adopting the phrase, we have varied its original meaning from the sociology of work where it was used to refer to types of education, training, and habits that may lead individuals to be unable to think beyond a set of constraints and assumptions that they form [31]. In relation to Fiji (and perhaps other post-colonial countries), we use the phrase to refer to the continuing, and embedded, logic of education systems and practices that directly or indirectly valorize, inculcate, and privilege the white-collar job as the valued end goal. The manifest effects are demonstrable in choices and aspirations of youths for white-collar jobs. In the end, young people become trained, skilled, and certified through the education system but are incapable of meeting the skill requirements of industry. The consequences are unemployment or underemployment and a persistent drift into the world of informal economy. Evidence from recent research indicates the extent to which the value of white-collar jobs remains at the core of Fiji's education system. Tavola [20, 32] concluded from her research that, in Fiji, "despite decades of tailoring curricula to offer relevant subjects such as home economics and subjects with a supposed vocational drawing, etc., the overriding aim is for white-collar and professional jobs; and the overriding career preference is for white-collar jobs." The findings resonate with those of Tagicakiverata [22] who found that career pathway choices by Fiji secondary school students remained white-collar jobs. This is demonstrated by the subject/stream choices for Fiji Junior Examinations in which 30% of the students opted for pure science as a way to high-status professions compared with 6.0% and 4.8% who opted for vocational and agricultural subjects, respectively. Also, for career choices, 44% chose professional careers over 29% who opted for paraprofessional careers. Tagicakiverata concluded, in consonance with Tavola [32] that this was a "testament of the appeal of anticipated white-collar jobs." Of significance also and related to transitioning to the labor market of the youth, is the gendered nature of subject and area choices. In a study of ethnicity and gender choices, Perceptions about Science and Science-related Careers in Fiji, Renee and Dunn [24] found that male students were more apt to selecting science-related careers than female students and that, notably, this was not due to gendered attitudes and perception of science as such but, due to gendered and stereotyping advice given to students. Additionally, Tagicakiverata [22] also noted parents' worrying concerns regarding the relevance of TVET education or their children.

These issues continue to impact employment and opportunities for employment, as the youth seek to and transition into the labor market. By 2015, youth unemployment rate stood at 18% as reported by the Employment and Unemployment Survey (2015–16). The survey also showed an increase in employment between 2011 and 2015 from 148,310 to 167,300, respectively, but the volume was still not large enough to accommodate the increasing number of school leavers seeking employment. This shortfall stood as a challenge to any efforts at meeting Sustainable Development Goal 8; the promotion of sustained, inclusive, and sustainable economic growth; full and productive employment; and decent work for all.

Added to these nagging labor supply and labor market issues are the increasing effects of climate change and requirements of a 'just transition' toward green economy and green jobs. 'Just transition' will entail a structural change in the economy with new technologies to ensure fossil-fuel-free industry and manufacturing, and, most importantly, new skill requirements by the labor market [6]. The implications for the education system and skill development are clear; reskilling of old labor to ensure no job losses and provision of new skills to ensure a positive transition of youth to the labor market. The Permanent Secretary, Ministry for Employment, Productivity and Industrial Relations underscored this in the forward to the NEP. She observed that, "There is also attention given to a just transition of the workforce, creating decent work and quality jobs in the face of climate change by identifying and promoting new green jobs and green skill set" [30].

The NEP posed four strategic questions to embrace the critical aspects of employment creation for economic growth and the resultant benefits. These are:

- What can the government do to get the economy to generate more employment for those seeking paid work?
- How can the government improve the quality of work for those in paid work?
- What measures can the government take to ensure that the gains from economic growth are shared in a more equal way?
- What can the government do to identify the skills needed to grow the economy and liaise with the private sector and nongovernmental organizations?

Through dialogs and consultations, the National Employment Policy provided ten policy areas, which as noted, "will change as new variables intervene (COVID-19 has done just that) in the labor market...Thus the NEP will be reviewed on a periodic basis to ensure its relevance and applicability to address Fiji's real labor market needs" [32]. The ten policy priorities are:

(1) Create more opportunities for young people aged 15–24 years to follow clear pathways from education to productive employment.

(2) Promote private investment to create jobs.

(3) Boost action on just transition of the workforce and creation of decent work and quality jobs in the context of climate change by identifying and promoting green jobs and new green skillsets.

(4) Promote self-employment in the formal economy.

(5) Promote access to overseas employment opportunities.

(6) Create more income generating opportunities for those reliant on subsistence activities for their livelihood.

(7) Promote greater gender equality in employment and working conditions.

(8) Make it easier for disabled persons and the elderly to earn an income.

(9) Eliminate child labor and ensure social justice in workplaces.

(10) Strengthen good-faith employment relations and promote safe and productivity driven workplaces.

Employment and Productivity

The NEP has also identified specific government agencies and stakeholders that are relevant to the implementation of each policy [30, 38]. In support of the NEP is the National Productivity Master Plan 2021–36 [33]. The plan has underscored the relevance of productivity to economic growth and noted the structural vulnerabilities of Fiji's economy as well as Fiji's exposure to the elements of its environment and other geographical challenges. In spite of these challenges, and with reference to Singapore as a viable 'living' example of the positive effects of productivity, the plan has noted that economic success is based not on a miracle but 'simply hard-headed policy,' which by implication Fiji intends to emulate. In the foreword to the plan, the minister observed, "Productivity is a key factor for Fiji to raise living standards, improve people's ability to purchase goods and services, and help businesses to be more profitable and generally contribute toward future economic growth" [33]. He added that the plan placed productivity as a priority area in the context of planning for inclusive socioeconomic development and transformational strategic thrusts, and that the plan was also a response to international markets in aligning Fiji's efforts 'with the global move toward the fourth industrial revolution of digitization' and promoting natural resource management.' With an overarching growth target of an average of 3.2% annually between 2021 and 2036 that is anchored to five key goals (see below), the plan intends to contribute to the transformation of Fiji. The goals are:

Goal 1: productive and agile enterprises making efficient use of resources;

Goal 2: high-value-added sectors located in high end of productive space;

Goal 3: broad economic base with high-value-added industries;

Goal 4: robust business enablers propelling enterprise and sectoral growth; and

Goal 5: advanced macro enablers underpinning sustained productivity growth.

Realigning Skills for Transition to the Labor Market: Bridging the Skill Gaps

An educated youth without complementary skills for employment remains a critical aspect of the Fiji labor market. Evidence shows the availability and accessibility of education in Fiji consequent

to the government's free education policy [5, 28]. Of the total working-age population in 2011, 59% and 18% had attained primary and secondary school education, respectively; while 16.2% had post-secondary school qualifications. This notwithstanding, over 30% and 24% of those with post-secondary and secondary education attainment were unemployed. Among the youth aged 15–24 years, labor market participation also remained at 5.4% and 13% for those with secondary and post-secondary education, respectively [4, 35]. These figures underline the issue of skill mismatches between education and labor market demands.

Bridging this gap through a rational and effective alignment of education and industry is a key element of mainstreaming TVET within the education system and interfacing it with the industry to ensure complementarity between training and skilling with positive labor market transitions.

Outside the main education system, the Fiji National Productivity Centre, officially the TVET center of the Fiji National University, appears to have taken up part of this responsibility while additional efforts have been undertaken by the Fiji National Employment Centre [34].

The Fiji National Productivity Centre

In addition to training programs for unemployed school leavers and upskilling for workers and enterprises, the Fiji National Productivity Centre (FNTC) has recently strengthened collaboration with the industry [35]. An indication of this is the exercise in ascertaining the needs of the industry through an extensive gap analysis undertaken in 2015 [35]. The results showed acute skill shortages in areas such as human resources, skilled labor, and job readiness. Added to this exercise was the establishment of Industry Advisory Committees with a view to 'maintain connections and healthy relations between training providers and the industry, and give advice on changes in technology, global business trends, and new challenges that the industry is facing' [5]. A strategy of industry–community dialog to further explore, understand, and appreciate industry concerns was designed and put in place by the FNTC [35]. The result of a recent (2020) dialog is instructive to both the FNTC and the TVET provider community. Together with a national survey of the industry, it covered the following:

- areas of needed skill improvement;
- popular skillsets required by the industry;
- prevailing skill gaps;
- skill demands; and
- socioemotional and soft skills.

These provide valuable inputs to inform TVET training at the Fiji National University. Also, interviews with the TVET staff and trainers at the respective departments indicate awareness of the valuable information [35].

Tourism and other Sector Developments and the Labor Market, 2010–20

Tourism has emerged over the past two decades to become the dominant sector and the economic lifeline of Fiji, thanks to the determined, enterprising, and proactive attitude of the industry

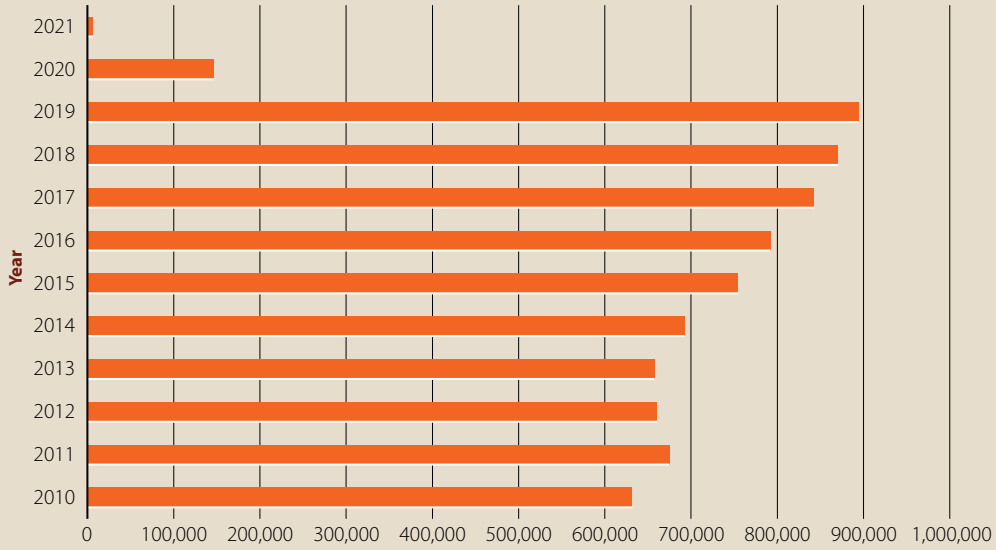
stakeholders as they engage with the government to explore relevant concessions in the face of multiple challenges. Interviews with hotels' managements [36] show keen interest in, and efforts at, digitizing relevant aspects of the sector, especially in areas of accommodations and human resources to enhance efficiency. COVID-19-related effects were primarily in readjustment of employment and jobs for many. These included leave without pay, selective retention, redundancy, and other special-activity areas such as the arrival of expatriates from sister facilities. The recent easing of COVID-19 restrictions on travel, together with a regime of preventive strategies, has seen a bouncing back of the industry.

Other areas of industry-related investments include the revamping of the international airport and acquisition of additional and new aircrafts. Recent investments in fuel-efficient fleet were aimed at expanding the fleet size and enhance passenger numbers by about 27% or to 1.7 million, over a five-year period (Ministry of Trade and Tourism). This appears to have been successful (see Figure 6) and with positive implications for the labor market until the recent effects of COVID-19. The accommodation sector has been resilient in the face of significant reduction in passenger bookings but with optimism of a bounce back [36]. In response to the challenges of climate change, hotels and resorts with high energy costs (for example, a 500-room resort has an annual energy cost of FJD30,000) are moving toward climate friendly strategies with the installation of solar panels and recycling. The domino effect of tourism provides a combination of direct and indirect employment to over 140,000 people, with added contribution to, and higher share of GDP. This also includes employment creation in rural and outer island areas where resorts linked with villages provide employment and needed livelihood [18].

There are also developments of entrepreneurs with SMEs that are linked to, and depend on, the expansion of the industry), though there is room for more areas of indirect tourism-related income generation for village communities).

FIGURE 9

TOURIST ARRIVALS, 2010–21.



Source: Ministry of Industry, Trade and Tourism, 2016.

Manufacturing

The manufacturing industry has also remained resilient and retained workers. In response to climate-change challenges, there is evidence of restructuring of the industry, accompanied by reskilling of workers in the spirit of 'just transition' and decent jobs. The three manufacturing facilities that were visited for this study had all taken to new technologies accompanied by retraining (see Table 7). The resurgence in the garments industry has contributed to the provision of employment (see Figure 7).

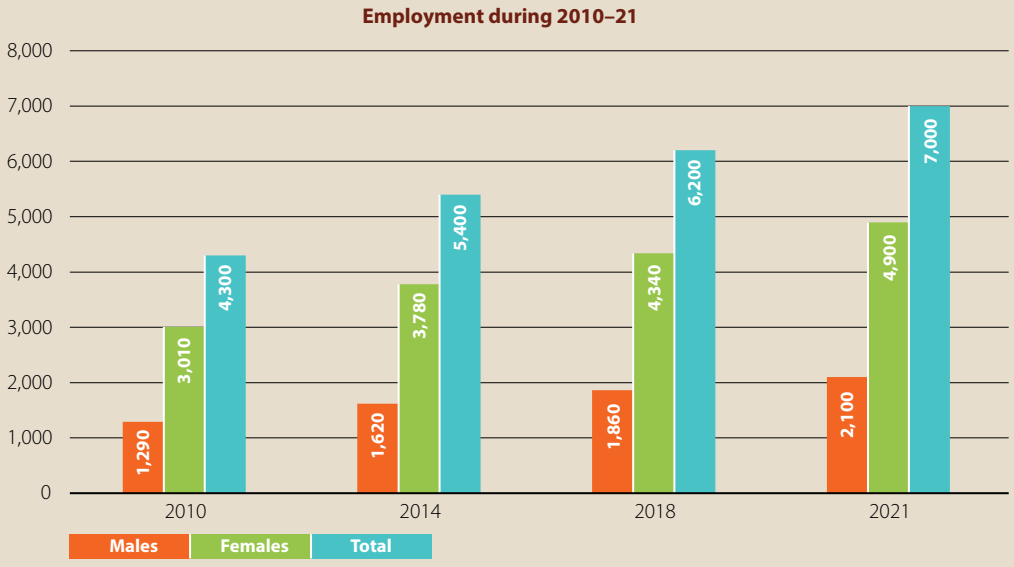
TABLE 12

MANUFACTURING SECTOR AND EMPLOYMENT (SELECTED INDUSTRIES), 2021.

Company name	Total employees	Main product	Cost of fuel	Changes in technology	Workers affected	Retraining	Hiring new workers
Fletcher Construction	200 96%male 3% female 1% nonbinary	Manufacturing bridges and buildings	$300,000	There has been introduction of Euro 4 vehicles and plants	No there was no reduction in employment	Workers were trained in accordance with use and procedures of environmental regulations and policies	New employees were given roles for environmental regulations
Coca-Cola Amatil Fiji	300 60% male 40% female	Beverages	Around $800,000	Installation of more than 3,800 solar panels to the Suva production plant which provides a 40% cleaner renewable energy source	No reduction in employment	Employees developing skills in the factories and following OHS procedures	Employees were trained on operational methods and regulations of the industry
Energy Fiji Limited	550–600 65% male 35% female	Providing electricity	$50–60 million	Renewable energy projects around Fiji: 5MW solar farm in Qeleloa; development of 3x5MW solar farms in Viti Levu; solar project in Taveuni	No employee was affected	Verify the existence of assets and recommend proper safeguards for their protection; evaluate adequacy of the system of internal controls; and Recommend improvements in internal control	The workers were trained on how to operate machines and given their roles

FIGURE 10

EMPLOYMENT PROVIDED BY THE GARMENTS INDUSTRY, 2010–21.



Source: Taken from interviews with garment industries, 2021.

Changing Labor Market Demands: Greening Jobs and Future Employment

TABLE 13

THE FUTURE OF JOBS AND GREEN EMPLOYMENT IN FIJI.

Sector	Contribution to economy	Current/future jobs
Tourism	This is already a mainstay of the economy with expectations of continued growth. Tourism sector managers understand that improved conservation, environmental management, and sustainable operations, with ecotourism, are necessary for continued growth. Much food for the tourism sector is imported but there are opportunities for strong multiplier effects through linkages with local food producers. Recent government initiatives in linking agriculture with tourism are indicative of the potential growth and the multiplier effect of tourism.	The estimated number is 12,700, mainly in the accommodations sector. This combines digital reservation and human resources, services, and solar energy installation.
Agriculture	Decline in the sugar industry over the past decade has impacted agriculture. Nevertheless, it continues to have a larger share of employment and remains the sector with most promise for green jobs, opportunities for growth, and provision of employment.	The sector is estimated to have currently provided 14,029 jobs.
Transport and storage	Fiji's Low Emission Development Strategy (LEDS) includes a strong component on energy, particularly electricity generation and transport fuel usage. Fiji's Nationally Determined Contribution (NDC) commitments for reducing GHG emissions are entirely within the energy sector (70% through renewable energy and 30% through improved energy efficiency), and there is considerable scope for expanding renewable energy supply through solar photovoltaics, other renewable energy sources, and improved energy efficiency in vehicles and buildings.	The sector is estimated to have provided over 15,000 jobs

Source: Green Jobs Assessment Preliminary Study of Green Employment in Fiji, 2019.

Ensuring Safe Labor Market: Labor Market Policies and Institutions

Concerns with training, skilling, and reskilling for effective transitioning to the labor market; unemployment and underemployment of the youth; and increasing migration of skilled labor encompass only one aspect of the labor market and productivity-related agenda. The other and most important aspect is the institutional framework anchored to specific labor policies and regulations, within which labor markets operate to provide quality jobs (most recently green jobs) and protect workers and employers. Together, these contribute to influencing employer and labor behaviors as well as shaping the conditions at work.

Labor regulations and labor market institutions have had a volatile trajectory in Fiji. From the Master Servant Ordinances and Indenture Labor contracts of the late nineteenth century to restrict and control the pattern of labor supply to, and use in, Fiji, the earlier institutions were not labor

friendly but more profitable to the employer. The labor crisis emerging, specifically from the sugarcane farms, provided the first instances of labor associations to press for institutional changes through policies [1]. Within the civil (now public) service, an association did emerge to press for better conditions for colonial civil servants [1]. This was the precursor of the current Fiji Public Service Association. The practices flowed on to other sectors of the economy to encourage worker resistance, including strikes, with respect to conditions of work and wages [1].

By 1960, legislations including the Workmen's Compensation Regulations, and the presence of colonial offices such as Commissioner of Labor, Industrial Relations Officer, labor officers, and Industrial Relations Officer constituted a part of the emerging labor market institution of Fiji [37]. Notably, there were also rudiments of non-racialized social protection schemes for the vulnerable coordinated through a Social Welfare department [37]. The Wages Council Act of 1960 would set the conditions for wage negotiations. The Trades Dispute Act, 1973, was the first in the post-independence era and it allowed for a role of unions in processing of wage bargaining and settlement of disputes [37]. This was soon followed by the Trade Union Recognition Act, 1976. It established, for the first time, a formal process for the legal recognition of the trade union as the collective representation of a work group, and the right of that collective to bargain. Slowly, unionism permeated other sectors to strengthen the basis of this pillar of labor market institutions in Fiji.

From these beginnings in the post-independence period, Fiji has remained partner to and ratified the relevant UN conventions, which have, together and increasingly, enhanced the emerging institutional framework for employer–labor–government relations (see Appendix 2).

What has remained a thorn, and a reason for vigilance by labor, are regulations, sometime including decrees, with the intent to limit contestations and leverage of the umbrella Fiji Trades Union Congress. A series of government initiatives to effect reforms in the 1990s, including the compulsory introduction of balloting for industrial action, are examples [38]. Another example was the 2011 Decree on Essential Industries, which in practice affects people working in such industries (Employment Decree, 2011) by

- limiting the eligibility of workers to be union officials;
- extinguishing certain collective agreements;
- limiting freedom of associations through requirements for 'bargaining units' that limit trade union activity;
- requiring arbitration by the Minister of Employment, Productivity and Industrial Relations if the parties cannot agree; and
- limiting industrial action in support of collective bargaining.

Then there was the Employment Relations (Amendment) Decree, which denied the rights and protection of workers as provided in the Employment Relations Promulgation of 2007. Contestations by the umbrella union, with support from the International Labour Conference 2013, have yielded positive results in the form of a significant pillar in labor market institutions in Fiji in the form of the Tripartite Agreement signed between the government, the Fiji Trades

Union Congress, and the Fiji Commerce and Employers' Federation in 2015. The critical aspects of the agreement are following:

- Employment Relations Promulgation (ERP) of 2007 is to be the primary basis for labor management relations in Fiji;
- review of labor laws in Fiji, including the ERP, is to be conducted under the Employment Relations Advisory Board mechanism;
- other issues and recommendations for review are to be negotiated through the board's mechanisms; and
- the government should restore the check-off facilities.

Characteristically, these policies and institutions have no bearings on substantial category of workers, i.e., those in the informal sectors, leaving them vulnerable not only to employer interests but also to illegal industrial actions. Even among the formal and recognized unions, there was defiance to some of the government regulations as strikes occurred in a few sectors such as telecommunications, mining, and garments.

To date, the provisions of the ERP continue to provide the framework for labor–management relations. Recommendations from the Employment Advisory Board have covered areas of industrial relations; protection of workers and anti-discrimination; and the framework for a three-tier system for labor dispute resolution, part of which provides space for presentation of grievances by workers.

There are provisions that prohibit child labor and also extend to prohibit violence against children [39]. The regulations covering age of employment of children (15 years), also provide for a different age, 18 years, at which children can be employed in the mining sector [39]. The institution of a minimum wage for labor has remained a contested area between the government, employers, and unions.

Conclusion

The challenges of Fiji's labor market of the twenty-first century are rooted in the legacy of its colonial economic structure and human resource development. International economic demands have impacted Fiji's economy to expose skill shortages and mismatches, especially among the youth, and an enlarged informal sector. Skill mismatches include soft skills at workplaces. A critical response in human resource development, led by efforts to expand and extend TVET education, appears to be the only strategic way forward to ensure economic growth and productivity. While labor migration to Australia and New Zealand contributes to addressing increasing unemployment, it appears insufficient to ensure economic development, the increasing volume of remittances notwithstanding. Investments in technologies for green jobs will impact the labor market with demands for new skills. Recent assessment of 'green employment' in Fiji provides indications of employment creation in different sectors of the economy. This is underscored by demonstrable efforts by industry employers from all sectors to introduce climate friendly and energy-saving technologies. The enduring question will continue to be the availability of requisite skills and skills training by educational institutions to meet new labor market demands.

Appendix 1

Institution	Training programs
Fiji National University	• It was established in 2010 as a dual-sector institution. • It provides geographic coverage of all areas in Fiji for students' access. • Total number of students is around 30,000. • It is currently the leading and eminent TVET institution in the Pacific. • It delivers new programs known as Basic Education Skill Training (BEST) introduced in 2012 as an alternative pathway to the world of work. • The university delivers government's franchise scheme, the Sustainable Livelihood Project (SLP). • It offers 444 (69% of total) TVET programs. • It also provides 195 (31%) higher education programs.
The University of the South Pacific	• It was established in 1968 as a regional institution with campuses across the Pacific Island countries. • The total number of students is around 24,000. • It has higher education faculties in the natural and social sciences, law, education, agriculture, engineering, and Pacific studies, with programs up to the doctoral level, which is level 10 in the new Fiji National Qualification framework.
University of Fiji	• The university was established in 2004–05 with two campuses in Suva and Lautoka. • It offers programs in indigenous studies, law, and education. • It has five main centers. These are: ◦ Centre for International and Regional Affairs ◦ Centre for Diasporic Studies ◦ Center for Environment, Energy and Sustainable Development ◦ Center for Gender research
Technical and Vocational Education and Programs (five TVET programs) **1. Centre for Appropriate Technology Programme** **2. Ministry of Forestry Training Centre and Timber Training Centre**	The main objective is to provide young people from the provinces with skills that are useful for their villages. • It was established in 1985 and offers certificates in agriculture, appropriate technology, entrepreneurship, and leadership. • It also offers programs leading to trade certificates in auto mechanics, carpentry, and joinery in addition to plumbing and welding. • Minimum requirements for entry are Form 4 education. • The selection is contributed by provincial and *Tikina* decisions. • It offers a two-year Forester program. • The entrance is free but there is a two-year bond post graduation. • It also runs a one-year certificate program in applied woodcraft technology and waste utilization. • It provides short technical skills in logging, chainsaw operation, and emergency services together with community education programs.
3. Ministry of Youth and Sports National Training Centre	• It is operated by the Ministry of Youth and Sports. • Skill training leads to certificates in carpentry, agriculture, sports administration, and small-engine maintenance. • It also offers courses in fiberglass boat repair, seafaring, and cabinet making. • It caters mainly to school leavers with emphasis on young women. • it is a 'barefoot college' for rural women provides relevant skills. • The center facilitates the Duke of Edinburgh Award Scheme.

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Institution	Training programs
4. Australia-Pacific Technical College **5. Technical and Vocational Education at Fiji National University**	• It was established in 2007 as a collaborative training enterprise between Australia and regional South Pacific countries. • It has campuses in Fiji, PNG, Samoa, and Vanuatu. • It offers Certificate III and Certificate IV programs in 10 hospitality, community services, trades, and technology areas. • Certificate IV is offered in training and assessment, and diploma is offered in child and community services and management. • It has two main schools, School of Trades and Technology and School of Hospitality and Community services with nine campuses, all based in Fiji. • A wide range of TVET programs are offered within the dual sector of the university. • These cover areas across and within the five colleges of medicine, nursing, and health; engineering, science, and technology; agriculture forests and fisheries; humanities and arts; business, hospitality, and tourism; and the National Training and Productivity Center. • The courses cover certificate, diploma, trade diploma, and degree levels. These include, for example: ◦ Engineering: avionics, automotive, electrical, electronics, and civil engineering. ◦ Building: carpentry, joinery, and plumbing. ◦ Mechanical: welding, fabrication, refrigeration, and plant maintenance. ◦ Agriculture: agroforestry, aquaculture, fisheries, and animal husbandry. ◦ Hospitality: hotel management, housekeeping, catering, and cookery and baking. ◦ Arts: sports, music, screen printing, hairdressing, and film and television.

Source: Adapted from ADB/ILO (2015) Fiji. Creating Quality Jobs; Employment Diagnostic Study.

Appendix 2

UN/ILO convention	Year
• Freedom of association and protection of the right to organize	1948 (No. 87)
• Right to organize and collective bargaining	1949 (No. 98)
• Abolition of child labor	1957 (No. 105)
• Minimum age convention	1973 (No. 138
• Worst Form of Child Labour, 1999	1999 (No. 182)
• Equal Remuneration , and	1951(No. 100)
• Discrimination Employment and Occupation, 1958	1958 (No. 111)
• Labour Inspection Convention, 1947	1947 (No. 81)
• Employment Policy Convention	1964 (No. 122)
• Labour Inspection (Agriculture)	1960 (No. 129)
• Tripartite Consultation (International Labour Standards) Convention.	1976 (No. 144)

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UN/ILO convention	Year
International Labour Organization Conventions as of 2015	
• Forced Labour, 1930	1974
• Freedom of Association and the Right to Organize	1949
• Right to organize and Collective Bargaining	1974
• Equal Remuneration	2002
• Abolition of Forced Labour	1947
• Discrimination (Employment and Occupation)	1958
• Minimum Age	1973
• Worst Form of Child labour	1999
• Labour Inspection	1998
• Tripartite Consultation	

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INDIA

Introduction

An efficient utilization and allocation of human resources is critical to economic growth. Human capital formation is a measure of the economic value of education and skills acquired by a person. Grundke, *et al* have also recognized that as human capital is forming a central position for attaining a sustainable competitive advantage in today's era, only a skilled and motivated labor force will be able to provide the required momentum and flexibility needed by global entrepreneurs. Thus, skilled labor force will be the key to success and enhanced organizational performance in future. Hajela and Froumin *et al* have pointed out that several Asian countries, especially India, are currently facing a shortage of technological skills in spite of having a demographic dividend, primarily because (1) the institutions responsible for skilling the population seem to be inefficient in catering to the skills-related demands of the industry; (2) a sizeable percentage of India's working population is engaged in the economy as casual or informal labor force, which mainly remains outside the ambit of the formal education and training system; and (3) most of the policies deployed are more focused on imparting basic formal education instead of focusing on skills development of current and future labor forces.

Recent news headlines suggest that the rise of modern technologies will drastically alter the jobs landscape in India, potentially displacing large portions of the workforce. While disruptions are inevitable, it is uncertain to what extent automation and digital technologies will impact employment, job roles, and skilling requirements. What is certain, however, is the need to create new and relevant employment opportunities for India's growing youth population and women.

India's problem is more of a quantitative rather than a qualitative skill gap between what is needed and what is available. Thus, it is imperative that requisite, and adequate skilling of the labor force, should be done at a rate faster than the current rate of economic growth. This is important to provide equal and sustainable opportunities of livelihoods to all sections of the society in an era of technological revolution. Also, changing technologies and shifting globalization patterns are bringing manufacturing-led development strategies into question. Technologies such as internet of things (IoT), advanced robotics, and three-dimensional (3D) printing are shifting what makes locations attractive for production and threatens significant disruptions in employment, particularly for low-skilled labor.

At a time when India was already facing a huge skills–jobs mismatch and high unemployment, new challenges have emerged due to the COVID-19 outbreak, which would be altering the skills landscape of India. According to the Center for Monitoring Indian Economy (CMIE) estimates, more than 122 million workers lost their jobs during the nationwide lockdown (which started from 24 March 2019) until April 2020. Among these, approximately 75% of workers were small traders and wage laborers.

The massive job losses, salary cuts, and uncertainties regarding further continuance of existing employment contracts have not only magnified the existing inefficiencies in the skills matching process but also steered the education sector toward newer directions and processes of skill acquisitions. Thus, anticipating the skills of tomorrow in the aftermath of the COVID-19 pandemic is of paramount importance. This study makes an attempt to present an overview of supply and

demand for skills and the extent of skills mismatch in the Indian labor market; examines the impact of COVID-19 on various skill categories; and considers the roles that policy makers and new policies can play in solving the issue of skill–job mismatch among the labor force employed in different industry segments.

Demographic Trends

This chapter tries to explore contributions of various demographic attributes such as age, gender, castes, and geographic location in the context of the job–skill mismatch among the masses. It also explores factors within the demography, which ultimately are a result of the mismatch and to a certain extent provide a plausible solution to bridge the gap.

Labor market dynamics and associated policymaking for a particular geographic region significantly depends on certain demographic attributes such as ageing, geographic location, gender ratio, dependency ratio, labor force participation ratio, trend of employment status, and wage scenario. As shown in Table 1, the next five decades will witness a significant increase in the share of aged people in the overall global population. While the magnitude of this change is expected to be higher in developed countries, it is likely to be much lower in regions such as sub-Saharan Africa. On the other hand, sub-Saharan Africa is expected to experience significant decline in the share of population aged below 15 years while the corresponding change in the more developed countries is predicted to be of a much lesser proportion. In 2050, one-third of the population in the more developed regions will be in the age group of 60 years and above, while the share of this age group in the sub-Saharan Africa will be just one-tenth.

Against the backdrop of ageing population in developed countries and the emergence of youth population in regions such as sub-Saharan Africa, we compare the world's five largest emerging economies, i.e., Brazil, PR China, India, Russia, and South Africa (see Table 1). During 2030–50, the share of Indian population in the age group of 60 years and above is expected to increase from 12% to 20%, indicating that ageing of population may generate a set of challenges and opportunities in various markets (e.g., labor market, product market, and financial market). On the other hand, India is expected to see a decline in the population share of the age group of 15 years and less from 23% to 18%, thereby leaving much scope for significant changes in the markets. Quite interestingly, among the five economies, the three large economies of India, Brazil, and PR China show changes of similar magnitudes in their population shares of those aged 60 years and above, while the other two countries, albeit having similar trends, report changes of lower magnitudes.

TABLE 1

SHARES OF POPULATIONS AGED BELOW 15 YEARS AND ABOVE 60 YEARS.

Major area, region, or country	Population below 15 years (% of total population)			Population above 60 years (% of total population)		
	2010	2030	2050	2010	2030	2050
India	30.8	22.8	18.2	7.5	12.4	19.6
Brazil	25.5	17.0	14.7	10.2	18.9	29.3
PR China	19.9	16.9	15.3	12.3	23.4	31.1
Russian Federation	15.0	15.2	16.2	18.1	25.0	31.7

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Major area, region, or country	Population below 15 years (% of total population)			Population above 60 years (% of total population)		
	2010	2030	2050	2010	2030	2050
South Africa	30.3	26.2	22.5	7.3	11.1	14.2
Sub-Saharan Africa	42.3	35.6	28.4	4.9	5.9	9.1
More developed regions	16.5	15.4	15.4	21.8	28.8	32.6
World	26.9	22.7	19.6	11.0	16.5	21.9

Source: ILO, 2010.

The demographic scenario described in Table 1 can also be assessed using measures such as dependency ratio. Here, again, basis ILO database, select sets of regions and countries can be compared (see Table 2). The dependency ratio refers to the ratio of dependent population (age groups 0–14 years and above 65 years) to working-age population (age group 15–64 years), referred to as total dependency ratio. Furthermore, this measure is decomposed into two age factors: old-age dependency ratio and youth dependency ratio.

Old-age dependency ratio is referred to as the ratio of populations of age groups '65 years and above' and '15–64 years,' the latter being the working-age group. Similarly, youth dependency ratio refers to the ratio of the population in the age group of 0–14 years with the working-age group. As shown in Table 2, total dependency ratio in more developed regions is going to increase from 61% to 71% during the period 2030–50, while the same is going to decline from 65% to 52% in sub-Saharan Africa, conveying clear signals of a structural change in the global economy. Further, old-age dependency ratio in more developed countries is going to show significant increase during this period, from 36% to 45%. On the other hand, youth dependency ratio for this region will show slow movement, showing a slight increase from 25% to 26%. Contrary to this trend, India is going to see a significantly dropping youth dependency ratio, from 33% to 27%, while the region will experience an increase in old-age dependency ratio from 12% to 20%. Quite obviously, for India, rise in old-age dependency is too huge to crowd out the slight change in youth dependency ratio, while the decline in youth dependency is of enormous magnitude, crowding out the change in old-age dependency ratio.

TABLE 2

DEPENDENCY RATIOS.

Major area, region, or country	Total dependency ratio (%)			Old-age dependency ratio (%)			Youth dependency ratio (%)		
	2010	2030	2050	2010	2030	2050	2010	2030	2050
India	55.6	45.3	47.0	7.7	12.2	20.2	47.9	33.1	26.8
Brazil	47.9	44.2	59.3	10.2	19.7	35.9	37.7	24.5	23.4
PR China	39.1	48.7	62.9	11.4	23.7	38.0	27.7	25.1	24.9
Russian Federation	38.7	53.0	65.6	17.9	29.7	38.8	20.8	23.3	26.8
South Africa	53.6	51.6	47.9	7.1	11.9	14.5	46.6	39.7	33.3
Sub-Saharan Africa	83.5	65.4	52.4	5.8	6.4	9.1	77.7	58.9	43.3

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Major area, region, or country	Total dependency ratio (%)			Old-age dependency ratio (%)			Youth dependency ratio (%)		
	2010	2030	2050	2010	2030	2050	2010	2030	2050
More developed regions	48.1	61.1	71.3	23.6	36.2	44.9	24.4	24.8	26.4
World	52.7	52.3	56.0	11.6	17.8	25.3	41.2	34.5	30.6

Source: ILO, 2010.

Among the five large economies, India and South Africa are going to experience a decline in total dependency ratio during 2010–50, while the trend for other three countries is just opposite. Moreover, the magnitude of change in total dependency ratio for India and South Africa is quite similar, i.e., a decline of 6% to 8%. On the other hand, PR China and Russian Federation are going to witness significant rise in the total dependent ratio, i.e., an increase of 24% to 27%. Decomposing total dependency ratios among these countries, the magnitude of falling youth dependency during this period appears to be the highest in India, followed by Brazil and South Africa, while Russian Federation and PR China are unlikely to experience similar changes. It is important to note that India and PR China present contrasting pictures of dependency. By 2050, youth dependency ratio in PR China will be two-fifth, while for India this ratio will be just one-fifth. Further, youth dependency ratio for India will fall from one-half to one-fifth, implying a significant change in the demographic structure. However, for this ratio, PR China is expected to experience insignificant change. Although both the countries will see rise in old-age dependency ratio, the magnitude of change in PR China is presumed to be more than in India.

A more detailed breakdown of above numbers reveals that approximately 62% of the Indian population are of working age, i.e., in the age group of 15–59 years, while 65% of this population fall below the age of 35 years. This results in an estimated 12 million additional people entering the workforce every two years. While efforts are being made to improve business environments for both established companies and startups, and to improve the skilling landscape, the task to increase the number of jobs and add a substantial amount of appropriately skilled workforce is formidable. Labor mobility and welfare are as much social questions as they are economic ones. Current technologies and work trajectories are likely to further enhance labor market inequities along gender, caste, class, and religious lines. In addition to providing for an increase in demand for jobs by making appropriately skilled workforces easily available; ensuring availability of gainful employment opportunities to women and marginalized groups is also another mammoth problem faced by the policy makers. Ensuring ease of availability of job opportunities and providing for upskilling of labor has always been hindered by two main factors: (1) lack of opportunities corresponding to existing skills within geographic demographies; and (2) prevailing sociocultural norms that significantly restrict access to education and employment, especially in remote areas that are yet a touch away from modernization and developmental initiatives.

The above discussion points to the advantages that India may gain by 2050, primarily resulting from significant decline of total dependency rate. However, the significance of this demographic dividend needs to be assessed against the trend of labor force participation rate, particularly the participation of women in the labor market (see Table 3). As shown in Table 3, India reports lowest labor force participation for women. In fact, during 2010–20, this indicator hardly changed. While labor force participation of women in India is just one-third, the same indicator in PR China is three-fourth. However, this is not to mean that mere participation in labor force would accord

egalitarian and enabling conditions of living to women. Interestingly, this indicator in sub-Saharan Africa approximated two-thirds in 2020. This raises questions about the veracity of the view that India may gain from the predicted demographic change.

TABLE 3

LABOR FORCE PARTICIPATION RATES.

Major area, region, or country	Male						Female					
	Ages 15+ (%)		Ages 15–64 (%)		Ages 65+ (%)		Ages 15+ (%)		Ages 15–64 (%)		Ages 65+ (%)	
	2010	2020	2010	2020	2010	2020	2010	2020	2010	2020	2010	2020
India	81.0	80.5	84.6	85.2	29.7	26.3	32.7	32.4	35.3	35.5	2.1	2.1
Brazil	81.9	80.4	85.1	83.8	46.2	52.2	60.4	60.4	64.6	65.8	23.2	24.9
PR China	79.6	77.2	84.9	84.8	30.0	27.3	67.2	63.0	74.3	72.6	9.4	10.8
Russian Federation	69.5	68.5	75.9	76.7	16.3	16.6	58.0	57.8	69.3	71.8	9.5	9.6
South Africa	63.7	64.7	67.0	69.2	4.3	1.5	47.0	46.4	50.9	51.9	1.6	1.3
Sub-Saharan Africa	80.8	80.9	81.7	82.0	61.9	61.2	61.1	62.7	62.7	64.5	35.9	36.2
More developed regions	68.4	66.2	78.7	78.8	15.1	15.7	53.4	52.7	65.9	67.5	8.8	9.1
World	77.7	76.7	82.6	82.7	29.2	28.6	51.6	50.6	56.8	56.6	11.8	12.8

Source: ILO, 2010.

To add to this, women have relatively limited access to technology gains. With only less than 30% of India's internet users being women, their access to updates on new technological development and upskilling opportunities is limited. Lower levels of education and skills, combined with sociocultural norms, inhibit their capacity to leverage new digital opportunities.

Digital access and fluency are rapidly becoming essential for approaching a variety of public goods and services, including suitable work opportunities. Low levels of education among marginalized social groups limit their capacity to access technological gains and adapt to technology-led disruptions with respect to the future of work. Marginalization of certain communities is becoming more entrenched due to technological skill bias.

Emerging Technology and Its Influence on Labor Market

This chapter attempts to explain the needs for adoption of new technologies, their benefits for end users, and their impact on the labor market. It tries to explain the basic assumption among the masses toward introduction of technology within various industry categories versus its actual impact on the individuals involved directly or indirectly with the industry. It also highlights the reason for possible gaps and introduces the concept of skill mismatches in the labor market related to a particular industry.

The world is currently experiencing a rapid and widespread advancement in automation, based heavily on artificial intelligence (AI), robotics, big data, and machine learning (ML). Examples of recent innovations include driverless cars, service robots caring for the elderly, smart factories,

IoT, and 3D printing. Machines driven by computer power, robotics, and AI are now increasingly able to perform tasks previously accomplishable only by humans.

New technologies are adopted on account of numerous benefits. These include emergence of new products; the ability of technologies to modify existing products, enabling to serve end users more effectively and expanding market outreach; better management and utilization of human and physical resources; and effective information management. Provisioning of anywhere, anytime, and anyone of new technologies is another feature that increases their acceptability.

TABLE 4

SECOND MACHINE-AGE TECHNOLOGY PRIMER.

Technology	Description
Mobile technology	It makes use of mobile data to access internet and related services.
Cloud computing	Cloud technology allows for remote storage, creation, and delivery of data, apps, and tools with limited local computing power and software.
Digital platform	A platform allows for smaller firms and individuals to access shared services that were previously available only to large organizations.
AI and ML	AI and ML use advanced computing power, big data, and algorithms to provide analyses that previously required an accomplished human mind. This includes but is not limited to speech recognition and computer vision.
Big data	It signifies huge volumes of data that are too big for conventional computer programs to process. Computers with exponentially high computing power are required.
IoT	The ability to use computers to manage everyday objects and industrial equipment while collecting a large quantity of data that further refines systems based on patterns of use.
Robotics	This implies automated assembly lines and smart factories.
Advanced manufacturing and 3D printing	Technologically advanced manufacturing uses massive computing power and building objects from a digital master design file.

Source: Brynjolfsson and McAfee, 2014; McKinsey, "A future that works," 2017; WEF, 2017.

In 2020, companies at all scales were spending a significant amount of their time engaging in digital transformation and adapting to new technologies. Due to the emergence of coronavirus and pandemic-induced lockdown, emphasis on technologies with lesser dependency on physical availability of labor force has taken off across all markets. Even after the battle against the COVID-19 is won, it is safe to say that things will never be the same again. Going forward, there will be more focus on technology transition and adaptation. When it comes to IT, enterprises have accelerated development of new digital capabilities and functionalities. This approach is helping them build resilience and keep pace with rapidly evolving technology trends across regions.

From AI to Security to 5G, the Future is Now

Zero Trust

In the current threat landscape, everybody is a live target. As threat actors increasingly initiate sophisticated cyberattacks, rapidly evolving enterprise environments are under threat like never before. This makes it vital to never trust anything and verify everything.

Zero trust is an idea based on the assumption that modern IT environments demand a different approach to security. There is no longer a clearly defined perimeter of trust where every user, device (laptop, mobile device, or IoT), and workload can freely operate. Instead, zero-trust architectures validate each access request based on multiple data points. These include devices, location, identity, and other variables that provide context to every connection. As the IoT grows exponentially, it will be critical to secure it properly. This approach also allows for more nuanced risk-based decision-making. It is a safer approach to enterprise security as applications, data, workloads, and other resources are all perceived as individually manageable units. By doing this, it becomes much easier and manageable to contain breaches. Even while engaging in remote work, access always depends on the principle of least privilege.

In recent years, we have seen establishment of automation and engineering protocols to help properly implement zero-trust security architectures. This has enabled modern enterprise environments to simplify security management and enhance enterprise security postures. However, small and medium businesses (SMBs) that use managed services may not have to worry, as service providers to such organizations already have zero-trust protocols in place. This has enabled SMBs to show greater adoption of modern IT-based technologies. Enterprises that plan to implement zero-trust security architectures themselves on their premises are required to plan extensively. They are required to automate a lot of manual business processes, prepare for transformational changes, and address foundational security issues. However, to assist such enterprises manage setting up of required protocols, there exist service providers with consulting capabilities that ensure complete privacy between competing organizations.

Cybersecurity Mesh

The COVID-19 pandemic and the rush to enable remote work has created countless opportunities for threat actors. Humans have always been the weakest links, and now work-from-home models have created a whole lot of unsecured networks and devices. In 2021, in India, not much had changed. Ransomware continued to infect enterprises with weak security postures, often leading to data breaches. To stay safe, businesses have started reimagining their IT security strategies and started investing in security and awareness programs.

One way of doing this is through implementation of an emerging technology concept called cybersecurity mesh. It is essentially a distributed architectural approach to enable flexible, scalable, and reliable security control. In this scenario, many assets live outside the traditional security perimeter. The cybersecurity mesh allows security teams to define the perimeter around the identity of a user or a device. Once defined, a centralized policy orchestration and distribution enforcement protocol manages all the activities allowed for the user or the device.

As the traditional perimeter approaches are growing meaningless, a more modular and responsive system is necessary to ensure security, privacy, and compliance. However, security awareness training programs need to complement these initiatives in order to make a real difference in the years to come.

Anywhere Operations

The pandemic has shown the world that one can perform most tasks from just about anywhere with the use of right technologies. As such, businesses are adopting an operating model that helps work get done efficiently from anywhere. It is important for them to have a secure environment that is accessed, delivered, and enabled from anywhere as their customers and business partners will also engage with them from physically remote environments.

SMBs following traditional operational models must switch to a digital-first approach. The more they can handle without any physical interaction, the better.

In the next normal, one should always be digital by default. This is not to say that physical spaces are unimportant, but digitization can ensure seamless operations. This is made possible by new and emerging technologies.

Distributed Cloud

The future of cloud is distributed. A distributed cloud is a cloud computing service or model that enables businesses to run public-cloud infrastructures and services across multiple locations. These include private data centers; different cloud service providers (like Amazon Web Services and Microsoft Azure); edge-computing locations; and third-party data centers just about anywhere.

This approach helps companies achieve low latency by having services closer to their physical locations. However, while cloud infrastructure is distributed, cloud evolution, governance, and operations remain the same (or the responsibility of the managed services provider).

Distributed cloud services also help cut big data costs and accommodate some local laws requiring data storage in a specific geographical area. This approach helps ensure that enterprises continue to benefit from public clouds that are cheaper and less complex than having their own private cloud or data center. As we have witnessed during the COVID-19 pandemic, companies with more advanced ICT and technologies like cloud computing could take lead in the market. Examples include all e-commerce companies like Amazon, Wayfair, and eBay in the USA; Jingdong, Alibaba, and Suning.com in PR China; Otto Group in Germany; Rakuten in Japan; and Zalando in Europe.

AI and Engineering

AI has been around for decades, but we had not reaped its benefits until now. Today, advanced AI and ML models enable enterprises to identify patterns and anomalies to make better predictions and smarter decisions. Operational insights are also a key driver of organizational performance.

As more businesses realize the value of engineered performance, smart algorithms, and effective ML models, we will realize the next level of productivity and operational efficiency.

However, many of the businesses (including startups and established enterprises) must contend with clunky development and deployment processes that stifle experimentation. For the best results, it is vital to find a way to realize enhanced collaboration between data science, operations, and production teams.

As AI and ML evolve and mature, robust engineering and operational disciplines will help organizations overcome potential obstacles. However, to realize the transformative benefits of these technologies, we must usher in an era of ML Ops (or ML CI/CD, Model Ops, and ML Dev Ops).

ML Ops is all about applying Dev Ops methodologies and tools to model development and deployment scenarios to industrialize and scale ML initiatives. However, there is one problem. Current data models and infrastructures assist decision making by humans, not machines. In response, businesses will take steps to disrupt the data management value and supply chain from end to end.

Some AI engineering trends to look out for are:

- AI-powered security;
- increased prevalence of AI in healthcare and marketing; and
- voice and language-driven AI.

Identity Access Management

It is safe to say that 2021 was the year of identity access management (IAM). According to Fortune Business Insights and Markets andMarkets, the global market for IAM was expected to almost double from USD12.3 billion in 2020 to over USD24 billion by 2025.

While the industry expects to grow by about 15% this year, the value of the IAM sector could increase by 65% over the next four years. This is because many corporations and SMBs now depend on IAM to verify user identities, evaluate access privileges (to protect sensitive enterprise and personal data), and improve the organization's overall security posture.

When we grant access to technologies and resources to people, devices (including IoT), and other assets, it will quickly become challenging to manage. As such, companies must take steps to standardize and automate their identity life cycle management processes.

Automating can also help extend operational boundaries beyond traditional systems while protecting and maintaining critical resources. This is achieved by moving their identity stacks and computation processes to the cloud. So, one can expect to see identity-as-a-service offerings or the implementation of advanced authentication methods such as behavioral monitoring, conditional access, and physical biometrics in the near future.

Multi-factor Authentication

Multi-factor authentication (MFA) has been around for many years and been applied across different use cases. But MFA truly gained a lot of momentum in 2020 when remote work quickly became the norm. By requiring users to prove their identity in two or more ways, businesses can better secure accounts, applications, systems, and of course, sensitive information.

In this scenario, users must provide a second authentication factor after inputting the username and password. Some popular examples of authentication factors include one-time passcodes (OTPs); software tokens; hardware tokens (like keycards and thumb drives); and mobile push from a software application to a mobile device.

By leveraging MFA tools, businesses help prevent data loss, internal theft, and external access from unauthorized users.

5G with Robust Connectivity and Automation

We have been reading about the promise of 5G connectivity for a while, and it is now almost here. Each advancement since 3G has created new use cases for the internet and mobile connectivity, and 5G is about to create many more.

For example, 3G made data-driven services possible and web browsing seamless on mobile devices. 4G enabled video streaming and an explosion of music platforms. As such, 5G will kick open the doors of new possibilities. It will catapult advanced technologies like augmented reality (AR) and virtual reality (VR). It will also accelerate the growth of cloud-based gaming, thus creating new opportunities for the industry.

At the same time, 5G also has the potential to eliminate the need for people to remain tethered and static near a particular location. So, cable and fiber-based networks will probably become redundant within the next few years.

5G and other advanced high-speed networks make some of the other technology trends on this list possible and available anytime from anywhere. For example, complex ML applications that rely on real-time data sources (for data analytics) are now available in the field via automation.

For example, Norwegian fishery operator Salmar already uses a 5G network to automate processes like feeding fish and caring for them. With the help of image recognition algorithms, Salmar identifies which fishes are overfed and which are underfed. Then it automatically dispenses food and medicines as needed. Initiatives like this will be the norm as companies attempt to automate anything and everything.

Extended Reality

AR and VR both leverage glasses and headsets to project computer-generated imagery into the human field of vision. When superimposed over the real world, it is AR. When it is a totally computer-generated environment, it is VR.

Extended reality (XR) is the new umbrella term for the combination of these immersive technologies. These include AR, VR, and mixed reality (MR) that has not been created yet. The inspiration for the term comes from the fact that all these tools help "extend" the realities we experience.

We can expect to see XR technologies used in conjunction with others to solve problems in the real world. For example, they can help us avoid potentially dangerous situations like conducting medical examinations remotely and diagnosing highly infectious diseases.

For example, VR can already be used to successfully conduct eye examinations. Patients can get their eyes tested and then select a pair of glasses or contact lens as needed, without ever leaving the comfort of their living rooms.

We can also expect to see more AR and VR tools used in education. For example, if XR were omnipresent in 2020, remote schooling would have been a different experience. At the same time, businesses can also use AR tools like smart glasses to communicate real-time warnings, especially during a pandemic in areas where infections spread rapidly.

Companies can also use these tools to ensure that people follow best practices like washing their hands, maintaining social distancing, and so on

Total User Experience

Hybrid workforces demand technologies to serve them as tools. Total experience combines customer experience, user experience, and employee experience into multi-experiences that transform business outcomes.

The goal of total experience is to enhance the overall experience where all these pieces intersect. Whether it is employees, customers, or users, the technology should serve all of them and enhance their experiences.

Instead of individually improving each one in a silo, tightly linking all of these experiences helps differentiate a business from competitors. The primary benefit here is that it is difficult to replicate, creating a sustainable advantage for a brand.

If an organization has moved all its operations online, it is vital to deliver total experiences to its remote workforce, and to mobile, virtual, and distributed customers. For example, if a company has shifted its business model online for safety reasons, it could do something like this: if customers want the option of picking up their orders, first it should deploy an appointment system through a website or a mobile app. When customers arrive, they receive a notification guide to the check-in process via an SMS or mobile notification. Then a message about how long it would take before they could safely enter the premises is received. Employees working at the store can use digital kiosks and tablets to co-browse with customers and solve any potential problems without physically touching the customer's device. This creates a safer, integrated, and seamless experience for all.

While these tech trends will probably dominate the industry in the months to come, success depends on the people. Companies need strong Dev Ops teams and developers with the necessary skillsets to make the most of these tools.

While security remains a dominant theme, and it will probably continue to maintain its place at the top until data breaches are a rare occurrence. Again, technology will not be enough to secure an enterprise infrastructure properly. One will need people who know how to use it and train others to follow best practices.

Adoption of new technologies, especially in the manufacturing domain, tends to raise fears that it will no longer offer an accessible pathway for countries' development, and even if feasible, it will no longer provide the same dual benefits of productivity gains and job creation for the unskilled labor force. This scenario makes it useful to assess the technological impact on existing jobs and understand the level of change it would have on the existing education system and prevalent upskilling programs.

As far as application of new technologies is concerned, they could be applied in all types of social, economic, and development activities. However, a discredit attached with adoption of new technologies is that benefits of new technologies are associated with a cost. It can be in the form of cultural changes (e.g., use of social media apps); loss of existing employment opportunities (e.g., development of robots to be used in manufacturing); or need for additional investments in creating upskilling institutions (e.g., setting up of training centers and vocational training centers). This disrepute is becoming more relevant if a technology's deployment is aimed at making changes in existing products and markets.

To some extent, the assumptions can be true if the technology is adopted for managerial functions and improvements in production processes rather than any direct benefits for end users. However, such initiatives do provide indirect benefits to users such as cost reduction, improved services, and better quality of products.

New technologies also generate employment as technological change will likely result in creation of new markets. Emergence of mobile telephony in recent times is a perfect example of this. Latest technologies create new avenues of employment by offering improvements in services and resulting in creation of next levels of service excellence. The emergence of internet-enabled information processing activities in the services sector is another example. The internet-enabled services such as financial transactions in the banking sector can be considered as the realization of anywhere, anytime, and anyone aspect of the new technology. Also, such technologies not only provide better services but also create employment in the services sector. Thus, in view of these recent technological developments, it may not be so appropriate to label technological development as employment reducing.

The stage of economic development is another factor that guides the impact of technological development on the economy, and to be more precise, on employment opportunities. In the developed world where the scope of market expandability is somewhat limited, adoption of new technologies can sometimes, but not always, lead to reduction in jobs. However, it may not be the case in the context of developing countries like India that are overshadowed by unserved markets, need for cheaper products, and cost-effective ways to provide services. Moreover, availability of cheap labor also provides for an option to firms in developing countries to adopt technologies that can help them expand the market rather than focus on cost-saving technologies. The recent development in communication technologies has enabled banking and insurance sectors to reach remote areas in the country, leading to the creation of new employment opportunities.

However, with the adoption of new technologies comes the need to change job requirements. With this comes the need to change the required skills and competencies of workers. This is what is termed as a case of skill mismatch wherein the skills or competencies required for a particular job do not match the skills and proficiencies of the existing labor market. A skill mismatch, in general, is defined as "some sort of discrepancy between the characteristics of employed workers and the requirements of the jobs that they occupy". According to the ETF Report, a mixture of deficiencies in the labor market such as recent adoption of new technology without proper upskilling of the existing labor force; geographical mobility; lack of clear definitions of skills required; matching frictions (e.g., retraining or moving costs); and last but not the least, lack of clear information are the main causes of a series of skill discrepancies.

In the present market conditions, most Asian countries including India are facing a massive problem of repurposing the poorly performing education-and-skills ecosystems and lack of vocational training to meet future requirements, while also safeguarding the educational needs of a growing number of young people.

Skills Spectrum for Emerging Markets

"The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

Alvin Toffler

Various studies have attempted to measure and predict the impact of automation on jobs by focusing on occupations and tasks. The onset of the fourth industrial revolution (I4.0) presages far-reaching changes in the nature of work. New occupations are mainly concentrated in the non-routine and cognitive categories requiring higher-order cognitive and soft or socioemotional skills (hereafter, referred to as 'soft skills'). Rising demand for high skills, combined with shrinking shelf lives of

specialized skills, means that the ability and willingness to learn to unlearn and relearn is more important than ever. Moreover, new modes of learning delivery and trends in the workplace demand self-directed learning for which learning ability will be crucial.

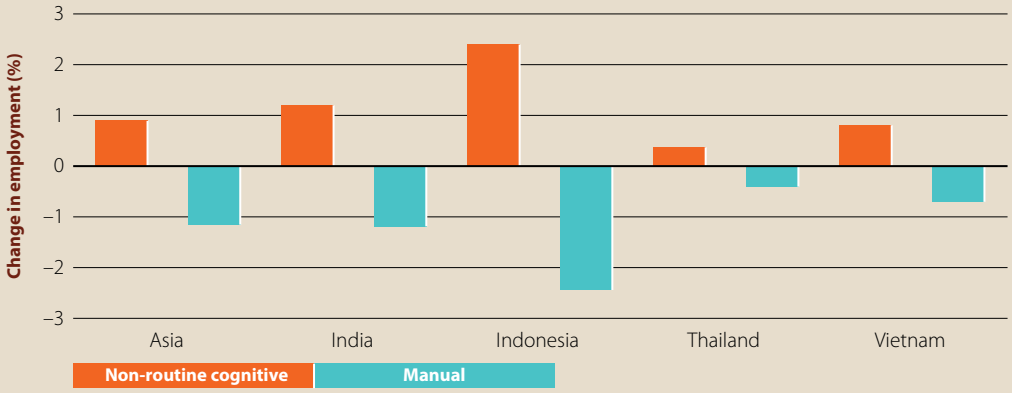
First, the alarmist view on adoption of technology resulting in job losses has been revised to a more optimistic outlook predicting a net increase in jobs. However, new jobs will only emerge in technology-based emerging industries and will require workers to learn new skills. The second key trend is that new jobs are more likely to demand higher levels of cognitive skills and entail non-routine tasks that are unlikely to be replaced by automation. Such changes in the nature of work will require continuous learning, which in turn can be bolstered by building the ability and willingness to unlearn and relearn.

Preparing the labor force for the future of work is one of the defining problems for the policymakers of our time and yet it is one that the majority of Asian countries are not ready to address. In India, the transition to the automation revolution has been accelerated by the COVID-19 pandemic. Companies are emerging from the crisis into a world of physical distancing in workplaces and major changes in customer behaviors and preferences. Recovery is forcing organizations to reimagine their operations for the next normal. Manufacturing companies are reconfiguring their supply chains and production lines. Service organizations are adapting to emphasize digital-first customer journeys and contactless operations. These changes will have significant effects on the requirements for workforce skills and capabilities, ranging from a dramatic increase in home-based and remote-working models to a need for shop-floor personnel to master new tools, along with new health and safety requirements.

A recent study has found that new jobs are majorly concentrated in the non-routine and cognitive categories requiring higher-order cognitive and soft skills that are less susceptible to automation. A study by Price Waterhouse Coopers shows that emerging technologies support additional jobs that are more difficult to automate, primarily in the services sector. ADB finds that demand for jobs that require non-routine cognitive tasks is growing faster than jobs requiring routine and manual tasks. Analysis of four economies in developing Asia shows that over the past decade, employment in jobs intensive in non-routine cognitive tasks expanded 2.6 times faster than total employment (see Figure 1). Examples of non-routine cognitive jobs include those of a

FIGURE 1

ANNUAL GROWTH IN EMPLOYMENT OF WAGE WORKERS BY JOB TYPE (%).



Note: Years of data used for the countries are as follows: India (2000–18); Indonesia (2000–18); Thailand (2000–15); and Vietnam (2007–19).

researcher or a manager. Routine manual tasks, such as assembly line workers, and routine cognitive tasks such as data collection, are more likely to be displaced by automation than non-routine cognitive ones.

The Real Problem

Recent reports have attempted to estimate the potential impact of automation on jobs in India. A 2017 McKinsey report, for example, explores how automation will impact employment by analyzing the feasibility of automating individual activities and capabilities within occupations. The report finds that 52% of Indian jobs can be automated using proven technologies. A second report finds that enough new jobs will be created to offset those displaced by automation and to accommodate a growing labor force. Instead of mass job displacement driven by technological adoption, there will likely be a simultaneous process of job creation in different sectors and occupations, leading to a shift of workers instead of a net displacement. The kinds of occupations projected to see significant increases in employment in India include construction workers; jobs in unpredictable environments, such as machinists and cooks; jobs requiring customer interaction; and care providers.

The impact of automation in India will also vary substantially between sectors, occupations, and geographies. In manufacturing, for example, evidence points to the decreasing demand for middle-skilled workers and increasing demand for low- and high-skilled workers; while in the services sector, low-skilled and manual tasks are at the greatest risk of automation. Among some of the most recent studies, three major findings offer significant reason for optimism. First, new research suggests that automation is more likely to replace tasks and activities within an occupation rather than completely eliminate jobs. Second, greater demand due to rising incomes is likely to offset job displacement from automation, which is particularly the case in developing Asian markets including India, as per an ADB study. Third, technology adoption will not be economically feasible at all levels, and so, displacement due to automation will not be immediate or as widespread as previously predicted.

Firms in India exist on a spectrum from very low-tech to those leading in innovation and technology. Technological change and digitization will affect low-tech and high-tech firms differently. The pace of digital change and technological adoption varies vastly across firms, and consequently, so does the risk of job displacement or opportunity for job creation. Skills requirements, too, vary between firms with dissimilar levels of technological adoption.

India must contend with high and increasing income and wealth inequality. The top 1% earners in India have seen a tenfold increase between 1980 and 2014, while the earnings of those at the median of the income distribution have barely doubled during the same period.

With automation and technological adoption comes the risk of exacerbating income inequality in a number of ways. On one hand, changing skills demand in the labor market driven by technological adoption will require individuals to invest in upskilling and reskilling. Individuals better able to quickly adapt to these changes and make private investments are already on the right of the income distribution. Not only will reskilling and upskilling be crucial, but basic digital skills will also be essential for individuals to adapt to changing demands. In the Indian context, the gender divide is also a concern when it comes to internet use and digital literacy: 70% of internet users in India are males. This presents a risk of greater inequality of opportunities and outcomes,' including wages

for India's women as digital literacy becomes increasingly important for accessing job opportunities and employability.

At the same time, however, high-skilled workers' wages increase at a faster pace than those of low-skilled workers. This is evident in India's manufacturing sector, where the wages of production workers declined as a share of total wages, from 58% to 49% between 2000 and 2012, while the wages of supervisors and managers increased from 26% to 36% during the same period.

The relatively faster growth of capital-intensive industries in recent decades will likely lead to greater concentrations of income among equipment, machines, firms, and technology owners, rather than laborers. This is already occurring in India's manufacturing sector, where the share of gross value addition (GVA) paid in wages to laborers decreased from 22.2% to 14.3% between 2000–01 and 2011–12.

Technological adoption and digitization also present an opportunity to reduce inequalities by bringing new workers into the workforce; increasing wages; and replacing jobs that are hazardous and where employers fail to provide for the workers' welfare. India must find ways of leveraging this opportunity, while managing the real risks of increasing inequality.

Research Methodology and Design

In this study, the research design consists of three sources of data collection:

1. review of published material on the subject;

2. getting pre-tested questionnaire filled up by respondents, pan India, both offline and online;

3. data collected through some industry associations, like FICCI, ASSOCHEM, etc.; and

4. taking a total stratified sample size of 210, wherein offline respondents were 44, and online were 166.

Sr. No.	Company/proprietor	Industry
1	ECON Laboratory & Consultancy	Pharmaceutical
2	Ahmed Rehan	Leather
3	Varun Mittal	Rubber
4	Sumit Kumar Goel	Paper
5	Laxmi Packaging	Paper
6	Jagmini Micro Knit	Textile
7	Manish Kapoor	Textile
8	Jitesh Kumar	Manufacturing
9	Smitglobe Web Services	IT
10	Flexus Web Solution	IT

(Continued on next page)

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Sr. No.	Company/proprietor	Industry
11	Kridha Rubber Udyog	Rubber
12	SVP Group	Manufacturing
13	Saphire Blue Industries	Consultancy
14	AG Industries	Manufacturing
15	Advance Valves Pvt Ltd	Manufacturing
16	AGNITY India Technologies	IT
17	AIF Engineering Pvt Ltd	Engineering
18	Applied Electro Magnetic	Electrical
19	YCUBE services	IT
20	UP Roller Flour Mill	Manufacturing
21	Lucent Biotech Ltd	Pharmaceutical

Company Profiles

Jagmini Micro Knit

Jagmini is an Oeko-Tex certified, export-oriented company engaged in the manufacturing of high-quality socks. In India, the company was set up in 1994 and has been successfully catering to the tastes and demands of its international customers for the last two decades.

Jagmini is a part of the Jagran Group, a leading business house of India, incorporated in the year 1942, with interests spanning across media and communications, education, real estate, and hosiery exports. The group employs more than 12,000 people and has offices in more than 200 cities of India.

Jagmini Micro Knit was the first Indian company to form a joint venture with one of the largest trading companies of Japan to produce high-quality premium business socks. The Japanese partner, Tokyo Kutsushita Co. Ltd. entered into the joint venture with capital participation and has been buying socks from Jagmini in large volumes for more than 15 years.

Vision

Jagmini's motto and challenge is to provide high-quality socks with value addition. To maintain consistency in its quality commitment, it implemented the TQC system as envisaged in the ISO principles and successfully acquired the ISO-9002 accreditation in 2002.

Laxmi Packaging

Laxmi Packaging is among the trustworthy companies of its field, involved in manufacturing and supply of quality-approved assortment of packaging bags. The offered products are quality assured against the diverse quality parameters by its quality experts. To cater to its client's demands in the best possible manner, the company is offering its products in various packaging options.

Team

Bolstered by a team of experts, Laxmi Packaging is engaged in manufacturing and supply of an extensive range of bag patterns. With the support of quality control experts, the company is able

to scrutinize the quality of its product at every step, which facilitates it in supplying high-quality products to its customers. In addition, these experts are involved in studying the most recent developments significant to Laxmi Packaging so that the company does not lag in any division.

Laxmi Packaging has the following professionals in its team: skilled workforce; quality controllers; warehousing and packaging staff; and sales and marketing executives.

Being a client-oriented company; Laxmi Packaging aims at providing its customers with a high level of satisfaction. Apart from providing fine-quality products, the company also makes certain that these are delivered within the promised timeframes. The most important objective of Laxmi Packaging is to provide maximum benefit to its customers. An effective communication structure has been developed with its customers to ensure flawless delivery as per their precise requirements. The company has garnered a strong base of satisfied customers globally, owing to its high-quality product assortment and prompt delivery.

Kridha Rubber Udyog

Kridha Rubber Udyog has come from a very humble beginning with a vision of uplifting the quality standards of products in the footwear industry. The company deals in the production of a variety of sole sheets, which is essential in making the footwear comfortable. It has all necessary facilities to conveniently meet the heavy demands and expectations of the market. Kridha Rubber Udyog offers a range encompassing textured EVA sole sheets, lady's slipper EVA sole sheets, Hawaii sole sheets, eva sole sheets, and other items. Established in 2018 in Delhi, the company is well-focused on growth and stability, for which, it is striving to become as resourceful for customers as possible.

SVP Group

SVP Group has been at the forefront of creating world-class residential and commercial properties in the national capital region since 1995. With a team of trained professionals who uphold its business vision, the company claims to have been crafting properties that are an amalgamation of solace, extravagance, and magnificence.

SVP Group's beginnings have been humble. It started with a basic observation that the city of Ghaziabad lacked decent housing complexes and shopping malls. Subsequently, the company started by creating residential homes, malls, and educational institutes to provide the residents of Ghaziabad with wholesome development.

SVP Group believes in building the foundation of trust, and is a name to reckon with in the real estate industry in the national capital region (NCR). SVP Group is about to complete residential projects located at Indirapuram, Raj Nagar Extension, and Mohan Nagar, while two of its flagship projects in Kaushambi and Nehru Nagar are on the anvil. The Opulent Mall, launched by the Group in March 2007, is an *avant garde* piece of stylish, rich, energetic, upscale, and unique shopping environment in the heart of Ghaziabad city.

SVP Group prides in not only creating residential and commercial real estate with ultra-modern facilities, but also eminently venturing into providing education to the youth and playing its part in the sustainable development of the country. An example of this is the SVP Group's Visveswaraya Group of Institutions.

Mission and Vision

SVP Builders India Ltd. is a reliable name in the construction industry that offers secure and luxurious housing options and convenient commercial business spaces. The group was formed to address the supply gap in quality housing and commercial spaces in the city of Ghaziabad. Today, the group has acquired an eminent position among the top real estate development groups in the NCR region.

SVP Group has committed itself to a fair and competitive marketplace where all members have an equal opportunity to operate their businesses profitably. It acknowledges that skills, experiences, and integrity are the foundations of professionalism. The group is also supportive of the right to opportunity for all to have their own homes and have access to entertainment, education, and leisure options. Its stated vision is "to play a strong and positive role in the housing industry."

SVP Group has also started its journey to be a socially responsible organization with the opening of Ganga Mata charitable dental and eye hospital in the city of Haridwar. The purpose is to help the poor and lower-class people who are suffering from various eye and dental problems. The registration fee is only INR10, which is valid for a month. For the poor, it is free. There are 60 beds, a staff of around 75 people, including eight senior doctors. The facility also houses 18 servant quarters.

Ethos

SVP Group keeps a constant eye on the regulatory environment and the marketplace. It voices its constructive views on overall enhancement of the society through tax reforms, regulatory reforms, housing finance, housing affordability, infrastructure financing, builder liability, builder licensing, shortage of skilled labor, smart growth, industry profitability, consumer protection, and environmental regulations. Its stated corporate philosophy is, "Earn faith and the rest will follow." The company strives to exceed expectations of its customers and provide them with value for their money by offering quality housing and services. Its project philosophy focuses on enriching the quality of life based on people's needs along with preserving the environment.

Saphire Blue Industries (P) Ltd.

Saphire Blue Industries (P) Ltd. is a privately organized company with a global reputation for quality products and outstanding customer services. It was started by a group of technocrats. The company is ISO 90001 and 14000 certified, and strongly believes in delivering customer satisfaction with consistent quality. For over six years, Saphire Blue Industries has been known for innovation, agility, growth, and socially responsible business practices.

The foundation stone was laid by a renowned scientist Dr. Suresh Singh having more than 50 years of experience in the field of water treatment and corrosion control. Under his guidance, the company has been developing advanced products for its markets.

Saphire Blue Industries has a very well-equipped research and development (R&D) laboratory with a sound backup of experienced and diligent team of technical experts in areas of production, marketing, and technical services. The teams have been working to innovate and develop new technologies.

The company has earned vendor appreciations in terms of reports such as CIRT and ARAI, and is also holding a good relationship with customers around the world.

Saphire Blue Industries is a manufacturer of specialized automotive coolants, brake fluids, engine oils, greases, hydraulic oils, aqueous urea solutions, and other operational fluids for high-speed diesel and petrol engines, including heavy-duty rail engines. It also manufactures high-tech artilleries such as bofors, guns, and cannon tanks and also products for high-speed racing cars, from six different locations. It is strategically located near Jaipur and Dehradun, which allows it to cost effectively serve its customers in India.

AG Industries

The business was started by Anil Gupta with manufacturing mint products in 1990. With an understanding of the industry and tasting success in a small span of time, Gupta started a new brand by the name of AG Industries in 1994 that grew with time to become a popular name in the area of essential oils, cold-pressed carrier oils, and allied product manufacturers and suppliers.

AG Industries is a leading manufacturer and B2B supplier of therapeutic-grade 100% organic essential oils, carrier oils, and allied products to some of the leading brands around the globe.

Since its inception, the company has focused on producing high-quality organic products through well-recognized practices like steam distillation for essential oils and cold pressing for carrier oils. After an initial growth led by Gupta, his elder son Arpit Gupta introduced a new growth vision supported by a technical background.

This phase saw an expansion of the product range, adoption of a customer-centric approach, and introduction of different types of packaging in various sizes to cater to customers of all scales. Another growth dimension was added by the youngest son, Achin Gupta, who introduced the cosmetic segment while sticking to the principles of organic products and customer-centric approach.

At AG Industries, delivering the highest quality is top priority. With the expertise in developing highly effective solutions to meet the market demand for organic products, the company lays high emphasis on factors like quality of products, hygiene of workers, and packaging of products.

Vision and Mission

Since its inception, AG Industries has had the vision to grow into the world's largest and most trusted manufacturer and supplier of pure natural products priced competitively. The company has been working to ensure a memorable and pleasant experience for its customers through dedicated customer service.

Advance Valves Pvt. Ltd.

Advance Valves commenced manufacturing industrial valves in 1986. At present, the company is led by Uma Shanker, a gold medalist in mechanical engineering with a master's degree in business administration (MBA) and having an industry experience of over 35 years. The ownership structure involves private ownership of the complete group among a group of closely knit individuals, with majority ownership being of Uma Shanker.

Advance Valves has established its position among the top 5 quality manufacturers internationally in its product range. It is today considered a pioneer in the technology for its dual-plate check-and-balancing valves, and even for its butterfly valves, especially in the domestic market.

Advance Valves has been regularly supplying its products to sectors such as oil and gas, refineries and petrochemicals, power, water, fertilizer, steel, and HVAC. Today, Advance Valves interacts with all the major clients and EPCs both in the domestic markets as well as globally.

Advance Valves specializes in the manufacture of dual-plate check valves (as per API 594/API 6D), high-performance metal-seated and soft-seated butterfly valves (as per API 609) in metallurgies suitable for all petrochemicals, sour services, seawater services, power and chemicals, mining, and power and oxygen applications, among others. These include offerings in aluminum bronze, duplex S.S., titanium, hastelloy, alloy 20, and inco alloy, among other super alloys. The company says its balancing valves are considered to be a *de facto* standard in the Indian HVAC sector.

AGNITY India Technologies Pvt Ltd

AGNITY Global Inc. is a global provider of intelligent business communication apps and infrastructure for communications and healthcare verticals. AGNITY's products leverage cloud, mobility, and real-time communication technologies to enable enterprise customers to transform their business processes for workplace collaboration, become more competitive, and capitalize on new market opportunities. All AGNITY solutions are powered by its communication application server (CAS), which supports secured mobile contextual communication and collaboration that can be leveraged in any industry vertical.

Communication service providers deploy AGNITY's intelligent communication solutions, to enable harmonization of service providers' existing intelligent networking services across legacy networks (e.g., 2G and 3G) and next-generation fixed line and mobile networks (e.g., LTE and Wi-Fi). The company also enables creation and deployment of new revenue generating multimedia applications for real-time business communications using AGNITY Open API.

Healthcare service providers deploy AGNITY's intelligent communications solutions to deliver MobileCare™, a cloud-based mobile secure contextual communications-and-collaboration service that improves patient outcomes at the point of care. MobileCare™ enables clinicians in the patient's circle of care to securely and intelligently communicate and collaborate to provide preventive, acute, and post-acute care for patients wherever they are. AGNITY delivers MobileCare™ directly to integrated hospital delivery systems and indirectly through communication service providers, independent software vendors, and system integrators utilizing AGNITY Open API.

AGNITY says its CAS platform and communications apps are adaptable to offer "sticky" new services in other industry verticals.

AIF Engineering Pvt Ltd

AIF Engineering Private Limited is an ISO 9001:2015 company involved in the design, engineering, manufacturing, supply, erection, and commissioning of furnaces, kilns, ovens, dryers, and other equipment for industrial applications. AIF Engineering is working with strong international partners to bring the latest technology for its customers. The target customers are non-ferrous, ferrous, and ceramic industries. The promoters are well established in non-ferrous smelting (e.g., HINDALCO, NALCO, BALCO, and Hindustan Zinc Ltd) and the aluminum recycling industry. The activities of AIFEL also include a wide product range for the ceramic industry (e.g., producers of sanitaryware, tableware, tiles, insulators, and refractors).

Applied Electro Magnetics Pvt. Ltd.

Applied Electro Magnetics Pvt. Ltd. (AEM) has been providing customized solutions to a number of government organizations, public-sector undertakings, and other private-sector organizations. AEM's R&D center has been recognized by the Government of India as a registered R&D center. AEM has 45 years of work experience with Indian Air Force for indigenized development of products.

AEM is the first Indian company having designed automatic signaling equipment for railways. The equipment supplied to railways for over 15 years has covered approximately 50,000 km of Indian Railways track. The company has been awarded the first prize for excellence in the domain of R&D in electronics by the Ministry of Information Technology, Government of India, and National Award for Indigenization by the Department of Defense Production and Supplies (MOD).

With a strong design and development base in hardware and software, years of rich design experience, and a track record of many successful projects, AEM is geared to take challenging multi-disciplinary assignments to provide total solutions to its customers.

Design engineering can adapt to changing technologies very fast, to address any problem in the field of embedded software and electronics with the right solutions. A well-designed in-house training system ensures that new personnel become useful for a project in the shortest possible time. Trouble-free operation of AEM installed systems over many years has generated tremendous goodwill among customers all over the country. AEM has an excellent human resource development (HRD) environment and hence the employee turnover is quite low in its industry.

Mission

Since 1975, AEM has been providing services in the field of design, development, and manufacturing of customized solutions for various segments. Its clients include Indian Air Force, Bharat Electronics Ltd, Department of Telecommunication, Electronics Corporation of India Ltd, and Central Electronics Ltd. AEM has been also serving as a complete contract electronic manufacturer (CEM) specializing in SMT and through-hole PCB assemblies. Based in Noida, AEM is only a short distance from any location in the Delhi Metropolitan Area and easily accessible.

UP Roller Flour Mill

The company is into flour manufacturing, having four branches and supplying flours to the entire north India. It has focused on process improvement through industrial engineering techniques and applying the *kaizen* culture for productivity improvements. The essence of the company's culture is: human obsolescence is worse than technological obsolescence. The company believes in slow but gradual technological improvement as a secret of staying in the market. However, it agrees that as and when new machinery is acquired, it needs to upgrade the skills of its workers.

Lucent Biotech Ltd

This is an upcoming pharma company based in Roorkee, having presence in north India. The company is of the opinion that in the pharma sector, there is acute shortage of lab technicians in the market. Only limited number of lab technicians keep moving from one pharma company to another. The company is also of the opinion that in the next decade India will be at the top of the world in supply of medicines, so the knowledge gap should be addressed to achieve the target of becoming a global leader in the pharma industry.

SAMPLE QUESTIONNAIRE (AS FILLED BY A PARTICIPATING COMPANY)

Research on **Labor Market Policies for Changing Market Demands** by the APO

Dear Respondent,

The Asian Productivity Organization (APO), Japan has entrusted us to carry out a Nationwide Survey of Industries, on the theme **"Research on Labor Market Policies for Changing Market Demands,"** with the purpose of identifying gaps in the present level of technology in Indian industries, so that on the basis of the report, certain measures may be taken to remain competitive in economic growth.

There are a few questions that need to be answered. Please take a few of your minutes and oblige us.

Q1. Please provide your name and designation.

Sumit Kumar Goel, Proprietor

Q2. What is the nature of your operation/product?

Corrugated boxes.

Q3. Are you in favor of introducing new technology in your sector?

Yes.

Q4. Kindly identify the technical gap in your process vis-à-vis the world.

There is a huge gap (very labor-intensive work).

Q5. In which area your employees need training and new technical skills for that. How will you manage that?

Manufacturing and machine handling is the main area where employees need training.

Q6. Technology can improve your output and your business profit also. Don't you think it will be beneficial for everyone?

Yes, it is, but it needs space and money.

Q7. What is your idea about introducing new technology in your business sector?

It is always welcome, but each technological process requires space which is a big trouble. It also increases the cost of the product.

Q8. What technological changes have you introduced in the last 10 years or before to improve your business operation for productivity improvement?

Many. A few of them are: order process (using ERP); marketing (using e-commerce platform); and a few CAD-enabled machines to improve the quality of products (some more machines to join the two different steps in one go).

Q9. What challenges have you faced when you introduced new technology in your business in the past?

The main challenges are skill development; space issues; electrical stability; cleaning and environment of labor to keep machine clean; and the return on investment is very slow;

Q10. How has your team responded to the technological changes? Are they comfortable or not?

They are not comfortable at all. It is very difficult to prove that the earlier process was not good for even their health and the environment.

Q11. Outline the three best things that you like about your business to introduce.

Latest machinery; in-house training center; and conveyer system, if possible.

Q12. What was the impact of COVID-19 on your business?

Only the cost of the product increased, which made it more difficult to arrange finance.

Q13. How does the technology help you to overcome the challenges of this pandemic situation?

It does not help.

Q14. What are your future plans for introducing new technology in your sector?

If everything goes well, I will be ready to introduce it.

Q15. Are you satisfied with your current employees and their expertise? What are your expectations?

As we do not have any training center, their capabilities are very restricted. We are unable to take proper advantage of technologies.

Q16. Did you organize any training program for your employees to gain knowledge and expertise? How did they respond?

I tried many times, but they generally think that we are fools.

Q17. Did the training program result in their productivity improvement?

No.

Q18. What are your suggestions for the government to improve the productivity of your employees?

Make the school enabled with machines to develop skills development in the lower-age bracket. It is difficult to train them at an older age.

Q19. On a scale of 1–10, how much do you rate the current labor policies and their implementations in improving productivity?

One.

Q20. If you are the labor minister, then what will be the first policy change and improvement that you will do to improve the productivity of the workforce?

I will work on the quality of their knowledge rather than just making the wages higher; if they are skilled, they will automatically get higher wages.

Q21. What training structure should be implemented to improve the knowledge and technical work experience of the employee?

Training is not a three-month job. It should be in daily particle. So, make your colleges skill development centers and not give them just degrees. Give them a real-life knowledge of doing work.

Q22. In your opinion, at least what level of education/training does a person need to get a job in your company?

Schooling with basic language, and training of at least three years on machines.

Q23. Ideally, what is the first and foremost quality you search for in your employees?

Knowledge of process and cleaning.

Q24. (MCQ) The organization uses technology to achieve its objectives.
Strongly agree.
Agree
Neither agree nor disagree
Disagree
Strongly Disagree

Disagree, this will just improve the quality of material.

Q25. Please suggest three ways to improve the use of technology in the workplace.

No idea.

Research Output

Job polarization owing to automation falls within the textbook definition of a wicked problem, as noted by Rittel and Webber. It is nearly impossible to definitively describe the policy problem in its entirety, as there is no consensus on what approach is considered equitable. Also, it is impractical to label any interventions as optimal.

Yet, something must be done. The foregoing discussion makes it clear that automation can have adverse impact on labor owing to the job and the resultant wage polarization. The polarization of jobs hollows out demand for mid-skill workers while increasing relative demand for high- and low-skill workers. An implication of this that goes unattended is that many rural people in India aspire to occupy mid-skill formal jobs. This aspiration stems from the promise that mid-skill jobs hold for escape from poverty and upward social mobility. Even prior to the ongoing COVID-19 health crisis, automation had resulted in job-and-wage polarization in India. However, post the crisis, studies have indicated that the rate of automation is going to increase due to aspects specifically related to the crisis. On top of this, India is set to enter a recession, which will only further hollow out mid-skill jobs.

If substitution of labor for the sake of replacement picks up momentum, the effects can be catastrophic. The failure of these technologies to bring about substantial increase in productivity will result in technological unemployment of an unprecedented scale.

Principle-based Approach

This signals the need to have pre-emptive safety nets or protective mechanisms in place. To analyze effects as they are unfolding and devising policies is next to impossible. We can adopt a principle-based approach, wherein we know that the outcome must conform to principles agreed upon. The following two guiding principles are selected:

1. Do not hamper automation and let the market experiment: Automation has the potential to bring in substantial improvements in aggregate quality of life and work opportunities. The quest for realizing such a technology must not be thwarted by restrictive policies stemming from Luddite paranoia.

Hence, market forces should be left to interact freely. To enable market forces to realize the greatest benefits, it is crucial for labor supply to be adequately equipped to withstand changing tides of automation. More specifically, labor must be skilled enough to shift jobs within and between sectors. Such mobility is possible if workers possess skills covering a range of tasks in demand, especially cognitive, both routine and non-routine.

2. Right to decent work (do not plan for mass technological unemployment, but facilitate reinstatement): Work is essential to humans and provides benefits that transcend the individual person it originally concerned. A state of affairs wherein nobody needs to work as technology has taken care of the 'economic problem,' as Keynes predicted, might not be the most desirable outcome.

WJ Wilson states that "the consequences of high neighborhood joblessness are more devastating than those of high neighborhood poverty," as quoted in Brynjolfsson and McAfee.

Accordingly, policy must give space for automation, but at the same time ensure that the hollowing out of mid-skill jobs (and jobs in general) does not violate the laborer's right to decent work. This can be achieved by skilling and facilitating mobility, incentivizing labor engagement, and having a social protection system in place.

Another consideration to keep in mind is that interventions must be wary of making labor more expensive (e.g., through higher MW, extra contributions to labor funds, etc.) as that would bring down the relative cost of automation.

Imperative 1: Skilling and Labor Mobility

Oversupply of educated labor in India has resulted in funneling of mid-skill labor into low-skill jobs, Kuriakose and Iyer have noted. Part of the reason for this rigidity in upward mobility of mid- and low-skill workers is that skilling and other aspects that characterize high-skill workers are acquired from a young age. As highlighted by Vasishta and Dubey, jobs comprising cognitive and analytical tasks that demand high-skill labor are dominated by socially forward castes. It is a well-known fact that good primary and secondary schools, which matter the most, are effectively reserved for economically privileged stratums of the society.

The government has recognized the need to impart skills to place employees in a better position in the ruthless market. The Ministry of Skill Development and Entrepreneurship has launched various schemes to that end. Pradhan Mantri Kaushal Vikas Yojana (PMKVY), a flagship scheme, aims at skilling the youth in industry-demanded skills. Skills Acquisition and Knowledge Awareness for Livelihood Promotion also has similar aspirations. Projects in the past have indicated that attempts at scaling up the skilling of the workforce have not been met with increases in labor demand/job creation as expected.

These, and other efforts by the government, though well-intentioned, are not steps in the right direction. A key requirement for workers in the coming years would be the ability to undertake cognitive tasks. Although routine tasks in general get automated, routine manual jobs are usually affected worse than their cognitive counterparts.

There is empirical evidence supporting this claim. In 2018, a labor market demand survey showed that machine operators and technical staff (both of which are extensive routine manual jobs) were part of the top ten jobs in demand by the industry. The 2019 survey showed that the top ten jobs demanded by the industry now all comprised cognitive tasks. The falling out of routine tasks from 2018 to 2019, according to the report, reflected the rise in automation. The report also claimed that the share of recruiters who could not find workers with the desired skillsets has only been increasing over the years, and presently, 64% of the recruiters cannot find workers with the skills sought after.

It thus becomes important to re-envision skilling and education in general. Various labor competencies are determined by the schools that people go to at a young age, which is highly class contingent in India. To right this wrong, we need to stop treating education and skills training as they have conventionally been understood. Workers from all spheres will have to keep demanding upskilling throughout their careers as and when disruptive technologies keep emerging. We cannot allow labor to compete solely on privilege of good education received in childhood; competencies have to be developed in individuals that go beyond specific tasks. An example of this is soft skills training for integrating individuals into the hotels and accommodation industry. These skills can be utilized in other jobs as well.

Imperative 2: Social Security

There is an urgent need for simultaneously devising a social security measure. If labor mobility turns out to be low, it becomes extremely important to have a social safety net that mitigates the adverse impacts of automation on labor. The job polarizing effect of automation would result in

two ills revolving social security: first, many mid-skill workers would be displaced from formal employment structures wherein they received social security benefits; and second, the wage polarizing effect would reduce the dispensable income available to workers, which could result in reduction in the income being utilized for health purposes.

The role of the state in financing this fund is important as the funding aspect should not burden the industry too much. Rather, if the industry considers the costs for engaging labor to be substantial, it will catalyze automation. The Vice Chairman of the Niti Aayog has recognized this responsibility and stated that in developed economies, social security is extensively provided by the state. To this end, India should have a labor fund that helps with provident fund, medical costs, and so on. Other areas for generating funding of this instrument could be explored, such as giving individuals the right to be paid whenever their data is utilized for purposes other than what they had originally opted for. These would require a legal economic exploration.

Imperative 3: Labor's Competitive Edge over Automation

The last implication draws on the potential inability of the market to deliver socially desirable automation technologies (technologies that substantially increase overall productivity, and thereby create new jobs in allied and varied fields). Government policies can be aimed at giving labor a competitive edge over automation in industries where automation is intended to merely substitute labor with capital. This can be done in two ways. First, we can increase the relative cost of capital, thereby disincentivizing automation. Reduction in tax deductions for interest, increased cost of acquiring the automation technology, elimination of capital subsidies, and so on are possible options in this regard. More explicit moves include implementation of 'robot taxes' repeatedly promoted by Bill Gates.

However, this goes against the first principle of letting automation flow freely. The second approach focuses on giving labor the competitive edge by implementing beneficial measures if firms opt for labor over automation. The Vice Chairman of the Niti Aayog has stated that we must dispense with capital subsidies, and it is time to focus on labor subsidies. Such subsidies reduce the cost of labor directly, while protecting wages from dropping below a statutory level.

Combined with a push for generating jobs in emerging industries (such as manufacturing of robots), routine mechanical jobs that most skilling programs impart, can be reinstated by providing labor the competitive edge through subsidies.

Other Concerns

First, automation has also been suspected of deskilling labor due to its polarizing effect on jobs. Automation pushes existing mid- to low-skill workers into low to unskilled work and reduces the aggregate skill composition. Even when automation brings about a strong reinstatement effect, it has been observed that jobs created are menial in nature. Gamst notes that deskilling is a Marxian mode of societal control, wherein jobs are divided into discrete minute tasks that are to be repeatedly performed, not requiring any cognitive skills.

Second, availability of opportunities and attempts at skilling would not be sufficient. The oncoming digital wave is most likely to reflect and incorporate existing social hierarchies in India, with sociocultural forces shaping the capability of individuals to reap the benefits of technological advancements. This ranges from restriction of good formal education to upper echelons of the society to patriarchal forces restricting women to sell their labor online.

Third, automation has become a tool for subverting democratic forces and progress. Strikes in 2011–13 by workers at a Maruti plant in Gurgaon were quickly followed by accelerated automation. This highlights a clear impetus for automation of jobs to reduce the bargaining strength of labor. It has been argued that automobile manufacturers 'learnt' from the foregoing event and increased automation in their plants as well. The period revolving these strikes witnessed a 27% increase in purchase of industrial robots by the automobile industry. COVID-19 has shown the relative elasticity of labor supply like never seen before and will surely add weight to this. Perverse incentives and socially undesirable impetuses must be kept under check.

Conclusion

The new-age digital skills include emerging technologies such as big data analytics, AI, ML, automation, cloud computing, cybersecurity, IoT, robotics, and telemedicine. There is a severe shortage of such skills as the demand during last two years has been exponential, but supply has been moderate. Technology service providers are witnessing a 30% growth in digital deals, an 80% jump in cloud spending, and a 15% rise in customer experience spending since the coronavirus outbreak. The number of workers in India requiring digital skills will need to increase nine times by 2025, and the average worker in India will need to develop seven new digital skills by 2025 to keep pace with technology advancements and demand, according to a recent report commissioned by Amazon Web Services Inc. This would amount to a total of 3.9 billion digital skills training from 2020 to 2025. At present, digitally skilled workers represent only 12% of India's workforce.

During COVID-19, it became evident that the future of businesses will be hyper digital and largely contactless. Technology will play a much larger role across different verticals, with concepts such as telemedicine, contactless drone delivery, and on-the-go education becoming a reality. It is all about digital transformation, cloud adoption, software advancements, chatbots, IoT, and a lot more. The shortage of people with digital skills is leading to a war for talent among companies, which, in turn, is leading them to pay higher salaries and offer multiple hikes in a year as a retention strategy.

IT companies are reviewing compensations and providing multiple increments within a year to retain talent. Organizations across industries are on a hiring spree, either to fulfill current demands or to make investments for future growth. Significant salary hikes are given to hire people. To address the demand-supply gap, companies are also adopting a hire-train-deploy (HTD) model wherein employees, especially freshers, are trained by specialist staffing firms on the exact skill requirements before deploying them with the clients.

Not only the IT sector, but also the service and manufacturing sectors rely almost exclusively on skilled workforce. As the confluence of business and technology continues, most jobs will be redefined to be knowledge oriented. It is evident in several industries where the employability gap is ever increasing as more and more future skills-oriented jobs are created. These sectors include traditional sectors such as banking and financial services, manufacturing, pharma and healthcare, telecommunications, and infrastructure. These sectors are evolving into digital and tech-centric roles. However, as the employability survey of 2019 revealed, 80% of Indian engineers were unfit for knowledge-based roles, and only around 4.6% of Indian job aspirants were good at coding.

Another such sector is the pharmacy and health services sector. including pharma manufacturing, e-commerce, multispecialty hospitals, and allied health service providers. India is the largest provider of generic drugs globally, and Indian companies supply over 50% of the global demand

for various vaccines. This is a huge sector that is highly underserved in terms of skill enhancement. As technology is further integrated into how we manufacture drugs and run our healthcare services, more and more new roles would be created to support digital healthcare. Some of the important skills here would be AI, ML, IoT, data analytics, and e-commerce management.

India's most pressing labor market challenge going forward will be to generate a large number of good jobs. These jobs tend to be formal-sector jobs. Two obstacles to formal-sector job creation are regulation-induced taxes on formal workers and spatial mismatch between workers and jobs. Encouragingly, firms and workers are finding solutions to deal with these obstacles that are even more varied than the obstacles themselves, as we have been described in this chapter. Meeting the challenges ahead will require more of such ingenuity, and the private sector, state governments, and the central government will all have important roles to play.

Measures to shore up labor demand were essential in the early phases of this crisis and the speed of their application demonstrated their use in fighting immediate and acute demand shocks. As the recovery proceeds, training programs that are responsive to business needs are essential so that displaced workers can be easily reintegrated into the labor market. Particular attention should be given to more vulnerable workers, such as the young and low skilled, so that programs can address specific needs and provide opportunities that enable an inclusive and widely shared recovery.

Governments have made rapid and substantial responses to this crisis thus far with far reaching policy changes to cope with the significant challenges to labor markets. As support to jobs via job retention schemes is gradually wound down and more permanent structural demand shifts become evident, the challenge will be to ensure that the policies they have currently implemented are sufficient. This encompasses both the coverage of the individuals they reach and the extent to which investment in reskilling matches labor market needs. The latter will require effective tools to identify the skills in demand and a strong dialog with the social partners and businesses now as well as in the future. Moreover, the effectiveness of new and adapted measures will also depend on their successful implementation.

ISLAMIC REPUBLIC OF IRAN

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Executive Summary

The Fourth Industrial Revolution is creating demand for millions of new jobs, with vast new opportunities for fulfilling people's potential and aspirations. However, to turn these opportunities into reality, new sources of data and innovative approaches to understanding emerging jobs and skills, as well as empowering effective and coordinated large-scale action, are urgently needed across the globe. The issue of employment is complex and multifaceted, so employment-oriented policies are also wide ranging. Some approaches have examined the issue of employment by focusing on economic growth policies. But the experiences of countries that have experienced economic crises have led to a change in this attitude. This approach considers macroeconomic policies and tools necessary but insufficient to create sustainable employment. In fact, in this approach, activation programs and capacity development in the real sector of the economy through the use of business development tools are prioritized. In this context, the role of policies aimed at promoting individual and specialized skills, active and passive labor market policies, and the like are redefined. In IR Iran, employment policies have changed in recent decades. Thus, the basic approach is that employment macroeconomics has three main components: (1) the labor supply side, the main actors of which are the skills and expertise training system; (2) the demand side, which includes the economic sectors of the country; and (3) institutions, including laws, regulations, and components such as salaries. Sustainable employment policies are wide ranging. Some approaches focus on economic policy, some focus on policies aimed at enhancing individual and specialized skills, and some focus on developing employment-generating capacities. Paying attention to the political and institutional conditions of the labor market, supportive policies, and empowerment are also among the important approaches that can be adopted in specific circumstances.

In times of recession and economic and social crises, the central priority in the optimal allocation of resources is employment. The starting point for government intervention in the field of employment development is the demand side or business units. Businesses, i.e., the "stimulus side of the labor market demand," are the points of entry and focus in times of recession and economic crisis. Naturally, after the prosperity and development of existing businesses, labor supply-side management also becomes relevant. In improving the labor market demand side, priority is given to developing and upgrading the capacity of existing firms. After the prosperity of existing businesses, the issue of attracting new investments and creating new enterprises also becomes

important. In selecting any specific category of activities for development, the categories that lead to the promotion of employment dynamics in the region are prioritized.

In the development of existing enterprises, the focus will be on small- and medium-sized enterprises. The programs will be designed in such a way that companies can connect with the backward and forward linkages of value chains. In times of recession and economic and social crises, much of the employment in the informal sector is realized. It is necessary to support the circles with "employment-orientation capacity" in the programs to attract an active labor force by analyzing the value chains of labor.

In allocating financial resources, the focus should be on circles in the business chain that increase the demand for skilled and specialized labor in the society. National Business Development and Sustainable Employment Plan, within the framework of the business system development model and using standard model tools, was implemented at the provincial level.

The following should be considered to facilitate sustainable employment:

(1) improving the skill level of human resources, given the recognized known needs of each field of activity;

(2) holding training courses in areas required for the field of business activities;

(3) helping recruit skilled labor appropriate to each field of activity;

(4) creating or strengthening educational and executive institutions and improving the skills of human resources using existing capacities;

(5) helping to absorb technical knowledge tailored to the real needs of each field of activity;

(6) creating or supporting actors of venture capital or other similar types of investment;

(7) facilitating the relationship between business and employment in each target activity;

(8) facilitating the connection between a province's businesses and its tourism sector;

(9) helping recruit temporary foreign skilled labor;

(10) contributing to the direct presence of business units and labor in regional and global markets;

(11) adopting correct economic policies and ensuring optimal allocation of resources, favorable income and wage policies, exchange rate, and real energy prices as the necessary conditions for solving problems of the Iranian labor market;

(12) solving the employment problem and paying attention to increasing production;

(13) adopting a set of monetary, financial, and credit policies with sufficient coherence as one of the basic conditions for improving the labor market; and

(14) understanding technological developments and their current consequences for markets because of the necessity for labor market analysts to pay attention to technological unemployment in terms of labor demand under the influence of technological changes.

Introduction

One of the most important economic goals for IR Iran is to deal with internal and external shocks to the economy. Toward this end, IR Iran should adapt its structure such that less damage is inflicted on the country at the time of the shock. Unemployment is one of the most important challenges facing the Iranian economy. According to studies, the increase in labor supply, along with the economic downturn due to international sanctions and COVID-19, has caused the country's labor market to face significant shocks in recent years. One of the salient features of Iranian employment is the small share of highly educated employees. In other words, the current structure does not attract the educated active population. However, in recent years as well as in the coming years, we see significant growth in the active educated population in IR Iran.

The issue of unemployment and its socioeconomic consequences have led to the employment policies in most countries, especially the developing ones. In IR Iran, the issue of unemployment in the current situation has become one of the most important challenges facing the government. This problem has been exacerbated on one hand due to the young population structure and high labor supply and on the other hand due to a slow growth of demand for labor (for various reasons such as structural problems in production, insufficient investment, etc.).

Since the current unemployment of the country is not necessarily related to the cycles of economic boom and recession and has a structural aspect, so temporary measures and solutions, if applied without regard to structural reforms, will only aggravate this problem in future. The challenges of the Iranian labor market in terms of labor supply and demand and the factors affecting it can be discussed. These are, increased labor supply over demand and the widening of the existing gap; structural problems in supply-side economics; inefficient performance of relative prices; and dependence of production on investment, and consequently a lack of market-related labor demand. Emphasis on structural reforms in the economy, especially with investment and production, including adequate attention to the capital market; reform of the tax structure; growth of exports; and removal of obstacles to its development for full use of productive capacity are necessary.

The government has placed a high priority on tackling the challenge of generating employment for the rapidly rising labor force in the country. IR Iran's relevant population has doubled between 2005 and 2020, with the rising number of youth population (aged 15–25 years) joining the labor force. At 71% male and 16% female labor force participation rates, the country faces the enormous task of creating productive, remunerative employment for the new entrants to the labor market. The economy has shown a steady growth averaging 1.73% through 2005–20, while the employment growth has been at the rate of 0.89%. Although the number of jobs available to women has increased as much as 27% during 2005–20, educated unemployment among women remains far too high. The need for creating jobs for educated young women and men leaving educational institutions, particularly in the urban areas, has added socioeconomic urgency to the task of the government.

The country is faced with both a challenge as well as an opportunity to economically engage its youth population to bring about further prosperity and growth. Several measures to improve the employment and labor market situation, especially for young women and men have been initiated to ease their

entry into the labor market. The government has undertaken, with good results, various initiatives to rapidly create jobs in the private sector, such as providing incentives to enterprises to recruit new workers. IR Iran is also joining, as one of the eight countries, the Youth Employment Network set up jointly by the UN, the World Bank, and the ILO. The country is expected to benefit from its experiences and good practices in promoting employment among young women and men.

Both the Sixth and Fifth National Development Plans of IR Iran have placed major emphasis on employment generation and have outlined several policy measures to reduce the growing employment pressures. The Sixth National Development Plan emphasizes employment generation for poverty alleviation, primarily through improved social dialog and greater participation of the private sector in developmental activities. Policy measures for further relaxation of export promotion and greater participation of the foreign direct investment (FDI) are envisaged. These policy measures emphasize enhancing youth employment prospects beyond the available opportunities in the public sector.

The government recognizes that the problem can only be solved on a sustainable basis by bringing about appropriate structural changes in the economy, which would increase the rate of creation of productive and remunerative employment. Good labor market policies and labor market functioning are essential for bringing about the required structural changes and creating conditions for sustained economic growth and job creation in the economy. The government also considers providing productive, remunerative work under conditions of freedom, equality, and workers' rights as key to such sustainable growth in employment.

The purpose of this report is to provide the Government of IR Iran elements for developing an employment policy framework to respond to the challenge of creating employment opportunities for a rapidly rising workforce. Such a policy framework is expected to be a part of the overall employment strategy of the government. The report was prepared with the APO, the National Iranian Productivity Organization (NPO), and IR Iran's Ministry of Cooperatives, Labour, and Social Welfare Organizations. The NPO shares the widespread view that IR Iran could make better use of its labor, which is its most versatile and fastest-growing resource. Because so many young people, and others, are unemployed and because so many people of working age, especially women, are not fully and productively employed, IR Iran's rate of output growth is way below its potential. Pockets of poverty persist largely because few family members beyond the household head are productively employed. Labor market distortions and segmentations between rural and urban economies highlight the severity of poverty, particularly in terms of the educated unemployed in urban areas and the uneducated unemployed in rural areas. Summarily expressed, much of IR Iran's economic policy framework and correspondingly its economic structure needs to adjust to become conducive to economic dynamism and thus absorb a growing and ever better-educated labor force in decent employment.

Hence, the report takes the view that an employment strategy for IR Iran needs to examine the following major issues:

(1) adjustments in macroeconomic policy to remove labor market, trade, and fiscal policy distortions;

(2) skills development policy for enhancing employability among young women and men workers;

(3) conducive environment for the growth of small and medium enterprises for generating employment, with particular attention to women entrepreneurs and workers;

(4) improved coverage of social protection to allow higher levels of economic participation of women and men workers;

(5) effective social dialog leading to greater participation in economic decisions;

(6) paying attention to expertise and increasing the skills of the workforce;

(7) paying attention to declining jobs in future;

(8) effects of COVID-19 on employment; and

(9) coordination between economic policies and their effects on employment.

Several key policy recommendations are being put forward in this report after examination of issues in areas of policies relating to the labor market, macroeconomics, skills training, micro and small enterprise development, gender equality, social security, and social dialog. Further policy inputs, based on practical field action programs in each of these areas are expected for finetuning the employment strategy at a later stage. This report will comprise the following sections: Theoretical Foundations; COVID-19 and Employment; The Economy of IR Iran; Employment in IR Iran; Active Labor Market Programs in IR Iran; Identification of Declining Jobs; Industrial Policies and Employment; Employment Projection in Industry and Mining; and Conclusion and Recommendations.

Theoretical Foundations

The issue of employment and access to desired job is based on the most basic needs of a person. Unemployment as a phenomenon of social, economic, and cultural issues has been raised, which has become a major concern of the program. Following a very high population growth over the past few decades, especially in the first decade of the revolution, a large number of young people have become predominantly of working age. Over the past decade, with the expansion of educational coverage in the country, more of them are waiting to enter the labor market.

On one hand, there has been unfavorable economic situation in the past, caused by war and economic sanctions, which has led to a programmatic growth of labor supply. On the other hand, unfortunately, the lack of a long-term strategy has led to many policies that the government has taken with short-term plans. This issue is of greater importance and severity for the low-income groups or the generally accepted deprived classes.

One of the most important areas is the designing of labor market policies, which, while pursuing the goal of economic growth, can reduce unemployment and increase efficiency for these groups. However, in the market, there are several actors with different orientations, abilities, and goals, so that stimulating demand and equipping labor supply in this market is a complex matter and needs scrutiny, coordination, and active participation of relevant executive bodies and institutions. In the labor market economics literature, different policies for achieving short-term and long-term employment are considered by governments. Given the breadth of these policies, it is common to see them typically in four different categories: macroeconomic policies affecting employment growth; active labor market policies; labor market regulation policies; and passive labor market policies. These policies are both direct and indirect.

Policies related to the reform of job search mechanisms, which are usually provided through employment service agencies, include education for the unemployed and incentives to stimulate labor demand directly or through subsidies. Specific measures for disadvantaged groups in the labor market, including youth, women, and the disabled are among such policies.

Traditionally, labor market policies are classified as active, passive, and regulatory policies. Regulatory policies on aspects such as working hours and minimum wages include the share of social security costs and the like. Passive labor market policies such as Passive Labor Market Policy (PLMPs) provide alternative income. They are designed during the period of unemployment. In contrast, Active Labor Market Policy (ALMPs) targets unemployment through measures such as:

(1) making connections and matching or providing information on the status and characteristics of people looking for work with job opportunities through direct employment partnership services;

(2) upgrading and adapting the skills of current job seekers to improve their employability;

(3) improving the motivations of individuals or industries to accept specific jobs or hiring specific categories of workers; and

(4) job creation, whether in the form of public sector employment or by providing subsidies to stimulate employment in the private sector.

Historically, active labor market policies have sought to reduce unemployment through such tools. However, these policies in recent years have also covered a wide range of social and employment goals. Consequently, while the beneficiaries of passive policies are generally the unemployed, they can also target groups looking for better jobs or young people moving from school to work.

Over time, the gap between active and passive programs has become more detailed. What are closely related to the purpose of this study are policies that can increase employment among lower-income or more vulnerable groups. From this perspective, it seems that active market policies are more suited to this goal. These policies, with the aim of increasing employment and reducing unemployment, create and improve incomes for households, especially poor households; improve the economic and social status of households; and pursue distributional goals. But to better understand the goals and effects of these policies, we present the labor market activator and then its effects on the key indicators.

Types of Active Labor Market Policies

Education

One of the most important types of active market policies is education, so it has a significant part of the volume of activities and resources. This policy has on-the-job training and training for the unemployed, job seekers, and future employees. It seeks to provide basic skills training and promote specialized skills, technical, and vocational training, and creation of in-service training and internships. Workforce training represents an important component of policy strategies that aim to improve people's employability and thus enhance their future career paths (such as higher incomes or improved quality of work) with positive cumulative spillover effects (such as increased productivity). These programs often target the training of specific groups of people in the labor

market, including young workers and older women. In Organization for Economic Co-operation and Development (OECD) countries, there is a difference between on-the-job training and off-the-job training. The latter usually targets the unemployed but can also be used for the employed. In these countries, education is the mainstay of active labor market policy spending. In emerging and developing countries, education also represents the major types of activities and is commonly associated with other labor market interventions and may include some form of income support. In addition, in these countries, training is often relatively short-term and focused on acquiring basic skills.

Public Work

The main purpose of public work programs is to compensate for the shortcomings of job creation by the private sector. Jobs created also intend to complement existing ones, and as a general rule, public work programs are part of public or public-private projects with special benefits to the society. In the OECD countries, these programs aim to help unemployed people stay connected to the labor market, and this is especially important during periods of economic recovery. In recent decades, however, the role of public works programs in these countries has declined dramatically after widespread use during the 1970s and 1980s. In emerging and developing countries, public works programs are increasingly seen as ways to reduce poverty and increase social development. However, they have other goals, including providing a source of social support for people who are not covered by relief or income support schemes as insurance against economic shocks. Another difference from developed countries is that in emerging and developing countries, public jobs are often implemented as forced labor programs, which means that they first keep in touch with the labor market through forced jobs and basic skills. They may be taught a specialty to follow in their next steps along with other programs, especially training programs, to return to jobs without subsidies. Over the last 10–15 years, a large number of public works programs have been implemented in these countries to help the vulnerable[1].

Employment Subsidies

These programs include all initiatives that seek to motivate employment or retention by reducing labor costs. On the demand side, subsidies to employers are expected to encourage employers to hire or retain a particular group, such as those who are long-term unemployed or young workers who are subsidized. On the supply side, the target worker groups are encouraged to reenter the labor market while reducing their precautionary wages. In OECD countries, employment subsidies are primarily designed to provide limited-term support for vulnerable groups facing particular challenges, and their use is intensified during periods of labor shortage. In emerging and developing countries, these subsidies are used to improve the employment of workers suffering from chronic problems, e.g., female-headed households, low-income household members, unemployed youth, and dropouts; and are therefore less commonly used during recessions. There are employment subsidies in emerging and developing countries.

Self-employment and Establishment of a Micro Enterprise

These measures are intended to provide both financial and logistical support to the unemployed or inactive individuals who wish to start an economic activity, whether as self-employed or micro enterprises. In the OECD countries, these policies are more focused on young and highly skilled people, as empirical observations have shown that such interventions are effective when targeting the unemployed[2]. In emerging and developing countries, such programs play an important role in

[1] Subbarao *et al*, 2013.
[2] Martin, 2000.

promoting job creation in both formal and informal economies, which means that countries that can benefit from such programs have a wider group than the OECD. The degree of convergence of services provided to program participants, who still suffer from significant barriers to full employment in emerging and developing countries, is especially limited to access to credit in the informal sector.

Labor Market Services

Labor market services intend to connect job seekers and employers. This is achieved through a wide range of services, including job counseling, job market familiarity, job participation, and referrals to other resettlement measures such as training. These services can be provided through the Public Employment Service (PES) as well as public sector measures or with the participation of private actors, along with other types of active labor market policies such as education. Public works should also be involved. According to the 1948 Employment Services Convention No. 88, the Public Employment Services Unit is a government unit that is primarily part of the Ministry of Labor, focusing on various programs and activities to promote employment and protect the workers employed during the transition period or economic reform[3]. To achieve these goals, the Public Employment Services Unit has the following tools:

(1) providing labor market information;

(2) job search assistance and job search services;

(3) consulting services during the period of unemployment;

(4) managing labor market programs; and

(5) the Unemployment Benefit Office.

Employment service units usually have relatively the same performance in different countries, and the only issue discussed in this regard is considering the unit as an institution or part of active labor market policies. In the second definition, the first three of the tools mentioned should be considered, whether they take place in these units or any other part of active labor market policies. But given the first definition, the last two will be more important, i.e., managing labor market programs and managing unemployment benefits. However, according to the definition provided by the International Labor Organization (ILO), the first definition, public employment services is considered to be a public institution that manages active and passive policies. In OECD, the public employment services and labor market service units are at the center of complementing and streamlining active labor market policy measures. In emerging and developing countries, the role of the public employment services and labor market service units is generally more limited and public resources are relatively rarely allocated to them. However, existing efforts in these countries have often focused on increasing employability and fostering job readiness with a supportive view of the transition from education to employment. Yet, despite the many reforms that have been adopted in these countries, especially in Latin America, the focus on strengthening and improving the efficiency of market services is more than that in OECD countries, which have developed new institutional frameworks or linked active policies to passive policies. The work is focused.

[3] ILO, 2009.

Effects of Active Labor Market Policies

Theoretical foundations and empirical results of studying the effects of active labor market policies show several important effects on key economic and social indicators, the most important of which are discussed below.

Increasing Employment

The first role of active labor market policies is to reduce imbalances and unemployment and increase the level of employment. In a highly competitive labor market, the presence of independent job seekers, along with job creation, will lead to expansion and development; and allocation of employment will increase productivity in the economy. In reality, such a self-regulatory mechanism comes with some problems and obstacles. For example, at a given time, there may not be enough jobs in the labor market, or, job opportunities may be created in sectors of the economy that do not have adequate labor, i.e., employers may be looking for people with special and new skills and abilities that are not currently available. In addition, workers and employers may not have enough information to create a fully competitive and self-regulatory mechanism for the labor market. In the face of these obstacles, active labor market policies can increase the level of employment through:

(1) direct or indirect job creation; and

(2) helping people to find the desired job that suits their skills and abilities and is also in line with the market demand.

Improving Equality

Active labor market policies can improve equality by targeting disadvantaged groups who face certain barriers in the labor market, such as those in the low-income classes. Under these circumstances, active labor market policies may improve the employability of disadvantaged groups in ways such as hypothetical training courses for specific groups such as low-skilled individuals. Employment opportunities for different social groups in terms of age, gender, ethnicity, and local community are the most important, in which case, considering the potential of active labor market policies to affect certain groups and strict targeting can be economically austere. Also, socially adjusted, the cumulative effects of active labor market policies may be low[4]. It is important to note that although active labor market policies can be particularly effective, there are risks associated with these policies. For example, the benefits for certain groups may be associated with the effects of substitution. In addition, in the absence of specific components aimed at increasing employability, such as education, these policies can have detrimental effects due to social notoriety or lock-ins for vulnerable groups[5].

Poverty Reduction

Employment has increasingly been recognized as a fundamental driver of poverty reduction since the mid-1980s[6]. The integration of skills, as well as active labor market policies, can increase the potential for lifelong learning, along with the potential for positive intergenerational effects. At the same time, improving the infrastructure provided by the financing program is helping to improve living conditions. In both OECD and emerging countries, active labor market policies are being implemented alongside benefits, and evidence has shown that, complementarity between these policy tools has the potential to reduce poverty[7]. In addition, poverty alleviation is usually a

[4] Escudero, 2015.
[5] Hujer *et al*, 2004.
[6] Todaro, 1989.
[7] Martin *et al*, 2015.

condition of policy goals in these countries, especially in forced labor programs and conditional transfer payments. Importantly, these measures may also have positive unplanned effects.

First, active labor market policies can increase demand by improving consumption, such as public work programs during a recession, or by creating other positive spillover effects through provisioning of public infrastructure. Second, they can have positive spillover effects on employment growth, those hired by participants in self-employment programs, and the creation of micro enterprises. Third, they can affect wage structure. Fourth, they can have positive effects on productivity by improving skills, either through a direct impact on participants in these programs or through positive externalities.

Finally, active labor market policies can ensure a minimum level of labor supply by providing incentives for specific groups to remain active or join the labor force.

Increasing Employment Mobility and Quality of Work

Advances in technology and international trade and the expansion of financial markets have increased the importance and role of skills and knowledge in the labor market. Even these advances have led to the disappearance of some jobs and the replacement of others with those with higher levels of skills and knowledge. These developments have led to the emergence of new forms of employment, which can be defined by unconventional patterns, arrangements, and workplaces[8]. There is a rich theoretical literature on how such structural changes at the technological level have caused a gap between the income levels of highly skilled workers and low-skilled workers. However, others believe that these structural changes can lead to a gradual disappearance of low-income jobs and products and the emergence of high-income jobs[9]. From this perspective, and given the concerns and hopes for structural changes, active labor market policies can significantly promote the positive aspects of structural change from declining-sector jobs to emerging-sector jobs. For technological innovations to increase job opportunities, policies must be adopted so that the workforce has the necessary skills to take advantage of innovations. For example, training programs and job search aids will give people the ability to find jobs that fit their needs along with the needs of the job market while improving their skills.

Summary

In general, employment and labor market policies can be divided into active and passive policies. From this perspective, and given the content, structure, approach, and goals of the two types of policies, active labor market policies can target vulnerable groups, the poor, young job seekers, and small and medium-sized businesses. These policies can be powerful tools having potential at both individual and national levels. At the individual level, active labor market policies can provide new job opportunities, keep people active in the labor market, and increase employability, thereby not only significantly improving the performance of labor market participants, but also their living conditions. At the national level, a comprehensive set of active policies can help reduce poverty and improve equality, as well as increase employee mobility and job quality, thereby increasing the economic potential. In the following sections, labor market policies in IR Iran will be examined with a focus on active labor market policies.

COVID-19 and Employment

COVID-19 presented a major threat to the global economy and the health of millions of people around the world, but its impact on IR Iran, one of the early epicenters of the outbreak, has been

[8] ILO, 2015
[9] Esposito and Stehrer, 2009

particularly severe. The Iranian labor market was already suffering from a higher rate of unemployment due to structural problems of the economy and imposed sanctions. The outbreak of COVID-19 in February and March 2019 came very close to the Iranian New Year, an important time for many businesses. The pandemic caused many businesses to reduce working hours and, in some cases, effect complete closure to prevent the spread of the virus. These efforts caused huge financial losses for companies, especially in services, tourism, retail, transportation, clothing, and education, among other sectors. To support enterprises and businesses hit by the coronavirus, the government allocated 75,000 billion tomans (Iranian currency) to be provided to enterprises in form of facilities. Such enterprises, spanning 340 job activities across 10 guild categories, were entitled to the facilities if they had no record of layoffs.

Supporting Enterprises, Jobs, and Incomes

As regards fiscal policies, it was decided that the cash and non-cash contributions of real and legal entities during March 2019 and the first quarter of 2021 for supplying equipment and devices required by hospitals and medical centers to fight COVID-19 would be considered as tax allowable expenses. Meanwhile, a respite was given for the insurance contribution payable by the employers of such enterprises in March, April, and May 2022 and a period of grace was to be considered for due value-added taxes for 10 economic groups that were hardest hit by the coronavirus. Also, the moratorium period for repayment of all banking loans was to be increased.

Coronavirus testing and providing coronavirus patients with relevant services in public hospitals was free of charge and for those without any insurance coverage, the disadvantaged groups, and foreign nationals, the services utilized the resources under the health system development plan. Wage compensation for the sick period was paid to all the insured contracted workers while establishing unemployment benefits for workers who were left unemployed during this period.

Considering the grace period for insurance premium of March 2019, April, and May 2021 payable by employers (20%) for 10 business categories and workshops subject to social security law affected by COVID-19, they were not obliged to pay employer's insurance contribution (20%) during the period. Also, payment of the premium by installment for the mentioned period without any penalty, from July through March 2020, was made possible. Increasing the respite period related to the process of concluding the agreement and payment of insurance premium of February 2019 for policyholders as business owners and self-employed, optional continuation of the insurance period, and individual compromised insurance for drivers, fixed mosques custodians, porters, construction workers, carpet weavers and those employed in licensed handicraft businesses were extended up to April 2021.

Protecting Workers in the Workplace

The following measures were taken:

- sending coronavirus protection and prevention instructions to all enterprises and workshops to protect workers' health and wellbeing;
- two-month credit extension of work permit for foreign nationals whose validity period expired on 19 April 2021;
- organizing the presence of civilian staff and personnel in public offices and environments for urgent services through shifting, granting of leave, and/or teleworking up to two-thirds of personnel (also, leaves during this period are not considered as leaves with pay);

- agreement with continuity of premium payment of construction workers whose technical skill cards expired from March 2019 through April 2021; and

- launching "Electronic Unemployment Insurance Application Registration System" to prevent the physical presence of applicants in the relevant departments and the spread of coronavirus, and to pay unemployment benefits for three months without those covered by the Labor and Social Security Law having to go through the administrative process.

Pharmaceutical-sanitary production centers of the Ministry of Cooperatives, Labour and Social Welfare have changed and extended their production lines to produce 400,000 liters of alcohol-based sanitizing solutions and hand gels; more than 3 million liters of water-based hydrogen peroxide disinfection solutions (bleach); 6 tons of the active substance, hydroxychloroquine, according to the instructions of the Ministry of Health, and Medical Education; and 1.6 million three-layer facial masks distributed among medical centers.

IR Iran's Economy

IR Iran is a mixed economy with a large state-owned sector. It is the world's 23rd largest economy by purchasing power parity (PPP). It is dominated by oil and gas production, though over 40 industries are directly involved with the Tehran Stock Exchange. The stock exchange has been one of the best performing exchanges in the world over the past decade. With 10% of the world's proven oil reserves and 15% of the gas reserves, IR Iran is considered an 'energy superpower.' Price controls and subsidies, particularly on food and energy, are heavily prominent in the economy. Contrabands, administrative controls, and other restrictive factors undermine private-sector-led growth. The market-based reforms were reflected in the five-year development plan (FY2016 to FY2021) focusing on 'a resilient economy' and 'progress in science and technology.'

Most of the country's exports are in oil and gas, accounting for a majority of the government's revenue in 2010. GDP contracted in 2018 and 2019, but a modest rebound was expected in 2020. However, challenges included a COVID-19 outbreak starting in February 2020 and the USA sanctions reimposed in mid-2018, increased unemployment, inflation, a 'chronically weak and undercapitalized' banking system, and an 'anemic' private sector. IR Iran's currency (Iranian rial) has fallen, and the country has a relatively low rating on the parameters of 'economic freedom' and 'ease of doing business.'

Territory

IR Iran is located in West Asia. Its coastal borders include the Caspian Sea in the north and the Persian Gulf and the Sea of Oman in the south. In land terms, the country is bound by Turkmenistan, Azerbaijan, and Armenia in the north; Afghanistan and Pakistan in the east; and Turkiye and Iraq on the west. IR Iran has an area of 1,648,195 sq km and enjoys a diverse climate.

Population

According to the latest census carried out in 2020 (Iranian year 1399), IR Iran's population was around 84 million, having recorded an average annual population growth rate of 1.23% during 2005–20. Of its population, 72% live in urban areas while the remaining 28% are in rural areas. The drastic rise in the number of youths (resulting from the population boom in the 1980s) has posed serious challenges to the labor market; and the relevant authorities and institutions are faced with increasing pressure to meet the country's socioeconomic needs and demands.

Economic Specialization

IR Iran's economy mainly consists of oil, agriculture, industry, and mining and services sectors. The industry and mining sector is divided into three subsectors, namely, manufacturing and mining; electricity, gas, and water; and construction.

Main Economic Indicators

Table 1 reports that the GDP fell from USD403,716 million in 2011 to USD403,338 million in 2020. Government expenditure increased from USD46,542 million in 2011 to USD49,166 million in 2020, while gross capital formation fell from USD169,889 million in 2011 to USD153,148 million in 2020 and consumption expenditure fell from USD251,512 million in 2011 to USD232,183 million in 2020. Exports of goods and services fell from USD87,857 million in 2011 to USD58,992 million in 2020, while imports of goods and services fell from USD151,008 million in 2011 to USD26,331 million in 2020.

TABLE 1

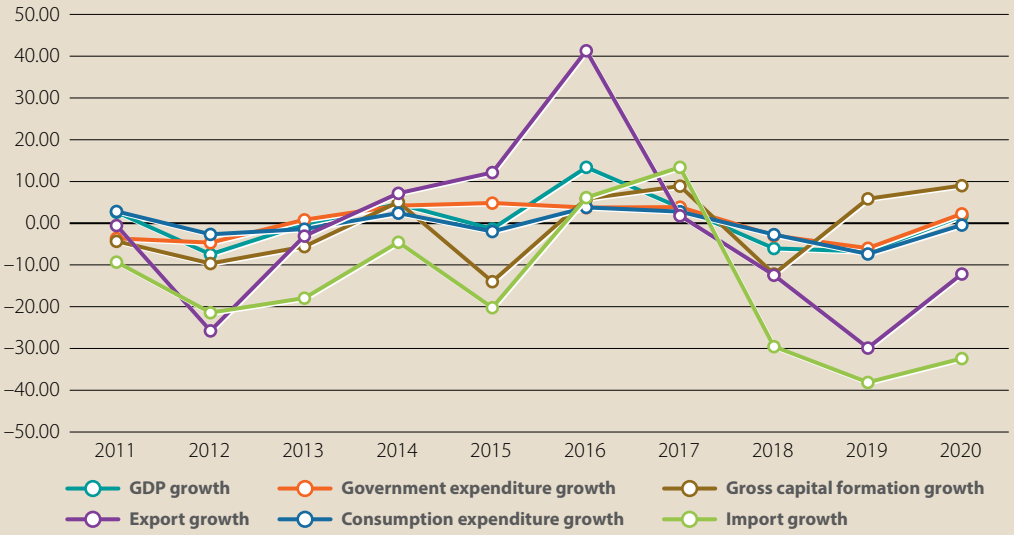
REAL GDP AND ITS COMPONENTS.

(Million USD, constant 2015)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GDP	403,716	373,661	372,936	390,103	384,951	36,521	452,913	425,620	396,745	403,338
Government expenditure	46,542	44,365	44,731	46,614	48,871	50,698	52,666	51,122	48,069	49,166
Gross capital formation	169,889	153,564	144,990	152,297	131,013	38,705	151,067	132,731	140,475	153,148
Consumption expenditure	251,512	44,856	241,454	247,347	242,494	51,687	258,654	251,677	233,153	232,183
Export	87,857	65,246	63,246	67,772	76,002	107,420	109,357	95,729	67,153	58,992
Import	151,008	118,676	97,434	93,010	74,195	78,750	89,307	62,925	38,951	26,331
Net export	–63,151	–53430	–34189	–25239	1,807	28,670	20,051	32,804	28,202	32,661

Source: World Bank, November 2021.

FIGURE 1

GROWTH RATES OF GDP AND ITS COMPONENTS.



Sources: Author's calculation from Worldbank data files

Figure 1 reports the growth rate of real GDP and components yearly for the period 2011–20. GDP growth fell from 2.65% in 2011 to 1.66% in 2020, while averaging at 0.43% during the 2010s. Government expenditure growth increased from –3.63% in 2011 to 2.28% in 2020, averaging at 0.26% during the 2010s. Gross capital formation growth increased from –4.33% in 2011 to 9.02% in 2020, averaging at –1.10% during the 2010s. Consumption expenditure growth fell from 2.84% in 2011 to –0.42% in 2020, averaging at –0.46% during the 2010s. Exports of goods and services growth fell from –0.53% in 2011 to –12.15% in 2020, averaging at –2.14% during the 2010s. Import of goods and services growth fell from –9.30% in 2011 to –34.40% in 2020, averaging at –15.39% during the 2010s.

IR Iran's Employment

Despite the significance of cash transfers, employment is still the main source of income for most Iranians. In 2019, the share of earnings from wages and self-employment accounted for 53.3% of rural and 47% of urban household incomes. The main sources of unearned income are retirement pay, cash transfers of various kinds, and rent. Income from wage employment is more important than self-employment, accounting for 63% of all earnings. This suggests that any decrease in employment or wages would have a strong negative effect on average household incomes. Thus, to better understand how the negative shock of sanctions is transmitted to household budgets, it is important to understand what has happened to employment. The review of trends below suggests that employment has been relatively stable compared with income and consumption.

Trends in Employment

During 2005–21, employment continued to grow, albeit very slowly. It was relatively higher in all sectors in 2020 than other years during the period. Figure 2 reports annual data published by IR Iran's Statistical Center, with the total number of employed growing from around 21 million in 2005 to 24 million in 2020, and 23 million in 2021, at an average annual growth of 0.71%. This exceeded the 1.37% average growth rate of the prime-age population (age group 10–60 years) during 2005–20. Much of the increase was in services, which grew at an average of 1.50%, followed by the industry (0.40%), and agriculture (–0.99%). The increase in the number of those employed in the industry, which is the sector most exposed to trade sanctions, especially after 2018, indicates the positive effect of real depreciation of the national currency on local production. However, the increase in employment did not overturn the decline in wages in real terms, which is why poverty has risen despite higher employment.

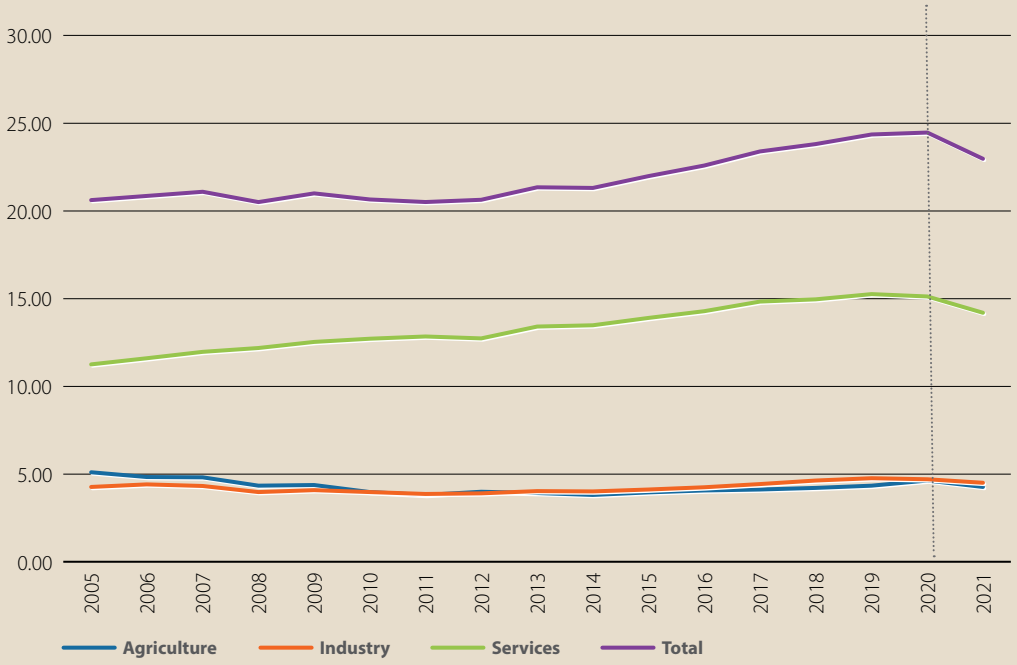
This situation did not persist into the new Iranian year 1399 (2020–21) when the initial negative effect of COVID-19 on employment became evident. In spring 2020, the economy lost 1.4 million jobs, most of them in services, as around 2 million people left the labor market. Published data show a lower unemployment rate for the first quarter (9.8%) compared with the previous year (10.9%), an artifact of a smaller labor force. During the second quarter (June–September 2020), the downward trend stopped, as Iranians went back to work despite the raging pandemic. Employment as well as labor-force numbers went up compared with the previous quarter but were still well below the corresponding quarter a year ago. Unlike sanctions, COVID-19 took a huge toll on jobs.

The Structure of Employment

As in most upper-middle-income countries, about half of IR Iran's 15 million labor force is employed in the service sector, with industry and agriculture absorbing the other half. In 2021, agriculture's share was 15.57%, industry's share was 18.60%, mining's share was 0.38%, construction's share was 12.13%, oil's share was 0.49%, and services' share was 49.67% (see Table

FIGURE 2

SHARES OF EMPLOYMENT.



Source: Statistical Center of Iran, 2021.

2). The slight shift in employment shares over the decade away from agriculture and toward services seems at odds with the change in the distribution of value added between these sectors. In general, employment in IR Iran is relatively rigid, so the differential impact on the main sectors is less evident in employment than in production. During 2005–21, the average share of employment was 19.57% in agriculture, 47.76% in services, and 18.54% in industry.

TABLE 2

EMPLOYMENT SHARES OF MAIN SECTORS, IN PERCENT.

	Agriculture	Industry	Services	Construction	Oil	Mining	Total
2005	24.73	19.95	44.16	10.39	0.46	0.29	100
2006	23.16	20.33	44.32	11.36	0.53	0.30	100
2007	22.80	19.72	44.41	12.33	0.45	0.29	100
2008	21.19	18.63	45.82	13.61	0.42	0.32	100
2009	20.86	18.72	46.63	13.07	0.41	0.32	100
2010	19.22	18.55	47.86	13.65	0.50	0.22	100
2011	18.58	18.04	47.24	15.34	0.53	0.27	100
2012	19.38	18.02	46.35	15.39	0.57	0.29	100
2013	18.33	17.93	47.33	15.46	0.55	0.39	100

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	Agriculture	Industry	Services	Construction	Oil	Mining	Total
2014	17.89	17.81	48.27	15.03	0.53	0.47	100
2015	18.03	17.81	49.35	13.87	0.49	0.46	100
2016	17.98	17.86	50.06	13.14	0.56	0.40	100
2017	17.58	17.92	50.37	13.09	0.60	0.43	100
2018	17.69	18.41	50.24	12.60	0.53	0.52	100
2019	17.78	18.60	50.17	12.49	0.46	0.50	100
2020	18.93	18.29	49.62	12.20	0.46	0.50	100
2021	18.57	18.60	49.67	12.13	0.49	0.54	100
Average	19.57	18.54	47.76	13.25	0.50	0.38	100

Source: Management and Planning Organization of Iran.

A more detailed view of the employment structure for the period 2010–20 is given in Table 3. The diversity of different sectors is seen in the divergent behavior of employment shares of manufacturing relative to other sectors in the industry group, such as construction. The share of construction in total employment was only slightly below manufacturing in the early years of the decade (e.g., 15.7% versus 16.8% in 2011), but later it became considerably lower (12.5% versus 17.4% in 2019). The reason is that construction declined as overall demand fell, but manufacturing was helped by real devaluation of the national currency, which promoted the substitution of foreign goods by local goods.

TABLE 3

SHARE OF EMPLOYMENT BY SECTOR.

Sectors	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Agriculture	19.34	18.59	19.45	17.87	17.41	17.59	17.55	17.16	17.27	17.28	17.41
Forestry and fishing	0.40	0.47	0.39	0.47	0.49	0.44	0.43	0.42	0.42	0.50	0.51
Mining	0.56	0.67	0.63	0.71	0.75	0.71	0.69	0.81	0.82	0.74	0.78
Manufacturing	17.51	16.84	16.79	16.96	16.84	16.83	16.90	16.85	17.34	17.42	17.49
Utilities	0.98	1.01	1.06	1.13	1.14	1.12	1.14	1.28	1.28	1.33	1.42
Construction	14.02	15.74	15.75	15.47	15.03	13.87	13.15	13.10	12.60	12.49	12.25
Retail and auto repair	16.07	15.60	14.70	14.14	14.63	14.93	15.59	15.84	15.69	15.50	15.60
Hotels and restaurants	1.23	1.17	1.10	1.06	1.17	1.32	1.37	1.46	1.56	1.70	1.80
Finance	1.21	1.16	1.11	1.47	1.59	1.54	1.41	1.34	1.38	1.43	1.32
Real estate	0.60	0.56	0.63	0.69	0.63	0.62	0.59	0.64	0.70	0.76	0.79
Other public services	15.34	15.88	15.78	17.03	16.89	17.28	17.28	17.24	17.05	16.41	16.28
Other private service	12.74	12.32	12.62	12.98	13.43	13.75	13.90	13.87	13.90	14.44	14.36
Total	100	100	100	100	100	100	100	100	100	100	100

Source: Author's calculation from Statistical Center of Iran data files.

The large share of services, a sector not directly impacted by sanctions, explains the employment stability in the face of sanctions. But the pandemic had the opposite effect, as services suffered the largest decline in employment. By summer of 2020, while the loss in industry jobs was limited to 43,000 (about 0.5% of all industrial workers), the loss in services was over 800,000 (7.2% of service workers).

Employment Vulnerability and Informality

Public and Private

In 2020, 13.4% of all workers and 21.71% of all wage and salaried workers were in the public sector, down from 22.66 and 43.12%, respectively, in 1998, when public employment had peaked. Government workers have stayed relatively constant, around 3.49 million. Public-sector jobs are traditionally considered more secure than private-sector jobs or self-employment. However, job security has changed significantly in the last two decades, as ever more employees are hired on contracts of less than a year to avoid tenure. As a result, job security is no longer defined by public employment, but rather by the worker's education and the degree of formality of employment. In 2020, 27.15% of the employed had a college degree or above, and another 29.54% had high school diplomas. These ratios were lower in the private sector, where 52.88% of workers had less than high-school degrees, 29.9% had only that degree, and 17.23% had at least a college degree. A large proportion of those with less than high-school degrees are likely also informal workers, whose jobs can be considered vulnerable.

Informality

Informality in employment presents a serious challenge to social protection in times of economic crisis. In advanced countries, where the vast majority of people are registered and covered by unemployment insurance, workers are automatically protected from negative economic shocks, at least for a period. Even after unemployment insurance disappears, the fact that their previous employment status is recorded makes it easier for the government to reach out to them with further income assistance. Informal workers, on the other hand, for lack of unemployment insurance and pension, are not only at more risk of falling into poverty when a crisis hits, but are also harder to reach with additional help. For these reasons, the degree of informality in the labor market is an important determinant of the severity with which an economic crisis causes distress in household welfare.

Like most developing countries, IR Iran has its share of informal employment, but its labor force surveys do not offer a ready indicator of its extent. The labor force survey does not ask if workers have a contract or are otherwise registered with the authorities, so a precise measure of informality is not available. But an estimate can be derived from some reported job characteristics. Public-sector jobs are, of course, formal, as are jobs that offer health insurance or pension. The survey distinguishes between private- and public-sector employment and asks if a worker receives health insurance through an employer. However, there is no question regarding enrollment in a pension scheme or the national social security program.

The survey also reports on the sector, and occupation, by firm size. These characteristics offer some insight into the extent of informal employment. About 74% of the workforce are in enterprises with fewer than five workers. Such enterprises often do not register with the government. Also, they evade taxes and regulations that require them to offer health insurance and contribute to pension programs. In 2020, only one in five workers in these enterprises had health insurance through their employers, which indicates that four out of five workers in micro enterprises are

informally employed. In contrast, 91% of enterprises with more than 50 workers reported employer-provided insurance (see Table 4.). If we consider all those who do not get insurance through their employer as informally employed, about 70% of the workers would be so classified, which is higher than what the Iranian media reports.

TABLE 4

INSURANCE SHARE BY FIRM SIZE.

Sectors	1–4	5–9	10–19	20–49	50+	Total
2011	14.05	34.06	58.10	75.43	86.58	24.41
2012	16.30	34.57	6030	78.18	88.55	26.1
2013	16.47	370.9	60.28	78.94	89.35	26.30
2014	19.99	42.91	63.72	78.33	89.28	29.34
2015	20.99	43.55	65.19	81.21	90.71	31.22
2016	21.36	43.83	64.52	82.61	90.70	31.42
2017	21.75	44.40	66.31	81.94	91.55	31.40
2018	20.48	41.55	67.47	82.92	90.37	30.34
2019	20.01	44.67	63.78	82.38	90.95	29.88
2020	20.42	43.91	64.21	81.49	90.88	29.12

Source: LFS data files, 2011–20.

As given in Table 5, the lowest percentage of insured workers is in agriculture (8.32% in 2020), followed by construction (22.02%). In 2020, those sectors together accounted for 31.85% of the workforce. The economic crisis following the imposition of sanctions in the last few years has hit construction the hardest, while at least so far, agriculture has been spared. Turning to occupations (see Table 6), unsurprisingly, unskilled workers are least likely to be insured (20.33%). Manufacturing and formal services (such as banking) have much higher rates of insurance.

TABLE 5

INSURANCE COVERAGE BY SECTOR.

Sectors	2014		2018		2020	
	Labor share	Insured	Labor share	Insured	Labor share	Insured
Agriculture*	17.41	8.52	17.27	8.20	17.41	8.32
Manufacturing	16.84	57.68	17.42	52.51	17.49	55.25
Retail and other services	30.47	34.01	32.41	30.40	31.85	29.41
Formal services	19.62	87.57	19.65	83.92	20.21	81.36
Construction	15.03	22.45	12.49	24.86	12.25	22.02
Real estate	0.63	17.35	0.76	8.51	0.79	0.80
Total	100		100		100	

*Table 5 is based on 'sector' while Table 6 is based on 'employment.'
Sources: LFS data files, 2011–20.

TABLE 6

INSURANCE COVERAGE BY EMPLOYMENT, IN PERCENT.

Employment	2014		2018		2020	
	Labor share	Insured	Labor share	Insured	Labor share	Insured
Military	2.15	96.9	2.04	97.13	2.01	97.81
Professional	12	83.6	14.15	80.47	15.67	79.21
Technical	9.89	73.17	9.35	67.41	9.79	65.23
Services working	12.75	32.89	15.41	29.27	16.47	28.68
Agriculture	14.5	7.49	13.93	7.38	8.27	7.01
Craft	19.19	36.61	18.87	32.55	18.82	31.92
Industry	12.39	49.88	12.75	46.59	14.98	46.81
Unskilled	17.13	25.97	13.5	21.45	13.99	20.33
Total	100		100		100	

Source: LFS data files, 2011–20.

Active Programs in the Iranian Labor Market

Labor market policies express the government's approach to establishing and developing labor market processes through the creation of infrastructure and improving the performance of governance duties in the labor market. They also outline the supportive measures to improve the business environment as well as strengthen and institutionalize the process of sustainability and employment development. In the Sixth Development Plan, unemployment is considered one of the major challenges of the country and the labor market one of the important macroeconomic axes. Accordingly, the Ministry of Cooperatives, Labour and Social Welfare has put measures and programs on its agenda during the implementation of the Sixth Development Plan to mobilize the labor market and create job opportunities, especially for young people and university graduates, women, and low-income families.

These programs, while maintaining existing employment and protecting vulnerable occupations through empowerment; vocational and skills training, and grants; and use of current resources and costs and working capital, are aimed at developing new and sustainable employment through business development and capacity building interventions. They also strengthen the value chain and productive investments by using technical and credit assistance and capital and credit resources in various fields. Interventions include business development and sustainable employment plan, as well as active labor market interventions such as micro-employment and supportive employment. These plans and measures are being implemented in coordination with the country's program and budget organization and with the cooperation of other executive bodies. In line with labor market developments, much of which are related to the recession in economic activity due to the COVID-19 pandemic, the programs have been adapted as much as possible. Some of the ministry's actions are part of an active labor market policy program that is currently being pursued. It includes:

- University Graduate Internship Plan;
- Employer Insurance Exemption Plan;
- Skills Plan in the Real Work Environment; and
- Wage Subsidy Scheme;

University Graduate Internship Plan

Increasing labor supply due to the growing population and low production capacity is one of the main factors that has led to rising unemployment in IR Iran in recent decades, especially among university graduates due to the prevalence of young people pursuing postgraduate courses. The unemployment of graduates in the society is also considered a problem that is becoming more acute every day. Every year, a large number of people enter the higher education system, graduating a few years later and moving to the labor market, at a time when the economic growth and employment capacity of the society are not commensurate with the growth in the number of graduates. In this situation, the country's planners and policymakers are also looking for ways to reduce the unemployment problem in this segment of the society. The implementation of the Graduate Internship Program can be considered an effective step in improving the skills and employment in this segment.

A review of the experiences of selected countries and a UNESCO study on job creation for university graduates shows that in countries that have mass-produced higher education workforce, most graduates have difficulty finding employment, for one reason or the other. The mismatch is between what graduates have learned and the needs and skills required by the job market. In most of the countries surveyed, fresh university graduates do not have the skills and specializations required by the labor market and must receive technical and vocational training and specialization required by the labor market as well as the relevant professional certifications.

In many developed countries, including France, Germany, Italy, Japan, the USA, and the Republic of China (ROC), the importance of vocational training as part of training at different levels of education or after the completion of regular educational programs in the form of schemes such as internships have been emphasized. However, entry into internship programs and the balance between working and studying time have varied from country to country. Also, the study of the experiences of the mentioned countries regarding the internship plan shows that the plan in most countries has a systemic mechanism and is not separate from the educational system. At the same time, its implementation is pursued purposefully for progressing from school to university and obtaining a job in the labor market. The most important points in the mentioned experiences are developing an internship program based on the needs of the labor market; the continuous process of improving skills from school to university; receiving a grant commensurate with the minimum wage; developing skills standards; and considering incentives for employers. Holding a test and receiving a certificate that confirms the eligibility of individuals to enter the labor market can be mentioned.

To implement the graduation internship plan by the end of 2020, 39,283 employers of economic enterprises have registered their desire to participate in the internship system and enjoy its benefits by registering with it. It is worth mentioning that 50,501 contracts were concluded for the admission of interns through the mentioned workshops by the end of 2020.

TABLE 7

SUMMARY OF PERFORMANCE OF ACTIVE LABOR MARKET POLICY PROGRAMS IN 2020.

Title	Money allocative (billion rials)	* Targeting employment / employability (no. of people, based on allocated money)	Employment performance employability (no. of persons)	Percentage of employment
Internship of university graduates	1,005	56,000	51,000	91
Employer insurance exemption	3,203	22,000	21,450	98

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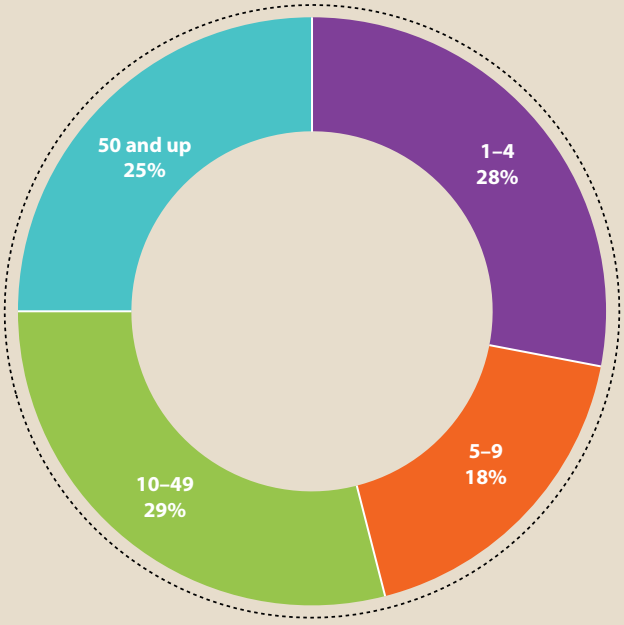
Title	Money allocative (billion rials)	* Targeting employment / employability (no. of people, based on allocated money)	Employment performance employability (no. of persons)	Percentage of employment
Real-world skills training	35	200,000	194,300	97
Wage subsidy	2,454	30,000	27,000	90
Total	6,697	308,000	293,750	95
Microfinance	65	6,000	13,000	217
Home jobs	360	54,000	8,200	15
Sum total	7,122	368,000	314,950	86

Source: Ministry of Cooperatives, Labour and Social Welfare.
* Figures in the column "Targeting employment/employability" are based on the effect of increasing the level of wages during the years of a program's implementation and not on increasing resources when the plan has been adjusted to the original goal of the program.

The ratio of the number of firms included in the internship scheme to the number of registrants as firm applicants is 50.2, which indicates that almost half of the firms registered in the system are eligible and have benefited from participating in the scheme.

FIGURE 3

SHARES OF FIRMS, BY EMPLOYEE SIZE, COVERED BY THE INTERNSHIP PLAN IN 2020.

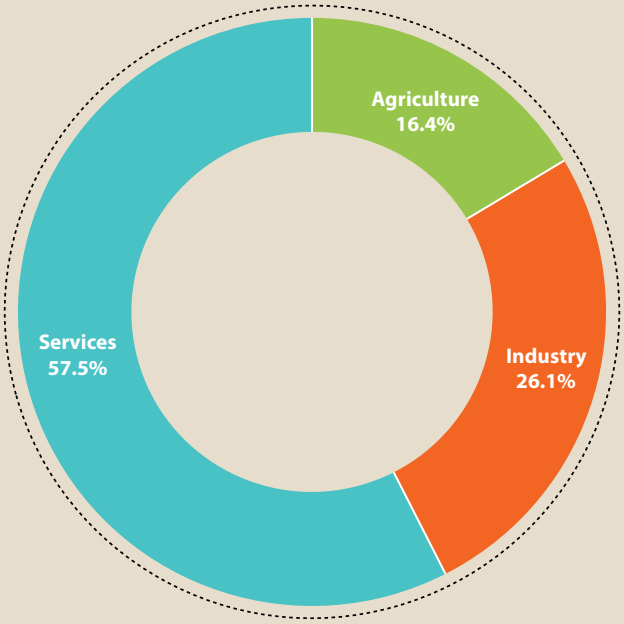


Source: Ministry of Cooperatives, Labor and Social Welfare.

An examination of the performance of firms covered by the internship program shows that firms with 1–4 people (28.3%); firms with 5–9 people (17.9%); firms with 10–49 people (28.8%); and firms with 50 and more (25%) participated in the program from 2017 to 2020. This performance indicates that firms under 21 people have about 22% of internship capacity during the years, and firms over 21 people are less willing to participate in internships during those years.

FIGURE 4

SHARES OF INTERNS IN VARIOUS ECONOMIC SECTORS IN 2020.



Source: Ministry of Cooperatives, Labor and Social Welfare.

Figure 4 shows that the agricultural sector's share of participants in the implementation of the University Graduate Internship program is about 16.4%, while the industrial sector's share is 26.1%, and that of the service sector is 57.5%. So, the service sector has the largest share of internship applicants, followed by industry and agriculture, respectively. This distribution is in proportion with the percentage of employees in the three sectors (agriculture 16%, industry 34%, and services 50%) in 2020.

The number of female interns in all provinces is more than the number of male interns, implying that females have welcomed this project more. This is because the unemployment rate of the female graduate population in the years of the internship program has always been higher than that of males (about two times).

Challenges and Results of Reviewing the Internship Plan

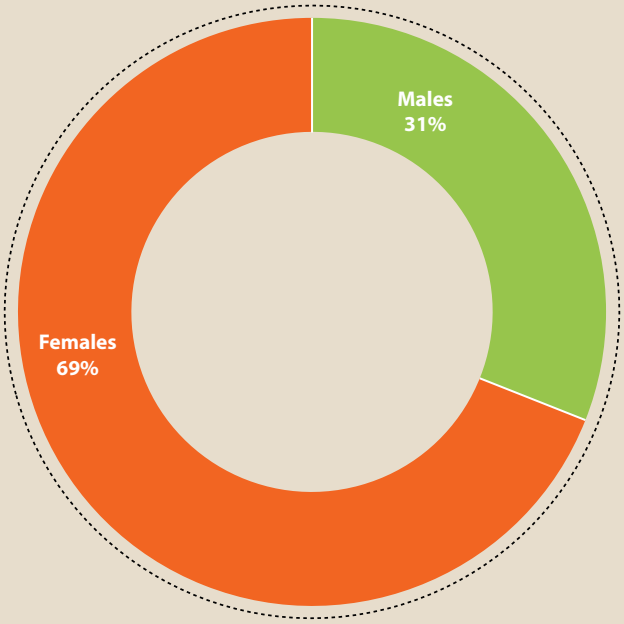
Some of the most important challenges facing the implementation of the graduate internship program are listed below:

(1) Temporary closure and stagnation in the activities of many economic enterprises in the country due to the outbreak of the coronavirus disease has weakened the financial strength of economic enterprises and the possibility of developing or even maintaining the existing activity of the enterprise.

(2) Not considering the associate degree to enjoy the benefits of the plan, even though employers welcome graduates with associate degrees, opportunities for internship training, and consequently employment for this group are limited.

FIGURE 5

SHARES OF INTERNS BY GENDER IN 2020.



Sources: Ministry of Cooperatives, Labour and Social Welfare.

(3) The studies performed on the results of the pilot implementation of the project in previous years indicate that after the end of the probationary period, at least 21% of the interns are employed in the same firm of the internship place, and entry into the labor market for other interns' skills upgrades are facilitated in the same field.

Executive Suggestions for the Continuation of the Internship Plan

(1) Review and amend the executive instructions of the internship plan to facilitate the participation of economic enterprises active in the private and cooperative sectors, especially due to the closure and stagnation of the activities of some economic enterprises during the coronavirus outbreak in IR Iran.

(2) Ensures more effective participation of some executive bodies in the field of informing and identifying the receiving units and removing the obstacles and problems for them.

(3) Use the capacity of organizations such as Chamber of Commerce, Industry, Mining and Agriculture; Cooperative Chamber; Chamber of Guilds and Organizations of the Building Engineering System, Agricultural Engineering System, and Natural Resources.

(4) Disseminate appropriate information to students and graduates through universities and higher education centers.

(5) Review the number and capacity of fields and academic orientations; modify the content of courses; and increase the provision of practical and applied education of university fields of study based on the needs and capacities of regions and the labor market.

(6) Lay the groundwork for the implementation of this plan in the Seventh Development Plan by applying the necessary reforms, including providing of internship grants based on the extent of enjoyment or deprivation of the region.

(7) Consider the favorable effects of active labor market policy programs, including graduate internship program and employer insurance exemption on increasing employment and graduation. It should be noted that achieving the maximum goal of creating employment and increasing employability of graduate students is associated with economic policies, employment policy, science and technology policy, and industrial and commercial policies; and to achieve it, the executive apparatus and relevant organizations must avoid sporadic actions in the field of job creation.

Employer Insurance Exemption

Considering the relatively high unemployment rate of university graduates on one hand and the lack of proper profitability of the country's economic sectors from investments made in formal education to raise the level of knowledge and improve the technologies needed by the country, a short-term solution to compensate for the country's education system might be needed. There could be a different higher education system to create a fit between theoretical knowledge of university graduates with job and professional skills needed for entering the job market. The history of establishing employer insurance exemptions as an effective policy to support the employer to attract labor dates back to the implementation of the third program of economic, social, and cultural development of the country. To encourage the employers of the existing workshops to hire new workers, the government is obliged to include the following discounts for those employers who hire new workers during the program through the employment service centers of the Ministry of Labor and Social Affairs:

(1) Reduction in the amount of the employer's share premium and forecasting the necessary credit to compensate for the decrease in the income of the Social Security Organization in the country's budget.

(2) Reduction in the taxes of the employers of such workshops to the amount of the tax on the salaries received from the newly hired employees.

(3) Implementation of the program law to attract university graduates with at least a bachelor's degree as an internship exempts employers from paying insurance contribution for two years from the date of commencement of work.

With the implementation of the internship plan and the related employer insurance exemption, more than 29,000 employers of economic enterprises have so far expressed their desire to participate in the plan and enjoy its benefits by registering in the internship system. Of these, more than 19,000 companies met the requirements of the internship plan and were able to attract interns. It is worth mentioning that the number of contracts concluded for the admission of interns by the mentioned workshops reached 50,500 by the end of 2020, which confirms that each workshop participates in more than one internship plan on an average.

After the introductory internship period, 7,383 economic enterprises had recruited and employed their workers from among interns by the end of 2020 and had been exempted from employer insurance. The impact of some unfavorable variables such as the adverse economic situation due

to multiple exchange rates jumps in 2019, employer uncertainty about the future of the business environment, and, finally, the prevalence of the coronavirus disease, are among the challenges in implementing the plan.

Although companies and law firms are expected to have a higher level of expertise, complexity, and differentiation than other firms, and therefore have a greater need to attract and hire a university-graduate workforce, there are still 7,383 of such firms. The economic beneficiaries of employer insurance incentives are 61% regular and 39% legal persons, which indicates that in concluding an employment contract, the issue of education is not important enough for the parties, due to cheap labor and economic needs. This is a concern for the country's education system and its incompatibility with the needs of the labor market.

Out of 7,383 enterprises that were eligible for employer insurance exemption, 87% belonged to the private sector and 13% to the cooperative sector. Considering the 5% share of the cooperative sector in the Iranian economy, their level of participation and benefits from this plan indicates the appropriate capacity and interest of cooperatives in attracting and employing the university-graduate workforce.

The percentage of participation of economic enterprises in each of the sectors of agriculture, industry, and services was 14%, 21%, and 65%, respectively, which shows the high capacity and share of the service sector in attracting and employing university graduates.

The share of enterprises benefiting from employer insurance exemption in 2020 for workshops with one to four people was 26%; with five to nine people was 19%; with 10 to 49 people was 26%; and with 50 or more people was 29%.

The implementation of the Employer Insurance Exemption Plan resulted in 7,383 firms benefiting from government insurance support, which ultimately created new job opportunities for 18,180 university graduates by the end of 2020. These jobs created a cost of 2,672 billion rials for the government by the end of 2020.

The per capita job creation cost in this plan is 147 million rials, which is much lower than the per capita job creation cost in each of the sectors of agriculture, industry, and services. In this regard, the implementation of the employment creation plan of employer insurance exemption is very cost-effective for the government. In addition, the maximum two-year support period for the employer provides a relatively good opportunity for the recruited workforce to accumulate sufficient knowledge, experience, and skills in doing the work and to be profitable for the employer.

Skills Plan in the Real Work Environment

In the beginning of their first jobs, mostly, workers cannot create enough added value due to lack of sufficient knowledge and skills. Real-time skills training plan, with the approach of creating the necessary conditions for productive and sustainable employment, as well as the continuation and stabilization of employment corresponding to existing and needed opportunities in the society, was implemented in 2017. It has aimed at improving job skills and employability of young job seekers for the last 15 years. With the implementation of a real-world skills training program from the beginning of 2018 till the end of 2020, more than 106,000 young job seekers in private-sector workshops, cooperatives, and armed forces have received training services under the scheme.

The Organization of Technical and Vocational Education of Iran, in terms of its mission, structure, and goals, has the highest compliance with the provisions of the plan and has been primarily responsible for the implementation of the plan in recent years. Other agencies, such as the Ministry of Cooperatives, Labor and Social Welfare and Social Security, provide the necessary cooperation in its implementation. The main objectives of the plan are: (1) familiarizing young job seekers with the business environment, providing experience, and building self-confidence with the skills needed to enter the field of employment and entrepreneurship; (2) preservation and sustainability of traditional and indigenous jobs; (3) assisting active enterprises in identifying and attracting talented and capable workforce; and (4) reducing the costs of attracting and employing unskilled workers and using the capacity and ability of practical training of economic enterprises.

TABLE 8

TOTAL PERFORMANCE OF THE TRAINING PLAN.

	Sectors of the economy				Number of acceptor units
	Services	Industry	Culture and art	Agriculture	
2017	1,952	3,356	738	485	6,531
2018	2,527	4,346	960	623	8,456
2019	5,536	9,520	2,102	1,364	18,522
2020	9,877	15,462	2,200	2,170	29,709
Total	19,892	32,684	6,000	4,642	63,218

Source: Ministry of Cooperatives, Labour and Social Welfare.

The Wage Subsidy Payment

One of the programs of the Ministry of Cooperatives, Labour and Social Welfare is focused on short-term goals based on current economic realities, which are included in the framework of active labor market policies. In general, active policies have always tried to make the necessary changes in the labor market and improve the quality of labor supply. They focus on mobilizing labor supply through education and training of the unemployed, strengthening employment, financial support, reducing demand for creating jobs through various methods such as retraining, and reducing the burden of employer obligations.

Active policies, especially incentive programs, aim to create jobs in some developed countries, such as Germany, Sweden, Canada, and Finland. Selected countries that have implemented incentive or wage subsidy policies include Poland, Estonia, India, Austria, Romania, and Bulgaria. Of course, it should be noted that the target population of a country's chosen policies varies according to the labor market conditions in the country. Sweden and Romania, for example, have provided subsidies, seeking firms to attract the disabled. In general, incentive policies could be divided into the following three groups:

(1) development of employment in existing enterprises that are active in the economic field, such as wage subsidies, employment subsidies for the disabled, and employment subsidies for university graduates and women;

(2) incentives for maintaining and consolidating existing jobs in firms, such as compensatory wages, financial support to restructure businesses, and part-time employment grants; and

(3) incentive strategies for setting up new businesses, such as self-employment grants and special grants for the unemployed to set up entrepreneurial enterprises, or based on entrepreneurial activities and business start-up subsidies.

Statistics show that globally, young people are three times more likely to be unemployed than adults[10]. This leads us to the question of what leads to high youth unemployment and what should be done to attract young people to the labor market effectively.

Active labor market policies provide labor market management tools to policymakers in the medium and short terms. The success of these policies to create employment and reduce unemployment, especially among young people, is achieved in four steps, given the existing knowledge and experience. In the first step, the target community and its employment constraints are identified. In the second step, a list of appropriate interventions is provided to remove the known constraints. In the third step, the list of interventions is modified according to the real situation of the country and the labor market. In the fourth step, the impact and success of policies is evaluated and reviews are done based on the results of the evaluations.

Communities are not homogeneous groups. Each subgroup has limitations related to its inability to enter the labor market, which is observed through different unemployment rates among young men and women of different ages, rural and urban residents, etc. Therefore, determining the target community is necessary for purposeful interventions. The four categories of restrictions that can prevent young people from accessing the labor market are: (1) job-related skill limitations including inadequate basic skills, non-compliance of technical skills, non-compliance of behavioral skills, or inadequacy of entrepreneurial skills; (2) lack of labor demand, both at the macro level due to slow economic and employment growth and at the micro level due to employer discrimination; (3) restrictions on job seeking, such as unfamiliarity with information about job opportunities or limited ability to communicate with potential employers; and (4) restrictions on setting up a startup, including lack of access to finance or a business network and social constraints on labor supply and skills development that limit entry into the labor market[11].

Low labor demand can be due to a wide range of economic and non-economic factors. It may be due to broad economic factors such as difficult economic environment, natural disaster, war, sudden changes in the global economy, or trade patterns that limit employment growth[12]. Due to structural problems and the critical situation resulting from sanctions and the coronavirus crisis, IR Iran's economy is struggling with a lack of macro-level labor demand and low economic growth. This deficiency, less acute in border areas, is more severe than natural disasters.

Slow Economic Growth and Jobs

In many countries, the supply of labor is far greater than the demand for it. In the Middle East and North Africa (MENA) region, for example, planning an annual workforce growth of more than 4 million people by 2030 required the creation of more than 50 million new jobs by 2015[13]. Governments cannot create jobs directly, but there are short-term plans that governments can implement to accelerate long-term development of the private sector. IR Iran, which is also an economy in the MENA region, is currently suffering from slow economic and jobs growth. This situation helps strengthen the labor market demand.

[10] ILO, 2008.
[11] World Bank, 2010.
[12] World Bank, 2010.
[13] World Bank, 2005.

A wage subsidy intervention is intended to encourage labor recruitment by lowering the cost of new labor for firms with the capacity to employ labor or reducing employment due to financial constraints. This intervention is particularly relevant to young people with low efficiency[14]. Wage subsidies in Poland and the Czech Republic have had a positive impact on employment, especially that of women and people with lower education. Evaluating the impact of wage subsidies in Argentina has significantly increased the likelihood of employment, especially for the participating women and youth.

The wage subsidy scheme has been developed as an active labor market policy to mobilize job creation in micro, small, and medium enterprises as well as to pave the way for employment of job seekers with diploma and higher education; skills and experience development for job seekers, especially the primary job group through interaction with specialized forces; new findings of knowledge and technology for enterprises with the entry of young people; and the promotion of production and investment in the cooperative and private sectors.

The wage subsidy scheme as a tool to attract new labor by employers during or after recession as well as during the prevalence of COVID-19 has been effective. For the implementation of this plan, 1,604 billion rials of spending was announced by the Program and Budget Organization. It was planned that the implementation of this plan in 2021 in 16 provinces would create 15,000 new jobs in those provinces. As an output of the scheme, in one year, 23,340 people from provinces deprived of employment, as well as from border and flood-affected provinces, were attracted to the active private sector and cooperative enterprises, which was the main achievement of this project.

Of the 23,340 contracts, 62% were for male job seekers and 38% for female job seekers. With the implementation of the wage subsidy scheme, male job seekers were attracted more than female job seekers to the participating enterprises. The significant difference between the percentages is debatable from a policy point of view because women make up more than half of the country's population, and if their enormous capacity is not used in economic activities, the country will undoubtedly face difficulties in economic development and growth. A study of countries that have moved to higher levels of economic development shows that the presence of a trained and well-educated workforce, especially women, as one of the components and pillars of human capital, has been effective in the transition of these countries.

Political Recommendations

Given the economic downturn and the crises caused by sanctions and the coronavirus outbreak, which has led to slow economic and employment growth throughout the country, the following are recommended in connection with the implementation of the wage subsidy scheme:

- Considering the positive achievement of the wage subsidy payment plan in 16 provinces of the country, its cost-effectiveness compared with the bank facility payment plans, and the vulnerability of all provinces to the spread of the coronavirus, this plan should be implemented in all provinces of the country.

- The target group of the project should be extended from primary jobs to other vulnerable groups in COVID-19 conditions (such as heads of households, both male and female).

- In addition to the wage subsidy scheme, in times of recession and slow economic and

[14] World Bank, 2010.

employment growth, other successful active schemes and programs of other countries could be considered. Examples include public service programs in areas such as public health clinics, sustainable housing, private tutoring, environmental protection, and creation of small-scale infrastructure. These could enable the unemployed, especially young people, to play an active role in the society and in national development, introduce them to new skills, and increase their employability.

The results of surveys conducted in the informal economy and informal employment in the labor market confirm the tendency of a relatively wide range of labor force, especially unskilled or semiskilled labor to work with wage conditions less than the annual amount approved by the Supreme Employment Council.

Identifying Declining Jobs

The survival of a job depends on the number of people working in it. Therefore, with the decrease in the number of employees in each job at the community level, the probability of losing that job increases. Therefore, identifying the currently declining jobs and helping the labor force continue to survive, in addition to reducing the current unemployment rate, can also be useful for controlling unemployment in the coming years. In this section, by calculating the values of the three indicators mentioned for each of the known jobs, declining jobs have been identified. Jobs that have negative changes were identified as the first declining jobs.

Jobs Have Negative Changes Throughout IR Iran

TABLE 9

REDUCTION IN NUMBER OF EMPLOYEES.

Job title	Change (no. of persons)	Average annual growth
Carpet weavers, weavers	–250,603	–4.74
Armed Forces personnel	–198,998	–6.83
Farmers, vegetable growers, and gardeners	–79,534	–0.31
Accounting and statistics staff	–54,273	–7.48
Work and business specialists	–26,341	–1.60
Personal care staff in hospitals and homes	–13,761	–5.01
Vendors in stalls	–4,619	–7.19
Fashion mannequins and other models	–4,010	–30.21
Vaccine and other simple street service workers	–3,186	–18.65
Other educational trainers	–2,284	–15.19
Farmers producing agricultural and livestock products	–1,903	–10.07
Manufacturers of leather, leather, and footwear	–1,889	–0.22
Forestry staff	–1,563	–3.62
Village council members	–1,139	–26.62
Self-employed agricultural and fishing workers	–1,031	–27.20

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Job title	Change (no. of persons)	Average annual growth
Operators of wood production machines	–478	–2.75
The assistance of preschool teachers	–282	–1.42
The assistance of special education teachers	–273	–19.96
Locomotive drivers and related staff	–230	–0.28
Private detectives	–107	–14.64
Total	–646,504	

Source: Author's calculation from Ministry of Cooperatives, Labour and Social Welfare data files.

As seen in Table 9, jobs of 'carpet weavers, weavers, 'armed forces personnel,' 'farmers, vegetable growers, and gardeners,' 'accounting and statistics staff,' 'work and business specialists,' and 'personal care staff in hospitals and homes' are facing the largest decrease in the number of employees.

Reducing Jobs for Men

TABLE 10

REDUCTION IN JOBS FOR MALES.

Job title	Change (no. of persons)	Average annual growth
Armed forces personnel	–195,149	–6.92
Carpet weavers, weavers	–71,322	–5.60
Farmers, vegetable growers, and gardeners	–50,482	–0.21
Accounting and statistics staff	–48,899	–8.05
Work and business specialists	–20,988	–3.54
Personal care staff in hospitals and homes	–12,269	–7.56
Vendors in stalls	–4,288	–7.90
Manufacturers of leather, leather, and footwear	–1,889	–0.51
Fashion mannequins and other models	–3,853	–30.03
Vaccine and other simple street service workers	–3,055	–19.12
Farmers producing agricultural and livestock products	–1,741	–9.76
Forestry staff	–1,456	–3.62
Village council members	–1,126	–29.57
Self-employed agricultural and fishing workers	–977	–29.18
Operators of wood production machines	–478	–2.76
The assistance of preschool teachers	–272	–0.03

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Job title	Change (no. of persons)	Average annual growth
The assistance of special education teachers	–269	–26.85
Locomotive drivers and related staff	–228	–0.35
Other educational trainers	–1511	–14.84
Private detectives	–16	–7.31
Total	–420,268	

Source: Author's calculation from Ministry of Cooperatives, Labour and Social Welfare data files.

Table 10 shows that for males, job categories of 'armed forces personnel,' 'carpet weavers, weavers,' 'farmers, vegetable growers, and gardeners,' 'accounting and statistics staff,' 'work and business specialists,' and 'personal care staff in hospitals and homes' are facing the largest decrease in the number of employees.

Reducing Jobs for Females

TABLE 11

REDUCTION IN JOBS FOR FEMALES.

Job title	Change (no. of persons)	Average annual growth
Carpet weavers, weavers	–179,281	–4.47
Farmers, vegetable growers, and gardeners	–29,052	–1.39
Accounting and statistics staff	–5,374	–3.31
Work and business specialists	–5,353	–4.58
Armed Forces personnel	–3,849	–15.35
Personal care staff in hospitals and homes	–1,492	–11.93
Other educational trainers	–773	–2.65
Vendors in stalls	–331	–4.28
Farmers producing agricultural and livestock products	–162	–8.28
Fashion mannequins and other models	–157	–16.06
Vaccine and other simple street service workers	–131	–18.30
Forestry staff	–107	–1.00
Private detectives	–91	–6.32
Self-employed agricultural and fishing workers	–54	–10.89
Operators of wood production machines	–13	–15.14
The assistance of preschool teachers	–10	–3.19
The assistance of special education teachers	–4	–0.61
Locomotive drivers and related staff	–2	–2.65
Total	–226,236	

Source: Author's calculation from Ministry of Cooperatives, Labour and Social Welfare data files.

Table 11 shows that for females, job categories of 'armed forces personnel,' 'carpet weavers, kilim weavers,' 'farmers, vegetable growers, and gardeners,' 'accounting and statistics staff,' 'work and business specialists,' and 'personal care staff in hospitals and homes' are facing the largest decrease in the number of employees.

Industrial Policies and Employment in IR Iran

The current state of the global economy and the region is such that it is difficult for countries like IR Iran to be on the path of growth and prosperity of industrial production. This can only be achieved by increasing the policymaking and guiding role of the government. One of these policies is industrial targeting, which is defined in the context of industrial policy. Industrial targeting policies in the country in the last three decades have not been sufficiently efficient and coherent and have been more at the level of strategy of the Ministry of Industry. On the other hand, the task of the targeted industries in the industrial development policy is not job creation, because the selected industries include large and high value-added industries that do not have a high level of employment. According to the Statistics Center, more than 60% of industrial employment is created in industries with less than ten employees (small industries), which shows that goal-oriented industrial policy is focused on large industries and these industries are capital intensive in nature.

Pathology of Employment in the Industrial Sector

The current situation in the Iranian economy is based on the intensification of economic sanctions against the country and the need to implement the general policies of the resistance economy by increasing support for domestic production. Efforts to provide appropriate production infrastructure, especially in the industrial sector (as a growth engine of economy) has been placed at the top of the government priorities, which requires the implementation of industrial policies under the conditions governing the country's economy. One of the issues that should be considered in the industrial policy is the issue of employment and the effects of industrial policy on it. In this discussion, the role of industrial policy in the three issues of graduate employment, women's employment, and employment in deprived areas have been studied.

In response to the question of how the country's industrial development policies have affected employment, it can be said that the current situation of the global economy and the region is such that it is difficult for countries like IR Iran to be on the path of growth and prosperity of industrial production. This can only be achieved by increasing the policymaking and guiding role of government. One of these policies is industrial targeting, which is defined in the context of industrial policy. Industrial targeting policies in the last three decades have not been sufficiently efficient and coherent and have been more at the level of strategy of the Ministry of Industry. On the other hand, the task of the targeted industries in the industrial development policy is not job creation, because the selected industries include large and high value-added industries that do not have a high level of employment. According to the Statistics Center, more than 60% of industrial employment is created in industries with less than ten employees (small industries), which shows that goal-oriented industrial policy is focused on large industries. Since these industries are either capital intensive in nature or based on technology, they do not create jobs.

To increase the effectiveness of industrial development policies on sustainable employment, it is necessary for all governmental and non-governmental stakeholders to actively and fully participate in the formulation of long-term and integrated industrial development policies and to avoid island

and individual movements. The status of the private sector in the formulation of industrial and commercial policies and also the consideration and stability of commercial and industrial policies should be on the agenda.

Two issues should be considered in industrial policy to increase employment in the industrial sector and create sustainable employment. One, the small, medium, and large industries should be developed in a balanced way, with a pattern in which large industries are targeted as drivers of the country's industry to bring about industrial and export development. Two, the medium and small industries should act and develop as downstream industries and as part of the supply chain of large industries. The burden of job creation in the industry should be on the shoulders of these industries, in line with the nature of such industries.

Another issue in the discussion of employment and industrial policy is the role of higher education. Every development policy requires the development of higher and vocational education as a driving force. In the last three decades, higher education has developed a little, but unfortunately in this period of focus on quality, development based on needs assessment and land management has not taken place. As a result, the labor market is facing high unemployment issue of graduates who either do not have enough skills or their expertise is not needed at all by the country's industry.

The unemployment of graduates in IR Iran is a problem that is becoming more and more acute. Every year, a large number of people enter the higher education system, graduating a few years later and moving to the labor market, at a time when economic growth and employment capacity of the society are not commensurate with the growth in the number of graduates. The unemployment rate of university graduates increased from 19.4% in 2011 to 20.9% in 2012 but was 18.9% in 2013. The participation rate increased from 2017 to 2020, except for 2019. The implementation of various plans under active labor market policies, including the internship program for graduates and the exemption of employer insurance, along with government support for the development of knowledge-based activities and other employment programs has played a significant role in this trend. As a result, during this period, the gap between the unemployment rate of university graduates and the average unemployment rate of the country has decreased, which indicates the success of the government in targeting and making intelligent interventions in the labor market.

TABLE 12

LABOR PARTICIPATION AND UNEMPLOYMENT RATES, 2011–20.

		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Unemployment rate (%)	Total population aged 10 and over, and graduates	12.3	12.1	10.4	10.6	11.0	12.4	12.1	12.0	10.6	9.6
Participation rate (%)		36.9	37.4	37.6	37.2	38.2	9.4	40.3	40.5	39.9	41.3
Unemployment rate (%)	Graduate	19.4	20.9	18.9	18.5	18.5	20.0	19.4	18.3	16.7	14.2
Participation rate (%)		46.38	48.50	48.63	48.97	51.87	55.09	56.89	57.67	56.96	56.27

Source: Statistics Center of Iran.

Projection of Employment in Industry, Mining, and Trade

Government policies in the labor market reflect the policies and decisions of the government in the establishment and continuation of labor market development processes through infrastructure creation, improving the performance of governance tasks, supporting measures to improve the business environment, and strengthening the institutionalization of sustainability and employment development processes. To mobilize the labor market to create job opportunities, especially for young people and university graduates, intervention policies and plans for job creation and division of national labor in this regard are of increasing importance.

In policies based on inclusive growth (including employment and development), policy tools are used at three layers: micro, medium, and macroeconomic. Experience in recent years has shown that in addition to commodity economic policies, policies related to the real sector of the economy (the field of economic activity) are of particular importance. To make policies for the real sector of the economy, while recognizing the flow of developments and dynamics of business growth in the three sectors of agriculture, industry, and services, the flow and development of business growth is examined in the lower layers of each of these sectors as well (i.e., subsections and fields of activities). In this context, a series of activities are the subject of attention, which, in addition to creating added value, have the appropriate capacity to create productive employment. Therefore, establishing mechanisms for the growth of production and employment at different levels of various economic activities while promoting national productivity will be important for inclusive employment at the national and regional levels and based on land management.

According to the Statistics Center of Iran, in 2020, the number of employees aged 15 and over was 23,676,000. According to the Statistics Center, the study of employment in major sectors of economic activity shows that the service sector with 48.8% has the largest share of employment. Next is the industry with 33.2% and agriculture with 17.9%.

The goal of developing employment and inclusive growth shows that to develop employment by Iranian year 1404, there is a need to increase the number of employees in the country from 24 million to 28 million by creating 1 million jobs annually. So, considering the capacities and potentials of the industry, mining, and trade sector, which has around 40% share in job creation, creation of employment for 400,000 people annually in this sector is targeted. Also, employment has been targeted in the subsectors and fields of industrial, mining, and commercial activities (58 fields of activities at levels three- and four-digit ISIC codes).

TABLE 13

EMPLOYMENT PROJECTION IN INDUSTRY, MINING, AND TRADE FROM 2021 TO 2025.

Description*	2020	2021	2022	2023	2024	2025
Extraction of crude petroleum and natural gas; service	76	71	58	60	58	61
Other mining and quarrying	182	190	193	196	202	208
Manufacturing						
Manufacture of food products	591	576	612	656	712	774
Manufacture of beverages	37	36	38	41	45	49

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Description*	2020	2021	2022	2023	2024	2025
Manufacture of tobacco products	16	16	14	14	13	13
Manufacture of textiles	283	279	296	317	344	375
Manufacture of wearing apparel	44	43	43	46	49	54
Manufacture tanning and dressing of leather, luggage, and handbags	31	34	35	40	45	52
Manufacture of products of wood and cork	43	44	44	45	46	48
Manufacture of paper and paper products	83	82	79	77	76	75
Publishing of books, brochures, and other publications	41	41	39	38	37	37
Manufacture of coke oven products	81	83	79	81	82	86
Manufacture of basic chemicals	324	316	298	305	316	328
Manufacture of medical appliances	79	81	82	84	87	90
Manufacture of rubber products	254	260	259	266	275	286
Manufacture of non-metallic mineral products	594	606	1,014	1,046	1,091	1,141
Manufacture of basic iron and steel	395	403	404	415	429	446
Manufacture of structural metal products	300	293	313	352	396	451
Manufacture of office, accounting, and computing machinery	75	74	79	89	100	114
Manufacture of electric motors and generators	207	205	211	227	244	266
Manufacture of domestic appliances	236	241	224	266	309	373
Manufacture of motor vehicles	418	454	484	577	674	814
Manufacture of other transport equipment	53	54	45	47	45	48
Manufacture of furniture	64	65	63	65	66	69
Other manufacturing	44	43	38	37	34	34
Building and repairing of pleasure	10	10	10	12	14	17
Services and others						
Production, transmission, and distribution of electricity	78	72	70	72	77	81
Manufacture of gas; distribution of gaseous fuels	39	37	35	37	39	41
Collection, purification, and distribution of water	582	148	144	141	139	137
Building of complete constructions	1,938	1,890	3,830	3,953	4,114	4,310
Demolition equipment with operator	1,292	1,251	1,194	1,336	1,512	1,717
Sale of motor vehicles	3,585	3,195	3,010	2,857	2,745	2,641

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Description*	2020	2021	2022	2023	2024	2025
Maintenance and repair of motor vehicles	398	355	336	319	307	295
Transport via pipelines	1,877	1,967	1,988	2,234	2,538	2,890
Sea and coastal water transport	32	34	33	34	34	36
Scheduled air transport	32	36	36	37	38	39
Supporting and auxiliary transport activities	108	119	120	123	128	133
Post and courier activities	108	115	110	107	105	104
Hotels; camping sites and other provisions	145	154	140	137	132	131
Restaurants, bars, and canteens	217	231	216	212	206	205
Telecommunications	177	201	214	250	298	354
Courier activities other than national post activities	20	22	23	25	27	30
Monetary intermediation	288	281	270	259	253	245
Insurance and pension funding	54	55	56	56	58	59
Non-life insurance	18	18	17	17	16	16
Real estate activities	18	18	18	17	17	17
Real estate activities on a fee	18	18	18	17	17	17
Research and experimental development	201	219	243	273	310	354
Architectural, engineering	318	323	287	281	266	264
General (overall) public service activities	630	627	584	554	528	508
Defense activities	567	576	553	540	532	528
Compulsory social security activities	63	64	64	75	89	105
Primary education	260	259	242	229	219	211
Secondary education	260	259	242	229	219	211
Higher education	260	259	241	229	218	210
Higher education	260	259	237	225	212	204
Human health activities	353	359	346	338	333	331
Other human health activities	318	323	311	305	301	298
Mining	**258**	**261**	**251**	**256**	**260**	**269**
Manufacturing	**4,303**	**4,339**	**4,803**	**5,143**	**5,529**	**6,040**
Services and others	**14,514**	**13,744**	**15,228**	**15,518**	**16,027**	**16,722**
Total	**19,075**	**18,344**	**20,282**	**20,917**	**21,816**	**23,031**

* Value in terms of 1,000 persons.
Source: Author's calculation from Ministry of Cooperatives, and Statistics Center of Iran.

Table 13 shows that employment in the mining sector will increase from 261,000 people in 2021 to 269,000 people in 2025; employment in manufacturing will increase from 4339,000 people in 2021 to 604,000 people in 2025; and employment in services and others will increase from 13,744,000 people in 2021 to 16,722,000 in 2025.

Conclusions and Recommendations

In this section, first conclusions and then recommendations in the short-term and long-term are presented.

Conclusions

Going by the high priority placed by the Government of IR Iran on generating employment for the rapidly growing number of young women and men joining the labor market, this report has been prepared based on analysis of each of the key elements of an employment strategy framework. The issues within these elements have to do with labor market and macroeconomic challenges; supply of skilled labor and generation of employment in small enterprises; gender equity; social protection; and social dialog. The conclusions have been drawn from examination of these issues; and recommendations for appropriate short-term measures and long-term strategies have been provided.

In the context of employment and labor market challenges facing IR Iran, several key questions have been addressed relating to the centrality of employment in economic and social policymaking. These are:

(1) Is the overall macroeconomic policy environment right for realizing the economy's full growth and employment potential?

(2) Is the mix of social protection, employment promotion, training, and labor market regulation appropriate for job creation?

(3) Since small and medium enterprises (SMEs) will most certainly be the main engine of employment growth in future, are SME policy and regulation helping to unlock their potential?

(4) How can gender equity be achieved for the full employment of human resources in IR Iran?

(5) Are the labor market and tripartite institutions contributing fully to the goal of full employment?

Conclusions reached under each of the key elements of the employment strategy framework are recapitulated ahead before discussing the appropriate short-term measures and long-term strategies.

The implementation of the internship program by the end of 2020 has been welcomed and registered by 444,000 young job seekers in the internship system. Of these, more than 139,000 were eligible under the internship plan. In addition, 50,500 interns have been introduced to eligible interns to complete the three-month introductory course. The main reasons for low acceptance of firms are the sanctions, the unfavorable situation of some firms, and also IR Iran's lack of favorable relations with global markets, which have made firms less inclined to develop their activities and attract new workers. Also, a study of the implementation of the graduation internship plan in provinces shows that the less privileged provinces had better performance in the implementation of the internship plan during 2017–20. In addition to indicating deeper unemployment in low-income areas among university graduates, this also indicates the need to implement the plan in less developed areas as

a promising route for employment of young graduates. This situation indicates the need to implement different wage policies as per the economic conditions of different regions of the country, because, in relatively affluent areas, low tuition fees do not provide sufficient incentives to welcome unemployed university graduates to the project.

In more affluent areas, a relatively wider range of employment opportunities, including part-time, educational, and even false jobs, mediation, etc. are available to university graduates along with internship programs. However, in low-income areas, the possibility of graduate participation in these activities is very limited, and the income from participation in the internship program is of great importance for graduates and their families. Also, a review of the performance of this plan shows that certain provinces have been relatively more successful than other provinces, which while confirming the direct impact of different conditions of the provinces in terms of economic development and infrastructure capabilities, greater participation of economic units and trade unions, also emphasizes the need for more effective management of officials in lower-performing provinces.

Also, while emphasizing the favorable effects of the plans under the active labor market policy program, including the graduate internship scheme and the employer insurance exemption on increasing employment and graduate employment, it should be noted that achieving the maximum goal of creating employment and increasing job satisfaction for university graduates of higher education is in line with economic policies, employment policies, science and technology polices, and industrial and commercial policies. Moreover, to achieve this, the executive bodies and relevant organizations should avoid sporadic actions in the field of job creation.

A review of global experiences with internship schemes shows that in most countries this scheme has a systemic mechanism and is not separate from the education system, while its purposeful implementation from primary school to university graduation and obtaining a job in the labor market, continues. The most important points in these experiences are the development of an internship program based on the needs of the labor market, the continuous process of upgrading skills from primary school to university, receiving a grant commensurate with the percentage of the minimum wage, developing skill standards, and considering incentives for employers. Holding an examination and providing an approved certificate that confirms the eligibility of individuals to enter the labor market is recommended to be a model in IR Iran as a successful global experience.

Macroeconomy and labor market challenges: IR Iran is faced with a dichotomy between rural and urban employment while its level of labor force participation, particularly for women, remains quite low by international standards. Urban unemployment is largely a phenomenon of the growing number of educated unemployed, while a large proportion of those unemployed in the rural areas is semiliterate or illiterate. There is a sectoral concentration of women in urban and rural areas indicating great potential for their employment expansion, particularly when it is considered that employment generation in the trade and service sectors has so far remained quite marginal.

The country needs to expand employment opportunities through labor-intensive investments and increasing export orientation, particularly in the non-oil sectors. The key requirements are, on one hand, a redirection of the past trend of capital-intensive investments toward labor-intensive ones; and on the other hand, diversification and expansion of exchange of goods and services in the context of a globalizing economic environment. This calls for the reduction of resource demands of the public sector through transparent public financing, and a policy shift from import substitution to export orientation, along with the reorientation of the banking sector toward support for private sector growth.

Industrial and trade politics challenges:

- lack of macro and integrated policies and immediate actions without expertise;
- non-participation of all stakeholders in the formulation of industrial policy (other ministries and stakeholders such as the Ministry of Energy, Ministry of Jihad Agriculture, Ministry of Roads and Urban Development, and Ministry of Economic Affairs and Finance, need to participate);
- lack of appropriate and integrated statistical database and presentation of inconsistent statistics by various organizations and devices;
- weakness in the structure of the industry (high concentration of small industries and lack of development of medium industries);
- differences of meanings in the industrial literature of the country with the world (differences in definitions, views, and applications);
- industrial development based on political criteria regardless of land use planning;
- existence of several officials in the field of employment development without having a trustee and a responsible position;
- unprofessional government support for the workforce and the imposition of costs on employers;
- lack of attention to value chains in clustering (from raw material supply to sales and distribution and aftersales service);
- development of science and technology parks and growth centers without considering the needs of the country;
- lack of turning knowledge into technology in parks and business clusters; and
- island and scattered activities in the field of employment development.

Graduate and youth challenges:

- lack of empowerment of the university workforce to enter the industrial sector;
- development of higher education without needs assessment (regional and thematic) and lack of a comprehensive view of the future of labor market for graduates;
- planning higher education according to the country's needs, especially in the industrial sector; regional needs; and labor market conditions;
- supplementary, technical, and vocational training appropriate to existing and emerging jobs;
- building trust in corporate management regarding the benefits of hiring university graduates for firms;

- promoting the professional competence of graduates and students under the industrial policy;
- providing practical training for university graduates;
- adopting incentive policies in the employment of university graduates;
- changing the approach of job creation policies toward entrepreneurship and creating knowledge-based enterprises; and
- strengthening and developing internships in industrial enterprises.

Deprived areas challenges:

- weak information and a top-down view of industrial development and employment (especially in disadvantaged areas);
- lack of development of industry in rural areas based on indigenous technologies and migration of villagers to cities and expansion of marginalization and increase in social problems;
- development of small and medium industries to create employment (especially in deprived areas);
- providing investment exemptions in disadvantaged areas and implementing incentives and preferential policies;
- development and expansion of conversion and complementary industries in rural areas and small and medium industries in deprived provinces;
- determining the minimum wage on a regional basis to take into account the special conditions of deprived areas;
- development of infrastructure required by industry in deprived areas; and
- identifying advantages of industrial activities in deprived areas and supporting their development.

Skills development: IR Iran's training system is comprehensive and active, anchored in both the secondary school system and technical training centers. Vocational education has a growing number of educated unemployed, while a large proportion of those unemployed in rural areas are semiliterate or illiterate. There is a sectoral concentration of women in urban and rural areas indicating great potential for their employment expansion, particularly when it is considered that employment generation in the trade and service sectors has so far remained quite marginal.

As the general rate of wages in IR Iran has remained low and resource input has tended to be inefficient, there has been a perceptible fall in productivity, particularly in total factor productivity, thus eroding the overall competitiveness of the Iranian economy in the world market. Nonetheless, there is a persistent differential in wages between women and men workers, indicating not only inequity but also less-than-productive employment for the relatively better-educated women workers.

IR Iran's fiscal, trade, and monetary policies have led to currency appreciation resulting in the movement of resources to nontradable sectors, including the government. The controlled nature of the country's economy has meant that many of the normal causal interrelationships have been absent; for example, high rates of monetary inflationary pressures have coexisted with low deficits during the period.

A successful export promotion policy would certainly generate additional employment and ease import liberalization. On the other hand, productivity, efficiency, and real incomes would rise as the performance of domestic firms should improve in response to increased competition spurred by import liberalization. The challenge however remains in increasing exports of other goods and services alongside oil products, which would require special attention in enhancing the competitiveness of small firms through the provision of credit and technical assistance for skills development and product upgrading.

Job creation in SMEs: The private sector is largely dominated by micro enterprises in terms of numbers, particularly when trade and services are considered. There have been several supply-oriented initiatives to create jobs in SMEs through cash incentives. However, the overall conducive policy and regulatory environment are more critical for sustained growth in the creation of jobs in small enterprises. Female entrepreneurs face particularly difficult social and procedural barriers in starting and operating enterprises, which need to be considered in improving the policy and regulatory environment.

There has been a singular focus on industrial firms without much attention to trade and service sectors, which have greater potential for job creation. At present, several ministries are involved in the promotion of small enterprises; and at least four ministries are involved in the registration, licensing, and certification of activities of small enterprises. So far, the entrepreneurs have felt that no particular benefit is received by complying with the various regulatory requirements. As a result, the compliance cost differential has been two-thirds of what it costs in establishing and operating a formal business. It is essential that a mechanism for coordination among various ministries is created and the regulatory provisions are simplified.

All small enterprises suffer from problems of outdated technologies, poor quality, and unstandardized products signifying the lack of business development services to these enterprises. Although these enterprises have greater efficiency in the use of capital for the creation of jobs and thereby are more labor-intensive, labor productivity, however, remains low. Small enterprises are squeezed out of the banking system due to a larger share of the public sector in the institutional credit. Targeted lending to the public sector and specific firms has not made the situation easier for small borrowers, who are often unable to offer the kind of collateral desired by banks. Nonbanking loans are exorbitantly costly at the rate of at least 25%, thus undercutting the competitiveness and growth opportunities of small enterprises.

Gender equity: Generally, gender gaps in the levels of education and literacy in IR Iran are low. Women's participation in the labor force remains quite low at around 17%. Women experience much higher unemployment (35%) in urban areas. Traditional values considering women only as 'secondary' workers within the household and in society at large have not helped the situation to improve. Women's share in management positions, particularly in the private sector, has remained much lower. As privatization of the public sector enterprises has proceeded further, the decline in women's employment has taken place.

Thus, gender inequity signifies labor market inequality and underutilized human resources. Women's labor force participation is often borne out of economic necessity and is therefore common in the informal economy. Upgradation of the women's low-value-added work at the lower ends of micro and small enterprises is necessary to increase overall productivity. This is particularly true in rural areas where a larger number of women are found to be engaged in manufacturing.

In urban areas, women are generally attracted to the public sector and professional employment. They have been less inclined to engage in entrepreneurial activities for various social and economic reasons. Also, the services sector remains quite small in the Iranian economy, thus limited the potential for expansion of women's employment in such sector. There is growing interest among women in IT skills, which can lead to the expansion of the services sector.

Recommendations

Two main findings emerge from this report. First, IR Iran's current set of economic policies and correspondingly its economic structure are neither conducive nor dynamic for a job-creating economy. They need a radical change in the direction of establishing a more conducive environment for enterprise creation and private investment. Second, IR Iran's present labor policies relating to training, industrial relations, social security, and above all, labor market regulation, represent the foundation for stimulating job creation. All aspects of labor relations need to be significantly improved to develop a consensus-based approach to satisfactory labor market performance. Only by establishing a dynamic economy and a well-functioning labor market IR Iran's employment problem will be addressed.

Output growth and diversification of the economy away from oil would be possible with these conditions. But economic dynamism, while responding to such technocratic changes as exchange rate unification, or easier provisions on collaterals in lending to small enterprises, also requires a degree of decentralization of decisionmaking. Tripartism and freely chosen associations of workers and employers are basic foundations for such decentralization of decisionmaking. The strategy proposed in this report is one in which freely chosen and productive employment is promoted simultaneously with fundamental rights at work, an adequate income from work, social dialog in decisionmaking, and security of social protection. The proposed strategy does not promote just any employment, but decent employment in which recognition of international labor standards and workers' fundamental rights go hand in hand with job creation.

The strategy recognizes that labor markets function differently from other markets. They are about people; their skills and competencies; their incomes, safety, and health; and their aspirations and motivations. The way in which labor markets often function invites adverse social and economic consequences. A labor market that is free from discrimination on all grounds is one where macroeconomic gains result from more productive job matches. Furthermore, giving people a free and independent voice at work will have substantial productivity advantages through facilitating consensus, minimizing social costs, and speeding adjustment to change.

The employment strategy for IR Iran weaves together the four key elements of 'decent work' as conceptualized by the ILO, namely:

- the centrality of employment in economic policy;
- the guarantee of basic rights at work;

- a floor for social protection; and
- the promotion of social dialog.

In line with the ILO's Global Employment Agenda, the proposed employment strategy for IR Iran rests on the twin pillars of promoting change and managing the employment and social consequences of change. Economic change has to be embraced; and while it may sometimes be slowed down, it cannot be avoided for long. IR Iran is encouraging change by opening up its economy and stimulating private-sector investment. The effects of change have, however, to be constantly reviewed. It is here that a well-functioning labor market and a high demand for labor are essential. Some workers will lose their jobs due to change. To the extent possible they should be compensated, but the forms of compensation applied must themselves be compatible with job creation and encourage job seeking. In this respect, the wide coverage of IR Iran's system of social protection makes it an excellent foundation for social policy in a time of transition. The ILO is confident that a mix of economic policies furthering private investment, enterprise creation, and social policies leading to better labor market functioning will achieve the goals of better labor utilization, higher productivity, and equity.

Greater gender equality is in this respect both an ingredient to achieving better labor market outcomes and a consequence of more sensitive and better-informed policymaking. The report makes several proposals for action. These proposals have been divided into two parts. The first part comprises actions whose impact should be evident in the short-term in improving employment and labor market situation. The second part involves actions that are more structural and can be implemented in a medium- or long-term framework.

Short-term Measures

Short-term measures covering a period of up to two years need to be taken as part of initiating steps toward an employment strategy framework for IR Iran. Such short-term measures are to initiate the process of formulating and undertaking policy measures through immediate reviews and testing of the intended strategies in limited geographical areas or institutional settings. These measures should include, though not exclusively, the following:

Macroeconomic policies:

(1) Macroeconomic policies need to be reviewed to allow greater export orientation and lesser import restriction by reducing tariffs to reasonable levels and abolishing non-tariff barriers.

(2) Banking sector must reduce the differential between borrowing and lending rates through increased freedom for balanced portfolios rather than directed credits. The supervisory and monitoring role of the central bank must be strengthened.

Labor market policies and labor relations:

(1) A labor market information system with a data bank of key labor market indicators needs to be developed to provide gender-disaggregated information. The system should be housed at the Ministry of Cooperatives, Labour and Social Welfare (MCLSW).

(2) Labor law reform needs to be initiated with a view to strengthening the tripartite institutions and redefine the role of MCLSW with workers and employers' organizations. National Labour Advisory Council should be further strengthened as a national tripartite institution.

(3) Workers' and employers' organizations should be strengthened to allow them to fully participate in social dialogs. Labor law reforms should permit workers and employers' organizations to develop and function with the capabilities to analyze and protect the interests of the respective constituencies.

(4) MCLSW needs to be further strengthened for analyzing labor market information, facilitating social dialogs, and developing dispute settlement and wage-fixing mechanisms that would be relevant to a growing private sector.

(5) MCLSW also needs to work out coordinating and collaborative arrangements, particularly for skills development, small enterprise development, and social security, given that several ministries and organizations are involved in promoting and coordinating various regulations, activities, and schemes in these areas. The most important is the coordination among the Youth Council, MOLSA, and other key agencies in strengthening the entry of young women and men in the labor market.

The ILO has been working closely with MCLSW to assist in all of the above categories. A memorandum of understanding was signed in July 2002 between the ILO and MCLSW to further assist in the above areas.

Skills development:

(1) The role of Iran Technical & Vocational Training Organization (TVTO) in coordinating skills development and its linkages with vocational education training (VET) need to be reviewed. In this review, the quality of training delivery, standards testing, certification, and participation by employers also need to be taken into account.

(2) The cost of vocational training needs to be examined to determine not only the efficiency of delivery but also the increased participation of employers. Various methods of subsidizing training (e.g., voucher system) that would encourage innovation and foster competition need to be considered. Training activities other than formal routes (i.e., apprenticeships) need to be encouraged with a tie-in with formal testing and certification.

(3) A system of assessing demand for skills development needs to be built into the labor market information system proposed earlier, and the information so generated should provide inputs to the curriculum development and training of instructors and upgradation of training centers.

(4) A review of the methods to encourage private-sector training centers to develop and compete against the subsidized public-sector training institutions need to be carried out so that there is minimum wastage of resources while maximizing efficiency and innovation.

(5) An examination of how a greater role can be played by the training institutions in organizing and managing skills training needs to be carried out. The ILO has proposed to review the TVTO's role in skills development by examining its management, organizational structures, and functions at the headquarters and selected provincial directorates. A review of operational efficiency is expected to be taken up at a later stage.

Job creation through SMEs:

(1) The government may wish to continue various schemes being implemented at present. But eventually, these schemes have to give way to a systematic creation of the environment, entrepreneurial culture, and support system for sustained growth of small enterprises in the country. For evolving such a holistic approach, a few provinces could be selected to integrate all the three elements and test the results before policy measures are undertaken at the national level.

(2) The labor law reforms proposed above should also include examination of the ways to improve compliance of micro and small enterprises with labor laws since the growth of small enterprises is often constrained by their inability to comply.

(3) Ways of simplifying the compliance requirements for registration, license, and certificates need to be explored with a view to establishing a single agency for micro and small enterprises in place of four different ministries currently involved.

(4) Access to credit for micro and small enterprises and collateral requirement for such access needs to be reviewed to determine how credit can be made available through the normal banking system rather than special schemes.

(5) Business development services (BDS) should be made available for micro and small enterprises by promoting and strengthening the BDS providers. The ILO is currently engaged in further examining the needs of micro and small enterprises through a survey to provide policy inputs to the government.

Gender equity:

(1) A review of legislation presenting barriers to gender equity needs to be undertaken.

(2) Policies and programs based on labor market information need to be developed for promoting and furthering gender equity and for increased access of women to employment opportunities, including entrepreneurship. Such policies and programs need to be aimed at not only removing barriers and promoting equity at work but also at encouraging the participation of women in diverse occupational areas. In March 2004, the ILO initiated a discussion on these issues by organizing a meeting in Tehran with the participation of government ministries, workers' and employers' organizations, and NGOs that were actively involved in these issues. The meeting provided recommendations in the areas of legislation and policymaking, labor market and poverty eradication, and promoting women's entrepreneurship. Among others, its recommendations included enforcement of existing legislations promoting gender equity, providing social protection for women, facilitating access of women entrepreneurs to credit, and removing barriers to women entrepreneurship.

Internship program:

(1) There is a need for revising the number and capacities of disciplines and academic orientations; modifying the content of courses; and increasing the provision of practical and applied education of academic disciplines based on the needs and capacities of the region and the labor market, gender requirements, and national development programs in universities and higher education institutions. Educating students on labor market needs by the Ministry of Science, Research, and Technology is also important.

(2) Based on the Employment Indicators and monitoring and publishing annual reports by the Ministry of Science, Research and Technology to achieve the goal of improving the employment of university graduates, the National Employment System for University Graduates should be launched.

(3) University graduates should be encouraged to start their businesses, promoting a culture of entrepreneurship and self-employment instead of getting paid; and creating a suitable environment in universities and higher education institutions by holding startup events and entrepreneurship festivals.

(4) In general, some projects of active labor market policies have been significantly successful in terms of performance, allocated resources, and quantitative objectives. This may be noted as a suitable experience in the plans in the coming years, especially in the seventh development plan.

(5) Considering the favorable effects of the active labor market policy programs in creating employment and consequently reducing the unemployment rate, for achieving the maximum goal of increasing employability of young people and university graduates, coordination of higher education policies with economic policies, employment policies, science and technology policies, and industrial and commercial policies is required. To achieve it, the executive apparatus and relevant organizations must avoid sporadic actions in the field of job creation. At the same time, the basis of active policies is the use of unutilized capacities of existing workshops or restoration of those capacities damaged by economic problems and the coronavirus disease. However, given the limited capacity of unused economic workshops, this policy can in no way replace the development of employment through creation or development of economic infrastructure capacity. Therefore, part of the employment development goals should continue to be pursued, through government support, for the creation of new capacities, especially of new businesses, startups, and entrepreneurial activities.

Long-term Strategy

A long-term strategy for five years or so should focus on policy changes and institutional development as part of the employment strategy framework. Previous short-term measures and various other initiatives to be taken by the government should lead to the development of the long-term strategy.

Macroeconomic policies: The macroeconomic policies should encourage export orientation, realistic currency valuation, and banking-sector restructuring. The role of the central bank in the supervision and monitoring of the banking sector needs to be strengthened while allowing regular business decisions to be taken by banks. The thrust has to be on expanding the role of the private sector while including resource transfer to the public sector. The competitiveness and productivity of the economy should be enhanced through gradual introduction of a competitive environment under facilitative regulatory frameworks for each of the major subsectors.

Labor market policies and labor relations: A fully functional labor market information system, a strengthened MCLSW with a redefined role in facilitating social dialog, and a fully functional national tripartite organization (National Labour Advisory Council) with strengthened workers' and employers' participation have to be the ultimate goals of the long-term strategy. The labor law reform process would have to be completed with adequate attention to gender equity.

Skills development: Inputs from short-term reviews of TVTO need to be provided into policy measures for strengthening TVTO as a coordinating and facilitating body in skills development in the country in close collaboration with the Ministry of Labour and Social Affairs and the Ministry of Education. The data on skills development should be available for periodic improvements and upgrades.

Short-term examination of the issues of private-sector participation and its contribution to skills development should lead toward a mechanism for financing skills development.

Job creation through SMEs: The results of short-term pilot testing on the holistic strategy of improving regulatory environment, entrepreneurial culture, and support mechanism in selecting provinces should be made available as inputs to the larger policy measures at the national level for the growth of small enterprises. An apex body for promoting small enterprises in collaboration with various ministries, including the Ministry of Industry, Mines and Trade, needs to be established to facilitate better coordination of compliance requirements as well as business development services. The review of access to credit needs to provide inputs in facilitating credit to micro and small enterprises. Attention also needs to be given to enhancing women entrepreneurs' access to credit and business services.

Gender equity: Specific concerns on attaining gender equity in terms of the socioeconomic environment for women need to be further examined and necessary actions need to be taken, e.g., in examining the legislation allowing greater participation of women in diverse economic and political domains as well as allowing them to fully participate in management roles in public and private sectors. Policies and programs promoting gender equity and women's entrepreneurship need to be developed and implemented in consultation with the workers, employers, and other stakeholders.

Industrial development policies:

- developing long-term and integrated industrial development policies with the participation of all government and non-government stakeholders, avoiding island and individual movements;
- active and colorful participation of the private sector in the formulation of industrial and commercial policies;
- stability of trade and industrial policies;
- selecting an export development strategy and competitive advantage as a new approach to industrial development;
- improving the business environment and removing barriers to production and investment;
- developing high-tech and knowledge-based industrial activities with emphasis on market development of knowledge-based products;
- reforming the structure of the industry (empowering firms to move on the path of turning enterprises from micro to small, small to medium, medium to large, and large to international);
- developing a culture of participation and partnership among small enterprises to develop business clusters;

- changing the approach of job creation policies toward promoting entrepreneurship and creating knowledge-based enterprises;

- focusing on small industries that are in the value chain and supply of large industries to develop employment;

- globalizing brands in large industries and connecting small industries to them;

- attracting foreign direct investment to transfer knowledge and technology and create jobs through ways such as increasing investment security; and

- establishing an integrated statistics and information system to plan employment development in the industrial sector.

Industrial policy and increase in employment

Two issues should be considered in industrial policy to increase employment in the industrial sector and create sustainable employment:

(1) Small, medium, and large industries should be developed in a balanced way, such that large industries are targeted as drivers of the country's industry to bring about industrial and export development.

(2) Medium and small industries should act and develop as downstream industries and part of the supply chain of large industries, and the burden of job creation of the industry should be on the shoulders of these industries, in line with the nature of these industries.

Further, every development policy requires the development of higher, technical, and vocational education. In other words, higher and professional education is the driver of development.

In the last three decades, higher education has developed a little, but unfortunately, development based on needs assessment and land management has not taken place. As a result, the labor market is facing high unemployment of graduates who either do not have enough skills or their expertise is not needed at all by the country's industry.

Productivity: To increase the productivity and effectiveness of higher, technical, and vocational education to advance industrial and commercial policies, it is necessary to pay more attention to the development of women's employment. Among the most important strategies affecting the development of women's employment in the industrial sector, the following can be mentioned;

- providing practical training for women;

- using incentive policies to employ women in companies;

- amending laws related to women's employment conditions (with emphasis on labor and social security laws);

- promoting practical training for women and promoting their expertise and capabilities;

- creating a culture regarding women's employment;
- developing part-time, participatory, and telework jobs and opportunities for women;

The strategies for developing employment in deprived and disadvantaged areas are:

- developing small and medium industries to create employment (especially in deprived areas);
- providing investment exemptions in disadvantaged areas and implementing incentives and preferential policies;
- developing and expanding conversion and complementary industries in rural areas and small and medium industries in deprived provinces; and
- determining the minimum wage on a regional basis to take into account the special conditions of deprived areas.

Industrial and trade policy

Some of the measures that should be taken are:

- formulation of long-term and integrated industrial development policies with the participation of all government and nongovernment stakeholders and avoidance of island and individual movements;
- active and colorful participation of the private sector in the formulation of industrial and commercial policies;
- stability of trade and industrial policies;
- selecting an export development strategy and competitive advantage as a new approach to industrial development;
- improving the business environment and removing barriers to production and investment;
- development of high-tech and knowledge-based industrial activities with emphasis on market development of knowledge-based products;
- creating sustainable enterprises or sustainable jobs;
- reforming the structure of the industry (empowering firms to move on the path of turning enterprises from micro to small, small to medium, medium to large, and large to international);
- planning and policymaking based on improving productivity and increasing competitiveness;
- developing a culture of participation and partnership among small enterprises to develop business clusters;

- accuracy in identifying business clusters based on existing or achievable advantages;
- providing specialized training for cluster members to work between and within firms;
- changing the approach of job creation policies toward entrepreneurship and creating knowledge-based enterprises;
- creating technology-based comparative and competitive advantages; and
- improving economic infrastructure to improve and stabilize corporate activities.

NEPAL

Introduction

Background

The economy of Nepal is largely dominated by agriculture. In fiscal year 2011–12, the contribution of the agriculture sector (including agriculture, forests, and fisheries) to gross domestic production (GDP) was 32.7%, but it has been gradually decreasing in recent years and is estimated to remain 25.8% in fiscal year 2020–21 [1]. Agriculture is regarded as one of priority sectors for the economic development of the country. Besides agriculture, tourism, carpets, and garments are major industries. By analyzing the spread, magnitude, and severity of poverty and enhancing the access and participation of poor and deprived communities in capital, technology, and local resources through targeted programs, a broad-based economic process was achieved. Consequently, remarkable progress was being made in poverty alleviation. However, the spread of the COVID-19 pandemic since December 2019 resulted in an exceeding contraction in economic activities and employment opportunities. This made the goal of reducing absolute poverty to the extent of 10.0% by 2023–24 a challenge [1] as the impact of the COVID-19 pandemic persisted for an extended period.

According to APO Productivity Database 2019, Nepal's average income has increased nearly three times since 1970, though the income growth has been low relative to other APO countries in the last decade. The employment rate in Nepal is low and its age-dependency ratio is high, while the level of labor productivity is among the lowest in APO group [2]. Nepal, despite its multiple vulnerabilities (being a least developed, landlocked, disaster-prone, and climate-vulnerable country), has made tremendous progress on the Human Development Index (HDI) [3]. Its HDI score increased from 0.387 in 1990 to 0.596 in 2018 and 0.602 in 2019 with annual growth rate of 1.54% during the period 1990–2019 [4].

The Fifteenth Plan of the National Planning Commission (NPC) outlines a path to prosperity with sustainable development by implementing the vision of making the national economy socialist-oriented and self-reliant. The purpose is to move the country forward. It outlines strategies for achieving free and sustainable economic growth, stability, better governance, and citizen satisfaction, according to the development direction set by the country's constitution [5]. It has provided the plan to improve the status of Nepal from a least developed nation to a developing nation by the year 2022, and to achieve the Sustainable Development Goals (SDG) by 2030, in order to lift Nepal to the status of a middle-income country (MIC) through additional revenue, creation of qualified human capital, and reduction of financial risk [5]. By the year 2024, the government of Nepal aims to reach a double-digit growth, a per capita income of USD1,595, a population of 9.5% below the national poverty line, and a 50% share of formal employment [6]. However, lack of adequate employment opportunities, skill mismatches, lower-level skills of the workforce, increasing working-age population, rising proportion of women entering into the labor market, and weak entrepreneurial capability are some of the challenges in the area of labor force management in the country [7].

According to Nepal Labour Force Survey (NLFS) 2017–18, out of the country's 29 million population, approximately 20.7 million people were of working age; 7.1 million were employed; and 908,000 were unemployed (i.e., trying to find work). This translated into an unemployment

rate of 11.4%. Females reported a higher unemployment rate of 13.1%, which was 2.8% points higher compared to males [8].

In the context of Nepal, technical education and vocational training (TEVT) is taken as an integral part of the national development. In order to strengthen the technical education and vocational training in a broader perspective, the Council for Technical Education and Vocational Training (CTEVT) was established in 1989 under CTEVT Act 1989. It has an important role in enabling sustainable national development and providing skills and jobs to many people who are away from general education due to various barriers [9].

CTEVT works to prepare skilled workforce required by the job market. Major functions of CTEVT are: policy and program formulation, coordination, and facilitation; quality control; and program implementation. In addition, the postal task of CTEVT is to formulate a technical and professional education and training policy. CTEVT coordinates and facilitates TVET services through research and development, curriculum development, standardization, instructors training, affiliations, and development of new programs. Although the number of long-term TVET providing institutes had reached an all-time high (1,551) at the end of the fiscal year 2019–20 [9], it is not sufficient enough [10].

Labor Indicators of Nepal

NLFS 2017–18 shows that the population of Nepal was 29 million, of which 13.5 million (46.5%) were males and 15.5 million (53.5%) were females. Figure 1 shows that more than 40% of the 20.7 million people of working age were aged 15–34 years, reflecting a dominance of young population. Females accounted for a larger share of the working-age population in the lower age groups (15–44 years) while males accounted for a larger share of the working-age population among those aged 45 years and older.

Figure 2 shows that the national labor force participation rate (LFPR) and employment-to-population ratio (EPR) in 2017–18 were 38.5% and 34.2%, respectively. However, there were gender disparities in that, the male LFPR and EPR were higher than those for females. The male LFPR was 53.8% compared with the female LFPR (26.3%), while 48.3% of males of working age were in employment compared with 22.9% of females. On the other hand, the unemployment rate was higher among females (13.1%) than males (10.3%).

Table 1 shows that the EPR increases with the level of education, irrespective of the gender. For example, the EPR for those with no secondary education was 31.5%, compared with 61.8% reported by those who had a tertiary education. Similar patterns are observed among both females and males.

TABLE 1

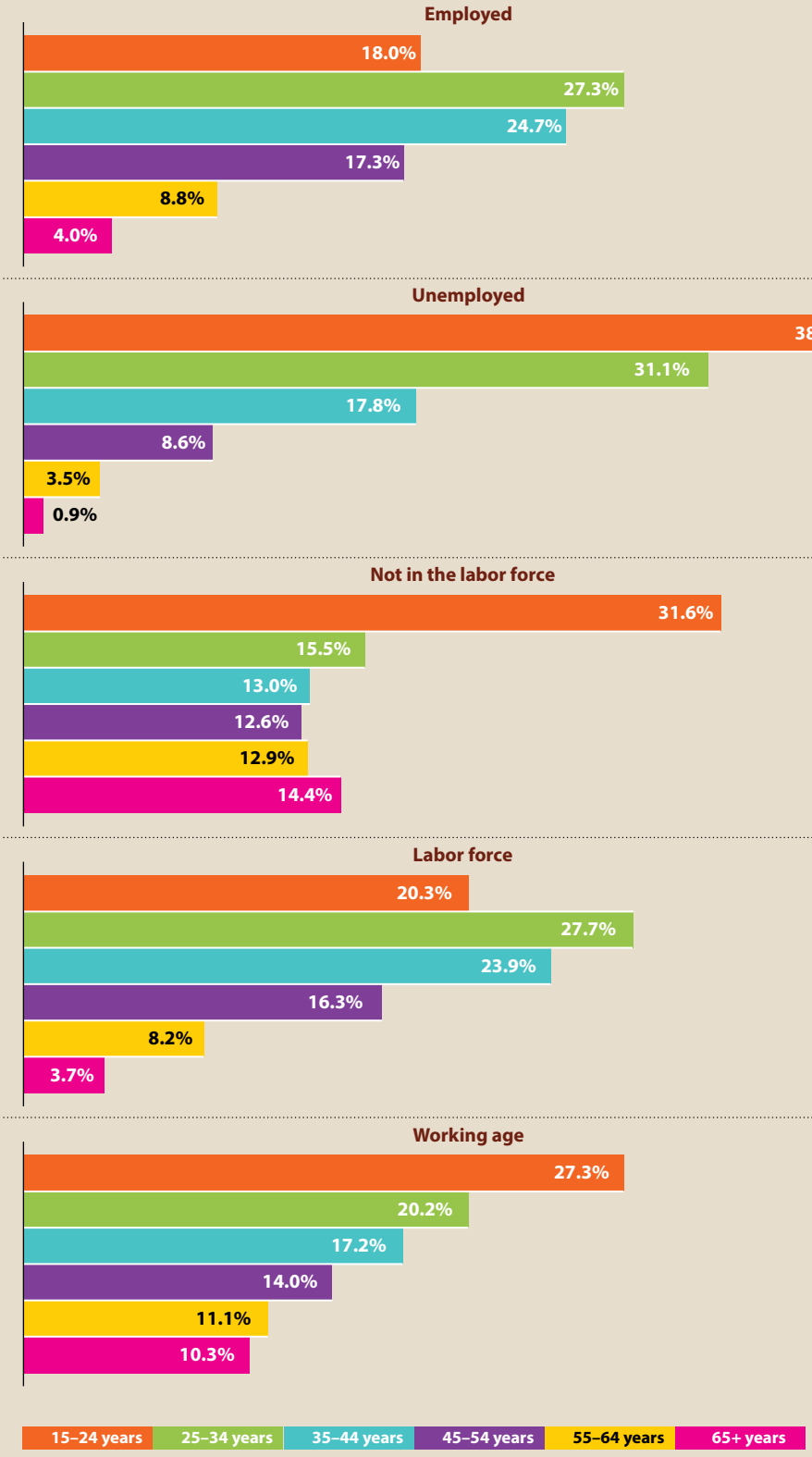
KEY LABOR MARKET INDICATORS BY EDUCATION LEVEL AND GENDER.

	Employment population ratio			Labor force participation rate			Unemployment rate (%)		
Education level	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	48.3	22.9	34.2	53.8	26.3	38.5	10.3	13.1	11.4
No secondary education	46.4	20.6	31.5	51.6	23.7	35.5	10.0	13.0	11.1
Secondary education	49.0	36.3	43.1	57.0	43.8	50.9	14.0	17.1	15.3
Tertiary	67.4	52.1	61.8	73.9	56.4	67.5	8.7	7.7	8.4

Source: NLFS 2017–18 [8].

FIGURE 1

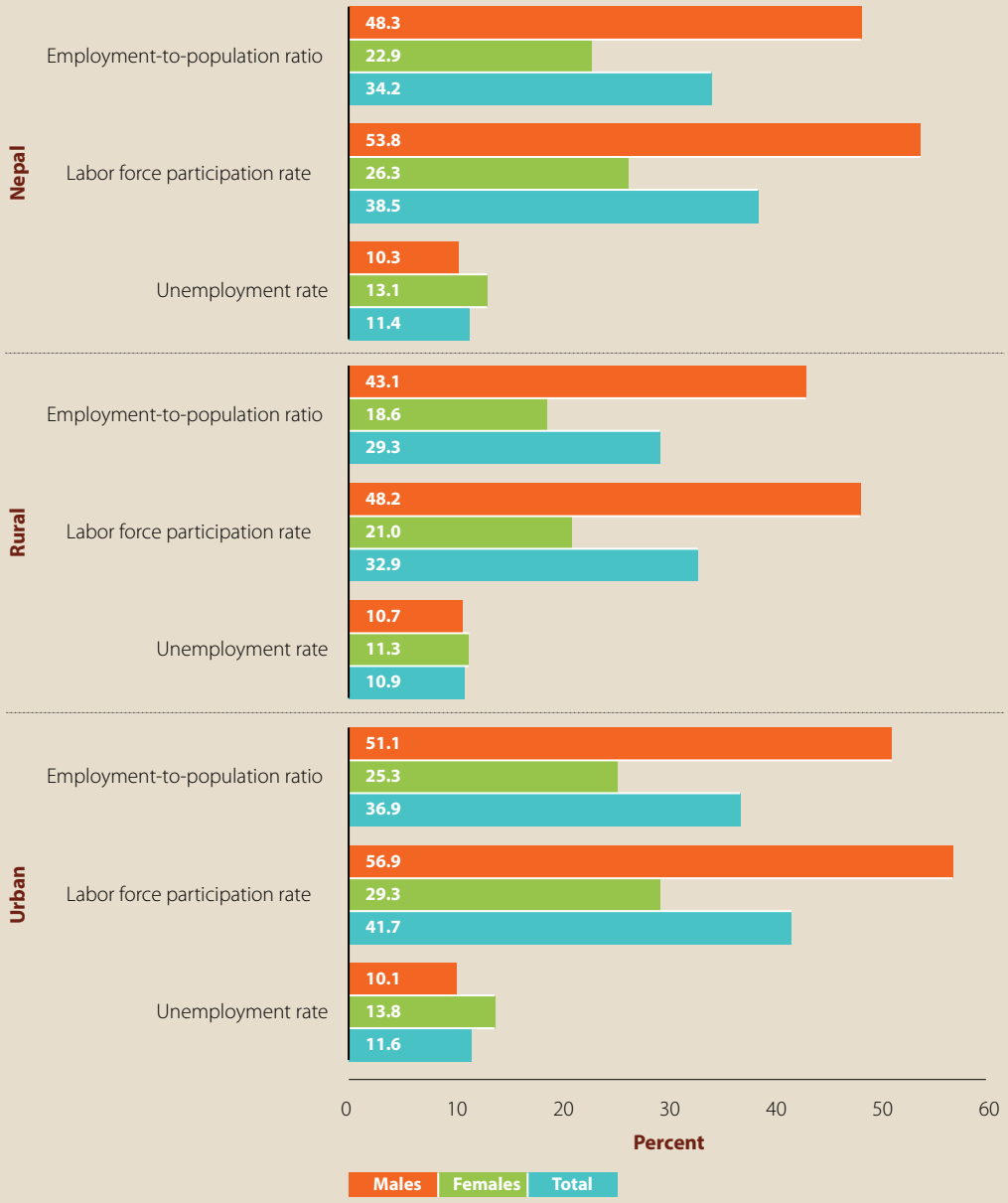
EMPLOYMENT STATUS OF WORKING-AGE POPULATION BY AGE GROUPS.



Source: NLFS 2017–18 [8]

FIGURE 2

KEY LABOR MARKET INDICATORS BY GENDER AND LOCALITY.



Source: NLFS 2017–18 [8].

Disparities remained in labor market outcomes between males and females, irrespective of the education level. However, it should be noted that the gap between male and female unemployment rates declined among those with tertiary education to one percentage point.

Table 2 shows that more than one in five people in Nepal were employed in agriculture, forestry, and fishing. However, gender disparities were observed between male and female employments. Males were mostly employed in industries such as construction, manufacturing, and transport. On the other hand, females were mostly employed in agriculture, forestry, and fishing; wholesale and retail trade; and education industries.

TABLE 2

EMPLOYMENT BY INDUSTRY.

Industry	Males (in %)	Females (in %)	Total (in %)
Total	100	100	100
Agriculture, forestry, and fishing	14.7	33.0	21.5
Mining and quarrying	1.0	0.6	0.8
Manufacturing	16.2	13.4	15.1
Electricity, gas, steam, and air-conditioning supply	0.6	0.3	0.5
Water supply	0.8	0.3	0.6
Construction	19.5	4.2	13.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	15.6	20.6	17.5
Transportation and storage	7.1	0.3	4.5
Accommodation and food service activities	4.6	6.3	5.2
Information and communication	1.1	0.5	0.9
Financial and insurance activities	1.4	2.1	1.7
Real estate activities	0.3	0.1	0.2
Professional, scientific, and technical activities	0.8	0.3	0.6
Administrative and support service activities	1.3	0.2	0.9
Public administration and defense; compulsory social security	2.4	1.1	1.9
Education	6.8	9.6	7.9
Human health and social work activities	1.8	3.5	2.4
Arts, entertainment, and recreation	0.7	0.1	0.5
Other service activities	2.7	1.4	2.2
Private households	0.6	1.8	1.0
Activities of extraterritorial organizations and bodies	0.3	0.2	0.2

Source: NLFS 2017–18 [8].

Close to a quarter of all employed people (23.8%) were employed in service and sales occupations, followed by just over 20% employed in elementary occupations. Craft and related trade occupations were among the top three contributors (19.6%) to total employment. Managerial occupations accounted for only 1.2% of the total employment.

Demand for Qualified Workers

In 2011, labor force was 14.5 million workers, up from 11.9 million in 2000 [11]. There were approximately 20.7 million people of working age in 2017–18 [8].

Migration for foreign employment has become a major source of income for many a Nepali household. The migration of Nepalese youth has been increasing year on year. Nepal Labor Migration Report 2020 shows that in the fiscal years between 2008–09 and 2013–14, more than

FIGURE 3

SHARE OF EMPLOYMENT BY OCCUPATION.

Source: NLFS 2017–18 [8].

500,000 labor permits were issued to Nepalis planning to work abroad. However, the number declined in the fiscal years 2017–18 and 2018–19 when a total of 354,098 and 236,208 approvals were issued, respectively [12]. Nepal may face shortage of workers by 2030 if people continue to take up jobs in foreign labor markets, thus creating hurdles for nation's transformation into a middle-income economy. The demand for qualified workers in Nepal is determined by national priorities for work, technological changes, and recent development initiatives (e.g., development projects, construction, new industries, new areas of physical development, mechanization and modernization, and growth of new and booming sectors like ICT). However, while Nepali industries and employers regularly seek skilled and experienced workers, the skilled and trained youths are scattered and compelled to leave the country because of lack of information on locally available employment opportunities. A mechanism such as an updated and reliable labor market information system that could serve as a link between skilled human resources and industries with available jobs, is urgently needed [11].

Methodology

The research is based on second-hand literature and data sources. The published documents will come from national-level reports, constitution, laws, policies, as well as CTEVT publications and website reports from various ministries and departments. The main limitation of this study is that it is based on second-hand data, so it is difficult to obtain data from some institutions for the most recent reference year. The summary analysis was done on the basis of data for the earlier available year for all institutions. However, this research provides some recent data for a few institutions.

Review of Policies, Strategies, and Acts

Nepal Constitution 2015 incorporates the fundamental rights of laborers. It notes that every laborer shall have the right to appropriate remuneration, facilities, and contributory social security. Also,

they shall have the right to form unions and associations, and to engage in any occupation or employment, and establish and operate industry, trade, and business in any part of Nepal. It also contains provisions against discrimination, forced and bonded labor, right to employment, and other rights pertaining to labor. Many laws, acts, policies, and strategies are formulated regarding labor management and TVET skill development. In this section such laws, acts, policies, and strategies are reviewed and summarized.

A summary review of policies, acts, and strategies regarding labor and TEVT is shown in Table 3.

TABLE 3

SUMMARY REVIEW OF POLICIES, ACTS, AND STRATEGIES REGARDING LABOR AND TEVT.

Policies, strategies, acts, and guidelines	Summary review
Nepal Constitution 2015 (2072) [13]	• To prepare human resources that are competent, competitive, ethical, and devoted to national interests while making education scientific, technical, vocational, empirical, employment-oriented, and people-oriented; • To promote private-sector investment in education service-oriented by regulating and managing such investment while enhancing the state's investment in the education sector; • To make higher education easy, qualitative, and accessible, and, free gradually; and • To establish and promote community information centers and libraries for the personality development of citizens.
Labor Act, 2017 (2074) [14]	The Nepalese labor market is governed by a specific law. It maintains the application of labor laws, provisions, and policies by providing a safe, decent, and healthy working environment for the labor force, as well as new technologies and markets in line with the national manpower, in order to reduce unemployment.
National Employment Policy, 2071 (2014) [15]	• To make available productive and output-oriented employment opportunities to all citizens by promoting the national economy to orient various sectoral policies toward employment generation by harmonizing them with this policy; • To improve the quality of employment by gradually transforming informal employment into formal employment; • To create suitable opportunities for preparing knowledge- and skill-based labor force as per the need of the labor market; • To appropriately manage migrant and immigrant workers; • To accord priority to the creation of employment opportunities targeted at the youth; • To strengthen the labor market by using modern research-based information technology; and • To encourage employment friendly investments by building harmonious industrial labor relations.

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Policies, strategies, acts, and guidelines	Summary review
The Right to Employment Act, 2075 (2018) [16]	The Right to Employment Act, 2018 is necessary to ensure every citizen's right to employment, provide every citizen with the opportunity to choose employment based on his or her capacity, and in relation to employment terms and conditions and unemployment benefits.
Foreign Employment Policy 2068 (2012) [17]	The policy's goal is to offer Nepalese human resources with knowledge- and skill-based training in order to generate skilled, empowered, and competitive migrant workers in line with international market demands while also ensuring a safe, organized, and respected environment for foreign employment.
Foreign Employment Act, 2007 and Foreign Employment Regulation, 2008 [18]	The Foreign Employment Act (2007) and its Rules (2008) govern all matters related to migration for foreign employment. The law and its rules promote security and welfare of Nepalese labor migrants with the provisions regarding protection of their rights and regularization and monitoring of the businesses that facilitate the migration process. It also sets out rules for recruitment agencies and establishes a bank guarantee system and a welfare fund. In order to strengthen the existing laws and policies to make foreign employment safe, decent and dignified, amendments were made to the Foreign Employment Rules 2008 in 2011 and Foreign Employment Act 2007 in 2015.
National Education Policy, 2076 (2019) [19]	The policy aims to provide competent, skilled, and tech-smart human assets for the transformation of the country. The policy stresses the development of human resources and seeks to develop them, keeping abreast of the needs of the country through competitive, technology friendly, employment-intensive, and production-oriented education.
CTEVT Act, 2045 (1998) [20]	This act for to set up and control the Council for Technical Education and Vocational Training for association of technical training and vocational education withinside the deliberate manner and placing standard of skill and certifying the equal so one can produce basic, center degree and better degree technical human resource.
TVET Policy Framework (March 2007) [21]	People who want to develop their production skills, training providers who want to engage in the development of human resources, and employers who want to improve their productivity and provide work and income for citizens are all targeted by the policy framework.

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Policies, strategies, acts, and guidelines	Summary review
TVET policy 2012 [21]	It focuses on expansion, inclusion, integration, relevance, and sustained funding to respond to market demand. In order to make social upliftment and poverty reduction, TVET, especially skills training, is an important means to prepare citizens to be able to contribute to socioeconomic development. If this can be translated into practice, the contribution of TVET in the development of the nation will be meaningful. In addition, the main goal of TVET is to produce human resources capable of competing at the national and international levels by properly adjusting knowledge and skills. The policy has adopted the measure in five areas: massive expansion of training opportunities; inclusion of an access for all citizens who need training; firm integration of various training modes and pathways; enhanced relevance of courses and competencies; and sustained funding and mechanism.
CTEVT Strategic Plan (2014–18) [22]	CTEVT's strategic plan includes a mission statement, goals for achieving the vision, and strategies for achieving each goal, as well as interventions/activities for 2014–18 with indicators, timelines, responsible authority, and collaborators.
Local Government Operation Act, 2074 (2017) [23]	As per the Constitution and the Local Government Operation Act 2074 (2017), TVET has been categorized as the exclusive function of the local government regarding training and labor force management.
TEVT Strategic Plan (2020–24) (Draft) [24]	Following the ADB supported strategy and roadmap development in 2018, there has been very little progress. Further, CTEVT had no strategic plan after 2018 and there was no national-level strategic plan. With TVET policy reforms, the establishment of a 2020–24 strategic plan by CTEVT and MoEST, and preparations for developing a 10-year TVET Sector Strategic Plan to implement the integrated 2019 Education Policy, the situation has improved. The policy's enforcement will encourage policy distribution and construction of a roadmap and strategic plan.

Technical Education and Vocational Training

In Nepal, a large number of institutions are involved in TVET. Among them, some are directly running under government agencies while others are getting support from donor agencies to run various TVET programs. Furthermore, a few have made their programs financially sustainable by charging certain fees to the trainees. From the public side, 17 ministries are involved in some kind of training. However, 12 different ministries are found to be directly involved in conducting a range of TVET programs in the country. In addition to these government institutions, a large number of TVET projects, donor agencies and I/NGOs deliver short-term TVET programs [25]. Now, TVET programs are running across various parts of the country. In February 2018, the government had planned to establish at least one TVET institute in all 753 local levels in the country. Since the announcement, the number of local levels having TVET institutes had increased from 332 to 635 as of mid-2021 [1, 10].

Started in 1989, the Nepali TVET system is around 34 years old. Its structure comprises formal, informal, and nonformal education. In terms of organized provision through a technical school system, students enter the formal TVET program at a technical school after completing grade 10 of general school education. The formal TVET system in Nepal includes: (1) vocational training (3–6 months of training courses for youth aged 16 years and older); (2) a technical SLC program (15 months for SLC-pass students and 29 months for grade 10-pass students); and (3) diploma and technical certificate programs (additional three years following grade 10 or SLC completion) [11]. Additionally, informal and nonformal skills training can have various forms (on-the-job, apprenticeship, etc.); timings (mornings, evenings, weekends, etc.); and environments (home, training centers, project-supported locations, etc.). The duration of such a training is not fixed, and there is no sufficient data for tracking its participation and post-training activities [11].

The institution's tasks and responsibilities, capacities, training programs, and outputs in relation to TEVT programs are covered next.

Network of VET Institution

Ministry of Education, Science, and Technology

The Ministry of Education, Science, and Technology (MoEST) is the apex body for all educational institutions in Nepal and is responsible for overall development of education, science, and technology in the country. According to the National Education Policy, 2076 (2019) [19] important work is also being done in the field of vocational education and training (VET). Some projects under this ministry, and TVET programs are also organized by some semi-government organizations and their departments and functions.

MoEST is responsible for formulating educational policies and plans and managing and implementing them across the country through the institutions under it. In addition to general education, MoEST also facilitates the provisioning of TVET. Under the ministry, some semi-autonomous boards and periodic projects are working for the sake of overall development and expansion of TVET programs across the country. MoEST provides policy-level feedback to CTEVT.

The Council for Technical Education and Vocational Training

The CTEVT, constituted in 1989, is the policy formulation and coordination body for TEVT programs in Nepal. It is a national autonomous body committed to the development of human resources for Nepal. In particular, CTEVT is concerned with basic- and middle-level TVET. CTEVT is a vibrant organization promoting TVET system to develop a competent workforce for Nepal's national and international market needs. It is mainly involved in policy formulation, quality control, and preparation of competency-based curriculum, as well as in developing skill standards for various occupations and testing skills of people, conducting various research studies, and training needs assessment, among other such things.

Currently, CTEVT offers three levels of TEVT programs: diploma, technical SLC, and short-term vocational training in the areas of health, agriculture, and engineering, among others. It also conducts skills testing and standardization of skills learned by formal or informal means. In addition, it also conducts training for technical instructors. The CTEVT system currently has an average annual enrollment capacity of 83,289 students in long-term programs [9]. Tribhuvan University (TU) offers some diploma-level programs in technical fields, and some of the newer private universities also offer diploma programs, accredited by the council, through their affiliated campuses.

CTEVT responsibilities are mainly to:

- provide advice to the Government of Nepal regarding TEVT policy and programs;
- determine scope and standards of TEVT programs;
- arrange for and conduct TEVT programs from basic level to higher education level;
- liaison and maintain coordination with national and international TEVT agencies for quality education and training;
- extend technical inputs to establish TVET Fund; and
- establish effective coordination with and among TVET stakeholders.

Institutes running under the umbrella of CTEVT by their types and enrollment capacities in different years are listed in Table 4.

TABLE 4

INSTITUTES BY THEIR TYPES, RUNNING UNDER THE UMBRELLA OF CTEVT, IN DIFFERENT YEARS.

Type of educational institution	Year				
	2016–17	2017–18	2018–19	2019–20	2020–21*
Constituent schools	19	31	45	59	61
PPCP partnership institutions	5	5	6	20	38
Technical education in public schools	117	185	397	534	572
Private affiliated institutes	428	429	429	429	429
Total institutions	569	650	877	1042	1,100
Total enrollment capacity	45,517	48,491	62,015	74,863	83,289

*Up to January 2021.
Source: Annual Report 2020–21, CTEVT [26].
Note: Since some institutions run both TSLC and diploma programs, the total figure is lower than the addition of corresponding figures of diploma and TSLC programs.

Long-term programs under CTEVT: CTEVT carries out the activities focusing mainly on the goals of the Strategic Plan 2014–18. CTEVT is currently running two types of long-term training programs: three-year diploma/PCL-level program and 18-month TSLC-level program. The number of programs and their enrollment capacities are presented in Tables 5, 6, and 7.

TABLE 5

STUDENT ENROLLMENTS IN DIPLOMA AND PCL-LEVEL PROGRAMS.

S. No.	Programs	Academic year			
		Male	Female	Other	Total
Health					
1	PCL in Nursing	63	3,985	1	4,067
2	PCL in Ophthalmic Science	79	236	0	315

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S. No.	Programs	Academic year			
		Male	Female	Other	Total
3	PCL in General Medicine	1544	1,112	1	2,657
4	PCL in Medical Lab Technology	438	1,120	0	1,558
5	PCL in Pharmacy	881	822	0	1,703
6	PCL in Diagnostic Radiography	159	269	0	428
7	PCL in Dental Science	98	245	0	343
8	PCL in Ayurveda (Health Science)	36	17	0	53
9	PCL in Acupuncture, Acupressure and Moxibustion	11	13	0	24
10	PCL in Physiotherapy (Medical Science)	21	43	0	64
Engineering					
1	Diploma in Civil Engineering	4,540	891	1	5,432
2	Diploma in Computer Engineering	586	194	0	780
3	Diploma in Electronics Engineering	26	0	0	26
4	Diploma in Electrical Engineering	645	63	0	708
5	Diploma in Geomatics Engineering	600	194	0	794
6	Diploma in Electrical and Electronics Engineering	110	6	0	116
7	Diploma in Mechanical Engineering	205	16	0	221
8	Diploma in Automobile Engineering	118	4	0	122
9	Diploma in Information Technology	138	82	0	220
10	Diploma in Architecture Engineering	83	38	0	121
11	Diploma in Biomedical Equipment Engineering	17	7	0	24
12	Diploma in Refrigeration and Air Conditioning	45	1	0	46
13	Diploma in Hydropower Engineering	35	10	0	45
Agriculture and forest science					
1	Diploma in Agriculture (Plant Science)	1,457	1,852	1	3,310
2	Diploma in Agriculture (Animal Science)	1,227	535	0	1,762
3	Diploma in Food and Dairy Technology	29	29	0	58
4	Diploma in Forestry	551	313	0	864
Hospitality and others					
1	Diploma in Hotel Management	85	33	0	118
2	Diploma in Social Work	4	4	0	8

Source: Annual Report 2020–21, CTEVT [26]

TABLE 6

STUDENT ENROLLMENTS IN PRE-DIPLOMA PROGRAMS.

S. No.	Programs	Year			
		Male	Female	Other	Total
Health					
1	Pre Diploma in Community Medicine Assistant	1,070	1,983	1	3,054
2	Pre Diploma in Auxiliary Nursing Midwifery	2	1,736	0	1,738
3	Pre Diploma in Medical Laboratory Technology	499	1,817	0	2,316
4	Pre Diploma in Ayurveda	218	252	0	470
Engineering					
1	Pre Diploma in Electrical Engineering	993	157	0	1,150
2	Pre Diploma in Survey Engineering	829	284	0	1,113
3	Pre Diploma in Civil Engineering	2,223	1,014	1	3,238
4	Pre Diploma in Computer Engineering	568	566	1	1,135
5	Pre Diploma in Mechanical Engineering	102	14	0	116
6	Pre Diploma in Refrigeration and Air Conditioning	45	5	0	50
7	Pre Diploma in Automobile Engineering	167	4	0	171
8	Pre Diploma in Electronics Engineering	24	2	0	26
9	Pre Diploma in Water Supply and Sanitary Engineering	9	1	0	10
Agriculture and forest science					
1	Pre Diploma in Livestock Production/Animal Science	1,444	1,091	1	2,536
2	Pre Diploma in Agriculture (Plant Science)	1,143	3,058	1	4,202
Hospitality and others					
1	Pre Diploma in Culinary Arts	40	4	0	44
2	Pre Diploma in Social Mobilization	5	36	0	41
3	Pre Diploma in Entrepreneurship Development	11	40	0	51
4	Pre Diploma in Computer Application and Secretarial Management	0	30	0	30
5	Pre Diploma in Hotel Management	9	8	0	17

Source: Annual Report 2020–21, CTEVT [26].

TABLE 7

NUMBER OF PROGRAMS.

S. No.	Activities	Activities up to June 2019	Activities during fiscal year 2019–20	Total number of activities
Health				
1	PCL in Nursing	113	4	117
2	PCL in General Medicine	65	4	69

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S. No.	Activities	Activities up to June 2019	Activities during fiscal year 2019–20	Total number of activities
3	PCL in Medical Lab Technology	59	6	65
4	Diploma in Pharmacy	37	16	53
5	PCL in Diagnostic Radiography	22	6	28
6	PCL in Dental Science	10	4	14
7	Diploma in Acupuncture, Acupressure, and Moxibustion	1	0	1
8	PCL in Ophthalmic Science	8	4	12
9	PCL in Ayurveda (Health Science)	4	2	6
10	Diploma in Homeopathy	1	0	1
11	PCL in Physiotherapy (Medical Science)	2	1	3
12	Diploma in Yoga and Naturotherapy	0	1	1
Engineering				
1	Diploma in Civil Engineering	181	20	201
2	Diploma in Mechanical Engineering	9	4	13
3	Diploma in Architecture Engineering	7	2	9
4	Diploma in Geomatics Engineering	24	11	35
5	Diploma in Electrical and Electronics	2	1	3
6	Diploma in Information Technology	13	9	22
7	Diploma in Automobile Engineering	11	8	19
8	Diploma in Computer Engineering	40	7	47
9	Diploma in Electrical Engineering	28	1	29
10	Diploma in Biomedical Equipment Engineering	1	0	1
11	Diploma in Refrigeration and Air Conditioning	1	2	3
12	Diploma in Electronics Engineering	8	0	8
13	Diploma in Hydropower Engineering	3	2	5
14	Diploma in Mechatronics Engineering	0	1	1
Agriculture and forest science				
1	Diploma in Agriculture (Animal Science)	73	9	82
2	Diploma in Agriculture (Plant Science)	164	9	173
3	Diploma in Food and Dairy Technology	4	2	6
4	Diploma in Forestry	36	8	44
Hospitality and others				
1	Diploma in Hotel Management	9	4	12
2	Diploma in Social Work	1	0	1
3	Diploma in Entrepreneurship Development	1	0	1

Source: Annual Report 2020–21, CTEVT [26].

Short-term programs and skill tests: CTEVT conducts short-term vocational training programs through its constituent and affiliated institutions. There are curricula for 190 short-term vocational courses related to different trades and occupations. Similarly, more than 1,078 institutes are affiliated with CTEVT to provide short-term training. At present, the training programs conducted by its constituent schools are also being supported by various development partners.

Skills test is a major activity of the National Skill Testing Board (NSTB) under CTEVT that develops National Occupational Skills Standard (NOSS) for elementary level as well as for levels one to four. Till the Nepalese year 2076–77 (2019–20), 5,14,316 students had taken skill tests conducted by NSTB and 3,87,695 had passed the test (see Table 8). By 2076–77 (2019–20), 299 occupational skill certifications had been placed in national occupational skill certification committee. Detailed information is given in Table 9.

TABLE 8

DISTRIBUTION OF SKILL TEST APPLICANTS.

S. No	Level	Up to 2018 June		2018–19		2019–20		Total up to 2019–20	
		Attendance	Graduates	Attendance	Graduates	Attendance	Graduates	Attendance	Graduates
1	Primary Level	8,723	6,788	–	–	–	–	8,723	6,788
2	Level 1	355,052	284,603	42,081	32,084	45,934	35,427	44,3067	352,124
3	Level 2	38,649	18,897	11,637	5,211	54,639	2,429	55,755	26,538
4	Level 3	4,450	1,853	1,052	293	319	57	6,821	2,203
5	Level 4	39	31	–	–	11	11	50	42
	Total	**407,813**	**312,183**	**54,770**	**37,588**	**51,733**	**37,924**	**514,316**	**387,695**

Source: Annual Report 2020–21, CTEVT [26].

TABLE 9

NATIONAL OCCUPATIONAL SKILL CERTIFICATION INFORMATION.

S. No	Occupational field	Level					Total
		Preliminary	1	2	3	4	
1	Agriculture	0	28	8	2	0	38
2	Automobile	0	5	11	2	0	18
3	Business	0	3	1	1	0	5
4	Computer	0	1	2	4	0	7
5	Construction	1	25	13	3	0	42
6	Construction-related material	0	4	7	6	0	18
7	Electrical	0	7	8	2	2	19
8	Electronics	2	6	7	1	0	16
9	Forestry	1	2	1	0	0	5
10	Handicraft	3	9	1	3	0	16

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S. No	Occupational field	Level					Total
		Preliminary	1	2	3	4	
11	Health	0	8	5	4	2	19
12	Hotel and guest hospitality	1	13	2	1	0	19
13	Skin-related products and industry	1	1	1	0	0	3
14	Mechanical	0	13	10	6	0	29
15	Mountaineering	0	0	0	1	1	2
16	Printing	0	1	1	2	0	4
17	Renewable energy	0	2	4	0	1	7
18	Tailoring	0	8	3	1	0	12
19	Textile	1	8	2	0	0	11
20		0	0	1	0	0	1
21	Others	0	4	3	1	0	8
Total							**299**

Source: Annual Report 2020–21, CTEVT [26].

Center for Education and Human Resources Development

Center for Education and Human Resources Development (CEHRD) is the new name of the erstwhile Department of Education, which was established under the Ministry of Education. At a time when Basic and Primary Education Program and Secondary Education Development Project were about to phase out, a separate entity was urgently needed to carry on the activities running under these projects. CEHRD is also implementing the technical stream of secondary education alongside secondary education throughout the country. At present, there are 434 technical stream schools running throughout the country offering technical diploma (9–12) in six occupational subjects [26].

Projects under MoEST

Enhanced Vocational Education and Training Project: Enhanced Vocational Education and Training Project (EVENT) has been carrying out training programs in different occupations and conducting training under result-based and voucher-based schemes. The primary beneficiaries of the project are approximately 115,000 Nepali youths, who will get access to short-term skills training, technical education, and opportunities for certifying their existing skills. The institutions providing Technical School Leaving Certificate (TSLC)/Diploma, which are the part of the project, will benefit through improved facilities, trained instructors, use of high-quality teaching and learning materials, and improved delivery processes, including regular monitoring and evaluation [28].

Skills Development Project: The Skills Development Project (SDP), financed by the Asian Development Bank and the Government of Nepal, was established to support the government to implement key aspects of the TVET Policy 2012. The project being run under MoEST is being implemented by CTEVT through a Project Implementation Unit (PIU). The SDP is helping the government to (1) initiate strategic sector reforms that aim to improve overall sector management and performance; (2) improve quality and relevance of public training; and (3) increase private

sector's engagement in training delivery and job placement. Each intervention has been designed to increase the efficiency and result-orientation of the TVET system, making it more market-driven. The impact of the project would be in the form of increased employability of the Nepalese workforce. Its outcome would be the establishment of a market responsive and social- and gender-inclusive TVET system [28].

National Vocational Qualification System: Nepal Vocational Qualifications System (NVQS) Project, a bilateral initiative between the Government of Nepal and Government of Switzerland, is funded by the Swiss Agency for Development and Cooperation (SDC) and implemented by CTEVT/NSTB with full technical assistance provided by the Swiss Foundation for Technical Cooperation (the Swiss contact). The overall goal is to contribute to systemic changes in the TVET system that would enable women and men, including disadvantaged groups, to get access to increased employment and self-employment and to perform at higher productivity levels [28].

Enhanced Skills for Sustainable and Rewarding Employment (ENSSURE): ENSSURE is a project funded by the Government of Nepal and SDC. The ultimate aim of the project is to help Nepalese workers, particularly from disadvantaged groups, to benefit from continuous employment and improved standard of living [28].

The project will achieve the following three interrelated outcomes:

(1) at the worker's level, workers (both women and men) have improved employability;

(2) at the employer's level, partner companies establish a favorable work environment; and

(3) at the system's level, TVET is expanded and is more inclusive of the private sector.

TVET Practical Partnership Program SAKCHYAMTA: TVET Practical Partnership Program is a project funded by the European Union and implemented by the British Council and CTEVT. Over a course of four years, the project aims to contribute to Nepal's inclusive and sustainable growth through investment in human capital and by creating better employment opportunities [28].

The specific objectives of this project are to strengthen and implement more effective policy in the TVET sector that is responsive to labor market needs. The program will pilot an integrated public partnership approach in three key economic sectors: (1) agriculture; (2) construction; and (3) tourism, offering opportunities for promoting the transition to a greener, climate-resilient, low-emission economy [28].

Other Government Agencies

Ministry of Labour, Employment, and Social Security

Under the Ministry of Labour, Employment, and Social Security (MoLESS), there are two entities that are mainly involved in the delivery of TVET. One is the Vocational and Skill Development Training Center, which works as a department-level office and is one of the major TVET training providers in Nepal. It conducts training programs of mainly three-month duration. During a fiscal year, the center provided three-month training programs to 17,493 students. The second entity is Foreign Employment Board (FEB) that has the responsibility of coordination, cooperation, and collaboration among workers, foreign employment recruitment agencies, civil societies, and all other concerned bodies to make this sector safe, orderly, and dignified [26].

Ministry of Culture, Tourism and Civil Aviation

There are mainly three entities involved under the Ministry of Culture, Tourism and Civil Aviation (MoCTA) to deliver TVET programs. They are Nepal Academy of Tourism and Hospitality Management (NATHM); Nepal Mountain Academy (MTA); and Department of Tourism (DoT). By 2019–20, NATHM had produced a manpower of 51,382 with skilled training; MTA had produced a manpower of 1,679; and DoT 1,240 [26].

Ministry of Industry, Commerce and Supplies

The Ministry of Industry, Commerce and Supplies (MoICS) has three separate entities for the delivery of training programs. They are Department of Cottage and Small Industry, Cottage and Small Industry Development Board, and Industries Enterprise Development Institute. The ministry also has some projects like The Rural Enterprises and Remittances Project (RERP) *Samriddhi.* It is a seven-year project jointly initiated by Government of Nepal and the International Fund for Agricultural Development (IFAD). The project aims at reducing poverty with employment-focused and inclusive economic development by providing sustainable sources of income to poor households and migrant families and returnees through creation of micro, small, and rural medium-sized enterprises as a means of developing local businesses and creating jobs. It specifically includes returning migrants [27].

In fiscal year 2020–21, a total of 58,796 potential microentrepreneurs were identified from the microenterprise development program. A total of 57,151 potential microentrepreneurs were selected, out of which 22,787 were selected for entrepreneurship development and 11,603 for technical skills development training [1].

Ministry of Agriculture and Livestock Development

Ministry of Agriculture and Livestock Development (MoALD) regularly conducts training programs for farmers. However, these training programs range from less than one week to a month in duration. Although the Agriculture Information and Training Center (AITC) is the specialized agency for training, its branch offices from service-center level to district level are involved in the training programs. Agricultural programs currently operating in Nepal can be put in two categories: (1) universities offering degree-granting programs in agriculture; and (2) technical schools and polytechnics offering a mix of short- and long-term training programs in agriculture and related fields [29].

Ministry of Health and Population

National Health Training Center is the training authority under the Ministry of Health and Population (MoHA). It conducts training programs that are mostly focused on in-service training to enhance and upgrade the capacity of internal staff [25].

Ministry of Forest and Environment

Forest Research and Training Center (FRTC) is an organization under Ministry of Forest and Environment (MoFE). Its main function is to train human resources through development process for sustainable forest, biodiversity, and environmental management. Mostly, FRTC conducts the in-service training programs [25].

Ministry of Women, Children and Senior Citizen

Ministry of Women, Children and Senior Citizen (MoWCSC) is working for women's welfare and skill development training programs and offers various trainings [29].

Ministry of Land Management, Cooperatives and Poverty Alleviation

Ministry of Land Management, Cooperatives and Poverty Alleviation (MoLMCPA) is working for the capacity development of cooperatives. This ministry also conducts long-term as well as short-term trainings [25].

Ministry of Youth and Sports

National Youth Council (NYC) has been established to conduct various activities as envisioned by Youth Vision 2025 and National Youth Policy 2015 as per the National Youth Council Act 2015 under the Ministry of Youth and Sports (MoYC). Various skill-based trainings are conducted under NYC [25].

Prime Minister Employment Programme

In line with the long-term vision of providing decent and productive employment opportunities to all citizens, Prime Minister Employment Programme (PMEP) has been launched at all local levels to guarantee minimum employment for all citizens. Skill-based and vocational trainings are being carried out on cost-sharing basis among federal, provincial, and local levels for the development of skilled, qualitative human resources to balance the supply and demand of human resources. Labor-intensive technology has been promoted in the public development works carried out at the federal, provincial, and local levels [28].

Some of the achievements of the PMEP are [1]:

- The PMEP was launched in 541 local levels out of the 753 local levels in fiscal year 2019–20. An additional 105,635 individuals had got employment from 4,302 schemes run under the program.

- The Prime Minister's Agriculture Modernization Project, which is being implemented as a transformational project, has so far provided partial employment to 443,467 persons and full employment to 48,781 persons through various employment-focused programs.

- As of mid-March of 2020–21, 1,000 youths who had returned after losing foreign employment due to COVID-19, had benefited from the reintegration program launched at 20 local levels under the Rural Enterprise and Remittance Project (Prosperity). Financial literacy training was provided to 25,000 persons of target groups in areas where such projects were implemented. Some 8,600 farm households of 16 districts linked to supply chain through collective investment had directly benefited.

- 2,259 youths of local levels were provided orientation training under Transformation Initiative for Youth Employment Project and PMEP as of mid-March of 2020–21. Similarly, 396 technical assistants were provided refresher training in data entry for Employment Management Information System (EMIS).

- Livelihood Improvement and Self-Employment Program Operation Guidelines, 2020 has been formulated and implemented in order to establish equal initiative and leadership for women and to ensure their equal access to resources, means, opportunities, and benefits. Skill development training and seed capital have been provided to 1,920 women at 100 local levels in 55 districts that were lagging on the Human Development Index.

Training and Reskilling/retraining for Employees in Enterprises

The industry is suffering from the fact that the majority of skilled and semi-skilled workers in the industry are not suitably trained for the minimum level of competencies required to accomplish their respective roles [29]. National Economic Census 2018 (NEC 2018) noted that the number of establishments in Nepal was 922,445 and the number of establishments per 1,000 persons was 31.6. Nepal had 3,408,746 persons engaged and the number of persons engaged per establishment was 3.7 persons [30].

The majority of the working people in the industry have learned their skills at work from their seniors and gained some level of experience over time. If this trend continues, the industry is bound to suffer on several fronts. The cost associated with training a worker at an ongoing project site or in industries is significantly high in terms of delays, rework, loss of productivity, and inferior quality of the output. CTEVT has so far produced 84,963 diploma- and certificate-level graduates and 2,30,056 TSLC graduates and tested the skills of 3,87,695 people across all disciplines until 2019–20. Out of these graduates, a significant number were working abroad. Clearly, these numbers are far from adequate [29]. A study in the banking sector done by Pandey [31] shows that formal training is shown to be more significantly associated with performance than informal training.

In the context of Nepal, market-based curriculum and courses are not developed properly to address the current needs of the industry. The main gap is that the necessity of the industry and education of the TVET graduates do not match. The TVET system is not sufficiently market based.

Forms of Training and Cooperation between VET Institutions and Enterprises

TVET policies, plan documents, various acts, laws, policies, and strategies are emphasizing the role of the private sector for skills development. However, the role of the private sector is very weak.

Samriddhi: It is a seven-year project jointly initiated by Government of Nepal and the International Fund for Agricultural Development (IFAD). The project aims at reducing poverty with employment-focused and inclusive economic development by providing sustainable sources of income to poor households and migrant families and returnees through creation of micro, small, and rural medium-sized enterprises as a means of developing local businesses and creating jobs. It specifically includes returning migrants [27].

As discussed in an earlier section, *Samriddhi* is a seven-year project for providing sustainable sources of income to poor households, especially migrant families. Agro Enterprise Centre (AEC) of Federation of Nepalese Chamber of Commerce and industries (FNCCI); an international non-governmental organization, HELVETAS; and selected financial institutions working within the project area are the implementing partners [27]. An agreement was made for skill testing of 9,320 youths supported by the RERP Project with NSTB [27].

In the Nepali fiscal year 2077–78 (2020–21), the government had allocated budget and planned for on-the-job training of 50,000 youths with the cooperation of the private sector. However, the program was not conducted. In fiscal year 2078–79 (2021–22), the government developed draft standards for conducting the training. Once the standards were approved, the training would be conducted in partnership with enterprises. Workplace training in Nepal lacks a well-developed training infrastructure at the institutional level. Therefore, developing firms' capacities as training

partners or training organizations is a pathway that can be faster and more sustainable for increasing the skill and knowledge levels in firms. To establish a solid labor market, human resources need evaluation, along with identification of industrial skills. Various studies in Nepal demonstrate that TVET graduates are either unemployed or employed with a poor income, or employed without meeting industrial needs [32].

Rank in the Global Innovation Index

The Global Innovation Index (GII) ranks world economies according to their innovation capabilities. Consisting of roughly 80 indicators and grouped by innovation inputs and outputs, the GII aims to capture the multidimensional facets of innovation.

Table 10 shows the rankings of Nepal over the past three years, noting that data availability and changes to the GII model framework influence year-on-year comparisons of GII rankings. In 2021, Nepal ranked 99th in innovation inputs, lower than both in 2020 and 2019. The statistical confidence interval for the ranking of Nepal in GII 2020 was between ranks 93 and 103, while in GII 2021 it was between ranks 102 and 113 [33, 34].

TABLE 10

GLOBAL INNOVATION INDEX RANKS.

Year	GII	Innovation inputs	Innovation outputs	Firms offering formal training %
2018	108	101	114	
2019	109	93	119	
2020	95	89	106	31.9* (rank 46)
2021	111	99	116	31.9* (rank 48)

Source: Global Innovation Index, 2020, 2021 [33, 34].
* Outdated data; the base year data is 2013.

Nepal performed better in innovation inputs than in innovation outputs in 2020. In 2021, Nepal ranked 99th in innovation inputs, lower than the previous year but higher compared with 2018. As for innovation outputs, Nepal ranked 116th in 2021. This rank was lower than last year's and that in 2018 but higher than the rank in 2019 [33, 34].

Nepal produces less innovation outputs relative to its level of innovation investments. The percentage of firms offering formal training was 31.9% with a GII rank of 46 in 2020 and rank of 48 in 2021. However, the data is older because the base year was taken as 2013.

Analysis of Technical Education and Vocational Training

There are 17 federal ministries involved in conducting technical and vocational education and training programs in Nepal. However, in this analysis, details of TVET conducted with 18 agencies of 10 ministries are included. Out of the 10 ministries, whose information and delivery of TVET programs have been presented here, some ministries have single agencies involved in delivering training programs, while some have more than one agency. The program has been implemented by ministries with different subject areas, i.e., not all ministries are confined to a single subject area.

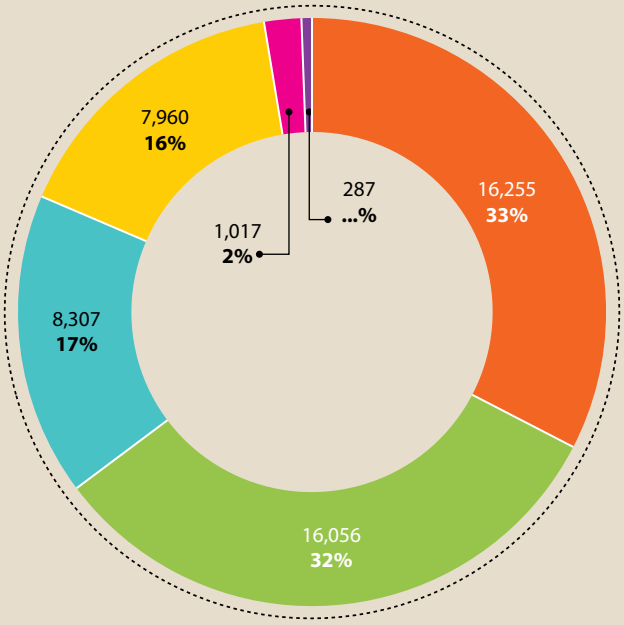
Thematic Areas

The trainings given by the ministries and their agencies are classified into six thematic areas, namely, agriculture and forest; construction; health; tourism and other services; productive industries; and administration (see Figure 4).

The tourism and service sector has the highest share at 16,255 (33%), closely followed by construction at 16,056 (32%). Agriculture and forestry account for 17% while productive industries account for around 16%. The health sector has a share of around 2% while the share of administration and management is negligible at less than 1%.

FIGURE 4

SECTOR WISE SHARES OF TRAINGS.



Source: Integrated Annual -TVET-Report 2076 [35].

Training Events and Graduates

Altogether 284,344 persons were found to have directly benefited from various technical–vocational training programs in the Nepali fiscal year 2073–74 (2016–17) while 149,485 persons benefited in the fiscal year 2074–75 (2017–18).

Although technical and vocational education and training programs have been conducted by 10 ministries, it has been found that programs have been implemented by more than one body in a single ministry. Out of the total 86,085 productive manpower, 49,882 (58.9%) benefited from TVET trainings while the remaining 34,768 (41.1%) benefited from various technical education programs in 2019–20.

TABLE 11

TRAINING DELIVERED BY FEDERAL MINISTRIES AND THEIR RESPECTIVE TRAINING CENTERS IN 2019–20.

S. No	Name of ministry	S. No	Name of training institutions/ agencies	Training event	Total graduates
1	Ministry of Education, Science and Technology	1	Council for Technical Education and Vocational Training	63	12,600
		2	Enhanced Vocational Education and Training Project	44	20,032
		3	Skill Development Project	17	3,096
		4	Employment Fund Office	2	1,136
		Total		**126**	**36,864**
2	Ministry of Labor Employment and Social Security	1	Vocational and Skill Development Training Center	10	1,274
		2	Safe Migration Project	5	1,229
		3	Foreign Employment Board	2	110
		Total		**17**	**2,613**
3	Ministry of Industry, Commerce and Supplies	1	Department of Cottage and Small Industry	5	148
		2	Trade, Export and Promotion Centre	5	915
		Total		**10**	**1,063**
4	Ministry of Agriculture and Livestock Development	1	Department of Agriculture	9	508
		Total		**9**	**508**
5	Ministry of Women, Children and Senior Citizen	1	President Women Promotion Program	20	1990
		Total		**19**	**1,990**
6	Ministry of Culture, Tourism and Civil Aviation	1	Nepal Mountain Academy and Cultural Corporation	4	851
		2	Nepal Academy of Tourism and Hospitality Management (NATHM)	13	3,217
		3	Department Of Tourism	29	1,240
		Total		**46**	**5,408**
7	Ministry of Youth and Sports	1	National Youth Council	2	76
		Total		**2**	**76**
8	Ministry of Forest and Environment	1	Forest Research and Training Center	5	343
		Total		**5**	**343**
9	Ministry of Health and Population	1	National Health Training Center	32	1,017
		Total		**32**	**1,017**
Total					**49,882**

Source: Integrated Annual TVET Report 2076 [35].

Major Occupations

In addition to the work involved, a total of 167 professions have been found. Details of 17 professional training programs that have been completed in a large number of these professions are given in Table 11. Among the various professions, the highest numbers are of welding electricians, tailoring, and assistant beauticians.

TABLE 12

MAJOR OCCUPATIONS AND TRAINED MANPOWER.

S. No.	Job description	Produced manpower	Percentage
1	Welding electrician	5,412	10.85
2	Tailoring	4,806	10.07
3	Assistant beautician	3,280	6.58
4	Off-season vegetable producer	2,547	5.19
5	Brick layer mason	2,149	4.31
6	Mason	1,681	3.4
7	Junior plumber	1,616	3.24
8		1,711	3.43
9	Junior computer hardware technician	613	1.23
10	Dress maker (tailoring)	1,574	3.16
11		1,073	2.15
12	Assistant mobile maintenance technician	1,073	2.15
13		1,073	2.2
14	Trekking route guide	880	2.2
15		1,186	2.4
16	Furniture maker	791	1.59
17	Trekking guide	880	1.76
18	Other jobs	17,537	35.16
	Total	**49,882**	**100**

Source: Integrated Annual TVET Report 2076 [35].

Academic Programs

Out of the 10 ministries in this analysis, three ministries conducted professional training as well as long-term training. Technical and vocational education and technical higher education programs

have also been launched. The three ministries are: Ministry of Education, Science and Technology; Ministry of Land Management, Cooperatives and Poverty Alleviation; and Ministry of Culture, Tourism and Civil Aviation.

Details of the programs to be implemented by the said ministries and the corresponding enrollment capacities are presented in Table 12.

TABLE 13

ACADEMIC PROGRAMS AND THEIR ENROLLMENT CAPACITIES.

S. No.	Name of the program	Subjects provided	Agency		Enrollment capacity
1	Technical SLC Program	25 different subjects	CTEVT and Affiliated Organization	CTEVT	27,000
2	Diploma and PCL level Program	32 different subjects	CTEVT and Affiliated Organization	CTEVT	39,000
3	Diploma in Geomatics Engineering	Geomatics engineering	Land Management Training center	CTEVT	48
4	Technical Programs in Public Schools (class 9–12)	Six different subjects	CEHRD/ Affiliated Organization	National Examination Board	19,000
5	Bachelor in Mountaineering Studies	Mountaineering studies	Nepal Mountain Academy	Tribhuvan University	50
6	Bachelor in Travel and Tourism Management	Travel and tourism management	NATHM	Tribhuvan University	250
7	Bachelor in Hospitality Management	Hospitality management	NATHM	Tribhuvan University	250
8	Masters in Hospitality Management	Hospitality management	NATHM	Tribhuvan University	40
9	Master in Adventure Tourism	Adventure tourism	Nepal Mountain Academy	Tribhuvan University	50

Source: Integrated Annual TVET Report 2076 [35].

SWOT Analysis of TEVT

On the basis of the literature and data review, the strength, weakness, opportunities, and threats (SWOT) analysis has been carried out (see Table 13). This will be helpful in drawing out the strategies for technical and vocational education.

TABLE 14

SWOT ANALYSIS OF TEVT.

Strengths	Weaknesses	Opportunities	Threats
• CTEVT was established as a national autonomous apex body for overall management of TVET programs. • Several education commissions and committees were formed to study, suggest, and improve the education system of Nepal. • Provinces are developing their own TVET acts in the absence of a common governing act at the federal level. • Power delegation has been done to LGIs for technical educational institute management and running. TVET would be as per the local need and curriculum could be designed to meet local, regional, national, and international demands. • Policy Coordinating Committee at MoEST will coordinate all ministries and departments involved in TVET developments	• Poor coordination among the institutions offering TVET has resulted in fragmentation of skill development programs, variations in training standards, duplication of resources, and unaddressed access and equity in training opportunities. • There are no proper trainers for proper delivery of contents. • There is lack of resources, tools, and equipment as per the need. • The quality of education, particularly in community schools, is not of desired level. • The delay in formulating a new Education Act has caused lots of discrepancies between secondary and higher secondary schools. • The private sector had failed to accept the government-funded private partnership programs. • There is poor effectiveness of the labor market information system and labor administration. • Ministries organize TVET programs entirely for their internal consumption, and there is nearly zero governance because there is no authority to look into or monitor the quality of trainings, access, or their relevance.	• Increase partnership coordination between industrialists, employers, and training institutions. • Assist in the management and availability of modern inputs and training tools and technologies. • Make provisions for one-window training and curriculum for short term vocational training. • Make provisions for skills testing and employment to those who pass such tests. • Implement national vocational qualification system (NVQS). • Make effective provisions for cooperation between industrialists, business communities, employers, and training providers for sustainable development. • Amend the CTEVT Act in line with the federal structure. • The Constitution foresees policies for developing skilled and professional labor force and maintaining good relations between workers and entrepreneurs. • The National Employment Policy, 2015, and the Foreign Employment Policy, 2012 are under implementation, and the commitment to safe employment has been expressed through the SDGs and ILO Convention 169. • There is expertise in the areas of teacher training.	• To retain the qualified 'technical teachers' in such schools as they have very high potential of getting better jobs in sectors other than teaching. Some schools have a very small number of students but the operations cost is very high. • There can be political influence in CTEVT. • Ministries continue to operate TVET programs without any mutual coordination. • Nepal's labor law is very stringent and makes it difficult for enterprises to flourish and compete. • There is lack of understanding in running TEVT environment by local bodies to implement technical and vocational education, and poorly managed governance of the technical institutes. • Enterprises are the main providers of reskilling and upskilling. Yet, not all firms have the capacity and capability to organize effective learning opportunities for their employees. • Policymakers lack a detailed picture of how training in enterprises takes place. • There is limited quality assurance and relevance of TVET qualifications. • The current TVET program has limited access and suffers from low quality and relevance.

Labor Market Transition Opportunities

Labor mobility and internal and external migration have considerably increased over the years in Nepal. Although the government has tried to make TVET need based, it is not relevant enough to respond to the needs of the labor market. Most TVET programs are driven by supply resulting in a situation where there is a shortage of skills in certain occupations and a surplus in others. Some TVET graduates are not getting jobs, while industries and the informal sector are hiring skilled workers from neighboring countries [11]. Over the past several decades, producers and suppliers of goods and services have improved the quality of their organizations by using innovative technologies [36]. The work in future will be quite different from traditional work, so traders will also demand different skills from those required today [36, 37]. Each of the industrial revolutions, in addition to technological changes, has also introduced economic and social changes [38]. Industry 4.0 is about the production of goods and services with the help of technical components such as big data, cyber-physical systems, and the internet of things; social components like attractive workplace conditions; and production components such as smart factories to increase the competitiveness of a country. Digitization is the most important component of Industry 4.0 because it connects people and technology [6].

Some of the significant opportunities are: a very high proportion of productive youth according to the age-wise structure of the population; ready-to-use assessment and projection details of current human resources; increasing demand for skilled human resources within the domestic and international labor markets; a gradual increase in public and private investment in quality technical and vocational education; and a growing interest in vocational and technical education allowing for socioeconomic transformation [39].

School-to-work Transitions

The net enrollment rate in Nepal for grade 9–10 is 70.8% whereas the net enrollment rate for grade 11–12 is only 31.5%, which shows that the number of students continuing further study after the SEE examination is low [1]. Education is important because people with a high level of education have better labor market outcomes. Employment-to-population ratio and labor force participation rate increase with the level of education for both males and females.

The unemployment rate is highest among young people aged 15–24 years and 25–34 years. The employment-to-population ratio and labor force participation rate are seen to increase with age and peak at ages 35–44 years [8]. However, the gap between males and females continues to be there, irrespective of the education level. An exception is the unemployment rate where the gap between males and females is found to get narrowed to one percentage point among those with tertiary education [8]. NLFS reports that there were approximately 908,000 Nepalese who were actively looking for work (unemployed), with 38.1% of job seekers being young people aged 15–24 years. Of the 29 million population of Nepal, around 10.5 million or 36.2% were lifetime migrants. In other words, they were not originally from their current place of residence or born there. The reasons for migration included studying (7.8%) and searching for work (5.5%). The education-to-work transition patterns exist for rural–urban migrant youth in Nepal [40]. The image of vocational education must be changed through reforms of curriculums and methodologies. Vocational schools need to modernize and incorporate life skills training.

Employment Transition and Skill Development

Overseas Development Institute (ODI) surveyed 43 businesses in four sectors (tourism, ICT, light manufacturing, and agro-processing) across different parts of Nepal [41]. The survey revealed that

the labor market is tight in many sectors. All these sectors have the potential to expand. Table 14 provides the general picture, the issues related with skills and employment, and the mechanism to address them [6]. These four sectors could help Nepal transform its economy and create various employment opportunities. There could be other sectors like hydropower, education, and health that may directly or indirectly support Nepal in improving its productive capacity [6, 41].

TABLE 15

SURVEY OF 43 FIRMS AND OBSERVATIONS ABOUT LABOR.

Sector	General picture	How to address the problem		Methodology
Tourism	Shortage of skilled/ experienced workers	Customer service skills, best on the job (placement or apprenticeship)	Other measures such as certified courses, perhaps by foreign trainers	Mostly on-the-job training with slightly longer periods and compulsory courses (e.g., first aid)
ICT	Adequate at entry level, shortage of experienced workers	Most technically skilled in programming language (software development)	Solid academic background followed by on-the-job training and online certification	On-the-job training, online certifications, in-house knowledge sharing, and external courses
Light manufacturing	Shortage of technically oriented workers	On-the-job training	Industry–training institute linkages	On-the-job training and certifications for machinery operation and maintenance
Agro-processing	Shortage of skilled machine technicians, but Indian workers are readily available	On-the-job preferred modality for most firms	Food safety and quality assurance training can be vocational	Linkages with tertiary engineering institutes (firms largely hire engineers to install machinery and provide ad hoc training for six months)

Source: Proceedings Report, 2021 [6, 41].

Sharma [6] analyzed the scenario for growth and employment in Nepal based on the World Bank reports and studies carried out by ODI, 2019 on that report. Nepal needs to create 6.1 million jobs by 2030, and by minimum standards, it will see a deficit of 3.6 million jobs, indicating that foreign employment will continue unabated. Promotion of productive and labor-intensive sectors can also help in generating more productive jobs, with a focus on ICT, tourism, light manufacturing, and agro-processing units.

Occupational Transition

There are some occupations that are traditionally thought of as specifically for males, while others are mainly for females. This has resulted in certain industries employing mostly females and others mostly

males. Compare NLFS 2017–18 [1] and the data published by the Ministry of Education [l]: in 2017–18, service and sales workers had a share of 23.8%; elementary occupations 20.3%; and managerial occupations 1.2%. However, subsistence agriculture occupation was 13.7%. The majority of all the other occupations were in informal employment. Those in elementary occupations were mainly in informal employment (97.4%), with 97% in skilled agriculture, forestry, and fishery occupations [1].

Creating productive employment opportunities and shifting the existing surplus and unproductive labor in agriculture to service sectors such as industry, trade, tourism, education, and health as well as employing young workers can contribute to a structural change in the economy [5]. The extensive use of automation, robotics, and digitalization will have serious implications for skills, competencies, jobs, and professions [38]. The development of Industry 4.0 will be accompanied by a change in tasks and requirements for workers in the factory.

Strategic Policy Directions

The Nepalese government has made TVET a top priority to create jobs in the country and help reduce poverty. However, as TVET programs are being delivered by central-level agencies of different federal line ministries, there is neither uniformity in the type and duration of the training nor proper coordination to select training programs and locations. To achieve faster economic growth for attaining the goal of a middle-income country (MIC), Nepal, as discussed in the earlier section, needs to develop its productive capacity. Skill development is key to achieving productive capacity and could help in reaching the target of becoming an MIC faster.

Issues related to the availability of competent human resources are among the key reasons for the industry not being able to achieve the desired results. Recent developments in the industry, with the adoption of latest materials and technologies, require more qualified and competent workers at workplaces. This trend is going to rise with time. The TVET system should be able to adapt to this fast-changing nature of the workplace and impart training accordingly so that the graduates are competent enough to deliver.

Direction and Solutions to Develop Professional Skills for VET Workers

The most challenging issue with the present TVET system is to mitigate the mismatch between currently available training programs and the needs of the labor market [8]. The industry can work together with the government to set up occupational standards that are required in the working environment and define levels of competence to perform the designated tasks. They can also participate and lead sector-specific skill development committees or similar bodies to add value to TVET governance. Such arrangements should be legally mandated with clearly assigned roles and responsibilities. It would be easier to engage employers at the implementation level. They could contribute in industry-specific soft skills training programs. In addition to the regular technical classroom training programs, on-the-job training programs and apprenticeships could be included with the support of employers. Trainees would benefit by working in the real work environment with some income. Employers would be willing to participate as they could retain the talented trainees within their organizations.

An integrated human resource development plan should be prepared and linked with research through participation of all levels of government and the private sector. The private sector also needs to be involved for the development and mobilization of human resources, based on the concept of corporate social responsibility and public–private partnership. In future, there will be

more collaboration within and between educational institutions and world of work. It will involve local and regional stakeholders including representatives of line ministries; public organizations; the private sector; development partners; and social organizations at local, provincial, and federal levels. There is a large share of youth in the population. Therefore, Nepal must prepare its youth as a competitive and skilled workforce through appropriate policies and programs.

Direction of Strategy for VET Development in the Period 2021–30

The industry is suffering from the fact that a majority of the skilled and semi-skilled workers in the industry are not suitably trained for minimum levels of competencies that are required to accomplish their respective roles. Majority of them have learned their skills at work from their seniors and gained some level of experience over time. If this trend continues, the industry is bound to suffer in several ways. The cost associated to train a worker at an ongoing project site or in an industry is significantly high in terms of delays, rework, loss of productivity, and inferior quality of output. Till 2076–77 (2019–20), CTEVT had produced 84,963 diploma- and certificate-level graduates and 230,056 TSLC graduates and tested the skills of 3,87,695 people across all disciplines [26]. A significant number of these graduates are working abroad. Clearly, these numbers are far from adequate. Issues related to the availability of competent human resources are among the key reasons for the industry not being able to achieve the desired results. Current developments in the industry, with the adoption of latest materials and technologies, require more qualified and competent workers at workplaces. This trend is going to go up with the passage of time. The TVET system should be able to adapt to this fast-changing nature of workplace and impart the training accordingly so that the graduates are competent enough to deliver.

Various types of vocational and skill-based training programs must be conducted in collaboration with the private sector, as per the domestic demand for labor. Capacity and quality need to be evaluated through collaboration, coordination, and integration among dispersed skills development institutions and programs within the government. Multiple partners should collaborate for TVET management to succeed on a larger and massive scale. In Nepal, industrial revolution 4.0 (IR4.0) is a new idea, and there may be only a little understanding around it (the authorities are now starting to discuss the topic). TVET training carriers and workers concerning the specified IR4.0 abilities need to set out for an IR4.0 working environment. Education and training providers must be aware of the anticipated labor market requirements in order to ensure that training provided to individuals could enable them to compete in the future. A meaningful practical partnership between the government and the private sector is essential for all TVET programs to be successful. To address the challenges of Industry 4.0, governments should establish a structure for digital skills standards and further develop corresponding training courses required by industries, along with promoting future talent competencies.

The CTEVT Strategic Plan integrated the 2030 strategic vision with a mission statement; the goals to achieve the vision; and strategies to achieve each goal. Each strategy was developed with response activities, action plans, and indicators, but the detailed action plan to meet its objectives was never finalized. The development of strategic plans, supported by comprehensive action plans, should be mandatory for all TVET organizations. This desired outcome will be achieved only if evidence-based TVET strategies are developed; human resources are properly produced and capacitated; infrastructures are adequately developed; and the private sector is properly engaged and involved. Within the MoEST's TVET function, the authority should establish interdepartmental coordination, and the technical committee should develop strategic plans to ensure coordinated planning and management.

Program to Support Development of VET Labor Market up to 2030

Nepal aspires to graduate from a least developed country (LDC) status and become an upper MIC by 2030. In addition to other strategies, special priority has to be given to improve skills and productivity of workers to achieve the target faster. It is important to consider development of important sectors like ICT, tourism, agro, and light manufacturing for increasing growth and productive employment. Employment opportunities should be provided to all and there should be a safe, healthy, and competitive market. Vocational training and education should be the top priority in any sector so that the workers have a strong baseline.

Approximately 500,000 additional individuals enter the Nepalese labor market annually [3]. VET is part of the education system, so many general-education issues are also TVET issues. Therefore, decentralization can be helpful for TVET outcomes when accompanied with good governance and outcome-focused incentives. However, TVET is different from general education in its connection with the labor market. TVET's connection with the labor market is important in two ways. First, actors from the education and employment systems must be linked to make sure that TVET curricula are correct, relevant, properly delivered, and regularly updated. Every year, a large number of youths migrate, as overseas employment is an important option for the youth. In order to prepare them for gainful foreign employment, a skill development program targeted at the unemployed youth is needed.

Through special programs including Prime Minister Employment Program (PMEP), labor productivity needs to be increased by developing the capacity of the labor force based on the demand of the labor market. For this, necessary arrangements should be made for migrant workers to acquire skills through necessary training and coaching before departure. Coordination with the National Technical Training Institute should be maintained to impart skills to those who are looking for employment to meet market demands and are registered with the authority.

A National Planning Commission or CTEVT mainframe is needed to collect both supply- and demand-side information using a Labor Management Information System (LMIS). MoEST/CTEVT should have a legal mandate to coordinate the system, and trained professionals should strengthen the Employment Information and Support Centre under MoLESS [12]. Employment information centers should be expanded at all local levels and integrated with the employment system of the organized sector.

Policy support to offer incentives for skills training programs, including work-based learning in partnership with the industry, should be developed. Universities should be encouraged to offer degrees in occupational education or TVET, and organizational capacities should be enhanced to produce quality human resources. The government should also allocate budget for on-the-job training in partnership with the private sector.

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PAKISTAN

Pakistan, as the world's fifth-most populous country with the ninth largest labor force, adds a considerable number of people to the workforce every year. Pakistan is a country with an estimated population of 215 million people in 2020, with 61% of the population aged 15 to 64. The country's resources are finite, and the country's growing population puts more strain on them. To realize the benefits of the demographic dividend, it needs educated and talented youth. The youth bulge would result in improved industrial output and larger foreign remittances if this demographic dividend is harnessed, and the youth are skilled to fulfil domestic and international market requirements [1]. There is no faster approach to drive economic development than the holistic digitization of the economy to address the requirement of the fourth industrial revolution (4IR), as other economies in Asia–Pacific have recently demonstrated [2].

This chapter presents the case of Pakistan with respect to labor market policies and changing market demand at the time of 4IR. Here, generally, the review of the labor market, demand and supply gap, income dynamics, Pakistan's Vocational Training Development Strategy 2018, and transition opportunities have been reviewed; and recommendations have been provided. Moreover, the interviews of personnel of Technical Education and Vocational Training Authority (TEVTA) in Pakistan have been conducted to have in-depth understanding of the situation. The thematic analysis technique of qualitative research by using Nvivo 11 software has been employed to extract the basic themes from the conversations.

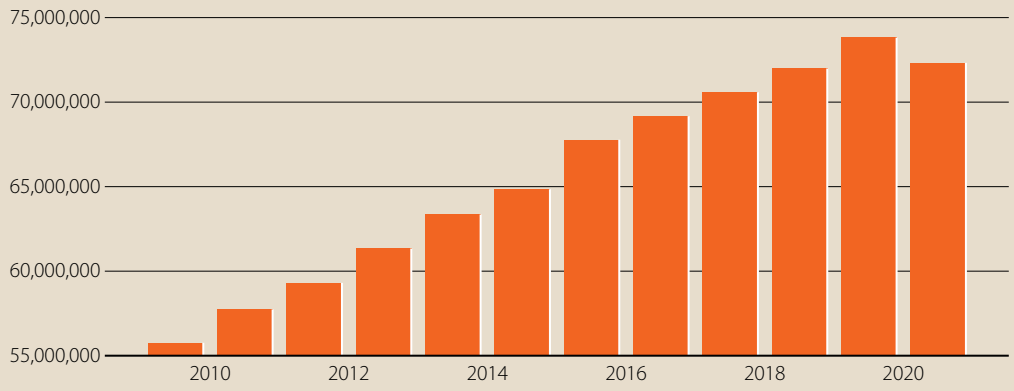
VET for the Labor Market

Labor Supply

Pakistan's total labor force was estimated to be 72.33 million in 2020, according to the World Bank's development indicators gathered from officially recognized sources. The World Bank published actual statistics, historical data, projections, and estimates for Pakistan's total labor force on 20 November 2021 [3].

FIGURE 1

LABOR SUPPLY IN PAKISTAN, 2010–20.

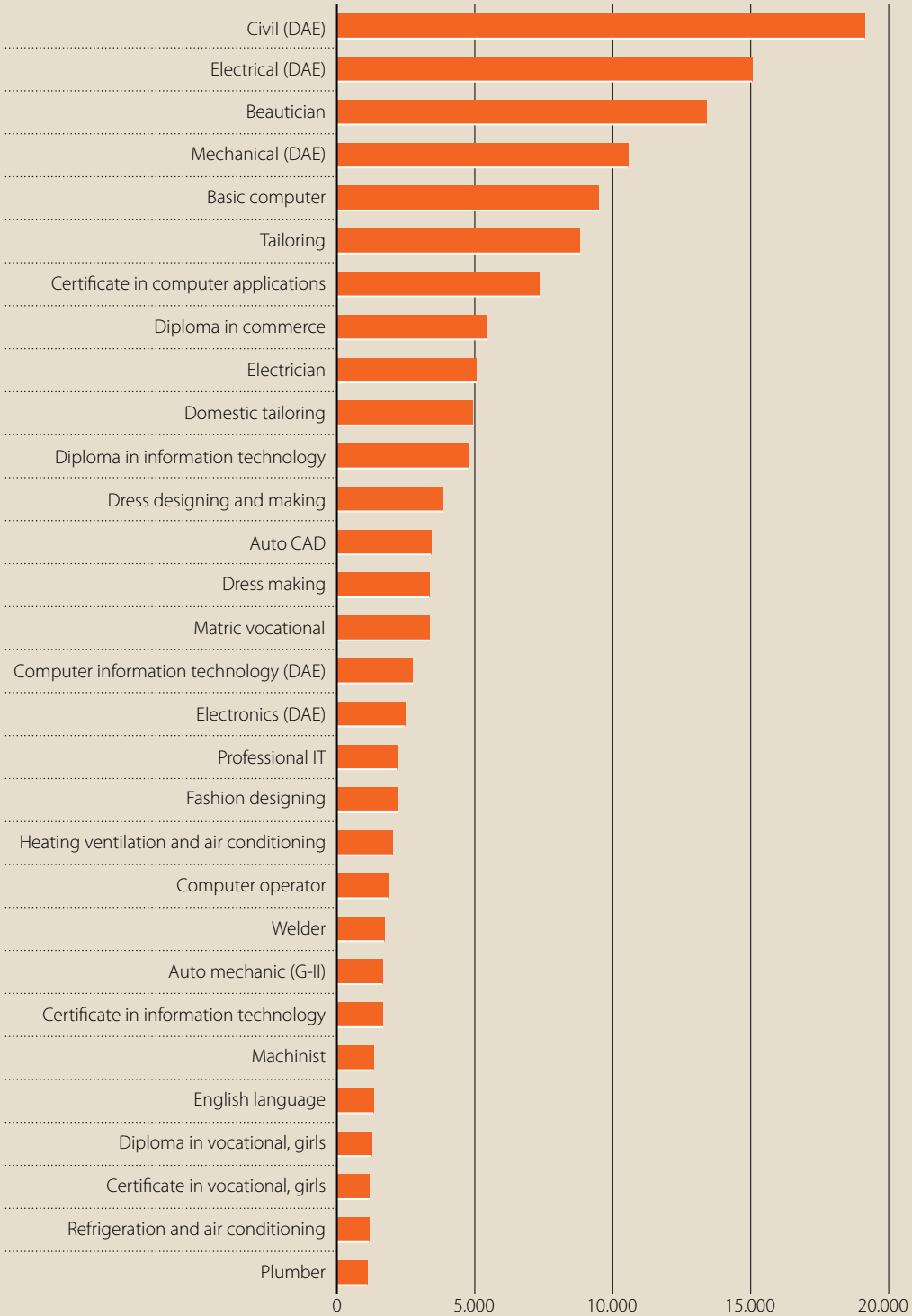


Source: Trading Economics.com, 2021.

If we view specific skills, Diploma in Associate Engineering (DAE) for civil, electrical and mechanical fields beautician, basic computer, and tailoring are more supplied skills-related trades as shown in Figure 2 [4].

FIGURE 2

SUPPLY OF TRADES.



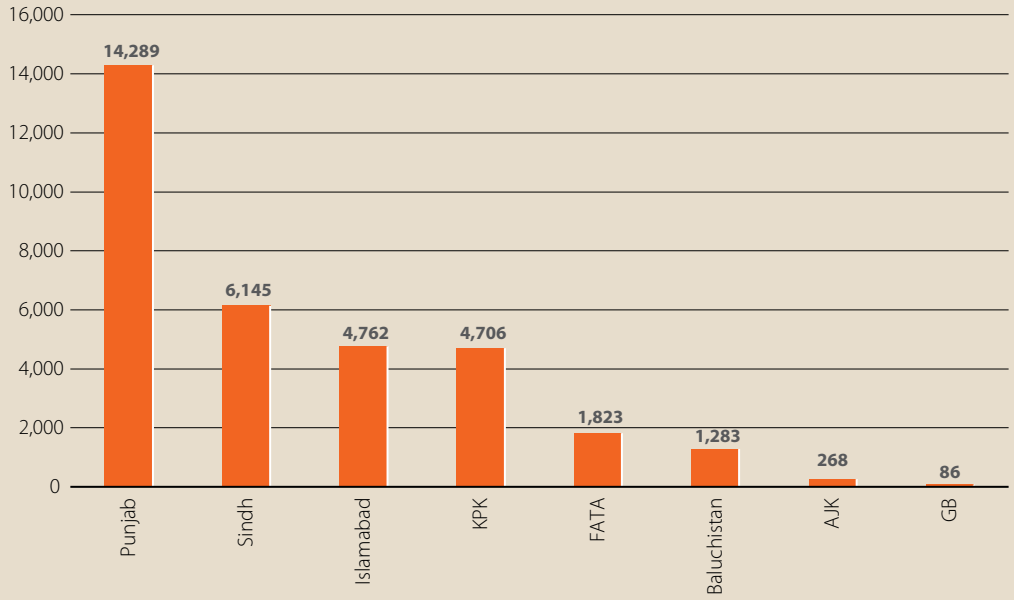
Source: NAVTTC website, 2021.

Labor Demand

Pakistan is among those countries that have huge skilled workforce demand [5]. Moreover, province wise, Punjab (48%) is the highest demanding region; followed by Sindh (18%); Islamabad and Khyberpakhtoonkhwa (14%); and FATA and Balochistan as shown in Figure 3 [5].

FIGURE 3

PROVINCE WISE SKILLED WORKFORCE DEMAND.



Source: Skill Trend Analysis, 2017.

Moreover, if we see the level wise picture, middle-level experience is demanded most (52%); followed by fresh candidates (30%); and highly experienced (18%). In addition, demand for male skilled workers (98%) is far higher than that for female skilled workers (2%). In terms of sectors, the demand in the manufacturing sector is 33%, in the services sector it is 27%, and in the construction sector it is 16% [5].

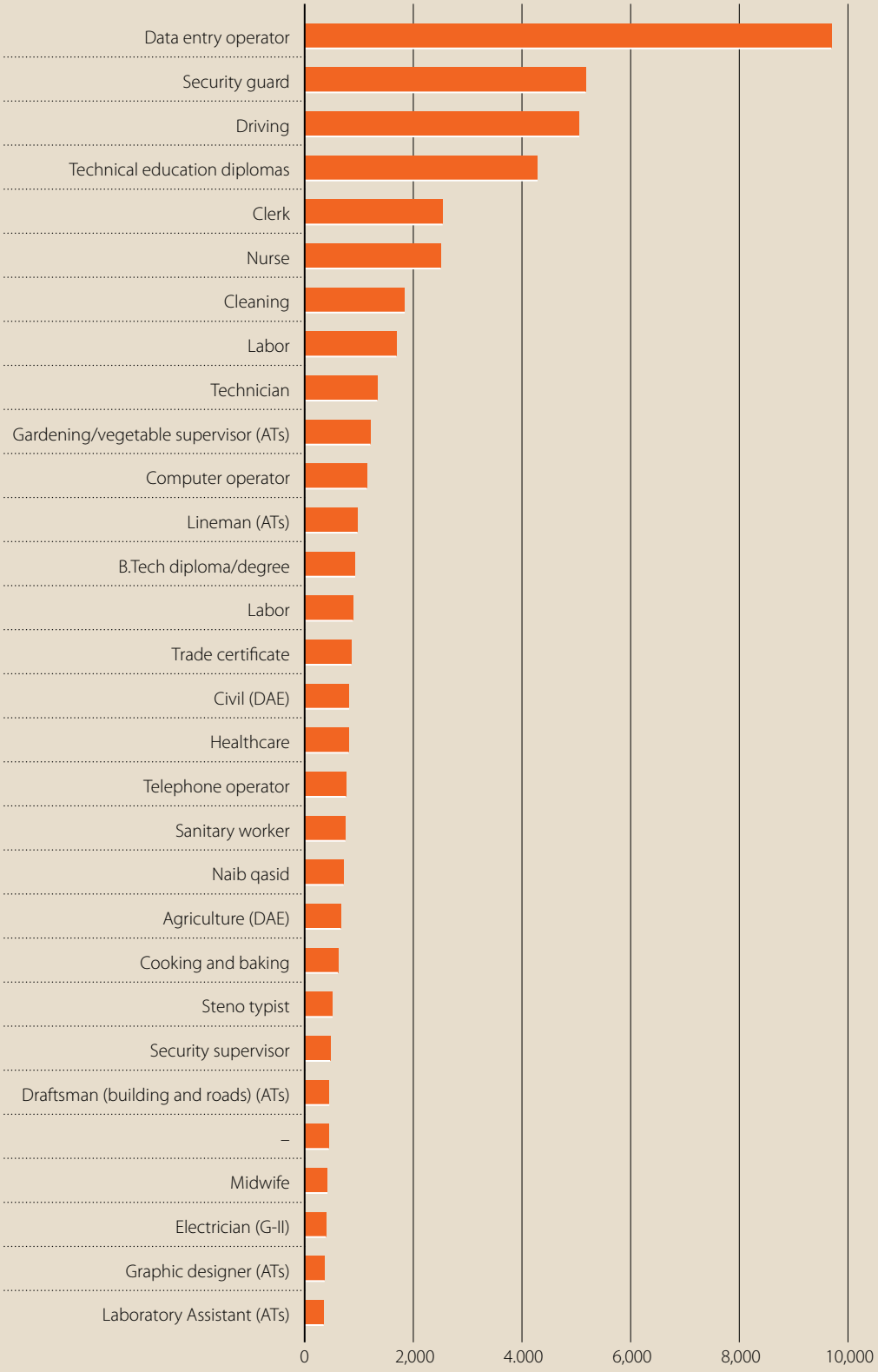
The most demanded trades are data entry operators, security guards, drivers, and technical education diploma holders, as mentioned in Figure 4 [4].

Likewise, the services sector has the highest demand for skilled workforce, followed by the health sector, education sector, power sector, and other sectors [4].

Pakistan ranks ninth in the world in terms of labor force size, with a total workforce of 63.4 million in 2018 [24]. The unemployment rate stood at 5.7%. The female labor force participation is much lower than male labor force participation. Overall, employment is concentrated in the services and agriculture sectors. The informal economy employs 71.4% of the workforce. The agriculture sector employs the majority of women, with the industrial and services sectors employing a smaller percentage. Around 55.6% of all employed persons are vulnerable or at risk of lacking good work, according to estimates [25]. Agriculture has a very high proportion of vulnerable workers (87.8%), as shown in Figure 5. The hazard that both men and women experience in agriculture is similar. However, in the manufacturing industry, 32.9% of workers are vulnerable, with 55.9% of females and 26.6% of employed males being deprived [6].

FIGURE 4

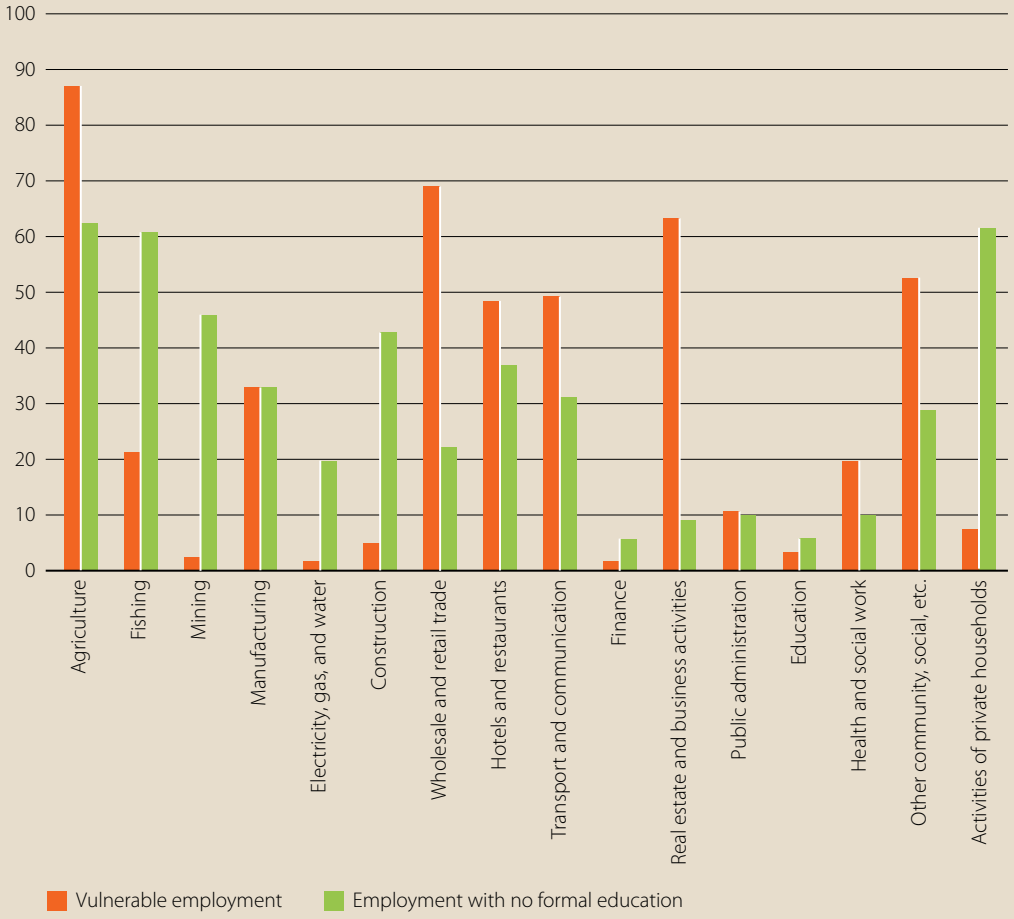
DEMAND FOR TRADES.



Source: NAVTTC website, 2021.

FIGURE 5

SHARE OF VULNERABLE EMPLOYMENT BY SECTOR IN PAKISTAN.



Source: Pakistan Bureau of Statistics, 2018.

Pakistan has a significant labor force that ranks among the ten largest in the world, and it continues to increase on a daily basis. It is a huge challenge to provide suitable work opportunities to this labor force. Employers, on the other hand, commonly claim that they are unable to locate individuals with skills essential for their sectors. This clearly demonstrates a skills shortage due to a mismatch between demand and supply. Women lack access to education and skills training at a higher rate than men, and as a result, they are disproportionately employed in low-skilled, low-paying occupations. In addition, the low female labor market participation rate is a barrier to inclusive economic growth [7].

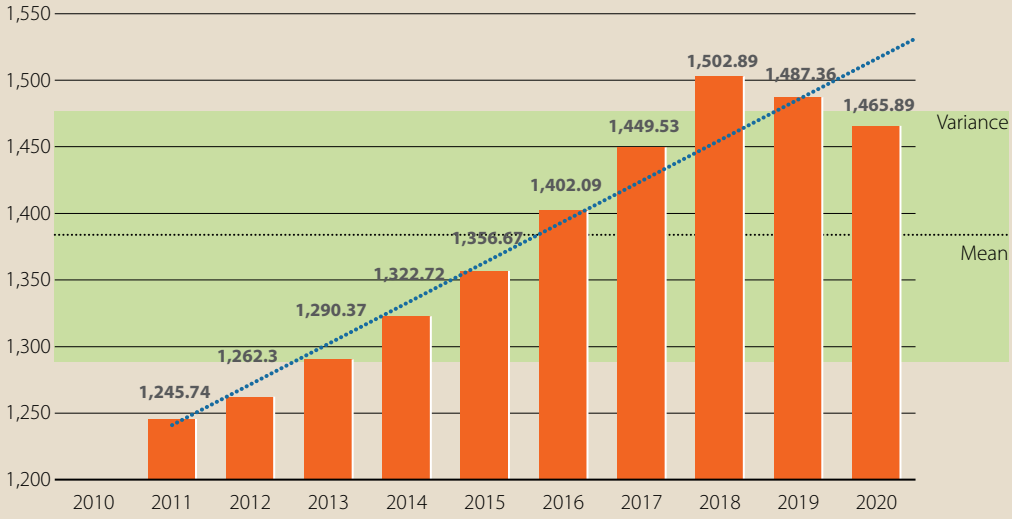
Skills development may play a vital role in poverty alleviation when carefully planned and executed in the context of available and growing employment and income-generation opportunities, as the ILO's experience in many countries, including Pakistan, has shown [7].

Income

From 1960 to 2020, Pakistan's GDP per capita averaged USD901.69, with a high of USD1,502.89 in 2018 and a low of USD379.03 in 1960. Pakistan's GDP per capita till 2021 is given in Figure 6 [4].

FIGURE 6

GDP OF PAKISTAN, 2010–20.



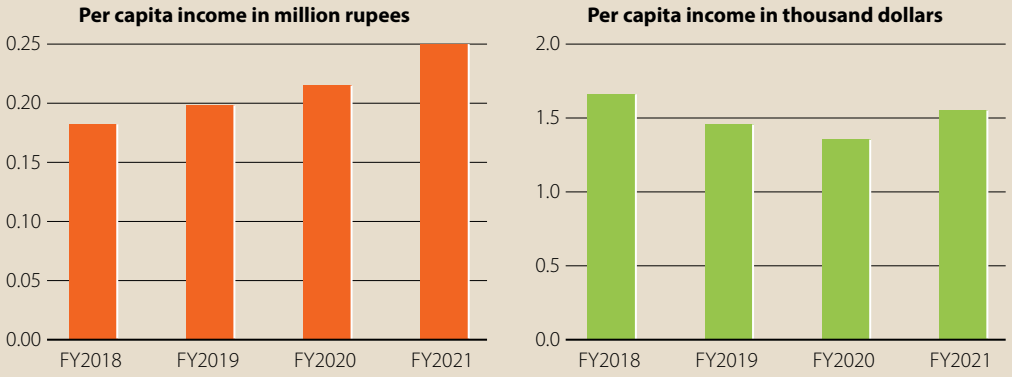
Related	Last	Previous	Unit	Reference
GDP	263.69	278.22	USD billion	Dec/20
GDP per capita	1465.89	1487.36	USD	Dec/20
GDP per capita PPP	4622.77	4690.48	USD	Dec.20

Source: Trading Economics.com, 2021.

During COVID-19's first wave, Pakistan's unemployment jumped to 34.1%, and mean income declined by 42%. The Pakistani government assessed the per capita income in PKR terms to continue its increasing trend in the context of growth with protection of vulnerable segments. In USD terms, however, there was a comeback in per capita income, which reflects both exchange rate stability and actual economic growth [8].

FIGURE 7

PER CAPITA INCOME IN PAKISTAN.



Source: Pakistan Economic Survey, 2020–21.

Despite the fact that real GDP growth maintained at 5.5% in FY2018 and per capita income was USD1,630, gross external financing requirements increased to roughly USD30 billion, resulting in unstable fundamentals on the balance of payments (BoP) side. Particularly, the total expenditures in the economy far surpassed the income generated by various economic sectors. This resulted in a large current account deficit for BoP, which was financed by depleting the country's official reserves to the point that the State Bank could not maintain the exchange rate any longer [8].

Evaluation of Pakistan's Vocational Training Development Strategy 2018

In consultation with all key stakeholders, a national plan has been developed that is linked to the 12th Five Year Plan (2019–23); Pakistan Vision 2025; and the National TVET Policy. The Task Force in this regard highlighted some important areas that required immediate government engagement in order to move toward a lively, responsive, and productive TVET system, based on the notified terms of reference [9]. The areas are:

(1) improving governance to eliminate fragmentation and duplication that result in systemic waste;

(2) investigating other funding sources in order to implement a broad-based reform agenda;

(3) increasing capacity to provide more and more training opportunities;

(4) quality assurance to ensure that skills meet national and international standards;

(5) equality of opportunity for underprivileged groups in society such as women, orphans, special people, youngsters from underdeveloped areas, and so on;

(6) industry ownership to improve training relevance and youth employability;

(7) international market skills improvement to increase foreign remittances; and

(8) a TVET communication plan to improve the sector's image.

Implementation Plan for the Strategy

The key elements of the implementation plan are:

(1) standardization and development of 200 TVET qualifications;

(2) expanding the National Vocational and Technical Training Commission (NAVTTC) job portal to become the National Employment Exchange Portal;

(3) creating 75 Smart Tech Labs to support virtual skills development;

(4) establishment of ten country-specific facilitation centers;

(5) creating 70 vocational laboratories in *madrassas*;

(6) training 50,000 youths in high-end technologies as part of their skill development;

(7) under the Apprenticeship Act of 2018, training 20,000 young people as apprentices in industry;

(8) recognition of prior learning (RPL) for 50,000 young people;

(9) initiation of the National Accreditation Council, which will be ICT based;

(10) accrediting 2,000 TVET institutes across Pakistan;

(11) training 2,500 TVET teachers in international best TVET practices; and

(12) establishment of 50 business incubation centers.

Strategic Gaps and Rationales of the Strategy

Administrative and legal issues among TVET authorities and departments, highly imbalanced and skewed skill trades among technical education and vocational trainings, skill trades deficiencies, gender-biased skill provisions, skill quality compromises, a lack of TVET institutions, traditional TVET skill trades, and non-collaboration among TVET institutions and authorities are all examples of TVET weaknesses. Slow and poor skill formation, skill shortages and prejudices against women and rural areas, regional incompetitiveness of local skills provisioning, uneven technical education and vocational training, and the expected entry of Chinese skilled workers are all factors to consider. Furthermore, the expansion of TVET trades to highly demand-driven skills, as well as the lowest socioeconomic indicators for the establishment and development of the TVET system, all pose significant risks to the TVET system [9, 10].

Civil engineering, electronics, mechanical engineering, computer science, and information technology are all covered by engineering diplomas. No high-tech engineering diplomas, such as nanotechnology and microbiology, are offered through TVET. For the provincial China–Pakistan Economic Corridor (CPEC) projects, no skill criteria in relevant TVET trades have been defined. Low curriculum, quality assurance in theory and workshops, teaching capacities, course contents, and lack of industry space for internships and apprenticeships compromise the quality of the existing six associate engineering technology certificates [9, 10].

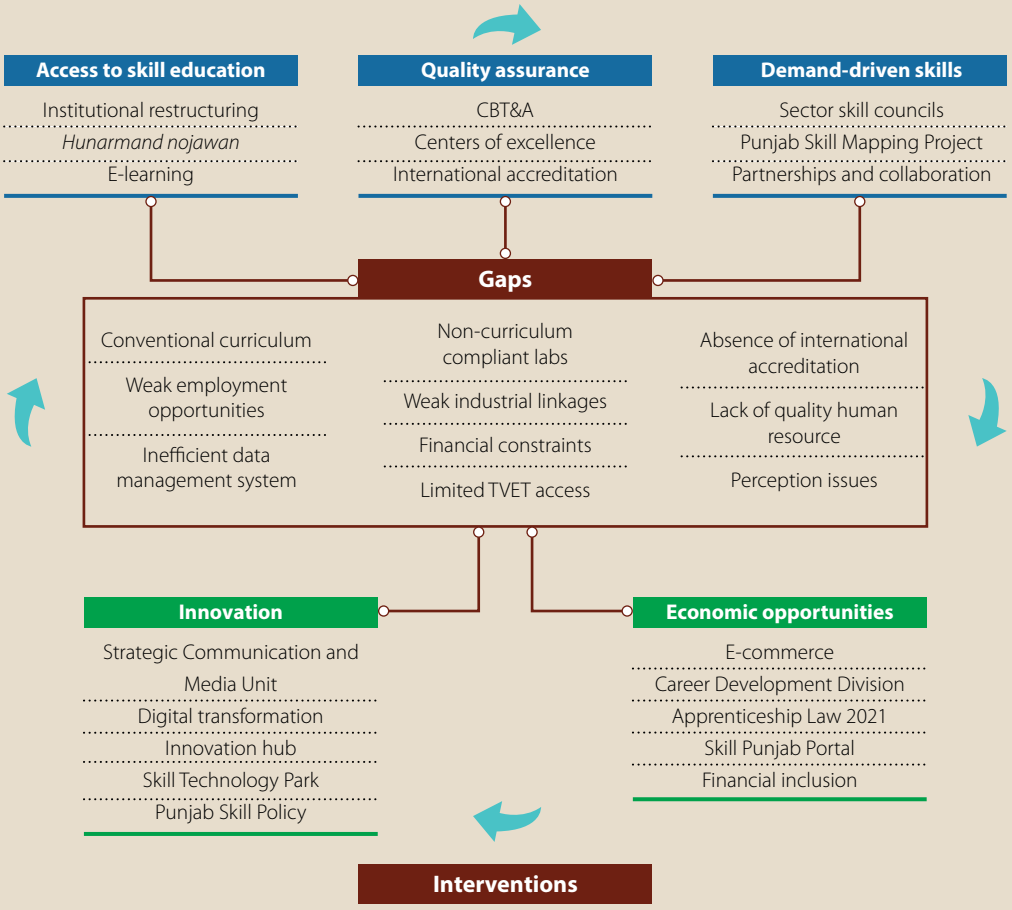
There is no consistent mechanism of quality assurance for vocational skill qualifications of numerous certifications for vocational training facilities across the provinces. There are no agreed-upon curricula and course systems for centralized examination in vocational training [9, 10].

Low pay, unemployment, even lower female participation, and no regular jobs are the labor market's replies to people with vocational and technical diplomas in the prevalent marketplaces of the country and neighboring Gulf states. In the Balochistan province, almost all private and NGO-based TVET institutes provide computer and IT-related certificates and diplomas, and these skill trades are very common. Because these TVET sectors rely heavily on donors and NAVTTC funds, their TVET programs are seasonal, irregular, and frequently used to raise funds [9, 10].

In its first 100 days, the new TEVTA management recognized the gaps and interventions with its key stakeholders. NAVTTC; the World Bank; ADB; and the TVET Sector Support Program (TVET SSP), which comprised the European Union, the Norwegian, and German governments; were among the stakeholders. This directs toward a paradigm shift from the traditional system to a modern skills ecosystem (see Figure 8) that will be implemented in future [4].

FIGURE 8

THE NEW SKILLS ECOSYSTEM.



Source: NAVTTC website, 2022.

Major Challenges in the Implementation of the Strategy

In Pakistan, there is no comprehensive information on skills development. Even publicly funded services are not routinely collected and analyzed. There is no systematic or complete census of TVET activities that encompass both the public and private sectors, as well as nongovernmental organizations' operations. There is little sustained review of the investment in skills development, though it is typical to hear comments that persons who complete training lack the abilities that the labor market demands. There is no national structure for developing and validating qualifications or certifying the talents of those who successfully finish training programs. Some businesses in the private sector, notably exporters and those with international ties, give world-class training, though they are in minority. According to estimates, less than 10% of employed workers obtain training. The policy is not functioning because there are only about 22,000 apprentices now. Because of the perceived costs, many firms are hesitant to invest in training [9].

Possible Measures to Implement the Strategy

The government requires a commitment to the development of a national integrated TVET system. As a result, a single, national certification system for recording and recognizing qualifications, as well as quality-assurance standards and processes, will be implemented. It will be investigated how the existing reliance on public funds might be reduced. To meet the TVET policy's goals, the government

will continue to seek funding from international donors. Mutual trust between national and provincial TVET entities, as well as among education and training providers, will be encouraged [9].

Network of VET institutions

The data in Table 1 depicts the overall picture of the TVET sector [4].

TABLE 1

TVET INSTITUTIONS IN PAKISTAN.

Province	Number
Punjab	1,672
Sindh	620
Khyber Pakhtunkhwa	686
Balochistan	149
Gilgit Baltistan	184
AJK	129
FATA	76
Islamabad	118
Total	3,634

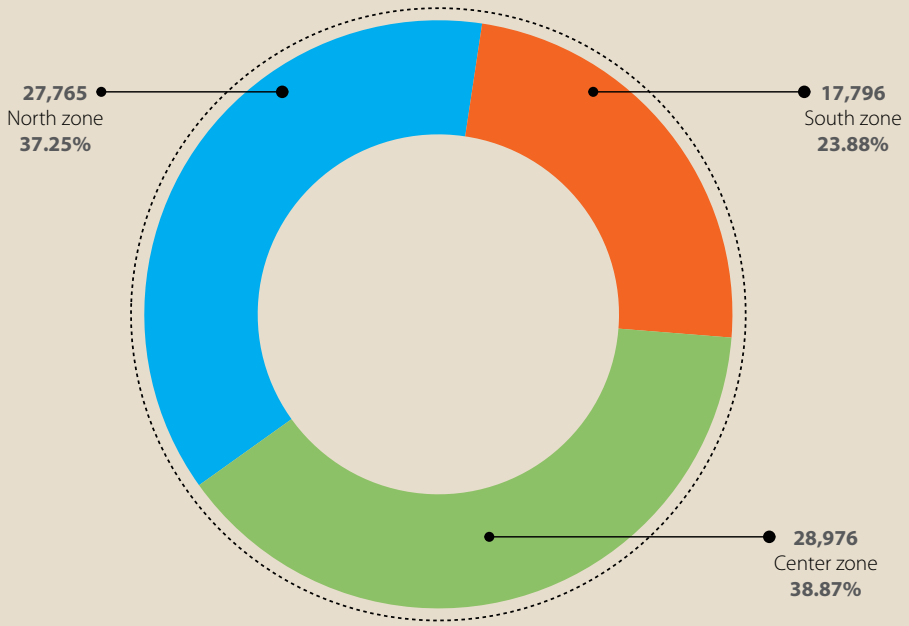
Source: NAVTTC website, 2021.

Admissions

If the region-wise admission is considered then Pakistan can be divided into three zones as north, south, and central. According to these zones, the admissions are mentioned in Figure 9 [4].

FIGURE 9

REGION WISE ADMISSIONS.



Source: TEVTA website, 2021.

If we see the province-wise picture, then the statistics are as below (see Table 2 also):

Punjab: In Punjab, the total number of enrollments in public institutes providing training was 188,353 persons and total enrollments in the private sector was 39,127 persons.

Sindh: In Sindh, the total number of enrollments in public institutes providing training was 58,395 persons and total enrollments in the private sector was 35,920 persons.

KPK: In KPK, the total number of enrollments in public institutes providing training was 23,130 persons and total enrollments in the private sector was 34,218 persons.

Balochistan: In Balochistan, the total number of enrollments in public institutes providing training was 6,665 persons and total enrollments in the private sector was 11,311 persons.

AJK: In AJK, the total number of enrollments in public institutes providing training was 3,660 persons and total enrollments in the private sector was 4,313 persons.

Islamabad: In Islamabad, the total number of enrollments in public institutes providing training was 1,469 persons and total enrollments in the private sector was 3,045 persons [11].

TABLE 2

BREAKUP OF ENROLLMENTS BY PROVINCE AND GENDER.

Region	Enrollments					
	Public			Private		
	Male enrollments	Female enrollments	Total enrollments	Male enrollments	Female enrollments	Total enrollments
Punjab	112,004	76,349	188,353	33,526	5,601	39,127
Sindh	47,677	10,718	58,395	26,199	9,721	35,920
Khyber Pakhtunkhwa	23,099	2,268	23,130	18,561	15,657	34,218
Baluchistan	5306	1,359	6,665	6,001	5,310	11,311
AJK	2668	992	3,660	2,290	2,023	4,313
Gilgit Baltistan	1863	992	2,855	2,156	7,544	9,700
ICT	1110	35949	1,469	1,344	1,701	3,045
Grand total	193727	93,037	284,527	90,077	47,557	137,634

Source: NAVTTC website, 2021

Teachers

The availability of qualified teachers and instructors (see Figure 10) is a critical component in implementing Competency Based Training and Assessment (CBT&A) in accordance with the National Vocational Qualifications Framework (NVQF).

NAVTEC and TEVTA are working on the training of teachers and some initiatives have been taken. For instance, the support program of TVET strives to create a long-term national strategy for betterment and education of teachers. Integration of in-service and pre-service training for teachers and instructors is in line with the National Skills Strategy, TVET policy, and HRD policy.

Toward this goal, the lessons learned during the first phase of the TVET reform (2011–16) have also been examined.

One of the specialties of the TVET Sector Support Program's appropriate intervention area is the transformation of the existing five teacher training institutes into centers of excellence (CoE). The CoEs will provide a functional and sustainable model of quality training for TVET managers, teachers, instructors, and assessors in the TVET system, with one in each province.

In-service training for 3,550 TVET teachers in Pakistan's main economic sectors is supported by this program. Initially, these trainings will be given through a cascade system in selected staff training institutes and technical training institutes. However, these trainings will be conducted through the CoEs in future [12].

In-service Training Program

As part of the TVET Support Program's reform process, a new mechanism for In-service Training (IST) Program for TVET instructors has been developed. This innovative training is focused on supported IT learning, in which participants are required to search the internet and prepare lesson plans, rather than the traditional classroom training with teacher-centered courses. Furthermore, educational theories and practical course delivery instruments are supplied. The course is four weeks long, with two weeks of self-study during which students must complete specific assignments.

Setting up E-learning Centers

This training initiative, which began in 2011, was carried out through 19 e-learning centers located throughout the country. As many as 100 e-tutors were first trained as multipliers to train more teachers. Under the auspices of the National Vocational and Technical Training Commission, the e-learning centers continue to work in close collaboration with the provincial Technical Education and Vocational Training Authorities (TEVTAs) and Punjab Vocational Training Council (PVTC).

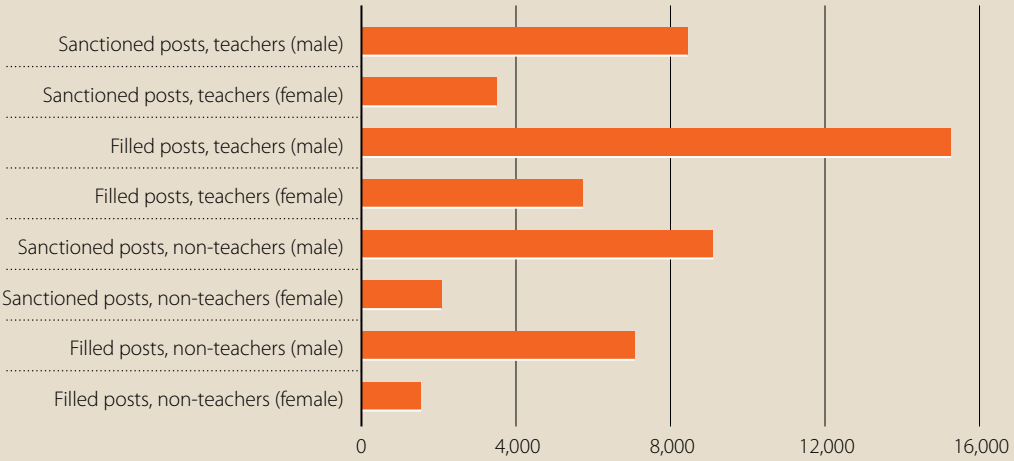
The e-learning centers listed that have been established include,

- six centers in Punjab;
- four centers in Sindh;
- four centers in KPK and FATA;
- one center in Baluchistan;
- one center in Jammu and Kashmir;
- one center in Gilgit-Baltistan; and
- one center in Islamabad Capital Territory.

By December 2015, more than 8,500 TVET teachers had completed this specialized training across the country. These e-learning centers will be used by partner organizations to train TVET teachers in future [11].

FIGURE 10

TVET TEACHERS IN PAKISTAN.



Source: NAVTTC website, 2022.

Training Curricula

Since 2006, NAVTTC, provincial TEVTAs and industry experts have established 105 competency-based curricula. For this purpose, Develop a Curriculum (DACUM) approach has been adopted. In addition to DACUM, experts having both industry and academia experience are consulted and then the National Curriculum Review Committee (NRC) reviews the drafts. The main steps in this curriculum development are job analysis/DACUM, labor market demand analysis, and development of curricula and training programs. The NRC is basically composed of five representatives from the industry, five representatives from TEVTA, five DACUM facilitators from NAVTTC, and one representative from the Board of Technical Education. The basic terms of reference of this committee are assurance of the review process effectively, attention to adequate details, professionalism, and review of course contents and practicals [13].

Curriculum for Students

The primary goal of this curriculum is to provide fundamental, conceptual, and practical instruction in vocational trades, as well as computer skills, so that trainees may generate creative art-and-design work that meets industry standards. They will be able to assist industry-linked or self-employed individuals. In particular:

(1) Trainees will be able to do drawing, design, draught pattern, cutting, sewing, art and craft, and textile design; and know techniques after completing the course.

(2) The level of proficiency and ability to use fundamental computer abilities will be determined in this course.

(3) The course has been planned/constructed with modern trends in mind while also incorporating historic components [14, 15].

Curriculum Preparation

In order to fulfil future demands for higher-quality standards, it is critical that in-service teachers be trained in TVET. Teachers will be able to improve their skills on a regular basis by including

ICT into their training courses, which will aid them in overcoming challenges such as outdated curricula. TEVTA's principal goal, when it was founded, was to align technical and vocational education and training with labor market demands and to increase educational quality through creative reforms. TEVTA was established to oversee/coordinate the smooth operation of institutions, authorize development projects, buy and install equipment for institutions, update/revise curricula, and arrange on-the-job training for trainees [16].

The curriculum is undoubtedly one of the most important factors in ensuring the success and long-term sustainability of the intended TVET teachers' development program. It could ensure that participating teachers are able to match industrial demands as well as the country's educational philosophy. In an ideal world, the curriculum for preparing TVET teachers would be flexible enough to meet current demands, which is even more difficult in developing countries [17]. Practical courses in technical issues like agriculture, business, and home economics were included in the general education curriculum in schools. Courses in social studies and humanities were added to the curriculum of technical and vocational schools at the same time throughout the middle stage. All students followed a common course, after which the first diversion of students from general to vocational and technical institutions occurred. After class 10, students should be able to enroll in polytechnics and technical schools. A nationwide network of vocational schools was formed with the goal of preparing students with manual skills and an aptitude for craft labor through apprenticeship programs in the industry. The curriculum in vocational schools was two-to-three years long. Current trade and industrial schools should be redesigned and maintained, equipped, and supervised in the same way as vocational schools are [14, 15].

Curricula, Book Production

The National Curriculum Bureau was strengthened and reorganized, and curriculum centers were established or developed in each province to review and update curricula for all levels of education, including TVET, to keep them constantly under review and revise and modernize them at regular intervals. Many current teacher training courses are outdated and do not focus on scientific and technological components of education, as well as the application of modern methodologies and techniques. All teacher training courses were redesigned and reformulated in accordance with national goals for technological education as well as industry and economic development requirements [14, 15].

Curriculum for Teacher's Training

The technical teacher training curricula are developed at various levels. A few of these courses are described below to provide more insight.

Teachers of handicrafts: The minimum educational criteria for prospective instructors of handicrafts for classes 6–8 was proposed as matriculation with passes in mathematics, physics, and drawing. They also received two years of handicrafts instructions. This two-year study included (1) woodworking, metalworking, and basic electricity with the use of common hand tools; (2) creative arts; or (3) agricultural crafts. Techniques of practical shop education, tool and equipment care and maintenance, and ways of recording and assessing practical work were all given special attention. During the training course, a special emphasis was placed on developing skills in language; civics and social studies; and fundamental craft science, craft math, and drawing [14, 15].

Technical instructors for vocational schools: The criteria for prospective vocational school instructors included matriculation (with mathematics, physics, and drawing);

technical diploma from a polytechnic or technical institute; and at least two years of experience in an industrial workshop. These lecturers were talented and experienced craftsmen with good understanding of the fundamentals of their craft fields. Teachers in this category were required to have professional training in teaching approaches and their subsets. The course would last a year [14, 15].

Technical teacher for secondary schools: These lecturers were talented and experienced artisans with a good understanding of the fundamental theoretical aspects of their crafts. Teachers in this category were required to have completed professional training in teaching methods and related subjects. The program was set to last one year. Professional training also included workshop-specific techniques of instruction, equipment care, use, and repair, and the recording and assessment of practical work. Engineering science, applied mathematics, and applied mechanics were included. This course focused on the pedagogy of technical subjects and was clearly linked with the course's practical content [14, 15].

Instructors for polytechnics and technical institutes: The first prerequisite, as with technical education in vocational institutions, was that a candidate for training had a high level of craft skill and some fundamental theoretical knowledge. This translated into matriculation and a technology diploma from a polytechnic or technical institute, as well as at least two years of experience in an industrial workshop. Furthermore, the candidate received a one-year training program that included technology, workshop teaching methods tailored to the candidate's specialty, assessment and documentation of practical work completed, and workshop tool and equipment care and maintenance. Practical mathematics, applied mechanics, engineering science, applied economics, and design were studied as part of the course, which focused on the relationship between background studies and technology [14, 15].

Apprentice-trainers or supervisors: Apprentice trainers or supervisors are experienced professionals who have previously worked in industrial settings and are familiar with trainees' challenges. A two-month short course on TWI methodologies was to build critical and analytic abilities and better understanding of work breakdown for training purposes. They were also given some background information on the young apprentices who attended evening or part-time programs, as well as the rationale for providing such training [14, 15].

In short, there is a wide range of such courses with deep details, but only a few have been described to provide a bird's eye view.

Actual Situation of Training and Retraining in Enterprises

There are different percentage of businesses that offer staff training and reskilling or retraining:

(1) In Punjab, 39.82% of institutes provide technical training and 60.16% institutes provide vocational training.

(2) In Sindh, 31.61% of institutes provide technical training and 68.38% provide vocational training.

(3) In KPK, 5.24% provide technical training and 94.75% provide vocational training.

(4) In Balochistan, 24.16 provide technical training and 91.94% provide vocational training.

(5) In Gilgit Baltistan, 4.94% of institutes provide technical training and 95.10% provide vocational training.

(6) In AJK, 10.85% provide technical training and 89.14% provide vocational training.

(7) In FATA, 13.15% provide technical training and 86.84% provide vocational training.

(8) In Islamabad, 16.94% provide technical training and 83.05% provide vocational training.

(9) All over Pakistan, 26.49% of total institutes provide technical training and 73.50% provide vocational training [4].

TABLE 3

NUMBER OF BUSINESSES PROVIDING TRAINING AND RESKILLING OR RETRAINING.

Province	Technical	Vocational
Punjab	666	1,006
Sindh	196	424
Khyber Pakhtunkhwa	36	650
Balochistan	12	137
Gilgit Baltistan	9	175
AJK	14	115
FATA	10	66
Islamabad	20	98
Total	963	2,671

Source: NAVTTC website, 2022.

Forms of Training

Technical and vocational institutions provide various trainings [4] for males and females as given in Table 4:

TABLE 4

TECHNICAL AND VOCATIONAL TRAINING FOR MALES AND FEMALES.

Training	Who can participate
Fashion designing	Males
Machine embroidery	Both male and females
House keeping	Females
Generator repairing	–
Plumbing	Males
Still fixer	Males

(Continued on next page)

(Continued from previous page)

Training	Who can participate
Tailoring skills	Males
Tailor training	Females
Civil services	Males
UPS repairing	Males
Bakery and sweet making	Both males and females
Solar panel	Males
Rice plant operator	Males
Tonal forming	Males
Leather garments stitching	Males
CNC machine operator	–
Safety inspector	Males
Model mold mechanic	Both males and females
Kashi gari	Males
Home appliance repairing	Males
HVACR	Males
Electrician	Males
Motorcycle mechanic	Males
Beautician	Both males and females
Welding	Males
Building painter	Males
Auto mechanic	Males
House car painting	Males
Car driver	Males
Cooking	Both males and females

Source: Pakistan Technical & Vocational Educational and Training Reforms [18].

Cooperation between VET Institutions and Enterprises

Any policy initiative aimed at creating jobs and reducing poverty must include TVET. The Pakistani government recognizes the importance of the TVET industry and plans to address the sector's difficulties, such as assuring quality, access, equity, and relevance [18].

The TVET Reform Facilitate Program works with the National Vocational and Technical Training Commission (NAVTTC), provincial and regional Technical and Vocational Training Authorities (TEVTAs), and a variety of commercial and public-sector players to support this process. Giving employers a significant role in all stages of TVET planning and delivery is a critical feature to ensure labor-market orientation [18].

A three-way working relationship among the technical school, the employer, and the trainee is required for cooperative training programs. Training institutions will become more aware of labor market developments and the types of information and skills that learners require to compete effectively in the workplace. In terms of training hours, training institutes have a lower training burden. As a result of the growing proximity to businesses, there is a greater demand for teachers to be qualified in the most up to date manner. At the same time, this relationship makes it easier for instructors to continue their professional development. Cooperative training contributes to Pakistan's economic and social growth by improving the skills of the future workforce [18].

Since 2013, Cooperative Vocational Training (CVT) has been known as the Germany Pakistan Training Initiative (GPATI), which includes a set of instruments to involve businesses in the planning and delivery of cooperative training. The goal of this training program is to demonstrate how important it is for businesses to be involved in maintaining demand-orientation in the TVET sector, which aims to educate the relevant knowledge, skills, and attitude for doing a job. This plan began in Punjab and Sindh, and the component has since expanded its activities to encompass innovative industries such as green skills training, which covers renewable energy and energy efficiency. The program has now been developed into a systematic approach to promote CVT in Pakistan, based on the insights learnt during the pilot phase [18].

Similarly, the Higher Education Commission (HEC), an independent, autonomous, and constitutionally established institution charged with overseeing, regulating, and accrediting Pakistan's higher education efforts, teamed up with Coursera to create a learning program that teaches Pakistani students job skills. Data analytics, computer science, and cybersecurity are just a few of the job-related learning paths available through the curriculum. Within two weeks of its debut, over 8,000 citizens had signed up, filling all available slots and creating a waiting list of over 24,000 people. In addition to an open catalog of 1,200 courses, HEC and Coursera plan to collaborate to build 20 more job-related learning pathways for students [19].

Private institutions currently supply 70% of higher education and 40% of primary and secondary education. There is no similar engagement with TVET, and the business sector may play a bigger role by training more of their own employees and contributing more broadly to TVET reforms. However, there is no significant information about skill development in Pakistan, and even publicly funded provision is not regularly collected and analyzed. There is no systematic or complete census of TVET activities that encompasses both the public and private sectors, as well as nongovernmental groups' efforts. Only 7.3% of people aged 15–24, who are participating in education and training, and only 0.7% of this age group, are served by publicly financed programs. Access to training is inconsistent across the country, with provinces providing different levels of service.

There are insufficient possibilities for women to obtain the skills they need to work, and there is a lack of attention to the requirements of those with disabilities. The quality of the service is inconsistent, and there is no agreed-upon quality assurance policy or process. There is little sustained review of the investment in skills development, though it is typical to hear comments that persons who complete training lack the abilities that the labor market demands. There is no national structure for developing and validating qualifications or certifying the talents of those who successfully finish training programs. In terms of capacity and facility utilization, the efficiency of the public service is debatable. The majority of historically recurring expenditure is allocated to personnel costs, allowing little freedom to allocate resources, provide materials for practical training, or cover the cost of updating outmoded equipment. Development budgets are typically far

smaller than the bids submitted for them. Despite budgetary allocations, transfer payments from national and provincial treasuries to training agencies can be sporadic, generating uncertainty and negatively impacting planning and delivery efficiencies.

Some businesses in the private sector, notably exporters and those with international ties, give world-class training, although they are in minority. According to estimates, less than 10% of employed workers obtain training. There are limited government programs to encourage private-sector training. Apprenticeship legislation imposes requirements on employers of a certain size, which are partially offset by tax and excise breaks. The policy is not functioning because there are only about 22,000 apprentices now. Because of the perceived costs, many firms are hesitant to invest in training. Employer representative organizations have not yet highlighted skills development as a key concern, but they lack the resources to provide advice and direction to companies, as well as to act as leaders [9].

Some private providers provide fee-based training, though not on the scale of private supply in basic, secondary, or higher education. Then, there are non-profit training providers, some of which have a good reputation for providing high-quality training and placing students/trainees in good employment, but there is no comprehensive data on their numbers or performance.

The *ustad–shagird* tradition and 'learning by doing' provide the majority of training in the informal sector. There are currently few procedures in place to recognize abilities gained in these ways in order to encourage workers to pursue official certifications.

There are a number of programs and training providers, but the service is fragmented, of varying quality, and with limited access in some areas of the country. Also, there are insufficient mechanisms to protect learners' or trainees' interests and ensure the integrity of training they get. It is possible that the name "TVET sector" is deceptive. Training is not provided in accordance with a shared vision or a set of coordinated and harmonious institutional relationships [9].

The lack of significant industrial ties was one of the main factors for Pakistan's non-performing TVET sector. To address this shortcoming, a focus has been placed on giving the industry and the private sector a central role in the country's TVET sector's development. For this purpose, in the construction, hotel, renewable energy, and textile industries, three Sector Skill Councils (SSCs) have been established. For the first time in Pakistan, the idea of Institute Management Committees (IMCs) has been adopted at the TVET institute level, giving the private sector greater representation in management and training delivery. The industry has played an active role in all stages of training, including curriculum development, final examinations, on-the-job training, and institute selection.

The outdated Apprenticeship Bill, 1962 has been replaced with Apprenticeship Act, 2018. The new law has a broader scope and is in line with the latest best practices in the field of apprenticeship [1].

Assessment of Enterprises on Skills of Employees after Training

Pakistan has 3,740 TVET institutes, including 2,100 private sector institutions, according to Pakistan's skills profile. These institutions provide 437,000 training spots each year, which is insufficient to keep up with the population growth. Furthermore, the Pakistani government has taken a number of steps to improve TVET training quality, including identifying training gaps, quality assurance, and the use of competency-based training (CBT), as well as engaging the private sector. *Kamyab-Jawan* and *Hunarmand Pakistan Program*, in particular, are supposed to provide greater

resources for TVET. The quality of training, on the other hand, varies from province to province and remains a major challenge for improving skills development. Gender differences in quantity and quality are also noted in the skills profile. Only one-third of places in vocational training schools are reserved for women, and they are provided with traditional training like tailoring and beauticians. Significant issues identified in the profile include lack of awareness of skill demands; lack of capacity to reach out to all Pakistanis; lack of skills portability, ambiguity, and overlaps in institutional frameworks; and infrequent private sector/employer engagement in TVET [7].

Evaluation of Pakistan's Firms using GII as a Basis

According to Global Innovation Index (GII), Pakistan's ranking for firms offering formal training is 48 (see Table 5). If we compare it with the rankings of Pakistan's neighboring countries, then we can see that it is lagging behind India (rank 38) and PR China (rank 1) [20]. This depicts that Pakistan has not achieved the optimal level of satisfaction regarding the training scenario by firms, and needs interventions. The reasons can be several as mentioned earlier [20].

TABLE 5

FIRMS OFFERING FORMAL TRAINING.

Country	Score	Rank
PR China	79.1	1
India	35.9	38
Pakistan	32.0	48
Nepal	31.9	48
Bangladesh	21.9	70

Source: Global Innovation Index, 2021.

Labor Market Transition Opportunities

Developing Professional Skills of Pakistani Workers

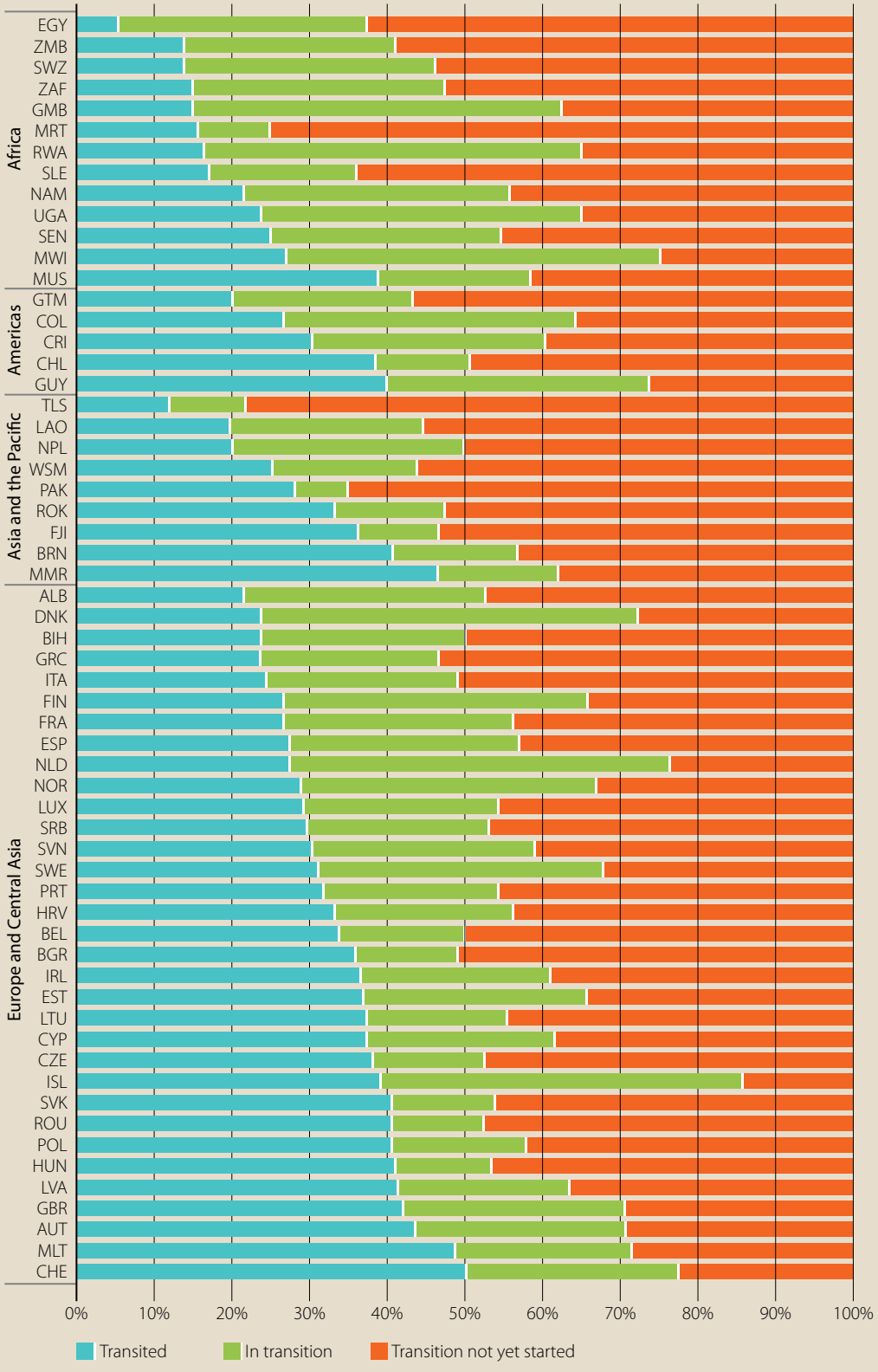
'Putting People First' is the first pillar of Vision 2025, and it stresses upon the importance of human capital development. Skills development is critical to achieving the national goals outlined in the Digital Economy Vision 2025. Private institutions currently supply 70% of higher education and 40% of primary and secondary education. There is no similar engagement with TVET, and the private sector may play a bigger role by training more of its own employees and contributing more broadly to the TVET reform. A more competent workforce will be an advantage and contribute to growth, while a lack of skills will stymie and frustrate development. To fulfil the demands of a changing economy, training supply must be linked with industrial and economic policies [9].

School-to-work Transitions

Of the total population, 59% are between the ages of 15 and 59, while 27% are between the ages of 15 and 29. Only if the youth have skills that are compatible with the demands of a contemporary economy will the youth bulge convert into economic gains [1]. However, the transition of Pakistan's young population into work is slow. According to the International Labour Organization [21], Mauritania, Pakistan, Sierra Leone, and Timor-Leste have the largest percentages of youth who have not yet begun their transition. These are nations where the percentage of youths not in employment, education, or training (NEET) is high. However, there are high educational enrollment rates and a low tendency among youth to mix work and studies. This is depicted in Figure 11.

FIGURE 11

DISTRIBUTION OF YOUTH BY STAGES OF TRANSITION.



Source: ILO Stat, 2019.

In low- and lower-middle-income countries, on the other hand, the proportion of school leavers outside the labor force who have no desire to work (see orange in Figure 11) is significantly higher, accounting for more than half of those who have not yet begun their transitions in Myanmar, Guatemala, Pakistan, Mauritania, and Lao PDR. With the exception of Lao PDR, these are the same nations where we see considerable gender discrepancies in the proportions of young women and men who have not yet begun transition. Such findings appear to show that women make up a substantial proportion of school dropouts with no intention of looking for work in these countries. These countries also have relatively high rates of women who are not in job, education, or training, which supports this finding [21].

Labor Market Transitions

The dynamics of market are changing and the statistics regarding the employment patterns of Pakistani market are also showing interesting facts. For instance, Figure 12 shows three important aspects. First, the number of employees has increased with the decline of self-employment, which is a sign of more organized workforce. Second, entrepreneurship got fame earlier, then declined, and has now emerged again. Third, the growth of unpaid family workers was seen earlier but has now decreased [22].

TABLE 6

GROWTH RATE OF EMPLOYMENT BY EMPLOYMENT STATUS.

	2003–04 to 2010–11	2010–11 to 2017–18	Share in employment in 2017–18
Employers	10.0	1.9	1.4%
Self-employed	2.8	1.9	34.8%
Contributing/unpaid family workers	5.6	–1.7	21.4%
Employees	2.9	4.3	42.4%
Total	3.6	1.9	

Source: Labor and Employment in Pakistan, 2021.

Similarly, if we see the occupation wise scenario, surprisingly, managerial and associate-level as well as technical occupations are showing declining patterns while middle-level occupations have increasing trends. This is described in Figure 13 [22].

TABLE 7

GROWTH RATE OF EMPLOYMENT BY OCCUPATION.

	2003–04 to 2010–11	2010–11 to 2017–18	Share in employment in 2017–18
High level[a]	3.6	–5.0	11.3%
Medium level[b]	4.2	3.7	49.3%
Low level [c]	3.0	2.4	39.4%

[a] Managers, professionals plus technical personnel and associate professionals.
[b] Clerical support workers, service and sales workers, and skilled agricultural workers.
[c] Craft and related trade workers, plant/machine operators and assemblers, and elementary occupations.
Source: Labor and Employment in Pakistan, 2021.

Strategic Policy Directions for Cultivating New Talent for Future

As mentioned earlier, to have an in-depth understanding of labor market policies for changing market demand, senior employees of TEVTA were interviewed. Open-ended questions were asked. The

analysis technique adopted for this study was thematic analysis and the model of Braun and Clarke [23] was followed by use of Nvivo 11 software. Video-recorded interviews were done and transcribed, and data was coded by finding themes and extracting nodes from the conversations with respondents. In the analysis techniques, 'text search query' was used to find the word trees that show the connection of conversation before and after some word of our interest (see Annexure 1). Then, 'word frequency query' was used to search the tag clouds based on the frequency of words spoken by respondents (see Annexure 2). In addition, exploration of tree map was done to see the weightage of each theme. By following Kushner [24], all video-recorded interviews were transcribed. Then, by coding data, five major themes were extracted and their nodes were generated. These themes are,

(1) training, skilling, and reskilling needs;

(2) strategic gaps;

(3) transition opportunities;

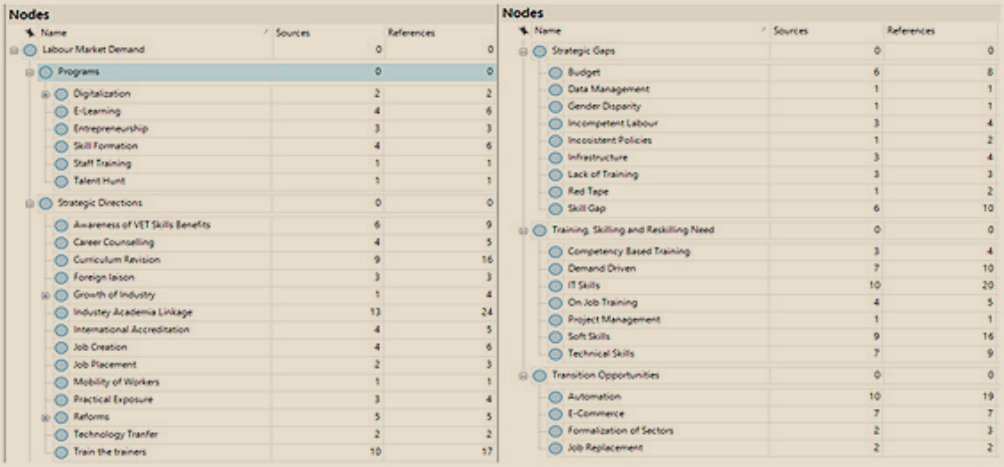
(4) strategic directions; and

(5) programs.

Nodes and sub-nodes of these themes are shown in Figure 14. Each node represents the mentioned factors as parent nodes and subsequent nodes as child nodes. These nodes are extracted by deep reading of textual data from interviews. In Figure 14, sources represent the frequency of participants who had talked about any specific theme in their conversations, whereas references depict the total number of coding.

FIGURE 12

DATA CODING AND DEVELOPMENT TREE MAP.

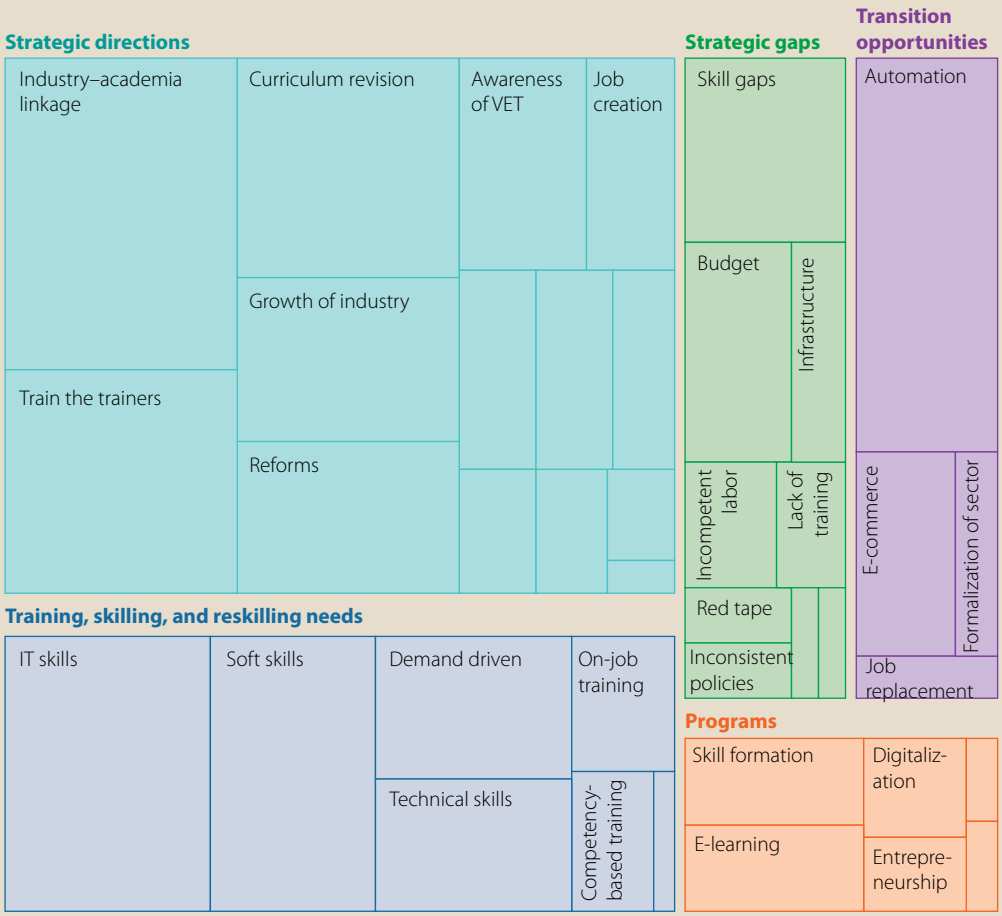


In Figure 14, it can be seen that programs is a parent node, under which, digitalization (S=2, R=2); e-learning (s=4, R=6); entrepreneurship (S=3, R=3); skill formation (S=4, R=6); staff training (S=1, R=1); and talent hunt programs (S=1, R=1) are child nodes. Similarly, strategic direction as parent node has its child nodes as awareness of VET benefits (S=6, R=9); career counselling (S=4, R=5); and so on.

Further, tree map is a depicter of significance of each theme. Figure 15 shows the tree map of 'labor market demand' as the main topic, which has themes of strategic directions; training, skilling and reskilling needs; strategic gaps; transition opportunities; and programs. Here, those themes are considered more significant that have comparatively bigger boxes than other themes.

FIGURE 13

TREE MAP OF LABOR MARKET DEMAND.



For instance, 'strategic directions' has covered a larger portion and within that, 'industry–academia linkage' has gained a major share in tree map. It indicates that more of the respondents emphasized this point compared with other points. Thus, this figure shows that industry–academia linkage, curriculum revision, train the trainer, growth of industry, reforms, and awareness of VET programs are major themes to be considered in the context of strategic direction. In the similar vein, for 'training, skilling, and reskilling needs,' IT skills, soft skills, technical skills, and demand-driven skills are mainly emphasized by interviewees, while on-the-job training and competency-based training are having relatively smaller shares. For 'strategic gaps,' skill gap and budget are the most important themes; and other factors like infrastructure, incompetent labor, lack of training are comparatively less significant, while red tape, inconsistent policies, gender disparity and data management are also gaps with comparatively less focus. For 'transition opportunities,' the major themes are automation, and e-commerce, while formalization of the sector and job replacement are

comparatively less significant themes. Lastly, for 'programs' theme, as also mentioned in Annexure 3E, skill formation and e-learning programs have got the main share of tree map compared with entrepreneurship, digitalization based programs, talent hunt, and staff training programs.

Direction and Solutions to Develop Professional Skills for Workers

Skills development is considered the key in the times of fourth industrial revolution for Pakistan [7]. For low- and middle-income economies, lack of professional and management skills in youth may lead to unemployment or resistance to acquiring quality jobs with decent work environment. The issue is becoming more serious with rapidly changing economies that require more innovative skills. Workers need to be updated, flexible, and adaptive in order to exploit the market opportunities at both national and international levels [1]. Thus, the focus should be toward future skills. As a respondent said, "Every strategy is not viable unless industry-demand-driven courses are offered. To make the strategy successful, there should be proper industry assessment and close liaison with institutions."

The fourth industrial revolution is also compelling acquisition of some other important skills that are not properly addressed in the context of Pakistan as mentioned by a respondent, "I guess we are providing computer skills but very advanced skills like artificial intelligence, freelancing skills, and ecommerce skills are still missing."

So, there is a need for training the labor force with latest IT skills. The international market today wants workers who keep soft skills along with technical skills [25]. A respondent said, "We should inculcate human skills and soft skills into our labor so that while being a good technician, one can be a good person as well. When a passed out student of TVET goes in the market to give interviews; he/she should know all decorum of an interview. I have seen industries where technicians have certain protocols. We should teach all those protocols to our students."

In this vein, competency-based training can play a vital role for professional development of the labor force. Several respondents have emphasized the need for these trainings. For instance, a respondent said, "Competencies-based trainings are great. I, myself, have attended one, and am satisfied with it to some extent. If you want to train our employees for the international market, we need to have access to their machinery, technologies, and manuals."

Moreover, the training of teachers is a widely neglected area of policy makers, but it should be addressed [9]. For that purpose, on-the-job training can be a very useful step to develop professional skills among teachers as well as students. As stated by a respondent, "On-the-job training is very essential. While students are learning from their teachers, the teachers also need an environment in which they can practice their skills."

When we look at the technical skills, there is another important fact that technical education is not accessed by all population, and particularly, the remote areas are neglected [9]. A respondent has also pitched for this area to be addressed, "Technical colleges should be established in remote areas of Pakistan. There is a gap, as only 45 technical colleges are present in Punjab to provide diplomas."

Thus, it can be assumed that professional skills can be enhanced through training in contemporary skills, especially soft skills, IT skills, and technical skills; emphasis on competency-based training; and on-the-job trainings.

Direction of Strategy for VET Development in the Period 2021–30

There are a lot of strategic areas that need to be addressed. Here a few important aspects have been explained in the light of earlier literature and the research findings of this research. First of all, the scope of allocation of additional budgets and resources for skills are limited. The prepared budgets are much lower than the bids, and transfer of payments from national and provincial treasuries are irregular [9]. This issue is largely discussed by most of the respondents as well. For instance, a respondent said, "There are strategic gaps in addressing skilling needs of Pakistani labor due to scarcity of resources, budgetary constraints, lack of equipment, and unavailability of quality trainers."

Similarly, the institutions are also reluctant to provide proper training to their employees due to cost issues [9]. A respondent said, "Due to budgetary constraints, we are unable to provide latest training to employees and students of the TVET sector."

So, special attention to budgetary allocation by government and private institutions is required to fulfill the skilling requirement of the labor force at this time of change. Assistance from foreign donors can also be a good option.

Another important issue is that the government had introduced some tax reliefs and incentives for apprenticeship providers, but provisioning of these incentives gets delayed due to bureaucratic procedures. The same bureaucratic hurdles are there in the provision of training [9]. A respondent said, "Being a government institute, when we hire someone, we face many difficulties in training them. First, an approval (red tape) is required, then if the person gets leave then he/she will be able to do the next course and upgrade him/herself. People do not get involved in such hectic exercises and it is not possible to train oneself without getting involved in such hectic exercises."

Thus, there is a need to simplify the procedures in order to cope with challenges faced by TVET institutions. In addition, there is a need for Skill Development University and revision of the curriculum. Also, the scale of skill development needs to be broadened [9]. The respondents also suggested that skill development should be a part of curriculum in institutions other than TVET institutions as well. A respondent expressed, "We need to formulate such strategies that will bind the industries such that they cannot induct unskilled labor. And the institutions should be instructed strictly that they cannot launch any course that is not according to the demands of industry. There should be a proper survey, followed by a recommendation on starting a course. Not only one, but all institutions' recommendations should be included."

Another respondent said, "We are producing youth that have only theoretical knowledge that is not at par with the requirements of the market. The market is changing very rapidly, and we need to replace the curriculum."

Furthermore, the World Bank has confidently assessed that the overseas employment of skilled workers will increase. However, the export of Pakistani workers is declining. Today, internationally recognized formal degrees are required, but in Pakistan most of the labor is skilled for the informal sector with no formal degree. Thus, all informal sectors need formalization to enhance the export of labor [9]. Similarly, the utilization of labor nationally also needs formalization. This is emphasized by a respondent, who said, "In domestic workstations, women used to work from home. They used to do stitching, embroidery, etc. for earning. The boutiques and brands have finished those women's monopoly and have made them dependent on them. Careem and Uber have disturbed all the systems of taxi services. Now drivers are helpless to get themselves

registered with these companies. The informal sector needs to be formalized with these technological advancements."

If we see the formalization of the sector, then there is another issue that those who get degrees are not skilled enough to meet the industry's needs [9]. A respondent highlighted this by saying, "There is still a gap. For example, the industry wants electricians for the logic control system. We do have a separate course, but its learning is not embedded in the electrician course. Institutions should merge electrical and electronics so that the person belonging to the electrical stream can also work on PLC panels."

Another respondent said, "For agriculture, many machines have been imported. In agriculture and livestock, it is hard to find labor. Even in other industries, compatible labor is not available."

Thus, there is a need for international accreditation of TVET institutions to update the standard of skilling as per the international benchmarks. A respondent noted, "There must be international accreditation. Also, there is a need to collaborate with all national and international agencies, including NGOs, which provide skills to our youths at the state level too."

Another important aspect in this regard was explained by a respondent, "Here in Pakistan, the skillsets that we are providing to students are relevant just for maintenance." This means one is not imparting the knowledge for creation. The technology is not learnt, and skill deficit is occurring. This was explained by a respondent, "In the automobile industry in Pakistan, assembling is being done but the technology transfer is very difficult. That is why our people working in that industry cannot grow. Atlas Honda has been earning from Pakistan for a long time and sending their cars to Japan but still our people are not having the technological control. Our law, regulation, and constitution are not strong enough so that a technology can be transferred to us."

Thus, there is a strong need for technology transfer to Pakistan for skill formation. The government should promote licensing instead of foreign subsidiaries. Moreover, the intuitions should be accredited internationally to enhance the level of training.

In addition, the China–Pakistan Economic Corridor (CPEC) is a huge project costing USD50.70 billion with the potential for creating 174,000 direct jobs [1]. However, no skill criteria in relevant TVET trades have been defined. Then, there is the threat of deployment of Chinese labor [9, 10]. Moreover, the technically weak labor can potentially harm the access of this project. A respondent elaborated the severity of situation with a statistical view, "There is a huge change in market demand in the current scenario. Presently, in the local market, there is demand for around 1 million skilled labor per annum, and if we include the CPEC as well, then there is demand for 2 million technical people per annum. Unfortunately, the current supply of workers is 4.5 million per annum through technical institutes."

Therefore, in the current scenario, there is a strong need to cover this demand gap by skilling more and more labor.

Additionally, women are 48.54% of the total population in Pakistan but they are just 20.53% of the labor force [3], with very few opportunities to get skilled. A respondent highlighted this aspect as well, and said, "The social barriers are so severe that our women, despite their need and willingness, are reluctant to enter the industry."

Thus, there is a need to bring this segment of population to best utilization by bringing policies for their empowerment and participation in the labor force. One of the major hurdles in the performance of TVET institutions is a weak industry linkage. Most of the respondents have elaborated this. A respondent said, "There is a gap between industry and institutions. The industry is thinking that institutions are wasting the time and resources of the government. Institutions are also of the view that the industry is not fulfilling its social responsibility."

This liaison is very important and can also give solutions for placement of skilled labor, as elaborated by a respondent, "There should be a database, and our trainees should be involved. They should be registered there and also the industry and institutes' liaison should be developed. The registered students and the industry should have direct contact so that they can apply for placement."

Another important thing to be considered is the practical exposure of students, which can be enriched through a strong industry–academia linkage, as suggested by a respondent, "There should be a strong linkage of institutions with the industry in such a way that 50% of a student's course should be completed at the institution while the rest 50% should be the practical part in which the student is supposed to apply skills practically in the industry."

This industry–academia linkage is of great importance but there is also a reality, elaborated by a respondent. He said, "In my opinion, we do not have sufficient industry, so how is it possible to create linkage between institutes and the industry? We should promote industry growth."

Thus, there is a need to ensure the growth of the industry to create a pool of jobs for skilled workers as highlighted by a respondent, "A skilled person, after getting out of an institution, is still unable to get a job. If we are training 50 students in auto mechanics in a small city, multiply it for five years. Then, you can calculate how many students will be present out there with this skill. Now, all 250 skilled persons cannot open a workshop in that area, as the maximum requirement of that area is 20 to 25. They will change the area or learn new skills because they are now unable to apply their previously learnt skills."

Lastly, an important point is that Pakistan is among the countries where the school-to-work transition is the slowest [21]. One of the major reasons is the lack of awareness of people regarding the benefits of technical and vocational education. This has been described by a respondent, "If you ask me today which profession I consider right for my children in future, despite my 15–20 years of experience in this sector, I will never want my children to adopt any profession in the vocational and technical sector. Even today, I want my child to become a doctor or an engineer."

Thus, there is a need to change this mindset. Awareness should be created among general public regarding the benefits of technical and vocational education.

If we summarize these directions then it evolves that the major areas with potential growth opportunities are: budgetary allocation to skills building, industry–academia linkage with industry growth, formalization of sectors, more participation of women, best utilization of labor force in CPEC, and international accreditation of TVET institutions, along with the placement of Pakistani labor at national and international levels.

Program to Support Development of Pakistan's Labor Market up to 2030

The scenario of TVET in Pakistan compels the initiation of several programs for the growth of labor markets. A few of the programs have been described in the light of findings of the current

study. First, the unemployment rate is currently at 5.7 and skills development is crucial to the achievement of national goals set out in Vision 2025 [9]. A respondent also said, "There should be focus on skills development so that unemployment rate can be reduced."

The government of Pakistan has initiated *Prime Minister's Hunarmand Program* (called 'skills for all' program). Similarly, in addressing the need of labor, the government has also introduced Youth Entrepreneurship Scheme and Prime Minister's Startup Pakistan Program to instill the entrepreneurial spirit among the youth and provide loans of Rs 100,000 to Rs 25 million with 3–5% markup for eight years [1]. A respondent, highlighting this need, said, "We have to encourage SMEs (like our current government has started to give loans). This is a great initiative. People will become job givers instead of job seekers. Job seekers are increasing unemployment; job givers are reducing unemployment. So, we need to embed entrepreneurship modules in our entire courses. The entrepreneurship module should be based on practical projects."

Likewise, the fourth industrial revolution has raised the demand for digital and e-learning-based education. Such programs should also be initiated. As a respondent said, "The market is getting more and more technology-based, the computer revolution is spreading, and Pakistan's textile industry is using high-level technology. We do not have skilled workers, so we need to train them well."

Another respondent said, "Promote e-learning, because it provides more skills to the TEVTA, and HR can create better situation for employees to work in a better way and use e-learning to earn more in these times."

Moreover, there is a big gap in the training of teachers. It is a neglected area [9]. Thus, such programs should be initiated that enhance the training opportunities for teachers. This was elaborated by a respondent in appreciating the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) model. He said, "We have to train the trainers (and for this, training cascade model has started with the help of the GIZ model). Training of teachers is about being strictly focused because those who have to train the students for the industry should be trained themselves first. Pedagogical training and skill upgradation training are being focused. I am personally a fan of this cascade model. GIZ is financially supporting it. Financially, there is no burden on the institutions."

In this reference, GIZ is actually a platform initiated by Pakistan and Germany for extending cooperation since 1963. GIZ works as representative of German Federal Ministry for Economic Cooperation and Development (BMZ), and its priority areas are

- training and sustainable growth for decent jobs;
- peaceful and inclusive societies; and
- climate and energy.

GIZ facilitates several vocational institutions to enable them to provide apprenticeships in accordance with the labor market demand. It provides social benefits to great number of people by helping health insurance systems and agencies working for social security. GIZ also maintains the labor safety and environmental standards in the textile sector of Pakistan in coordination with the Government of Pakistan. Moreover, GIZ is also advisor to the government for transparent and

people-oriented governance system. For instance, it has assisted the government and the civil society in health and education-oriented activities in border areas near Afghanistan and did work in the management of refuges. Remarkably, GIZ has financially and technically supported energy efficiency and use of renewable sources [27].

Specifically, in TVET context, a project tiled "Supporting technical and vocational education and training (TVET) reform in Pakistan" was launched by GIZ. The program had the objectives to raise the participation of private sector in TVET trainings, improve governance, and raise the quality of skill development aligned with changing labor market demands. It was funded by German Federal Ministry for Economic Cooperation and Development (BMZ) and the European Union. It completed its first phase in 2016 and the second phase was started in 2017 for three years. It focused on four areas, namely, governance and policy formulation, private sector engagement, implementation of reformed TVET, and human resource development and teaching [28].

In the area of *governance and policy formulation*, this program has facilitated TVET policy implementation and strengthened the bond between private and public sector organizations. Moreover, it also furnished the accreditation and quality enhancement standards for the TVET sector. For *private sector engagement*, it has promoted the placement of private institutions in decision making bodies, strengthened the stakeholder dialog, and furnished the grounds to institute management committees and employee-led Sector Skills Councils. For *implementation of reformed TVET*, it is ensuring demand-based vocational training for youth through agreements between institutions and training enterprises by giving on-the-job trainings. For the fourth area of *human resource development/teacher training*, it has encompassed the execution of National Vocational Qualifications Framework (NVQF) and Competency Based Training & Assessment (CBT&A) for formulation and deliverance of demand driven vocational courses. It has also arranged the pre-service and in-service training for teachers of TVET [28].

It has earned several outcomes. For instance, this program has led the first ever national TVET policy, initiated the National Skills Strategy, and formulated new apprenticeship law. It has accredited almost 1,200 programs in the TVET sector. It has constituted the NVQF that has produced 200,000 graduates via pilot project of CBT&A in 142 institutions. It has also arranged training of management skills for 880 managers and officers from TEVTAs. Resultantly, TEVTAs of AJK, Sindh, and Punjab attained ISO certificates. Moreover, with the perspective of e-learning, 18 centers were established and 8,500 teachers were trained. In parallel, three Pakistani universities were involved, in collaboration with the German University, for designing of new post graduate degree programs for TVET teachers. Furthermore, A National Skills Information System was also established through which employees and job aspirants were gathered and real-time market analysis were done. Moreover, its initiative of Fund for Innovative Training (FIT) has supported the 36 projects that have helped 125,000 people for training needs. In addition, in big cities, it has brought new training schemes for commercial and technical trades with collaboration of 143 local and multinational companies and has arranged training of 10,000 professionals [28].

Additionally, 102 vocational counselling and job placement centers have been developed. For recognitions, employer-of-the-year awards have especially been announced to admit the efforts of those organizations that conduct vocational training of employees. Moreover, the first ever TVET Conference has been introduced and donor coordination mechanisms have also been introduced in the county with the endeavors of GIZ [28]. Such initiatives, in collaboration with other countries, can bring considerable difference.

In addition, 27% population of Pakistan is in the age group of 17–29 years [1]. This bulge can transform the economy if their talents could be utilized in a true sense. A respondent suggested, "First of all, a talent hunt program should be initiated."

The government of Pakistan is aiming to address this, and a program has been initiated as Pakistan Talent Hunt Program. Also, the Prime Minister had nominated 2022 as the Youth Year. Some of the initiatives taken in this regard are contracts with international athletes to train the youth of Pakistan [26]. However, this should not be limited to sports. Other skilling areas should also be considered.

A lot of training programs and training providers are in the market, but training provision is still fragmented with less provision for remote areas of Pakistan. Additionally, the quality of training is uneven [9]. No doubt, governments take initiatives and develop strategies and programs, but several hazards exist in their implementation. Some of the biggest problems include political turmoil and inconsistency in the implementation of strategies due to regime changes. As a respondent expressed this concern, "Here, when a political party comes to power, they remove the heads of institutions without seeing their competencies and only on the basis that the previous regime had hired them. For the officials who have gained experience in the past 3–5 years, it was their time to deliver when they were removed from their post. The new hires will again take time to learn. The policy makers will make policies according to their parties and so those policies will be of short term."

Thus, continuity of policies is necessary for gaining the true results from the initiated programs. Conclusively, it is a reality that labor market dynamics are changing at the time of this fourth industrial revolution. This time presents an opportunity as well a threat for underdeveloped countries like Pakistan. Looking at the opportunities, Pakistan has a huge bulge of young population that can potentially boost its economy if treated in the right manner. Skill formation has become vital at this time. If the industry–academia liaison can be developed, growth opportunities will be created, and better utilization of funding can be done with the continuation of policies. Then, Pakistan can emerge a progressive country at this time of transition.

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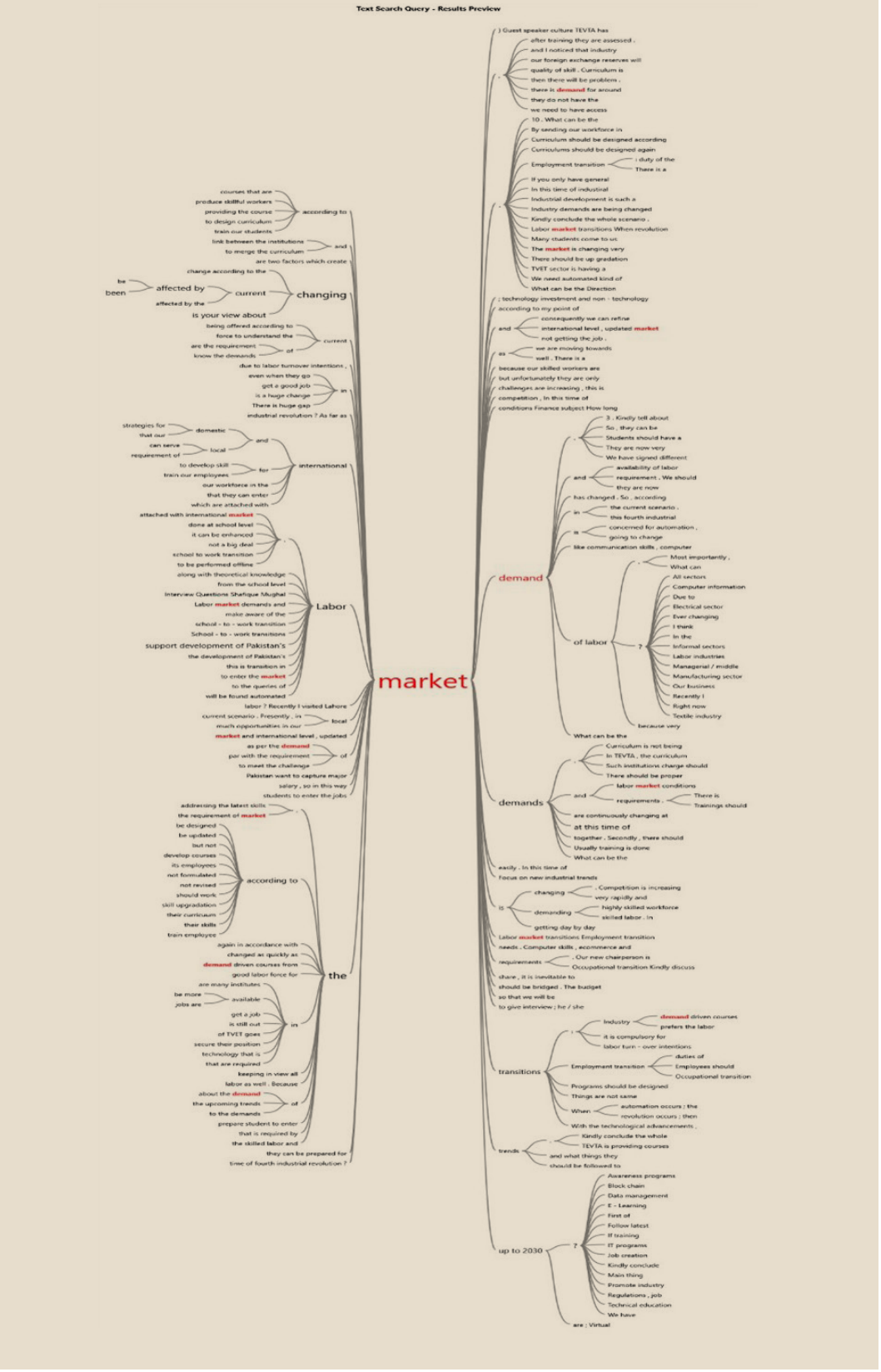
Annexure 1

WORD TREE.



Annexure 2

TAG CLOUD.

THE PHILIPPINES

Introduction

The Philippines is among the Asian countries having many skilled workers in various sectors. Skills are valuable in empowering a service-based economy. According to the International Labor Organization (ILO) [1], the world of work is undergoing a significant transformation process with the rise of new technologies, innovations, demographic shifts, climate change, globalization, and the impact of the COVID-19 crisis. These changes have led to disruptions, worldwide, including the Philippines, affecting economies, businesses, and the labor market, specifically employment opportunities. Furthermore, this disruption has led workers to adapt to technological changes in a hastened manner, by acquiring new skills that could address their upskilling and reskilling needs.

Lund, Madgavkar, *et al* [2] state that the range of workforce transitions set off by COVID-19 increases the importance for enterprises and policymakers to support additional training and education programs for workers. Establishments and governments have displayed extraordinary flexibility and adaptability in responding to the pandemic with purpose and innovation to retool the workforce in ways that point to enhanced productivity and a brighter future of work. Everybody has to step up for workforces and enterprises to bounce back, focusing on accelerating Industry 4.0 for surviving and resiliently recovering from the pandemic and facing the new normal [3].

The sudden upsurge of COVID-19 has quickened Industry 4.0 or Fourth Industrial Revolution (FIRe) adoption. However, it has caused an unanticipated change in the operation of establishments across sectors toward a mature state of digital transformation [4]. According to Davis [5], Industry 4.0 marks the advent of cyber–physical systems, involving new capabilities for all people and machines. The union of physical and digital technologies includes analytics, artificial intelligence (AI), cognitive computing, robotics, nanotechnology, internet of things (IoT), 3D printing, and other technological advancements brought about by FIRe [6].

This new era builds and extends the impact of digitalization in new and unanticipated ways. The future of work implies the possibility to evolve our workforces and workplaces. The widespread digitalization of business processes as well as of data and information has disrupted establishment models all over the globe. An individual working nine-to-five may observe that work seems to be changing faster than ever before. These significant changes threaten to create enormous social and economic disruptions. Digitalization causes jobs changes and job displacements due to the impact of emerging technologies on manufacturing and services sectors, and may cause anxiety due to automation or digitalization among individuals. The technological advancement could result in reconsidering the roles of individuals and organizations that will drive retooling and relearning for career stability and improvement. A collaboration of the government, the industry, and the academia should focus on developing strategies that will make the future of work productive and rewarding for everyone [7].

ILO has stated that the Philippines has urgently undertaken skills development against the new wave of technological innovation and demographic shifts [1]. The government has been crafting strategic policies and programs to help equip the Filipino workforce in the changing world of work. In 2018, discussions on the Philippine readiness on the future of work for FIRe were in place. The

government continues to spearhead programs that take advantage of emerging technologies to support the innovation capacity and competitiveness of establishments and the Filipino workforce, thereby leading to increased productivity. The Philippines, like other countries, sees a rapid increase in opportunities for productivity growth and development of technologies, even new business models, despite that countries are recovering from the pandemic. Skills development, upskilling, and reskilling form part of a strategy for building capacity in key priority industries with the emergence of new technologies, skills, roles, and capabilities. In this regard, Filipino workers need to collectively and individually have a sense of technological disruption. It is prompted by the pandemic's global disruptions and technological changes, while shaping the country's economic, social, and political outcomes in this new normal. A new mindset, along with new policies and institutions are necessary to bring about rapid changes and renewed thinking.

This report examines the current Philippine policies and programs that accelerate its human capital development to prepare Filipino workers to meet the changing labor market demands for new skills. These changes will also enable policymakers and even decisionmakers in enterprises to cope with fluid labor market dynamics in the Philippines. This report focuses on the Philippine Department of Labor and Employment initiatives on the current demand and technology-adept skills. The methodology of the study comprises (1) desk review of labor policies and initiatives of the government for the labor market; and (2) consultations with key responsible organizations in the government and other stakeholders.

Macroeconomic Setting in the Philippines

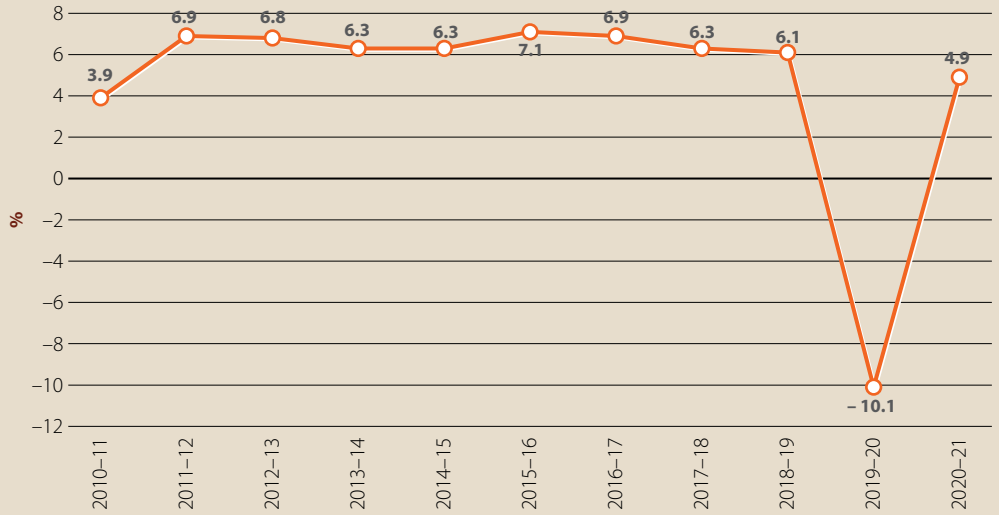
The Philippines has been one of the strong performers in the ASEAN region, having registered a robust economic performance averaging 6.2% from 2011 to 2019 (see Figure 1) amidst rising global uncertainties. Despite the downside of inflation in the country, economic developments have been brought about by fiscal reforms and public investment programs by the Duterte administration, including the 'Build, Build, Build' initiative. According to the World Bank, fast-tracking the implementation of recently approved reforms to help achieve inclusive growth and promote competition to generate quality jobs will enhance the impact of growth on poverty reduction in the Philippines [9].

The coronavirus outbreak and calamities such as volcanic eruptions and floods in the early part of 2020 and the latter part of 2021 have greatly affected the Philippine economy. The GDA slump by a negative 10.1% from 2019 to 2020, caused by prolonged lockdowns and strict quarantine measures that limited the movements of individuals. Businesses feared the surge of infections that caused some to close and focus on innovating, being creative, and becoming risk-takers to adapt to the new normal [10].

The Philippines is slowly bouncing back, having registered a positive growth of 4.9% in 2021 over 2020 (see Figure 1), in the third quarter. The main contributors to the growth have been industry at 7.6% and services at 4.6% (see Figure 2). Industries that contributed the most to the growth were food products, primary pharmaceutical products, and pharmaceutical preparations, which were considered essential during the pandemic. Employment continued to be there despite the pandemic through alternative work arrangements. The services sector sustained its momentum, accounting for approximately 60% of the GDP. The Philippine Statistical Authority (PSA) stated that the top contributors from this sector were wholesale and retail trade, repair of motor vehicles and motorcycles, professional and business services, and financial and insurance activities. Despite many unemployed workers in the country, Filipino workers proved to be resilient by way of

FIGURE 1

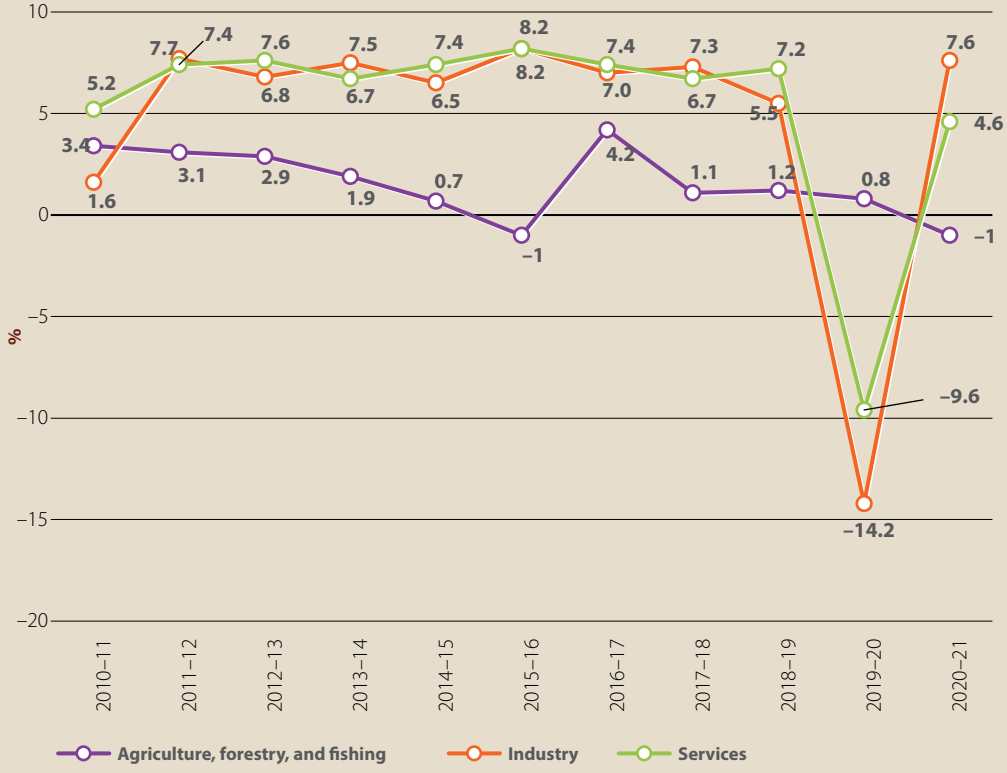
GROWTH RATE OF GROSS VALUE ADDED, 2011–21P.



Note: At 2018 constant prices.
*2021P: Partial result, as of the third quarter.
Source: The National Accounts of the Philippines, Philippine Statistical Authority (PSA).

FIGURE 2

GROWTH RATE OF GROSS VALUE ADDED BY SECTOR, 2011–21P.



Note: At 20018 constant prices.
2021P: Partial result, as of the third quarter.
Source: The National Accounts of the Philippines, PSA.

building and venturing into new companies, amidst the rise of the gig economy, to provide for their families and survive. The crisis has created opportunities for a new class of innovators adapting to the new normal where most businesses have gone for digitalization.

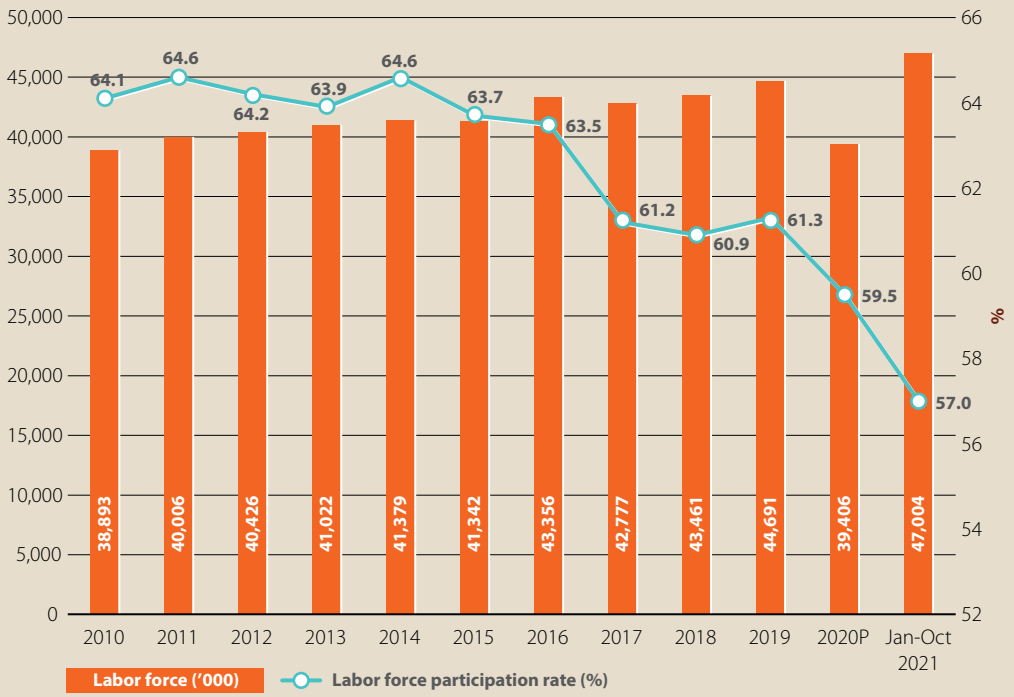
Labor and Employment Situation

One of the effective strategies in uplifting the lives of Filipinos out of poverty is providing them with productive employment. The PSA collects labor data through the Philippine Labor Force Survey (LFS) on a monthly basis to show how it has managed its employment program.

The Philippines' total labor force went up from 38.9 million in 2010 to 44.7 million in 2019 (see Figure 3). In the first quarter of 2020, there was a decrease in Filipino workers who lost their jobs due to the global disruptions caused by COVID-19, with only 39.4 million left in the labor force.

FIGURE 3

LABOR FORCE AND LABOR FORCE PARTICIPATION RATE, 2010–21P.

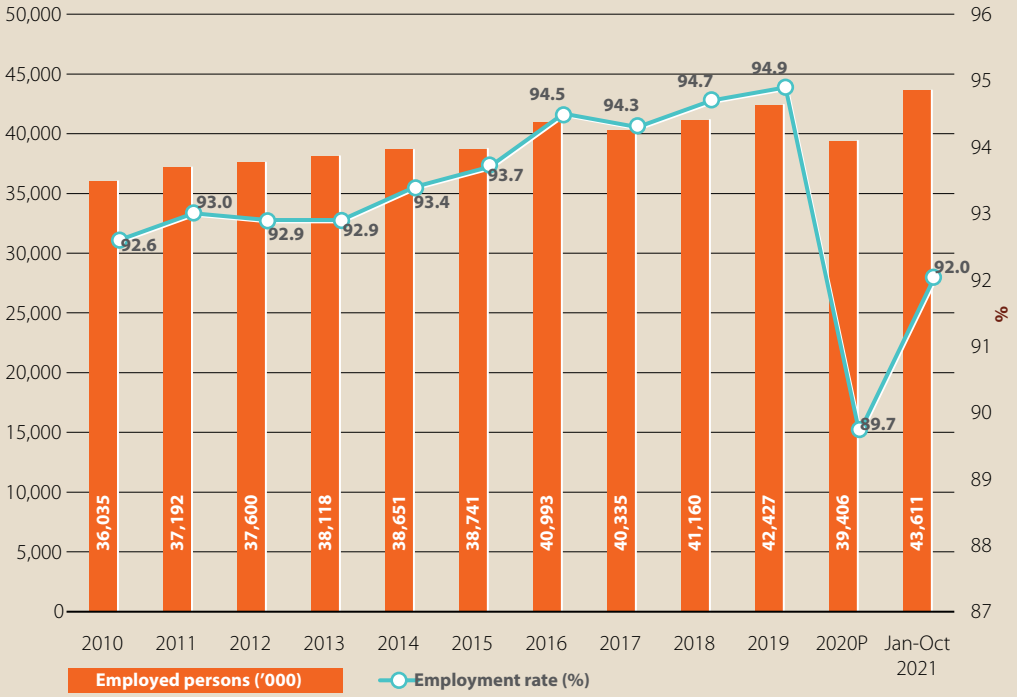


Notes: Employment levels and employment rates from January 2021 to October 2021 have been computed using average; 2021P data is partial.
Source: Labor Force Survey, Philippine Statistical Authority.

The Philippines is slowly opening its economy and recovering from the impact of the pandemic. As seen in Figure 4, in the last ten years, the employment rate in the Philippines increased from 92.6% (36.04 million workers) in 2010 to 94.9% (42.4 million workers) in 2019. However, due to prolonged lockdowns, business shutdowns, and travel restrictions during the pandemic along with community quarantine measures taken by the government, the employment rate decreased to 89.7% (39.4 million workers) in 2020, marking a decrease of 5.2% from 2019; while in 2021, the employment rate increased to 92.0% on an average during the period from January 2021 to October 2021.

FIGURE 4

NUMBER OF EMPLOYED PERSONS AND EMPLOYMENT RATE, 2010–21P.



Note: Based on partial results for the period 2020 –21.
Source: Labor Force Survey, PSA.

As is evident from Figure 5, the unemployment rate rose from 7.4% (2.9 million) in 2010 to 10.3% (1.5 million) in 2020. In 2019, unemployment rate was the lowest at 5.1% (1.1 million), with the NEDA reporting that the country effectively created jobs through 'Build, Build, Build' projects. The Philippines' unemployment rate increased by 8.2% from January 2021 to October 2021, after a drop in 2019. It translated into an average of 3.8 million Filipinos without jobs, though the government had eased out the quarantine measures.

The country gradually eased out the quarantine restrictions and authorized more economic activities to resume.

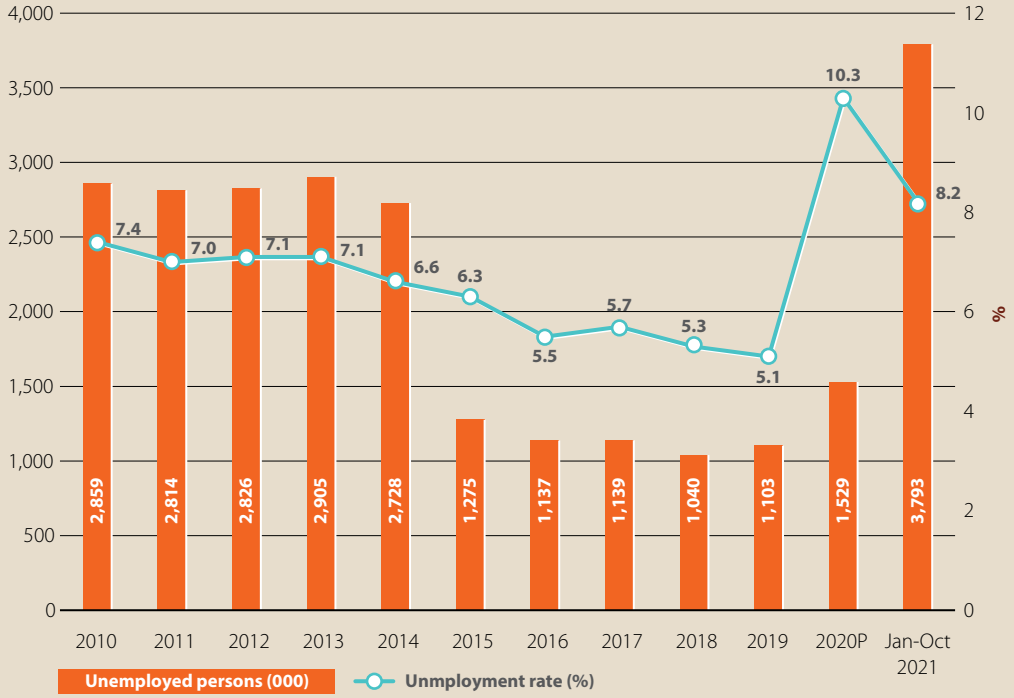
Assessment of National Labor Training and Reskilling Strategies

After embarking upon a program of inclusive growth and poverty reduction under the previous Philippine Development Plan 2011–16, the country has slowly transformed from being an economic laggard to one of the best-performing economies in Asia. The Philippine Development Plan (PDP) 2017–22 is a medium-term plan anchored on a long-term plan for the next 25 years [12]. The Philippines' vision for 2040 is *'Matatag, Maginhawa, at panatag na buhay'* or *'AmBisyonNatin 2040,'* wherein the country would be a prosperous middle-class society where no one is poor.

The Philippines has recognized the need to create quality jobs in various sectors to alleviate the plight of its people due to poverty. Chapter 10 of the revised PDP plan, titled "Human Capital Development Towards Greater Agility," intends to strengthen strategies to transform the Philippines'

FIGURE 5

NUMBER OF UNEMPLOYED PERSONS AND UNEMPLOYMENT RATE, 2010–21P.



Note: P=partial results from 2020 to 2021. Employment levels and employment rates from January 2021 to October 2021 have been computed using an average.
Source: Labor Force Survey, PSA.

human capital toward greater agility for a healthy and resilient country [13]. Despite the accomplishments of the previous plan and administration, the Philippines needs to address challenges that impede the realization of Filipinos' full potential. Combining the original and updated PDP 2017–2022, the difficulties in human capital development were identified to assess policies that would help the Philippines, its enterprises, and its workers to face and be ready for the changing market demands of the labor market, such as the rise of FIRe and the disruptions caused by the COVID-19 pandemic.

Chapter 14 of PDP 2017–2022, titled "Vigorously Advancing Science, Technology, and Innovation," is where the plan for artificial intelligence (AI) development is. The chapter states that science, technology, and innovation (STI) play a vital role in economic and social progress. It is an essential driver of the long-term growth of an economy. The AI component in PDP 2017–22 focuses primarily on manufacturing as the government pushes its 'Build, Build, Build' infrastructure plan. The plan describes AI as one of the "most promising and potentially disruptive emerging technologies."

However, a low level of innovation in the country is brought about by a weak STI culture; insufficient research and development (R&D) budgets; weaknesses in STI human capital; inadequate science and technology (S&T) human resources engaged in STI R&D; difficulty in increasing employment opportunities and retaining S&T human capital; absence of a vibrant intellectual property culture; weak linkages among players in the STI ecosystem; and inadequate STI infrastructure. Strategies were set in place to stimulate growth in STI, including promoting

commercialization and utilization of technologies from publicly funded R&D; development of a vibrant intellectual property rights (IPR) culture; provision of support mechanisms for startups and MSMEs in the regions; and supporting the R&D plan [14].

This report identifies five gaps or challenges that the government and the partners in the industry and academia need to prioritize to meet the changing labor market demands. These gaps, discussed in the next section, cut across sectors, including the rise of innovation and the digital transformation industry.

Gaps and Challenges

Underemployment Challenge

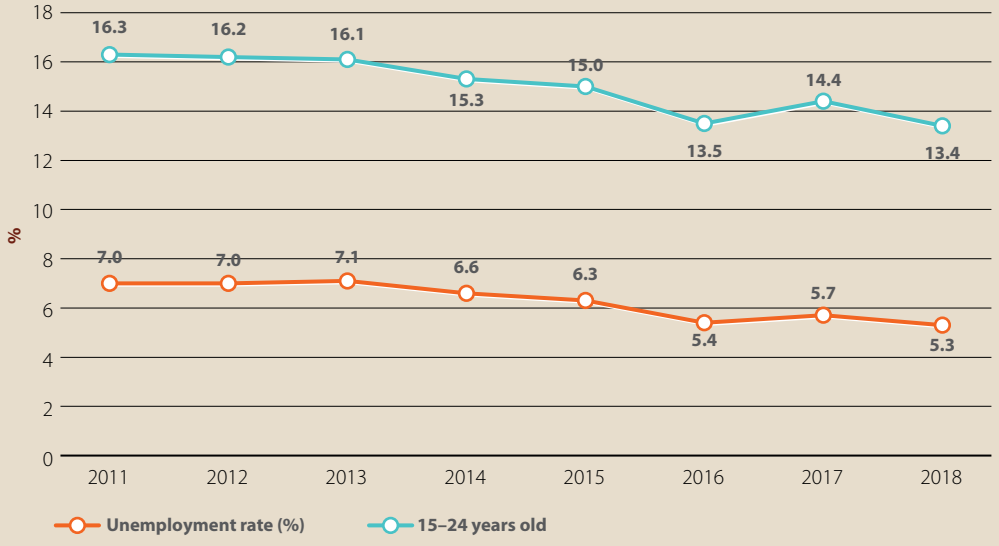
According to NEDA, PDP 2011–16 successfully attained the unemployment targets. However, the underemployment rate was higher than the unemployment rate, which could be attributed to a considerable component of laborers and lack of quality education and training. Unskilled workers comprise one-third of the total employment. Also, underemployment harms the economy. It directly contributes to the emigration of intelligent and skilled workers and professionals from one country to another for better income [15], which allows them to rise from poverty.

Youth Unemployment as a Necessary Focus of Intervention

The ILO has defined youth unemployment as an essential policy issue for many countries regardless of their stage of development [16]. Based on the PSA Open Stat database, the youth unemployment rate ranged from 16.3% in 2011 to 13.4% in 2018 [17], at twice the unemployment rate of the labor force (see Figure 6). According to PDP 2017-2022, youth unemployment rate was double the overall unemployment rate, which means that many Filipino youths were underutilized with skills not being enhanced by education, training, or employment. The DOLE Secretary has said that human capital is the key driver in promoting inclusive growth and sustainable economic development in the Philippines. So, the government should develop work-based training programs for the youth to prepare them for the world of work [18].

FIGURE 6

OVERALL UNEMPLOYMENT RATE AND YOUTH UNEMPLOYMENT RATE, 2011–18.



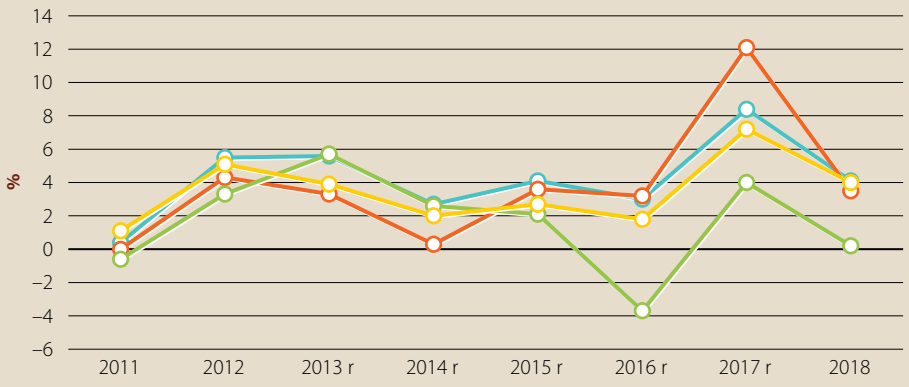
Source: Open Stat Database, PSA.

Labor Productivity remained below targets

Although industry and services sectors have improved over the years, they have remained below the target plan of 3.9% to 4.7%. As seen in Figure 7, from 2011 to 2019, labor productivity in agriculture, forestry, and fishing (AFF) and services sectors increased faster than the industry sector [19]. The positive increase in AFF may contribute to the government's focus on expanding this sector's opportunities. The growth in the services sector is the transition of workers from AFF, where the number of self-employed has increased, especially during the pandemic, and wages and incomes have become more flexible, which has resulted in growth in the number of employed workers in low-skilled and low-income categories. The shortage of workers on the needed technical and soft skills and work experience, along with lack of technological progress and innovation, have contributed to the slow increase in labor productivity. However, the decrease in 2020 was brought about by the effects of the pandemic, such as enterprise closure and job losses or displacements.

FIGURE 7

GROWTH RATE OF LABOR PRODUCTIVITY AT CONSTANT 2018 PRICES BY SECTORS, 2011–18.



	2011	2012	2013 r	2014 r	2015 r	2016 r	2017 r	2018
All sectors	0.4	5.5	5.6	2.7	4.1	3.0	8.4	4.1
Agriculture, forestry, and fishing	0.0	4.3	3.3	0.3	3.6	3.2	12.1	3.5
Industry	–0.6	3.3	5.7	2.6	2.1	–3.7	4.0	0.2
Services	1.1	5.1	3.9	2.0	2.7	1.8	7.2	4.0

Source: Labor Productivity Statistics, PSA.

Weak Academia–industry Linkages

There have been various efforts to link the academia and the industry in the Philippines for two decades due to a decrease in the quality of new entry-level workers and fresh graduates. In a presentation from Philippine Business for Education (PBED) on academia–industry linkages, it was noted that there was a decline in the quality of higher education. Weak professional preparation due to lack of time and low quality of incoming college students resulted in a mismatch in education [20]. Inadequate support to pursue graduate studies (or embark on research and publish papers) and limited domestic and international partners to facilitate knowledge transfer may have contributed to the low performance of higher educational institutions (HEIs). Further, the absence of collaboration with industry partners contributed to the mismatch between skills (provided in schools and universities) and labor market requirements.

Enhancement of the Quality of Education

The government has implemented various reforms in the educational sector. Institutionalizing the K to 12 Basic Education Program and the Republic Act No. 10931 of 2017 or the Universal Access to Quality Tertiary Education Law will enable Filipinos to continuously develop skills to gain their full potential as productive members of a rapidly changing society and environment (see Table 1).

TABLE 1

COMPARISON OF K TO 12 WITH OLD BASIC EDUCATION SYSTEM IN THE PHILIPPINES.

Old basic education system	K to 12 basic education program
• Learners lack mastery of essential competencies due to a congested ten-year primary education curriculum. • Graduates of the old curriculum are often younger than 18 years and are not legally ready to be part of the labor force or start a business. • Foreign countries saw that a ten-year curriculum was inadequate. They did not automatically acknowledge overseas Filipino workers (OFWs) as professionals abroad. • Kindergarten is a strong foundation for lifelong learning and total development, though it is optional and not a prerequisite for entry to grade 1. • The old education system delivers a broad curriculum that does not include enough practical applications.	• Learners lack mastery of essential competencies due to a congested ten-year primary education curriculum. • Graduates of the old curriculum are often younger than 18 years old and are not legally ready to be part of the labor force or start a business. • Foreign countries saw that a ten-year curriculum was inadequate. They do not automatically acknowledge OFWs as professionals abroad. • Kindergarten is a strong foundation for lifelong learning and total development, though it is optional and not a pre-requisite for entry to grade 1. • The old education system delivers a broad curriculum that does not include enough practical applications. – Academic track: university or college preparation ◦ General academic strand ◦ Humanities and Social Science Stand ◦ Science, Technology, Engineering, and Mathematics strand ◦ Accountancy, Business and Management Strand – Technical-Vocational Livelihood (TVL) Track (job-ready skills) – Sports track: physical education and recreation – Arts and Design track: design, performative and creative industry

Source: K12Philippines.

Before the disruptions brought about by the pandemic, the work landscape had been changing rapidly with the rise of FIRe. COVID-19 gave rise to unprecedented challenges, causing firms to migrate to new working arrangements to safeguard workers. The identified challenges show a growing demand for skilled workers; reskilling and upskilling of the current workforce; and at the same time developing the future workforce that would be able to adjust and succeed amidst changes. With the intensified adoption of remote and flexible work mechanisms, technology has a

critical role in redesigning and transforming individuals' work. The issue of jobs–skills mismatch pertains to its effect on the productivity of the Filipino workforce. Policies and programs intended to address the persistence of skills mismatch focus on the supply-side issue through education and training. It is also necessary to examine the demand side of the wage-setting practices.

This report identifies government policies that need to be strengthened and reviewed to improve labor market policies that influence changes in the labor market demands in the Philippines. These policies would impact the increase of linkages between skills development, productivity, and employment potential of Filipino workers, to address poverty reduction.

Labor Market Related Policies (Related Legal basis in achieving labor market governance)

Republic Act No. 10533

Republic Act No. 10533 is "An Act enhancing the Philippine basic education system by strengthening its curriculum and increasing the number of years for basic education, appropriating funds therefor and for other purposes."

This law is also known as the "Enhanced Basic Education Act of 2013." It was popularly called K to 12 because the act (RA 10533) enhanced the Philippine Basic Education System (PBES) by strengthening its curriculum and increasing the number of years for primary education. The policy aims to establish, maintain, and support a wholly adequate and integrated education system suitable to the needs of individuals, the country, and the society [21]. As cited in Republic Act No. 10533, it also aims to create a functional basic education system that will develop productive and responsible citizens equipped with essential competencies, skills, and values for both lifelong learning and employment. It has expanded the years of primary education from 10 years to 12 years. The additional two years were introduced in 2018, representing grades 11 and 12 in the primary education system through senior high school.

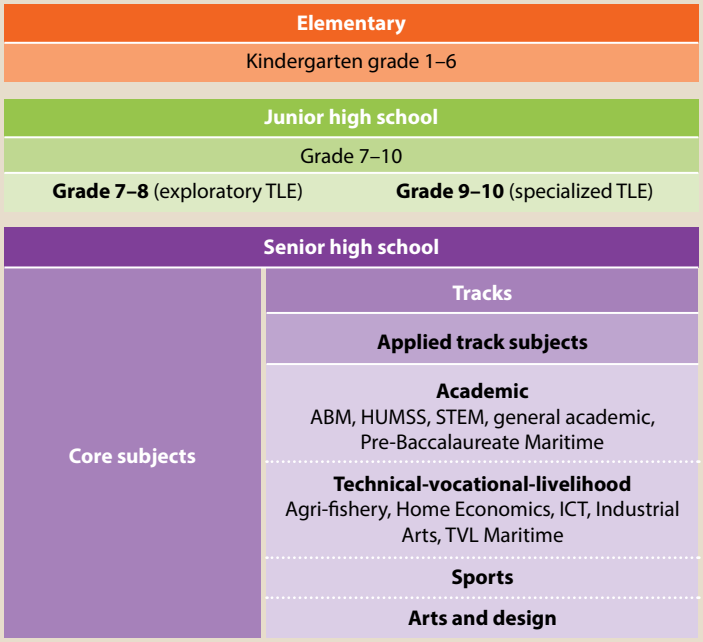
The implementation of the new Philippine education system will be at par with global standards. The government implemented the K to 12 programs to improve the country's education system for accelerating recognition of Filipino graduates and professionals across the world. The additional years in primary education provide time to master skills, develop lifelong learnings, and prepare the Filipino students for universities, employment, and entrepreneurship. Filipino students can master the skills and build core competencies that are essential to meet the demand of the changing labor market [22].

This policy is one of the top priorities of the Philippine government, for providing soft and hard skills training for Filipino learners. This would help them to develop and improve 21st-century skills such as critical thinking and problem solving; innovation and creativity; life and career skills; and information, media, and technology skills [23] to become a global and productive workforce.

However, with the implementation of the law, challenges have also come up. According to Ednave *et al*, some of the challenges are: lack of preparation and professional development; several people getting displaced over the five-year transition period since 2015; lack of teachers and classrooms to meet the demands of the program; excessive academic load on learners; and integration of learnings in real-life context. The shift to the K to 12 programs is a challenge for the government. This scheme will not rely on the government effort alone but on a collaboration with the private sector to implement nation-building by educating the Filipino workers.

FIGURE 8

K TO 12 BASIC CURRICULUM.



Source: K to 12 Basic Curiculum, Department of Education, the Philippines.

Republic Act No. 7686

The Republic Act 7686 is an "Act to strengthen manpower education and training in the Philippines by institutionalizing the dual training system as an instructional delivery system of technical and vocational education and training, providing the mechanism, appropriating funds therefor and for other purposes." The Act was approved and signed on 25 February 1994.

The law, also known as the 'Dual Training System (DTS) of 1994,' institutionalizes the program in accredited public and private educational institutions; training centers; and agricultural, industrial, and service enterprises. It is an act to strengthen workers' education and training by institutionalizing DTS as an instructional delivery system, combining technical and vocational education and training, providing the mechanism, and appropriating funds, among other things. It applies to all public and private educational institutions/training centers and the agricultural, industrial, and service establishments accredited to participate in the DTS. It encourages participation by employers in the system. It also permits a deduction from taxable income, of 50% of system expenses paid to the accredited DTS educational institutions, for their trainees. It sets out the employers, trainees, and accredited educational institutions/training centers.

DTS mandates the Technical Education and Skills Development Authority (TESDA) to promote, coordinate, and administer DTS and provide tax incentives to encourage the participation of companies in the program. The increase in the unemployment rate is one of the significant challenges in the Philippines that became apparent during the pandemic. Dernbach [24] has cited jobs–skills mismatch as one of the reasons for high unemployment, especially among the youth. The Philippine government is promoting DTS as an approach that specifically addresses the issue of jobs–skills mismatch. DTS promotes collaborations between technical–vocational institutions

(TVIs) and the industry. Local studies say that promoting industry partnership increases the employment rate. However, facilitating DTS is a challenge despite the government incentives to scale the program.

The training modality of DTS combines theoretical and practical training. The learning takes place in two venues: the school or the training center and the establishment or the workshop. The educational institution and the workplace together equip trainees with well-coordinated learning experiences and opportunities.

Trainees under the DTS spend at least 40% of the training/learning time in the school and 60% in practical training or immersion in the establishment. After the training, they are equipped with employable skills, work knowledge, and attitudes. In successfully facilitating DTS, there is a need to strengthen the advocacies and create more enticing incentives that would boost TVIs, NGOs, and businesses to engage in DTS.

Republic Act No. 10968

The Republic Act No. 10968 is an "Act institutionalizing the Philippine Qualifications Framework (PQF), establishing the PQF–National Coordinating Council (NCC) and appropriate funds therefor."

The PQF was created through the Republic Act No. 10968 and Executive Order No. 83 in 2012. The program grants official recognition of value in the world of education and training, work, and job creation.

The law aims to assist individuals in moving quickly and readily between the education sector and the labor market by focusing on what a learner can demonstrate due to a learning experience. The shift to outcome-based education is the system that prepares Filipino students for the highest standards of a particular profession and makes them employable and ready to enter a labor force. It also refers to a formal certification that has completed specific learning outcomes relevant to the identified academic, industry, or community conditions. The framework is a collaborative strategy by the Department of Education (DepEd); TESDA; Commission on Higher Education (CHED); Professional Regulation Commission (PRC); and Department of Labor and Employment (DOLE) [25].

The program aims to provide benefits across sectors and stakeholders of education and training by encouraging lifelong learning of individuals. It ensures that training and educational institutions adhere to specific standards and achieve the same. It also provides employers with specific training standards and qualifications aligned with industry criteria. It also provides the government with common standards, taxonomy, and typology of qualifications as bases for granting approvals to partners or stakeholders.

Based on the PQF website, the detailed objectives of the framework are

- to adopt national standards and levels of learning outcomes of education;
- to support the development and maintenance of pathways and equivalencies that enable access to qualifications, and to assist individuals in moving quickly and readily between different education and training sectors and between these sectors and the labor market;
- to align domestic qualification standards with the international qualifications framework; and

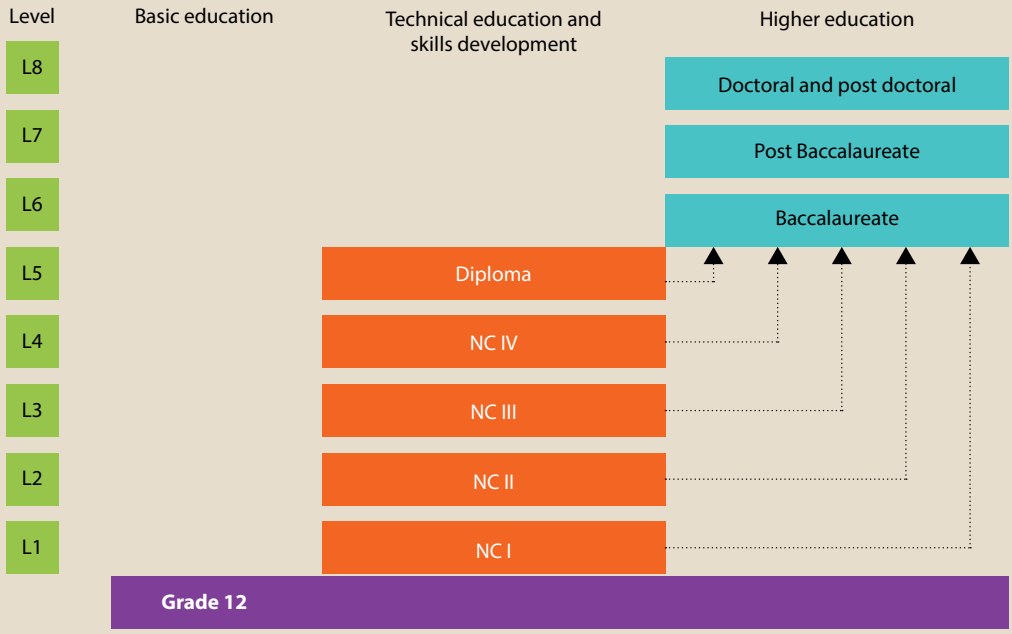
- to enhance recognition of the value and comparability of Filipino students and workforce qualifications and support the mobility of Filipino students and workers.

The PQF has eight levels of qualifications differentiated by descriptors of expected learning outcomes and three domains of (1) knowledge, skills, and values; (2) application; and (3) degree of independence, with sub-frameworks corresponding to the subsystems of the education and training system.

In contrast, the Commission on Higher Education Subsystem covers baccalaureate, postgraduate diploma, master's degree, and doctorate that correspond to levels 7 to 8. The two subsystems interface in the provision of qualifications at level 5.

FIGURE 9

THE PHILIPPINE QUALIFICATIONS FRAMEWORK.



Source: Philippine Qualifications Framework website (https://pqf.gov.ph/).

The labor market is concerned with unemployment and underemployment issues cutting across sectors and types of individuals. More people obtain capabilities that the labor market does not require, making it more difficult for employers to hire them. The framework serves as a quality-guaranteed national system for the development, recognition, and awarding of qualifications, based on standards of knowledge, skills, and values developed in different ways and methods by learners and workers of a particular country. Thus, the PQF will ensure that the standards and qualifications are consistent with job requirements/demands by the industry and needs. Likewise, it will provide a common understanding of standards, qualifications, and levels. It is competency-based and labor market-driven. It is an assessment-based qualification recognition. Employers can support the government as the country aligns the curriculum with the industries' current and future skills requirements. The government considers that transparent and robust methods, stakeholder engagement and consultation, robust quality assurance strategies, and nationally endorsed results will build more trust and confidence in the system.

Republic Act No. 11293

The Republic Act No. 11293 is "An Act adopting innovation as vital component of the country's development policies to drive inclusive development, promote the growth and national competitiveness of micro, small, and medium enterprises, appropriating funds therefor, and for other purposes."

It is also known as the Philippine Innovation Act, which pursues innovation as a vital component of national development and sustainable economic growth. This act states that the government recognizes the crucial role of the business sector, academia, scientific community, and research institutions in driving economic growth through innovation. As AI is one of the key drivers of innovation, the Philippine AI Roadmap serves as one of the key declarations of this policy.

To support this act, it is important to:

(1) promote, integrate and strengthen policies that engage with innovative businesses and entrepreneurs;

(2) invest in education, science, technology, and innovation;

(3) place innovation at the center of development policies;

(4) promote a culture of strategic planning and innovation, put efficient institutions in place; and

(5) strive to encourage potential innovations, and at the same time protect them from misappropriation.

Through the use of technologies, the adoption of AI is to strengthen inclusive innovation outlined in Section 11 of RA 11293, which mandates the National Innovation Council to "integrate policies to promote women's participation and skills development."

Executive Order No. 140

This executive order is for adopting the National Employment Recovery Strategy (NERS) 2021–22 and reinforcing job-generating programs through the NERS Task Force (Series of 2021).

The NERS program was the Philippine government's master plan from 2021 to 2022 to revive the labor market. It anchored on the updated PDP 2017–22 and 'ReCharge Ph' through the expansion of the initiative of the *'Trabaho, Negosyo, Kabuhayan'* (TNK), which aims to create decent jobs through promotion of entrepreneurship, as a collaboration project between the Department of Labor and Employment (DOLE) and the Department of Trade and Industry (DTI). The NERS project is a medium-term plan geared to create employment opportunities and improve the Filipino workforce's employability while considering the changes in the labor market and the accelerated adoption of new technologies brought about by the pandemic [25]. DOLE and Bureau of Labor and Employment (BLE) mentioned in a Philippine News Agency interview dated 3 April 2021 that the program was about job preservation and employment creation.

The program aimed to create a policy environment that encouraged the generation and improved access to employment, livelihood, and training opportunities. It also sought to improve the employability and productivity of the Filipino workforce and take benefits from the opportunities

in the labor market brought about by the 'new normal.' It also aimed to support the existing and emerging businesses to preserve and create employment. The NERS Task Force anchored its accomplishments of programs in the NERS 8-Point Employment Recovery Agenda, which includes,

(1) approval of the proposed wage subsidy for private-sector workers;

(2) conducting a job summit;

(3) supporting the passage of priority legislations and policies that strengthen economic and employment recovery;

(4) enabling retooling and upskilling of workers;

(5) full implementation of youth employability programs;

(6) extending assistance to establishments through loans, deferments, and upgrading of processes;

(7) providing social protection to vulnerable groups; and

(8) monitoring and supporting continuous implementation of programs with a high impact on employment.

During the pre-summit dialog for workers in an NERS program, ILO Country Director Khalid Hassan said that ILO, together with the UN, was committed to supporting national stakeholders in the development and implementation of the program. The NERS program anchored on the ILO's policy framework for responding to the socioeconomic impact of the COVID-19 crisis, from motivating the economy and employment; supporting businesses, employment, and incomes; and protecting workers in the workplace; to relying on social dialog for solutions.

TABLE 2

NERS ANCHORED ON THE ILO POLICY FRAMEWORK FOR TACKLING THE IMPACT OF COVID-19.

Pillar 1	Pillar 2
• Stimulating the economy and employment • Active fiscal policy • Accommodative monetary policy • Lending and providing financial support to specific sectors, including the health sector	• Supporting enterprises, jobs, and incomes • Extending social protection for all • Implementing employment retention measures • Providing financial and other relief for enterprises
Pillar 3	**Pillar 4**
• Protecting workers in the workplace • Strengthening occupational safety and health measures • Adopting work arrangement (e.g., teleworking) • Preventing discrimination and exclusion • Providing health access for all • Expanding access to paid leave	• Relying on social dialog for solutions • Strengthening the capacity and resilience of employers' and workers' organizations • Strengthening the capacity of governments • Strengthening social dialog, collective bargaining, and labor relations institutions and processes

Source: International Labor Organization.

In a November 2021 report, the DOLE said that as of August 2021, they had already generated 780,111 jobs. The majority of these jobs were in the construction sector, while others were in public administration services and IT-related upgrading of programs, both in the public and private sector [26].

Republic Act No. 6971

The Productivity Incentives Act of 1990, also known as Republic Act 6971, provides incentives to both labor and capital for voluntarily implementing programs that increase workers' sharing of the fruits of their labor. This Act applies to all business enterprises, with or without existing and duly recognized or certified labor organizations, including government-owned-and-controlled corporations performing proprietary functions, as well as all employees and workers, regardless of whether they are temporary, regular, supervisory, or managerial. The employers' group has always advocated for productivity to ensure that businesses establish and maintain a competitive edge. Labor is aware that as productivity rises, their total wages increase. The government has cited productivity as the key to attaining real growth without the inflationary effects of price increases.

Labor productivity is one of the most important indicators of a nation's economic development due to its close relationship with economic expansion, competitiveness, and living standards. According to the United Nations Development Programme and the National Economic Development Authority, labor productivity growth is one of the most important macroeconomic indicators for measuring progress toward the Sustainable Development Goals under Goal 8 or "Decent Work and Economic Growth," which aims to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

The Act recognizes the right of labor to a fair share of the fruits of production, as well as the rights of businesses to reasonable returns on investments, expansion, and development. Incentives for productivity aim to encourage higher levels of productivity, preserve industrial peace and harmony, and promote shared responsibility between employees and employers. Through its Regional Tripartite Wages and Productivity Boards (RTWPBs), the National Wages and Productivity Commission (NWPC) provides technical assistance to create productivity-enhancing and gainsharing programs.

The Productivity Incentives Act is undergoing legislative amendment to loosen up its restrictive provisions. It promotes inclusive and sustainable productivity programs that would increase the country's labor productivity by mandating the creation of a Productivity Incentives Committee for businesses with ten or more employees; implementing productivity incentive programs; granting or distributing productivity incentives to workers; and establishing a system for establishments providing incentives to workers to receive tax incentives. The measure also encourages businesses to implement incentive programs that will strengthen the link between wages and workers' productivity and promote workplace equity and fairness. It will require the government to promote or develop a workplace culture and mindset of productivity as a way of life through advocacy programs and incorporate them into primary and higher education curricula as well as technical training. Culture is related to employee productivity and influences employee engagement. It promotes work-life balance and empowers and motivates employees. It promotes the coordinated implementation of productivity-related programs and initiatives through collaboration with government agencies that provide technical assistance to MSMEs. In addition, the amendments call for the establishment of a recognition system for productivity experts to certify highly qualified professionals whose work centers on assisting MSMEs with the application of productivity tools and productivity-related activities, such as consulting and training.

The Act aims to strengthen competitiveness, skills, and the productivity-wage linkage, wherein higher productivity will be realized by encouraging enterprises to play a vital role in reskilling and upskilling their workforces and, concurrently, strengthening the bipartite workplace mechanism as the main instrument in setting better terms and conditions of work, which will benefit both workers and management.

Industry Drivers and Key Employment Generators in the Philippines

Through DOLE, the Philippine Department of Labor and Employment (BLE), in its 'JobsFit Labor Market Information (LMI) Report,' has identified industries/sectors with the most significant potential to produce employment opportunities and absorb the bulk of the Philippines workforce in the coming years. These identified industries/sectors are called Key Employment Generators (KEGs). DOLE–BLE conducted a review of the relevant labor market and economic indicators, and projected industry share in the gross domestic product (GDP), gross national product (GNP), foreign direct investments (FDIs), and inputs gathered through consultations with stakeholders [27].

TABLE 3

TOP TEN KEY EMPLOYMENT GENERATORS.

IT/business process management (BPM)	Agribusiness
Wholesale and retail trade	Banking and finance
Transport and logistics	Hotel, restaurant, and tourism
Manufacturing	Education
Construction	Health and wellness

Source: JobsFit 2022 LMI Report, Bureau of Labor and Employment.

The top ten KEGs identified are listed below:

(1) **IT/business process management (BPM):** IT–BPM covers voice and non-voice complex services. IT-BPM service experts have significantly increased, and the industry will continue to be a vital one in the following years. Currently, the Philippines is considered a global market leader in this industry.

(2) **Wholesale and retail trade:** This industry sector covers the wholesale and retail sale of goods and the rendering of services incidental to the sale of such goods as well as their distribution. With the government's investments in telecommunication and IT infrastructures to strengthen the expanding IT–BPM industry, the benefits will spill over to other sectors, including wholesale and retail trade.

(3) **Transport and logistics:** The transport industry covers air, water, and mass rail transport, while logistics covers airports and seaports, passenger/intermodal terminals, cargo terminals, container yards, and warehouses. The aviation industry aims to reach new heights with the national and local government's extensive promotions for prime tourist destinations. At the same time, the maritime sector continues to have a demand for Filipino seafarers abroad. Through the Department of Public Works and Highways (DPWH), with its advocacy to improve the country's national road network, it aims to generate employment opportunities.

(4) **Manufacturing:** This industry covers the physical or chemical transformation of materials, substances, or components into new products. As the government pushes through the manufacturing industry roadmap, it will strengthen the industry and help create employment opportunities in the priority sectors of electronics, food processing, automotive, chemicals, iron and steel, and garments.

(5) **Construction:** This industry includes horizontal and vertical construction projects. Horizontal construction involves heavy equipment to move tons of earth materials to complete buildings, airfields, etc. On the other hand, vertical construction is anything built from the ground up. The current administration's top priority project is the 'Build, Build, Build' project. Infrastructure building and development of industries have been accelerated, yielding robust growth across the archipelago, creating jobs, and uplifting the lives of Filipinos.

(6) **Agribusiness:** This sector is generally the retail aspect related to agriculture or agricultural activities. It is quite diverse as it encompasses input production, farm operations and management, equipment and supplies manufacturing, food/non-food processing, trading, and retailing. The *Kapatid Mentor Me* program, a Department of Agriculture and Go Negosyo act pioneered in 2017, aims to reinforce rural development and create sustainable economics by tapping agri-workers and promoting agripreneurship across the country.

(7) **Banking and finance:** This industry encompasses financial service activities including insurance, reinsurance, and pension funding; and activities to support financial services. As the Philippine economy grows, the foreseen growth in the number of business establishments will demand workers with skills to set up books, prepare taxes and payrolls, and provide financial analysis and advice. The role of financial intermediation in the economy continues to grow and create more significant opportunities for increasing employment within the next few years.

(8) **Hotel and restaurant, and tourism:** This industry includes tourism-related enterprises such as restaurants, food chains, and accommodation establishments that include but are not limited to hotels, resorts, apartments, motels, bed-and-breakfast facilities, and tourist inns. During the pre-pandemic era, visitor arrivals were around 8.2 million in 2019. However, due to the COVID-19 pandemic, the industry experienced an abrupt fall in tourist arrivals, resulting in a demand plunge causing thousands of job losses and economic hardships and closing of several establishments. The Asian Development Bank (ADB) recommends promoting domestic tourism to offset the recession in foreign tourist arrivals.

(9) **Education:** The education sector includes education at any level or for any profession, oral or written, and by radio, television, or other means of communication. It also provides education by different institutions in the regular school system at various levels as well as adult education, literacy programs, etc. Implementing the K to 12 programs is a government initiative to improve the country's educational system. Hence, this sector will continue to employ the country's workforce.

(10) **Health and wellness:** This industry covers the establishment and operation of medical facilities such as primary, secondary, and tertiary hospitals; ambulatory clinics; and spas that cater to the overall well-being of people. It includes operations of hotel spas, therapeutic centers, traditional and alternative healing, and medical care services.

ASSESSMENT OF SECTORS THAT HAVE AFFECTED THE CHANGING LABOR MARKET DEMAND

A questionnaire was sent to partners to validate sectors/industries and occupations that impact the changes brought about by digital transformation, pandemic, and other disruptions that will make a difference in the labor market for stakeholders. The Employers Confederation of the Philippines (ECOP) identified these areas of concern.

A. Sectors in which technology has a significantly negative impact on employment

Sectors in which technology has a significantly negative impact on employment	Accommodation and food service activities	Real estate activities	Wholesale and retail trade
Gross value added (In million PHP) Source: National Accounts of the Philippines, Philippine Statistics Authority	At current prices 2019 PHP 431,778 2020 PHP 253,656 At constant 2018 prices 2019 PHP 425,692 2020 PHP 232,389	At current prices 2019 PHP 692,011 2020 PHP 487,130 At constant 2018 prices 2019 PHP 689,362 2020 PHP 469,236	At current prices 2019 PHP 3,410,296 2020 PHP 3,257,598 At constant 2018 prices 2019 PHP 3,410,296 2020 PHP 3,257,598
Employment (in thousands) National		2019: 42,429 2020: 39,379[P]	
Employment rate	2019: 4.5 2020: 3.7[P]	2019: 0.5 2020: 0.5[P]	2019: 19.9 2020: 20.5[P]
Underemployment (in thousands)		2019: 5,933 2020: 6,395[P]	
Unemployment (in thousands)		2019: 2,263 2020: 4,501[P]	
Likely impact of technology's adoption in the sector's domestic market	Workers who do manual jobs (waiters/waitresses, room attendants, housekeeping) will be highly affected if establishments adopt technological improvements	Services can now be conducted virtually, without the physical presence of brokers, as enabled by online real estate platforms	Consumers can now order online, and opt for delivery of services. In physical stores, companies now have the option to adopt contactless checkout options, and thus obviate the need for cashiers and baggers

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Sectors in which technology has a significantly negative impact on employment	Accommodation and food service activities	Real estate activities	Wholesale and retail trade
Apparent need for reskilling for businesses to do a technological change	Highly needed	Highly needed	Highly needed
Risk of a sustained reduction in the size of addressable market due to changing consumer preferences and enterprise practices	High	High	High
Risk of sustained loss of exports and employment as global and regional value chains are reconfigured	At high risk	At high risk	At high risk
Apparent scope for skills to help enterprises to adjust to the changing environment and meet changing customer needs	Soft skills development	Soft skills development	Soft skills development
Potential to promote inclusion	Adapt diversity and inclusion policies and practices	Adapt diversity and inclusion policies and practices	Adapt diversity and inclusion policies and practices

P= Partial results

B. Identified sectors and occupations in which technology increases demand for skills or is likely to drive structural change in the sector or industry, changing the set of skills demanded

Sectors and occupations in which technology increases demand for skills or is likely to drive structural changes in the sector, changing the set of skills demanded	Mining and quarrying	Manufacturing	Financial and insurance services
Substantial need for more trained workers in an occupation or sector to respond to technology changes		Organization-wide retooling and retraining	Organization-wide retooling and retraining
Substantial need for more trained workers in an occupation or sector to produce goods or services needed nationally or internationally to respond to technology changes		Very much needed	

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Sectors and occupations in which technology increases demand for skills or is likely to drive structural changes in the sector, changing the set of skills demanded	Mining and quarrying	Manufacturing	Financial and insurance services
Potential for incremental growth in sales in a well-established sector arising from market changes resulting from a technology change	Highly likely	Highly likely	Highly likely
Potential for the sector to diversify into new products or services that will be in demand as a consequence of the technology change		Highly likely	Highly likely
Apparent scope for more or better skills to help businesses change or innovate to take advantage of market opportunities driven by the technology and to generate decent employment	Highly needed	Highly needed	Highly needed
Potential to promote inclusion	Adapt diversity and inclusion policies and practices	Adapt diversity and inclusion policies and practices	Adapt diversity and inclusion policies and practices

C. Identified groups of individuals needing training, reskilling and upskilling

Groups of individuals needing training, reskilling, and upskilling	Manufacturing	Real estate activities	Financial and insurance services
Groups that were affected the most by a technological change	Production line workers	Real estate agents	Bank tellers/insurance brokers
Groups, could an intervention make the most significant difference	All	All	All
Are there existing strategies for the target group or similar target groups that could be scaled up or applied to the group?			

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Groups of individuals needing training, reskilling, and upskilling	Manufacturing	Real estate activities	Financial and insurance services
Are there innovative strategies that could be applied to the target group? Perhaps there could be use of mobile technologies to develop basic IT skills or use of distance or blended learning by those who already have IT and literacy skills and have access to smartphones or other IT devices.	Soft skills development	Soft skills development	Soft skills development
Groups that could safely be reached through interventions during a technological change	All	All	All
For which groups is the risk of being out of employment most severe?	Rank-and-file employees	Rank-and-file employees	Rank-and-file employees
Are there groups of individuals who need new skills to mitigate the change? For example, workers moving to smallholding or subsistence agriculture may not have the agronomy skills required.	Women workers New entrants	New entrants	New entrants

The overwhelming impact on hard-hit and vulnerable groups, young people, women, and the low-paid and low-skilled workforce requires dedicated support for decent work opportunities. Recovery strategies also need to address the pre-crisis future of work trends, ranging from digitalization, demographic changes, and environmental and climate changes to globalization in the fast-changing world of work. These changes also came to force during the pandemic through increased digitalization. In building a better future of work, it is crucial to invest in people's capabilities; decent and sustainable employment, and a world of work that can help push in the right direction toward a lasting, sustainable, and inclusive recovery. One such push should focus on green recovery strategies that promote a just transition to a more inclusive and sustainable world of work. Skills and tasks (or roles) are two critical concepts discussed between jobs and digitalization. The changing role content of jobs has significant implications for skills demand.

Labor Market Transition Opportunities

The future of the Filipino workplace post-COVID-19, i.e., the new normal, is already here to stay. It is business, but it is far from the usual that we did before. COVID-19 has underscored the need to go digital without lengthy preparations by enterprises. The pandemic has driven micro, small, and medium enterprises (MSMEs) to adapt to technological changes. The strict quarantine measures imposed by the Philippine government on 16 March 2020 left many establishments with no other options but to go digital, automate, and innovate. Establishment owners knew that offering their services online was a way to survive during the unprecedented time. The pandemic transformed ideas about how and where workers could work, through flexibility, adaptability, and technology in the workplace.

Adopting Digital Technology

Telecommunications networks and digital technologies became essential during the prolonged lockdown, and the acceleration of digital transformation was crucial for a fast economic recovery. It supercharged individuals' ability to do their best. According to Linkedin, digital transformation defines adapting to newly available technologies and changes in customer expectations, societal shifts, and industry disruptions. In responding to these shifts, businesses need to become more customer-focused, agile, adaptive to new opportunities, and efficient to stay competitive.

Earlier, in the Philippines, it seemed that it would take years for enterprises and workers to shift to the world of digital technologies. The pandemic situation pushed the workers and industries into freelance opportunities and jobs amenable for alternative work arrangements across sectors, including

(1) web and software development;

(2) information technology;

(3) sales and marketing;

(4) data science and analytics;

(5) digital marketing and advertising;

(6) engineering and architecture;

(7) admin support;

(8) design and creatives;

(9) writing;

(10) legal administration;

(11) customer service;

(12) accounting; and

(13) consultancy.

However, due to the shift in work dynamics with prolonged lockdown measures and strengthened health-and-safety protocols, many establishments went on to adopt a more flexible work setup with off-site monitoring arrangements.

Job Opportunities and Relevant Skills

In the wake of COVID-19, the quarantine measures and health protocols on how we live and work have impacted our daily lives. However, as restrictions were lifted, thoughts inevitably turned to what the 'new normal,' and, better yet, 'better normal' would look like. Many things can still be sources of disruptions, but it is safe to assume that it is implausible that the country will go back to 'business as usual.' When the government imposed quarantine and movement restrictions in the first quarter of 2020, enterprises had to alter their business processes by implementing business continuity plans and changing work locations of their workers overnight. For many, this accelerated an existing journey toward having a more digital and remote workforce. For other organizations, the event marked the beginning of the new journey, as transformations cannot be done overnight. Enterprises have a real chance to plan their future and determine what they want their 'new normal' and eventually the 'better normal' to look like from a business model, workforce, or skills perspective.

This is based on the DOLE's 'JobsFit COVID-19 Labor Market Information Report' titled, 'How the Pandemic is Reshaping the Philippine Labor Market,' conducted and consolidated by DOLE Bureau of Labor and Employment (DOLE-BLE).

In-demand Occupations

Based on the report, from the list of the identified KEGs, a total of 79 occupations were identified as in-demand occupations (see Table 4), highlighted in italics. They can also be found in the JobsFit 2022 LMI Report.

TABLE 4

LIST OF IN-DEMAND OCCUPATIONS, 2020–22.

Rank	Occupation	Rank	Occupation
1	Accountant	41	IT manager
2	Accounting personnel	42	Laborer
3	Administrative clerk	43	Laundry worker

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Rank	Occupation	Rank	Occupation
4	App and game developer	44	Lineman
5	Bagger	45	Loans and credit officer
6	Call center agent	46	Mason
7	Caregiver (home-based)	47	Medical and radiologic technologist
8	Carpenter	48	Medical doctor
9	Cashier	49	Medical researcher
10	Civil engineer	50	Medical writer
11	Collector	51	Mining engineer
12	College instructor	52	Network engineer
13	Computer service technician	53	Nurse
14	Construction worker	54	Online seller
15	Customer relations officer	55	Online teacher
16	Customer service representative	56	Pharmacist
17	Cyber security expert	57	Pipe fitter
18	Data development engineer	58	Porter
19	Data encoder	59	Production worker
20	Database manager	60	Programmer
21	Delivery personnel	61	Promodizer
22	Delivery riders	62	Psychologist
23	Digital marketer	63	Quality assurance personnel
24	Digital marketing officer	64	Sales associate
25	Direct sales agent	65	Salesman/saleslady
26	Drilling machine operator	66	Security guard
27	Driver	67	Senior project engineer
28	Electrician	68	Service crew
29	Enumerator	69	Skilled worker
30	Factory worker	70	Software developer
31	Farmer	71	Steelman
32	Financial advisor	72	System a

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Rank	Occupation	Rank	Occupation
33	Fisherman	73	Teacher
34	Food and beverage manager	74	Waiter/waitress
35	Freelancer	75	Website designer
36	Graphic designer	76	Website developer
37	Heavy equipment operator	77	Welder
38	Household attendant	78	Wellness trainer
39	Information technologist	79	Utility worker
40	IT consultant		

Source: DOLE Regional Offices and COVID-19 LMI Survey.

Green Occupations

As we transition to sustainable development, green jobs become more critical to meet the demands of the green economy in terms of skills, credentials, and knowledge. These green occupations are found in the manufacturing and construction sectors and in emerging green industries that concern energy efficiency, pollution control, environment preservation, and climate mitigation. In 2016, the Philippine Green Jobs Act of 2016 (RA 10771) was signed into law. This law provides a policy framework for fostering low-carbon, resilient, and sustainable growth and decent job creation by giving incentives to enterprises generating green jobs and focusing on developing human capital to enable and sustain the transition to a greener economy. Table 5 identifies the list of green careers based on the results of the COVID-19 LMI survey report.

TABLE 5

LIST OF GREEN OCCUPATIONS.

Rank	Occupation	Rank	Occupation
1	Compliance officer/manager	28	Logistics assistant
2	Compliance specialist	29	Maintenance technician
3	Construction worker	30	Marketing manager
4	Drilling machine operator	31	Mining engineer
5	Driver	32	Production engineer
6	Factory worker	33	Production operator
7	Financial advisor	34	Production supervisor
8	Forklift operator	35	Risk control specialist
9	Heavy equipment operator	36	Skilled worker
10	Industrial engineer	37	Steelman

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Rank	Occupation	Rank	Occupation
11	Inspection manager	38	Supply chain analyst
12	Inspector	39	Technician
13	Laborer	40	Warehouseman
14	Call center agents	41	Mason
15	Forestry/forester	42	Teacher
16	Sales personnel	43	Farm laborer
17	Farmer	44	Agriculturist
18	Carpenter	45	Administrative aide
19	Agribusiness	46	Welder
20	Agricultural technician	47	Recycling worker
21	Urban farmers	48	Motor vehicle emission control technician
22	Civil engineer	49	Agricultural workers
23	Environmental specialist	50	Garbage collector
24	Cultivation agriculturist	51	Aqua culture technician
25	PCO-pollution control	52	Solar technician
26	Solid waste management equipment operator	53	Urban gardener
27	Farm technician aide	54	Fisherman

Source: DOLE–BLE COVID-19 LMI Survey.

Freelance Occupations

In the Philippines, more Filipinos ventured into freelance work amidst the pandemic, and the freelance economy will continue to grow even higher. Freelance jobs are essential since there are tasks that outsourced service providers can efficiently do. These jobs are contract work, independent contract, consultancy, and contract-to-hire. Table 6 shows the freelance occupations highlighted by industry groups. The Philippine House Subcommittee on Labor Relations had proposed a measure that would seek to provide hazard pay and night shift differential to freelancers.

TABLE 6

LIST OF FREELANCE OCCUPATIONS IN THE PHILIPPINES, 2020–22.

Rank	Occupation	Rank	Occupation
1	IT specialist	21	Logistics assistant
2	Sales executive	22	IT developer
3	Customer service assistant	23	IT programmer

(Continued on next page)

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Rank	Occupation	Rank	Occupation
4	Marketing staff	24	Data analyst
5	Accounting staff	25	Admin staff
6	Clearing specialist	26	Front desk staff
7	Office associates	27	Digital marketer
8	Driver	28	Insurance agent
9	Carpenter	29	Teacher
10	Mason	30	Farmer
11	Massage therapist	31	Tour guide
12	Manicurist	32	Gardener
13	Pedicurist	33	Sales representative
14	Online seller	34	Skilled worker
15	Construction worker	35	Dance instructor
16	Graphic designer	36	Private tutor/teacher
17	Caregiver	37	Encoder
18	Housekeeper	38	Gym instructor
19	Hairdresser	39	Welder
20	Laborer	40	Plumber

Source: DOLE–BLE COVID-19 LMI Survey.

Soft Skills or 21st Century Skills

Most employers look for viable traits and behaviors rather than skills and competencies. This is where soft skills or 21st-century skills play an essential role in establishing oneself at work or in other areas of life. They are holistic and classified as learning, literacy, or life skills. Below are the top soft skills that employers look for in a jobseeker:

(1) team play;

(2) social awareness;

(3) problem sensitivity;

(4) self-motivation;

(5) planning and organizing;

(6) decision making;

(7) creative problem solving;

(8) innovation;

(9) English functional skill and comprehension; and

(10) multitasking.

The world of work continues to evolve. The need for skills development also evolves to keep up with the demands of the labor market, given the challenges and opportunities presented by the COVID-19 crisis and FIRe. The following skills are dominant in the COVID-19 LMI Survey:

(1) financial literacy (functional math);

(2) digital literacy (word processing, and spreadsheet and electronic mail management skills);

(3) occupational safety and health skills;

(4) integrity (physical, mental, and reproductive health); and

(5) stress tolerance.

Labor and Employment Initiative Programs

In recent years, there have been challenges and opportunities associated with the transition to Industry 4.0. These challenges escalated while the opportunities also grew with the sudden arrival of the COVID-19 pandemic. The pandemic also hurried the arrival of the 'future of work' embodied in the era of FIRe. As a general policy thrust about such challenges and opportunities, the Philippines is preparing its workforce, mainly the Filipino youth, through skills development, skills qualifications and alignment, up-to-date labor market information (LMI), and timely policy research and advocacy. DOLE's mandate is to promote full employment, and its mission is to develop and protect human resources. Hence, DOLE is committed to some key relevant endeavors discussed ahead.

JobStart Philippines Program

DOLE believes in the value of partnership between the government and the private sector toward workforce skills development. The department collaborates with partner employers from the private sector to implement DOLE's flagship youth skills development and employment facilitation initiative, i.e., the JobStart Philippines program. With a pilot test done in 2014–15 and institutionalized in 2016 through the Republic Act (RA) No. 10869, JobStart helps the youth to be more employable through a full-cycle employment facilitation framework that involves the following: life skills training (LST) with one-on-one career coaching; technical training; job matching; and referrals to partner employers either for further specialized training and internship or for decent employment. While face-to-face registration for the program was still allowed, online registration was implemented through the JobStart Digitization initiative in consideration of the restrictions enforced by the government due to COVID-19.

Special Program for the Employment of Students

This program provides poor but deserving Filipino youth the opportunity to augment their income to finish their education and gain on-the-job experience for increased employability and improved

practical skills on the job. Further improvement on the benefits of this program, the DOLE, through the BLE, is considering the inclusion of a specialized LST module as part of the orientation for Special Program for the Employment of Students (SPES) beneficiaries. Amidst the continuous enforcement of community quarantine in the country, SPES was implemented in areas under the General Community Quarantine (GCQ) and Modified General Community Quarantine (MGCQ) classifications. Should a site under GCQ or MGCQ relapse into Enhanced Community Quarantine (ECQ) or Modified Enhanced Community Quarantine (MECQ), the program's implementation would immediately be suspended and permitted to resume only once the GCQ or MGCQ status had been restored. Partner employers/establishments of the program were encouraged to adopt alternative work arrangements (e.g., work from home). Should SPES beneficiaries be required to report to work on sites physically, they could only fulfill desk works or related tasks that would not require them to travel or stay outside for an indefinite period. Likewise, SPES beneficiaries were assigned to work within their respective areas or barangays to reduce their exposure from unintended COVID-19 risks through interzonal or intrazonal travel.

Government Internship Program

DOLE's Government Internship Program (GIP) provides internship opportunities for high-school, technical–vocational, or college graduates aged 18–30 years who intend to pursue careers in the public sector, either at the local or national level. Like the SPES implementation during the ongoing pandemic, heads of partner agencies were also encouraged to allow alternative work arrangements for GIP beneficiaries. Likewise, should GIP beneficiaries be required to report physically to offices of partner agencies, tasks were limited to desk works as beneficiaries are discouraged from engaging in assignments that would expose them to the COVID-19 virus (e.g., contract tracing, cleaning/disinfection of quarantine facilities, and distribution of food packs in quarantine facilities).

Career Guidance Advocacy Program

DOLE's Career Guidance Advocacy Program (CGAP) aims to immerse parents and students in the realities of the labor market and convince career advocates to use career guidance as an effective tool in addressing the job–skill mismatch. To expand the program's reach in response to the demands of Industry 4.0 and the increased digitized communication during the pandemic, the department, through the BLE, is developing the Enhanced Career Guidance and Employment Coaching modules and the CGAP microsite where interested stakeholders can access self-taught modules. These include modules on life skills, LMI, basic productivity, and other information materials from relevant government agencies such as NWPC, DepEd, CHED, TESDA, DOST, and PRC. While the CGAP microsite is being developed, the Public Employment Service Offices (PESOs) all over the Philippines are currently conducting career fairs via video conferencing platforms such as Zoom.

Other DOLE Initiatives Related to Employment Facilitation and Improvement

Inter-agency Partnership on Skills Framework and Roadmap for Industry 4.0

DOLE is collaborating with TESDA, DTI, CHED, and DepED in developing a Skills Framework and Roadmap for Industry 4.0 to prepare workers for in-demand jobs in the future through lifelong learning. Toward this end, the DOLE and the said agencies inked a partnership with the Singaporean government, which has a robust policy on lifelong learning and development of skills for the future through its SkillsFuture Singapore program.

Working Closely with TESDA to Fully Implement NTESDP 2018–22

Consequently, DOLE is an active member of the Inter-agency Committee on the National Technical Education and Skills Development Plan (NTESDP) 2018–22, which incorporates strategies and

interventions to adapt the workforce to the demands of Industry 4.0. As such, the department is working closely with TESDA to fully implement the said plan, mainly through alignment of program priorities and budget planning. Among the salient strategies and interventions of the plan are: (1) creation of a conducive and enabling environment for the development and quality service delivery of the TVET sector; (2) ensuring that industries with economic and employment growth potentials are provided with the required quantity of quality workers; and (3) preparation of the Philippine workforce for the challenges posed by FIRe.

Enhancement of the Education-employment Linkage through PQF

DOLE, together with other concerned government agencies, has contributed to the enhancement of the education–employment linkage system in the country by proactively advocating for the institutionalization of the PQF, which culminated into a law with the Republic Act (RA) No. 10968 in 2018. Further, it contributed to the formulation of the PQF Law's Implementing Rules and Regulations (IRR) released in 2019. The PQF is a "quality-assured national system for the development, recognition, and award of qualifications based on standards of knowledge, skills, and values acquired in different ways and methods by learners and workers."

Policy Research and Advocacy

The Institute of Labor Studies (ILS), the research arm of DOLE, has spearheaded various social dialog events on FIRe and the changing world of work in terms of policy research and advocacy. Other DOLE agencies such as the National Wages and Productivity Commission (NWPC) also conduct dialogs and conferences on digital transformation and productivity of Filipino enterprises and workforce.

Updated LMI Report on Future Skills in the Light of COVID-19

The DOLE, through the BLE, released the 'JobsFit 2022 LMI Report' in 2018, which identified various industries that were projected to create jobs, as well as the corresponding skills needed in the Philippines by 2022. However, after the coronavirus crisis hurried the arrival of the 'future of work,' the said LMI Report had to be updated. In November 2020, DOLE–BLE published the 'JobsFit COVID-19 LMI Report' to tackle how the COVID-19 pandemic was reshaping the Philippine labor market and what consequent changes were in the future skills needs.

Leveraging Productivity Mechanisms Effectively and Efficiently Through Productivity Trainings

Government and social stakeholders are jointly responsible for achieving the objective of increasing income-earning capacity. As the government restricts local travel, prohibits mass gatherings, imposes social distancing and other workplace health protocols, and prescribes remote work arrangements, the spread of the COVID-19 pandemic challenges organizations to rethink their approach to conducting trainings, seminars, and orientations. The government's sustained provision of technical assistance may enable the achievement of one of these objectives. The National Wages and Productivity Commission (NWPC), an agency attached with the DOLE, provides training and technical assistance to MSMEs on productivity improvement and incentives through its Productivity Toolbox programs, and, which highlights the various NWPC productivity training programs and technical assistances. These initiatives are geared toward enhancing the capacity and motivation of businesses to implement productivity technologies for the continuous growth and development of the enterprise and its workers. The Productivity Toolbox employs a "ladderized approach" to learning and application, in which the training programs provided depend on the enterprise's ability to implement technologies and make system enhancements.

- **Basic training:** This training is on basic productivity, values, working environment, and business system training. Productivity 101; ISTIV Values; 7S of Good Housekeeping; and ISTIV Bayanihan are the training programs.

- **Intermediate training:** This training applies productivity innovations to company improvement needs. ISTIV Succeeding in Business; Green My Enterprise; Service Quality; Retail Merchandising; Lean Management; and Social Media Marketing are the training programs.

- **Advanced training:** Businesses must be imaginative and involved to become productivity champions. The program encompasses all firm activities and supply chain. Training packages include gainsharing (GS) to inspire entrepreneurs to take productivity-based GS initiatives; Service Quality for Tourism Value Chain; Green My Enterprise for Hotel Industry; and Incentivizing Performance.

Given that one of the NWPC's dual mandates is to promote productivity improvement, its primary responsibility is to assist enterprises, especially MSMEs, in recovering and continuously enhancing enterprises' and workers' productivity in response to the new normal.

The NWPC condenses its training modules into a webinar format for use by its regional counterparts, the RTWPBs, when conducting productivity training for MSMEs. And during the pandemic, new productivity programs were implemented to improve worker skills and assist enterprises to recover from interruptions. Examples include Work Life Balance Leading to Productivity; Business Continuity and Resiliency Planning: Driving Productivity in the Better Normal; Work Ethics of a Productive Worker; and Productive Career Choice.

Strategic Policy Direction for Cultivating New Talent for Future

Strategic Policy Directions on Changing Labor Market Demands

Based on the updated PDP 2017–22 report's Chapter 10, "Transforming Human Capital Development towards Greater Agility Socioeconomic Report 2021," reviving labor market recovery is contingent on the dual disruption of the current global health crisis improving access to digital technology. Before COVID-19, the work landscape changed rapidly with the rise of FIRe or Industry 4.0. However, the pandemic has brought about unforeseen challenges, moving enterprises to new working arrangements to protect workers from COVID-19. The intensified adoption of remote and flexible work arrangements, technologies, and innovation plays a vital role in redesigning and transforming individuals' work and workplace environments. The challenge is to retool and upskill the current workforce and develop the future workforce so as to adapt and thrive amidst the changing labor market demands. There is a need to ensure that the alternative work arrangements will not reduce the well-being of Filipino workers or expose them to any forms of occupational and health hazards. Through the updated PDP 2017–22, the Philippine government aims to accelerate human capital development, focusing on the strategic framework guiding its goal, which are to:

(1) improve the nutrition and health outcomes for all;

(2) enhance the income earning ability and adaptability of Filipinos; and

(3) ensure a flexible lifelong learning opportunity for all Filipinos.

TABLE 7

STRATEGIC FRAMEWORK TO TRANSFORM HUMAN CAPITAL DEVELOPMENT TOWARD GREATER AGILITY.

Goal		
Human capital development toward greater agility		
Sectoral outcomes		
Improved nutrition and health outcomes for all	Enhanced income-earning ability and adaptability	Flexible lifelong learning opportunities for all ensure
Subsectoral outcomes		
1. Guaranteed care at all life stages 2. Ensuring a responsive and resilient health system 3. Sustained equitable health financing 4. Cross-cutting strategies: • Institute a fully integrated and interoperable health information system and database. • Strengthen health research and development, and evidence-based decision making. • Elicit multi-sector, multi-stakeholder support for nutrition and health. • Ensure transparency, accountability, and regulatory measures in nutrition and health sector. • Strengthen leadership, management, capabilities, coordination, and support mechanism.	1. Improved employability. 2. Improved productivity. 3. Enhanced labor mobility and income security.	4. Achieving quality, accessible, relevant, and liberating basic education for all 5. Improving quality of higher and technical education and research for equity and global competitiveness. 6. Cross-cutting strategies: • Develop future-ready adult learning interventions. • Modernize learning and teaching materials and methods. • Promote graduate scholarships and teacher training programs. • Maximize government–academia–industry collaborations and international partnerships to ensure alignment of competencies and labor requirements. • Formulate guidelines on internationalization of education. • Develop an action plan to operationalize the Philippine Qualifications Framework. • Develop an accessible sporting culture.

Source: Updated Philippine Development Plan 2017 to 2022, National Economic Development Authority.

Amidst the anticipations on the Philippines' recovery from the pandemic and automation and digitalization, in Table 7, the government identifies the effective strategies for the labor sector, based on the updated PDP 2017–22. Its focus is on the sectoral outcome by, "increasing income-earning ability and enhancing the adaptability of workers to the changing demands of the labor market. In Table 8, the National Economic Development Authority (NEDA) indicates the updated indicators and revised targets and result matrices for increasing the income-earning ability and enhancing the adaptability of the Filipino workforce [13].

According to NEDA's Updated PDP 2017–22, 2020 targets were set prior to the onset of the COVID-19 pandemic and retained in the mid-term update. The 2021, 2022, and end-of-plan targets were adjusted to take into consideration the effects of the pandemic.

TABLE 8

UPDATED PLAN TARGETS AND RESULT MATRIX TO INCREASE INCOME-EARNING ADAPTABILITY OF FILIPINOS.

Indicator	Baseline (year)	Target				Actual		
		2020	2021	2022	End of plan	2019	2020	2021
Sectoral outcome: Income-earning ability increased and adaptability enhanced								
Decrease in percentage of youth not in education, employment, or training (NEET) (cumulative)	23.0 (2015)	17.5–19.5	18.0–20.0	17.0–19.0	17.0–19.0	18.7	18.7	16.8 (January to October)
Subsectoral outcome 1: Employability improved								
Reduced duration of school-to-work transition of college graduates (in years)	2 (2008)	None	N/A	0.75–1.0	0.75–1.0	N/A	N/A	N/A
Reduced duration of school-to-work transition of high school graduates (in years)	4(2008)	None	N/A	0.75–1.0	0.75–1.0	N/A	N/A	N/A
Decreased duration of school-to-work transition of TESDA graduates (in months)	3.0 (2015)	3.5	3.5	3.25	3.25	3.42	3.35	N/A
Decreased percentage of discouraged workers (%)	12.50 (2014)	11.0	11.5	11.0	11.0	12.4	3.9	4.7 (January to October)
Reduced unemployment rate of college graduates	7.3 (2016)	7.2–7.5	10.0	8.0	8.0	6.7	12.4	9.6 (January to October)
Increased employment rate of TVET graduates	66.2 (2016)	72	68.9	69.4	69.39	84.2	70.5	N/A
Increased percentage of females with advanced degrees employed (% cumulative)	79.4(2018)	80.0	81.0	82.0	82.0	78.7	75.7	65.5 (January to October)
Increased labor force participation rate of women (%)	50.1 (2015)	50.5	48.5–50.0	48.5–50.5	48.5–50.5	47.6	45.8	50.9 (January to October)
Subsectoral outcome 2: Productivity improved								
Increased labor productivity in industry sector (% growth)	2.1 (2015)	3.0–4.0	2.5–3.6	4.40–4.65	4.40 – 4.65	2.0	–2.3	–5.1 (January to September)
Increased labor productivity in service sector (% growth)	2.7 (2015)	4.0–5.0	(1.02–0.13)	5.35–5.61	5.35–5.61	1.6	–0.7	–6.7 (January to September)
Subsectoral outcome 3: Enhanced labor mobility and income security								
Share of employees in precarious work among the total employed	18.9 (2016)	18.1	18.0	17.9	17.9	22.2	23.8	26.0 (January to October)
Share of waged and salaried workers in precarious work among the total waged and salaried workers (in %)	30.7 (2016)	28.5	28.4	28.3	28.3	26.3	27.4	29.6 (January to October)

Source: Updated PDP 2017–2022, National Economic Development Authority.

Identified strategies will improve the ability of Filipino individuals to operate and thrive in the digital environment. The strategic direction is toward expanding and strengthening the upskilling and retooling programs and employment facilitation services provided to workers and individuals, mainly by using digital technologies. The strategies identified are expected to improve individuals' access to employment opportunities and ensure their employability and productivity [13]. This translates into increased income-earning ability and enhanced adaptability of workers. The strategies for accelerating human capital development are divided into three categories:

(1) Improving employability

- Further advance skills development and retooling of workers through continuing education, training, and digital learning.
- Boost and expand employment facilitation services.
- Strengthen and expand internship, apprenticeship, and dual training programs, making them more anticipatory and geared toward future skills.
- Ensure flexible work arrangements and allow members of the workforce to balance their household and work duties.

(2) Improving productivity

- Enhance the delivery of capacity-building programs in productivity-based incentive schemes and business continuity plans.
- Ensure safety and health of workers amidst increased adoption of flexible working arrangements.
- Nurture workplace harmony.

(3) Enhancing labor mobility and income security

- Enhance income support and emergency employment.

Policies and programs related to these strategies should be evaluated and assessed to be further enhance and strengthen to achieve the full potential of Filipinos and transform the Philippines human capital for a healthy and resilient economy.

Developing New Talents and Skills for the Future Filipino Workforce

Over the years, there have been significant improvements in the employment situation of the Philippines. The concurrent efforts to address the prevailing jobs–skills mismatch underlying the country's unemployment and underemployment problems have been making progress with DOLE and other agencies implementing various employment programs and projects. Timely, relevant, and accurate labor market information (LMI) is needed to inform the Filipino students, workers, and employers. The JobsFit LMI report is a documentation report enumerating the industries that will create jobs and skills needed for the future. JobsFit LMI is also used in developing industry career guides (ICG) and career information pamphlets (CIP) that serve as

tools in helping students and job seekers make more informed education, training, and career choices [28].

DOLE–BLE identifies the following inputs and information limited to the JobsFit Labor Reports, highlighting the in-demand and hard-to-fill occupations of the key industries projected to be the primary sources of employment in the Philippines, on the strategic policy directives for cultivating new talents of the future:

Sectors Influenced by Technology Change and Advancement

A part of the JobsFit LMI Report is on emerging jobs that are relatively new to in-demand and hard-to-fill occupations and did not exist in the labor market before. These specified jobs refer to professions that resulted from technological advancements and innovations in the world of work. It can be observed in the report that the majority of the occupations belong to the IT–BPM sector. According to the Business Process Association of the Philippines (BPAP), more than 10 years ago, the Philippines were leading the IT–BPM industry, which has transformed into an omnichannel delivery model and continues to provide the niche in business process services to various industries. As stated on the BPAP website, the industry generates 1.23 million direct jobs and 4.08 million indirect jobs nationwide, contributing to the local economy with an estimated USD24.7 billion in revenue [29]. The emerging jobs identified are [30]: business process analyst; design engineer; evisceration processor; mobile app developer; search engine optimization analyst; data scientist; electronic mail and chat support agent; genomicist; nanotechnologist; and social media analyst.

With these identified emerging jobs belonging to the IT–BPM sector, the industry will shift to high-value services by attracting highly skilled talents and developing a globally competitive Filipino workforce to create an ecosystem that promotes lifelong learning.

Special Technical Skills Required

The COVID-19 pandemic, the growing role of Industry 4.0 and technology, the increasing number of green jobs brought about by climate change, the shift in demographics, urbanization, and the globalization of value chains are changing the world of work and skills demanded by the industries. To thrive in the 21st-century labor market, an individual needs comprehensive skills to contribute to structural transformation and economic growth by improving one's employability and labor productivity. Investment in a high-skilled workforce can create a successful cycle, wherein relevant and quality skills of workers will enable an increase in productivity growth and foreign direct investment. A greater number of high skilled workers will result in more and better jobs for the workforce and increase public and private investment in the education and training system. It will also increase the potential for employability and productivity for both the current and future workforces.

The pandemic shifted the trend from softs skills to digital and technical skills. This shift in direction is due to the change in labor demand and work arrangements caused by lockdowns and prolonged quarantine restrictions. According to the World Bank, technical skills are the knowledge, expertise, and interactions needed to perform a specific task, including the mastery of required materials, tools, or technologies. Digital skills cut across sectors and draw on all of the above skills and illustrate the capability to access, manage, understand, integrate, communicate, evaluate, and develop information safely and appropriately [31]. The World Bank identifies the digital and technical skills as Microsoft Office applications; analysis; computer literacy; design; programming; typing skills; customer service; encoding data and documents; data analysis; and sales.

A combination of policies is required to allow workers to keep their skills up to date, help them shift between jobs, and assure that employers have a skilled, highly productive, and innovative workforce.

Core Employability Skills that are Valuable Across Sectors and Occupations

In the International Monetary Fund (IMF) report, 'The Jobs of Tomorrow,' Zahidi [32] said that some jobs would disappear and others would eventually emerge as the world is experiencing dual disruptions in the form of COVID-19 and Industry 4.0. The workforce is automating faster than expected, displacing millions of jobs in the next five years. Automation, digitalization, and global health disruption have created a double disruption scenario for workers [32]. The WEF Future of Jobs Report 2020 maps out the jobs and skills of the future, tracking the pace of change based on inputs from business leaders and human resource experts from all over the world. The report aims to describe the effect of pandemic-related disruptions identified in the more comprehensive context of longer-term technology trends and the expected outlook for technology adoption, jobs, and skills in the next five years [33].

In the JobsFit LMI Report, DOLE–BLE mention the skills that employers demand in five years. The findings from the DOLE–BLE COVID-19 LMI survey were considered complementary to the WEF report on the 2020 Future of Jobs. According to the data from the WEF Future of Jobs Survey, formal upskilling appears to be closely focused on technology usage and design skills. In contrast, emotional intelligence skills are less frequently targeted in that formal reskilling provision. According to the Future of Jobs survey conducted by the World Economic Forum, the top 15 skills are [34]:

(1) analytical thinking and innovation;

(2) active learning and learning strategies;

(3) complex problem-solving;

(4) critical thinking and analysis;

(5) creativity, originality, and initiative;

(6) leadership and social influence;

(7) technology use, monitoring, and control;

(8) technology design and programming;

(9) resilience, stress tolerance, and flexibility;

(10) reasoning, problem-solving, and ideation;

(11) emotional intelligence;

(12) troubleshooting and user experience;

(13) service orientation;

(14) systems analysis and evaluation; and

(15) persuasion and negation.

Since its 2016 edition, the WEF report has tracked the cross-functional skills that are increasing in demand and emphasizes learner reskilling and upskilling efforts on personal development and self-management skills within the context of the pandemic. The employer group sees these top 15 skills as rising prominence in the lead up to 2025.

On a final note, for the Philippines a few years ago, the most significant catalyst for workplace change advanced in the form of digitalization or digital transformation. Many Filipino workers were alarmed that jobs would be replaced by artificial intelligence, automation, or robots; and unemployed workers would increase. Those changes caused by digitalization have not gone away. Still, the COVID-19 pandemic has taken the future of work on a new path, in a direction that is virtual and remote rather than physical and centralized, a direction where an eight-to-five job and a five-day workweek is suddenly hard to imagine. Even before the pandemic, it would have been naive to think that technology would continue to motivate changes in our daily lives and our workplaces. The question always is, how we respond to the changes brought about by disruptions.

Industry 4.0 and the unexpected global health crisis have brought the pre-crisis vision of equitable, relevant, and quality skills development into more sharp relief, adding unanticipated urgency to calls for reforms, specifically in the labor policies and combining technology and innovation. Developing and enhancing skills (new skills, reskilling, and retooling) can contribute to structural transformation and economic growth by improving employability and labor productivity and becoming more competitive. Investments in learners and workforces can create a virtuous process, wherein relevant and quality skills boost productivity growth and foreign direct investment. This may result in more and better jobs, job offers for the incoming and current workforce of the country, and more public and private investment in the education and training system.

These challenges require government and business leaders to handle uncertainty, emotions, individuality, and vulnerability; and engage. We are already hearing about those who have risen to the challenge and their decisions concerning their workforce. How businesses and leaders behave during this challenging time will measure their future success; people do not forget how organizations and people behave in the most difficult times.

All workers need essential skills in this pandemic-stricken environment, i.e., learning and re-learning. With establishment closing down, individuals losing their jobs, and organizations and enterprises redesigning their business models, we will all need to adapt to these changes, either by learning new skills, new technologies, new ways of working, or even making a shift to new jobs and careers. A new future is here in the 'new normal,' and perhaps a 'better normal' lies ahead. Whatever our circumstances, our working lives are changing, and we need to adapt. So, an 'always on' approach to learning will equip us for the future ahead, no matter what it has in store.

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SRI LANKA

Introduction

Sri Lanka is a lower-middle-income country, with a GDP per capita of USD3,682. The shares of economic sectors in the country are: agriculture 8.36%; industry 26.25%, and services 59.67%. Sri Lanka is positioned 72nd out of 189 countries on the Human Development Index. The country's literacy rate is 91.71%, while its overall computer literacy is 32.3%.

With its high literacy rate, Sri Lanka is a country with highest educational standards in south Asian region. However, the Government of Sri Lanka is aware of the difficulties confronting its skills development system as it responds to the needs of a rapidly growing economy. Thereby, the country has already drafted strategies and policies to address access and equity and improve the quality and relevance of Tertiary and Vocational Education Commission (TVEC) programs. At present, Sri Lanka is one of the largest labor exporting countries in south Asia.

In order to improve the quality of training and to increase the number of trained laborers in priority sectors in the country, trainings are carried out by both public- and private-sector training service providers. The prevalence of skill mismatches in Sri Lanka's labor market has been recognized, particularly in the context of high rate of unemployment among educated youth. Skills mismatch involves both the number and quality of graduates for a given industry sector.

As defined by the International Conference of Labour Statisticians (ICLS) standards, a labor force comprises the persons of working age who are actively engaged in the labor market. It is the sum of persons employed and unemployed.

Theoretically, demand for labor is determined by factors like demand for goods and services, labor productivity level, level of real wages, efficiency of employees, rate of investment, available technology, profitability of business activities, existing labor laws, government policies and activities, number and extent of development projects implemented by the government, etc. On the other hand, the supply of labor depends on factors like total population, labor force participation ratio, level of real wages, level and quality of education, female participation ratio, price level of the economy, labor laws, and government activities such as taxes, subsidies, policies, as well as cultures and attitudes of employees and management techniques adopted by employers.

Skills are essential in reducing the poverty and improving individual well-being. For instance, in Sri Lanka, workers with technical skills earn more than those without such skills even if both have the same level of education.

Therefore, the purpose of this paper is to provide an extensive analysis of labor training and reskilling strategies in Sri Lanka.

TABLE 1

SHARE OF EMPLOYMENT BY KEY INDUSTRY GROUPS.

No.	Industrial group	Percentage share of employment
1	Agriculture, forestry and fishing (A)	27.1
2	Mining and quarrying (B)	0.7
3	Manufacturing (C)	17.5
4	Construction, electricity, gas, steam, and air conditioning supply; water supply, sewerage, waste management, and remediation activities (D, E, F)	8.7
5	Wholesale and retail trade; and repair of motor vehicles and motorcycles (G)	13.7
6	Transportation and storage (H)	6.5
7	Accommodation and food service activities (I)	2.7
8	Information and communication (J)	0.7
9	Financial and insurance activities (K)	2.3
10	Professional, scientific, and technical activities (M)	1.1
11	Administrative and support service activities (N)	2.1
12	Public administration and defense; compulsory social security (O)	5.6
13	Education (P)	5
14	Human health and social work activities (Q)	2
15	Other service activities (S)	1.5
16	Activities of households as employers; undifferentiated goods and services; producing activities of households for own use (T)	2.1
17	Other such as real estate activities (L); arts, entertainment, and recreation (R); activities of extra territorial organizations and bodies (U)	0.6

Review of National Labor Training and Reskilling Strategies in Sri Lanka

Sri Lanka is a lower-middle-income country with a population of 21.92 million, and an annual population growth rate of 0.531%. Also, as noted earlier, agriculture accounts for 8.36% share of the economy; industry 26.25%; and services 59.67%.

TABLE 2

OVERVIEW OF THE LABOR MARKET.

Total labor force	8.0 million	37%
Informal sector and contract workers	4.7 million	21%
Formal private sector	1.8 million	8%
Government	1.1 million	5%
Not participating in workforce	7.1 million	32%

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Under 15 years of age	6.7 million	31%
Registered unemployed	0.3 million	1.70%

Vocational Education and Training for the Labor Market

Vocational education and training (VET) focuses on providing skills for work. It includes the increasing use of technology and growing importance of communications systems. Positioned as an interface between the education system and employment, VET has a role in contributing to the transition to vocational education and training for a suitable employment. It equips youths with skills relevant to employment in a rapidly changing global political and economic situation.

In Sri Lanka, the Vocational Training Authority (VTA) spearheads the provisioning of relevant trainings. VTA in Sri Lanka is expected to pay special attention to its career-oriented courses geared for the improvement of country's economy.

Sri Lanka needs more vocational and technical degrees of high quality along with vocational universities. A centralized system where courses are consolidated would help ensure efficient tracking, grading, and teaching processes.

In Sri Lanka, there are a number of government ministries and agencies involved with VET training. The development of a VET system is in order to prepare people for works that meet the needs of a developing economy.

Ministries and agencies such as the Ministry of Skills Development & Vocational Training; the Tertiary and Vocational Education Commission; the National Apprentice and Industrial Training Authority, the Department of Technical Education and Training; the Vocational Training Authority; and the National Youth Services Council play prime roles.

Labor Supply

As per the latest reports, Sri Lanka's population reached 21.9 million in June 2020. In March 2021, the unemployment rate had increased up to 5.7%. All persons above a specific age (i.e., 15 years and above) across genders are identified as working-age population. The supply of labor is defined as the amount of labor, measured in person-hours, offered for hire during a given time period. This amount can conveniently be expressed as a fraction or percentage of the total population and is also known as the labor force participation rate (LFPR). Sri Lanka's LFPR was projected to be around 53.50% in 2022 and 53.90% in 2023, according to our econometric models.

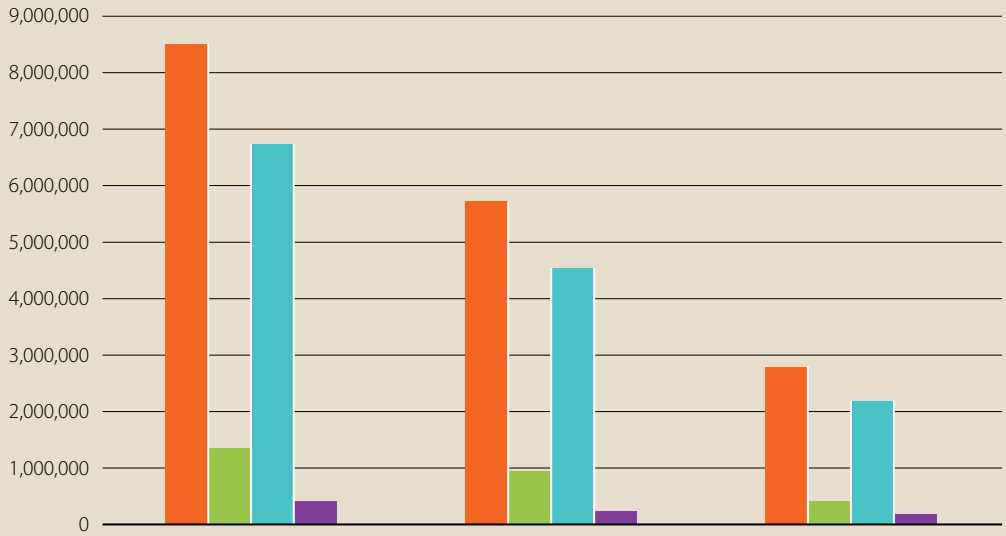
TABLE 3

ECONOMICALLY ACTIVE POPULATION IN SECOND QUARTER OF 2021.

Sector	Total	Male	Female
Sri Lanka	8,514,766	5,722,184	2,792,581
Urban	1,355,533	936,917	418,617
Rural	6,741,191	4,544,783	2,196,408
Estate	418,041	240,485	177,557

FIGURE 1

ECONOMICALLY ACTIVE POPULATION IN Q2 OF 2021.



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Estate	418,041	240,485	177,557

TABLE 4

LABOR FORCE PARTICIPATION RATE.

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
Labor force participation rate (in %)	52.5	53.7	53.2	53.8	53.8	54.1	51.8	52.3	50.6

FIGURE 2

LABOR FORCE PARTICIPATION RATE.

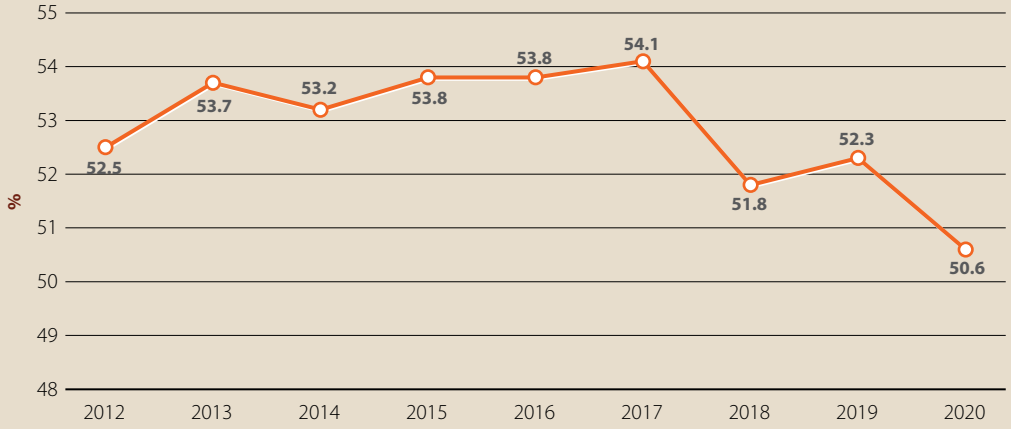


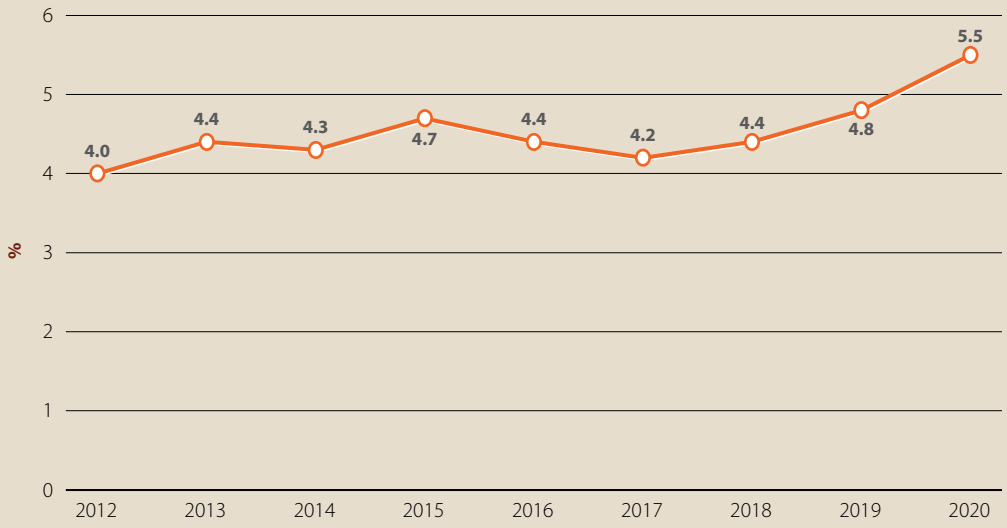
TABLE 5

UNEMPLOYMENT RATE.

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
Unemployment rate in %	4	4.4	4.3	4.7	4.4	4.2	4.4	4.8	5.5

FIGURE 3

UNEMPLOYMENT RATE FOR THE PERIOD 2012–20.



Labor Demand

As many as 104,714 informal-sector job advertisements (published in the classified columns) and 18,289 formal-sector advertisements (published by enterprises with their own titles in papers) were counted during the period January–December 2020:

- Around 88% of total job advertisements were published for service workers, shop and market sales workers, craft and related workers, elementary occupations, plant and machine operators, assemblers and technicians, and associate professionals during the year.
- 61% of the advertisements were not for any preferred gender.
- Around 9.8% of the advertisements required previous work experience.

TABLE 6

LABOR FORCE BY SECTOR, 2012–20.

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Agriculture	31.2	30.2	28.9	28.7	27.1	26.1	25.5	25.3	27.1
Industry	25.9	26	26.3	25.8	26.4	28.4	27.9	27.6	26.9
Services	42.9	43.8	44.8	45.6	46.5	45.5	46.6	47.1	46.0

FIGURE 4

SECTORAL LABOR FORCE FOR THE PERIOD 2012–20.

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Agriculture	31.2	30.2	28.9	28.7	27.1	26.1	25.5	25.3	27.1
Industry	25.9	26	26.3	25.8	26.4	28.4	27.9	27.6	26.9
Services	42.9	43.8	44.8	45.6	46.5	45.5	46.6	47.1	46

Table 6 and Figure 4 show the distribution of employed population for the period 2012–20. Services show a higher share in employment, particularly 2014 onward.

TABLE 7

DISTRIBUTION OF NUMBER OF JOB ADVERTISEMENTS BY JOB PROVIDER TYPE.

Job provider	2017	2018	2019	2020
Government	812	674	256	694
Semi government	1,179	1,087	570	450
Private	224,224	213,986	159,999	121,765
NGO	340	244	108	94

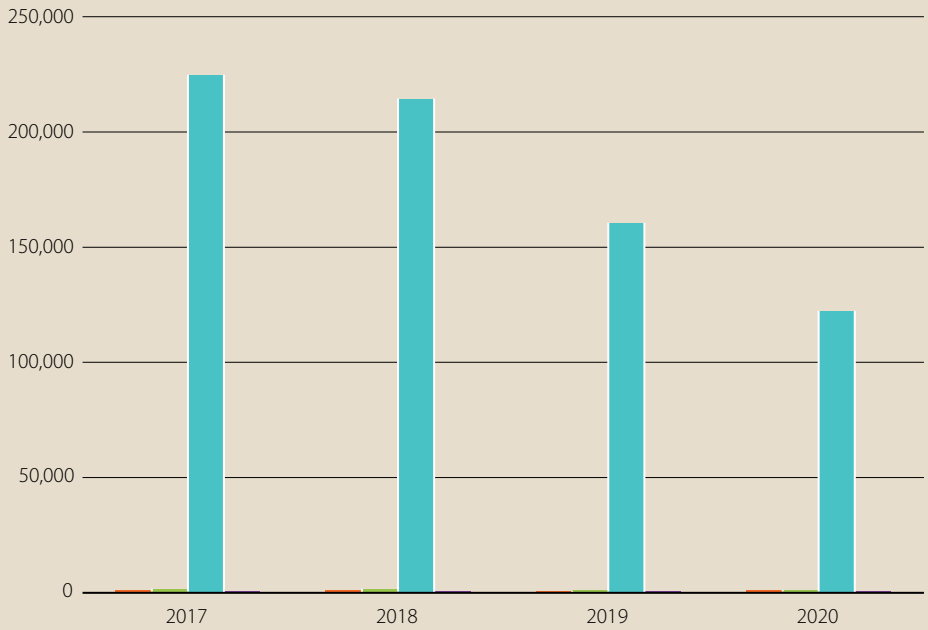
TABLE 8

JOB ADVERTISEMENTS BY MAIN OCCUPATIONAL CATEGORIES IN 2020.

No.	Main category	Gender (%)			Total No.
		Male	Female	Not specified	
1	Elementary occupations	15	29	56	31,681
2	Craft and related workers	32.6	2.7	64.7	27,094
3	Service workers, and shop and market sales workers	23.9	11.9	64.2	21,442
4	Plant and machine operators, and assemblers	38.8	3.7	57.4	15,448
5	Technicians and associate professionals	17.6	18	64.4	12,711
6	Clerks	11.2	35.1	53.7	7,044
7	Professionals	8.7	24	67.4	4,837
8	Legislators, senior officials, and managers	19.2	5.6	75.2	2,284
9	Skilled agricultural and fishery workers	36.2	1.4	62.4	425
10	Armed forces	21.6	10.8	67.6	37

FIGURE 5

NO. OF JOB ADVERTISEMENTS DURING THE PERIOD 2017–20.



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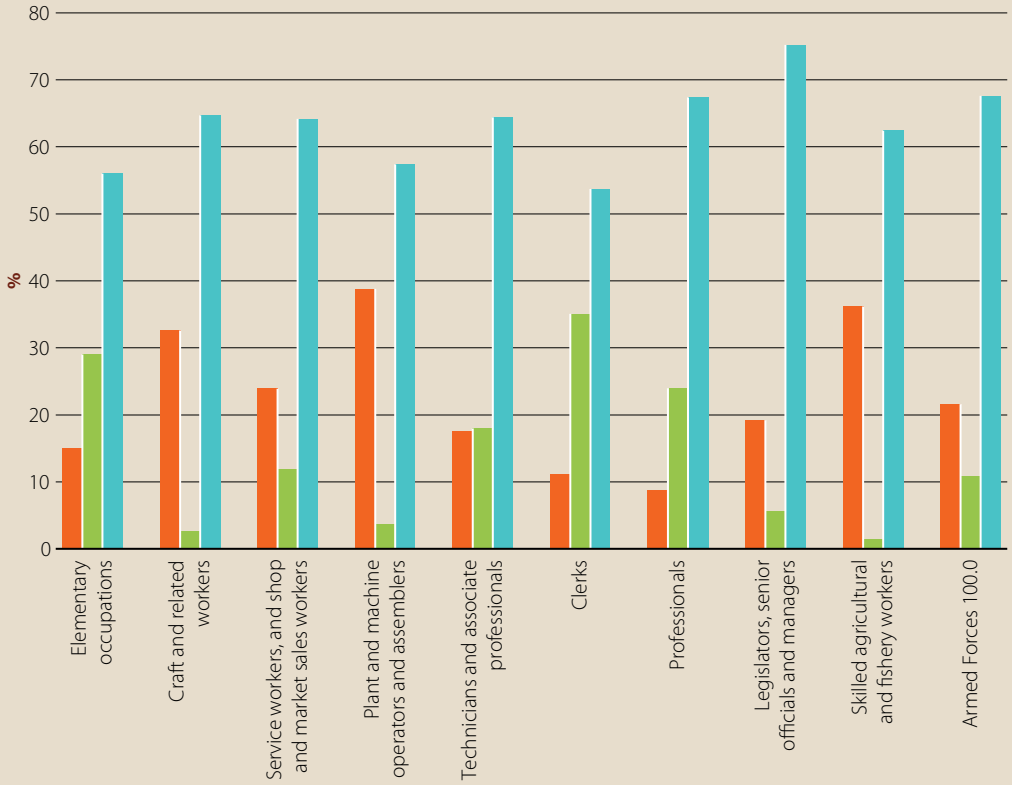

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Sri Lanka's Vocational Training Development Strategy 2011–20

Network of VET Institutions

Sri Lanka has a large number of vocational training educational institutions. While there are approximately 1,000 institutions under government and statutory boards, a large share (55%) of training institutions is with the private sector and NGOs.

The Department of Technical Education and Training (DTET) operates with a network of 29 Technical Colleges throughout the country, while nine Colleges of Technology (upgraded from

Technical Colleges) offer diploma-level courses within the National Vocational Qualification (NVQ) framework. Moreover, more than 38 Career Guidance Centres, and 21 Learning Resource Development Centres are also in operation as part of this system.

According to recent statistical data, the VTA operates with a network of 218 Rural Vocational Training Centres (RVTCs) and Special Vocational Training Centres (SVTCs); 21 District Vocational Training Centres (DVTCs); 14 Career Guidance Centres; and six National Vocational Training Centres (NVTCs), throughout the country.

The National Apprentice and Industrial Training Authority (NAITA) is the leading agency for providing apprenticeship training and developing National Competency Standards. It manages three national training institutes: the Apprenticeship Training Institute (ATI); Automobile Engineering Training Institute (AETI); and Institute of Engineering Technology (IET); along with eight career guidance centers and 51 training centers. The National Youth Corps (NYC) organizes vocational training courses in urban and rural areas; and is responsible for the implementation of the entrepreneurship program and career guidance services.

The University for Vocational Technology (UNIVOTEC) provides degree courses for people with NVQ qualifications as well as for those who work in the industry and those who wish to acquire degree-level education. UNIVOTEC delivers NVQ level 7 degree courses as well as training instructors for Colleges of Technology and assessors for course accreditation. It also develops curriculum and teaching and learning resources. Sri Lanka Institute of Advanced Technical Education (SLIATE), under the Ministry of Higher Education, manages and supervises 11 separate Advance Technical Institutes and five sections housed in the Technical Colleges. It also offers programs for Higher National Diplomas in civil engineering, electrical engineering, quantity surveying, building service engineering, agriculture, and for National Diploma in Business and Finance.

Evolution of the formal TVET education in Sri Lanka likely began in 1893, when the Colombo Technical School began operations in the premises of the Ceylon Government Railway at Maradana. This school later developed into the Maradana Technical College, which remains one of the premier technical training institutions in the country. In 1957, another technical college was established in Galle, followed by technical colleges in other major towns.

In 1950, the Department of Labor established its Vocational Training Unit, which operated several craft training centers throughout the country. This was the government's earliest attempt to make vocational training accessible to rural youth, i.e., the most economically deprived segment of the population. A comparatively large center was established in the main city of each district, and many small centers were established in rural areas. The large centers conducted craft courses for welders, motor mechanics, masons, carpenters, and electricians, among others, while the small rural centers were aimed mainly at the female populations in villages, conducting courses such as dressmaking and cooking. The Vocational Training Unit was later expanded, ultimately developing into the Manpower Division of the Department of Labor.

In 1964, the Ministry of Education established the Department of Technical Education and Training (DTET) to administer the technical colleges. By 2002, there were 37 technical colleges nationwide. Among them is the Institute of Practical Technology in Katubedda (now the University of Moratuwa), which was established in 1960 and was the only institute to conduct a certificate course for middle-level technicians and junior technical officers. The other middle-level technicians'

course at that time was the Diploma in Engineering Course at the Technical Training Institute (later known as the Hardy Institute) in Ampara, which operated under the Gal Oya Development Board.

DTET was the primary agency for TVET until 1971, when the National Apprenticeship Board (NAB) was established through the National Apprenticeship Act No. 49 and became another major player in the subsector. NAB was established primarily in response to a report of the Commission of Inquiry that investigated the cause of a youth uprising in 1971. The commission concluded that among the primary causes were unemployment among rural youth and lack of opportunity for social mobility. NAB's chief mandate was to establish a formal scheme for industrial apprenticeship to deliver crafts training through state and private-sector industrial establishments, thereby enhancing employment opportunities for youths. In the early 1970s, apprenticeship programs were managed by government departments and private-sector establishments, but they lacked proper coordination, evaluation, and certification. In 1990, the Parliament enacted the Tertiary and Vocational Education Act No. 20, which established the Tertiary and Vocational Education Commission (TVEC) and the National Apprentice and Industrial Training Authority (NAITA).

TVEC was a new institution established under Part 1 of the Act, while NAITA was established under Part 2, as the successor to NAB. The establishment of TVEC was the first attempt to coordinate and regulate the entire TVET sector, including both state and private-sector training providers. The conversion of NAB into NAITA was intended to broaden the scope of its activities, which had focused mostly on providing formal apprenticeship training through a large number of government and private-sector industrial establishments. Even before its conversion, the scope of NAB activities had been broadened slightly by the NAB Amendment Act No. 1 of 1988, which empowered it to conduct national trade tests.

Under this TVET system in Sri Lanka, nine tests were aimed at certifying competencies of crafts persons who acquired skills through nonformal training in industrial establishments or through informal apprenticeships such as family-run enterprises. Over the years, the national trade certificates awarded by NAB/NAITA gained a substantial degree of credibility and acceptance among employers. They also provided a valuable means of upward occupational mobility for crafts persons lacking formal qualifications. Another milestone in the development of the TVET sector was the establishment of a separate ministry for TVET in 1994. This could be considered a major achievement due to the highly complex and multi-institutional character of TVET providers in Sri Lanka. Although it took some years to bring almost all of the major TVET providers in the state sector under this ministry, a substantial degree of coordination and rationalization became possible for the first time in the history of TVET in Sri Lanka. However, full realization of this vision did not happen for various reasons, including bureaucratic obstacles, lack of enforcement, and the resistance to change the existing system.

Subsequent developments in this regard include the creation of the Ministry of Skills Development, Vocational and Technical Education; the Ministry of Tertiary Education and Training; and the Ministry of Youth Affairs and Skills Development. While the establishment of a separate ministry is generally seen as a significant step forward in the development of TVET, the complete separation of TVET and higher education is a serious disadvantage. Close linkages between these two streams of education are desirable for improving the image of TVET, as well as for providing lateral mobility between study programs for students.

In 1995, VTA was established through the Vocational Training Authority of Sri Lanka Act No. 12. This act is virtually a duplicate of TVE Act No. 20 of 1990, Part 2, which established NAITA. The

powers and responsibilities of the two agencies are almost identical. The only specific functions unique to NAITA are those of equivalency and validating local and foreign qualifications. Because the functions of the two agencies are almost identical, a certain amount of duplication is inevitable in the performance of their activities. However, although the TVE Act does not mention any division of responsibilities, VTA has identified its primary role as provisioning of basic training to rural youth through a large network of small training centers, while NAITA focuses mainly on apprenticeship training. Both institutions have agreed to avoid duplication of functions as far as possible. At the same time, the Manpower Division and the Foreman Training Institute, which had been in the Department of Labor, came under the purview of VTA. The large training centers under the Manpower Division were renamed as district vocational training centers (DVTCs) while the small centers were called rural vocational training centers (RVTCs).

Also in 1995, SLIATE was established by SLIATE Act No. 29. Currently functioning under the Ministry of Higher Education, SLIATE operates several Advanced Technical Institutes (ATIs), one in each of the nine provinces. The higher National Diploma in Engineering course is conducted at three of these ATIs, while the others conduct courses in languages and management, among others. The formulation and implementation of the National Vocational Qualifications Framework (NVQF) in 2006 was yet another significant achievement. Until then, individual training providers in both public and private sectors had conducted training programs according to their own standards and curricula, conducted their own examinations and assessments, and issued their own certificates without any central control or regulation. An array of certificates and diplomas caused considerable confusion among prospective trainees and employers, due to lack of standards by which to evaluate the competences indicated in the certificates. Despite its expansion over the years, institutional training has not yet become the dominant and industry-preferred mode of skill acquisition. A large majority of the population acquires skills by working in the industry, and also through NAITA's formal apprenticeship scheme. Informal apprenticeship arrangements are also prevalent. In the past, acquisition of skills and trades were enabled mainly through informal apprenticeships and family occupations. However, formal training programs have developed with modern technology and institutionalization of skills development, vocational training, and technical education. These developments are expected to make formal/institutional training more attractive to trainees and more acceptable to employers.

Admissions

Training Performance of Selected Public Sector Training Institutions

During the year 2020, as many as 98,313 youths were recruited for TVET by selected public sector training organizations. The majority (58.41%) of recruits were males. Department of Technical Education and Training recorded the highest number of recruitments, at 24,950. During the year 2020, 10,114 trainees completed their training.

TABLE 9

RECRUITMENTS AND COMPLETIONS IN SELECTED PUBLIC SECTOR TRAINING ORGANIZATIONS IN 2020.

Name of training provider	No. of recruitments			No. of completions		
	Male	Female	Total	Male	Female	Total
Department of Technical Education and Training (DTET)	14,669	10,281	24,950	4,847	5,267	10,114
Vocational Training Authority (VTA)	14,504	10,100	24,604	10,830	7,845	18,675

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Name of training provider	No. of recruitments			No. of completions		
	Male	Female	Total	Male	Female	Total
National Apprentice and Industrial Training Authority (NAITA)	9,387	4,823	14,210	9,550	6,080	15,630
National Youth Services Council (NYSC)	5,811	7,421	13,232	595	629	1,224
National Institute of Business Management (NIBM)	3,576	3,833	7,409	2,033	2,150	4,183
Mahapola Port and Maritime Academy (MPMA)	3,219	727	3,946	3,209	727	3,936
National Youth Corps (NYC)	1,077	1,020	2,097	38	27	65
Ceylon German Technical Training Institute (CGTTI)	1,147	50	1,197	515	9	524
University of Vocational Technology (UNIVOTEC)	665	498	1,163	0	0	0
University Collages (UC)	447	294	741	61	63	124
Sri Lanka Institute of Textile and Apparel (SLITA)	211	472	683	32	8	40
Gem and Jewelry Research and Training Institute (GJRTI)	339	132	471	117	66	183
Other government Institute	2,375	1,235	3,610	1,738	899	2,637
Total	57,427	40,886	98,313	33,565	23,770	57,335

Teachers

In order to impart technical and vocational education and training, teachers and trainers need to have one National Vocational Qualification level higher than the level that they intend to teach at, plus an industry experience. The Faculty of Training Technology (FTT) at the University of Vocational Technology offers pre-service and in-service TVET teacher and trainer training.

Training Curricula

VTA of Sri Lanka

The government regularly updates and improves its curricula to meet the recommended changes. First, the curriculum and structure of the vocational teaching system needs to be updated to meet the demands of the industries. The current learning courses need more emphasis on practical applicability.

The functions of VTA are to:

- provide vocational training to students by conducting vocational training through island-wide centers;
- conduct trade tests and final assessment, and issue national qualification certificates;
- conduct carrier guidance and counseling programs; and
- facilitate the youth who have undergone vocational training to engage with employment opportunities or to start their own businesses.

National Apprentice and Industrial Training Authority

The highest number of recruitments was recorded for Enterprise Based NVQ training, at 8,700. Considering Center Based Apprenticeship Training of NAITA, the highest number of recruitments was recorded in Nuwara-eliya district during the year 2020, at 164.

National Vocational Qualification

The highest number of NVQ certificates (15,608) were issued for courses conducted by vocational Training Authority in 2020. Of the total number of NVQ certificates, 14% were obtained through Recognition of Prior Learning (RPL) method. The private sector recorded 27.9% of the total number of NVQ certificate recipients in 2020. Female recipients were higher than male recipients for National Youth Services Council and private institutes.

There are a number of mechanisms in place to recognize prior learning. The National Vocational Qualifications Operation Manual stipulates that NVQ qualifications may be awarded through RPL if the applicant has a minimum industrial experience of 18 months for NVQ Level 2 or 3 qualifications. The criteria for awarding NVQ Level 4 qualification through RPL assessment is divided into two categories:

(1) Applicants with NVQ Level 2 or 3 qualifications require:

- minimum 24 months of work experience in the relevant section; or
- minimum five years of relevant experience in formal employment with contributions to Employees Provident Fund (EPF) or pension; or
- minimum five years of relevant experience in self-employment with a business;
- registration; and
- competency in the NVQ 4 assessment.

(2) Applicants without NVQ Level 2 or 3 qualifications require minimum five years of relevant industry experience. If relevant formal employment with contributions to EPF, pension, or self-employment with business registration cannot be proved, TVEC will nominate an assessor, in addition to the assessors nominated by NAITA or VTA, for Level 4 assessment.

Labor Market Transition Opportunities

The expansion of Sri Lanka's IT industry, mainly oriented toward international markets, is likely to increase demand for high-skilled technical jobs around data analysis and cyber security. A large portion of Sri Lanka's youth could bear the burden of job losses in the retail industry, particularly those moving out of agriculture and plantations (for whom retail is an easy steppingstone into formal work). On the contrary, a rise in e-commerce is expected to match this development through technological feasibility and low investments.

School-to-work Transitions

It is common for youth leaving schools to experience a period of unemployment or unstable employment before finding permanent work. If this transition period from school to work is short, it should not cause undue harm to lifetime earnings or employment prospects. In fact, short periods of unemployment or exit from the labor force could be useful, whether utilized for cultural enrichment, travel, or recreation.

More extended periods of unemployment or inactivity, however, may cause permanent harm to careers, because human capital deteriorates when it is not being used. Also, idleness can lead to discouragement or depression, criminal or antisocial behaviors, or a combination of two or more ills.

Much less is known about the transition from school to work in developing countries. This study represents a first pass at new information on the school-to-work transitions using newly available data on the early work careers of the Sri Lankan youth. Past analyses of the unemployment problems in Sri Lanka have shown that joblessness is concentrated in the population aged 15–29 years [1]. Surprisingly, it seems that the most educated may have the greatest difficulty in securing employment [2], though this conclusion is based on evaluations of work histories of college graduates. This paper aims to extend the evaluation of that work history to lower levels of schooling as well. We find that for the majority of Sri Lankan youth, particularly the male youth, transition to employment occurs within three years of leaving school. The average duration of the transition from school to first job is nearly two years. However, a significant fraction of Sri Lankan youth has considerably longer spell of unemployment or inactivity before finding work. These long spells of joblessness are particularly experienced by young women.

Unlike prior work, it does not appear that the more educated groups face added hardship finding work. Their lower employment rates shortly after leaving the school appear to be explained by their coincident higher levels of training. Examination of time used at dates after the date of leaving school does not reveal any adverse effects of schooling on successful transit to work.

Employment Transition

The world of work is undergoing a major transformation. The interaction of several complex drivers such as technological advancements, demographic transitions, shifting political cultures, and changing patterns of employment and production are heralding profound, and perhaps, unprecedented changes for the way people work and live. Most scholarly attention and public anxiety have been focused on the impact of the so-called Fourth Industrial Revolution, which typically refers to a cluster of digitally driven technologies such as artificial intelligence, intelligent automation, and robotics in the world of work. While global narratives oscillate between optimism and pessimism, these narratives need to be re-examined in the light of varying socioeconomic contexts across the global south. In many countries, earlier industrial revolutions are still unfolding. Technology trajectories and their impact on the world of work will be shaped by political and social interactions at the local level.

There is currently little discussion or evidence of the impact that emerging technologies will have on the future of work in developing countries. This study attempts to fill that gap. There are two key reasons for the increasing number of temporary forms of employment in Sri Lanka. Supply-side issues such as lack of education, experience, and skills compel workers to engage in temporary forms of employment. Further, employers exploit workers by recruiting them as temporary workers to fill permanent job roles, while denying them the rights granted to permanent employees.

Occupational Transition

Employment in the services sector will continue to grow during the next 14-year period while trends for the industry sector will grow at a slower pace. Employed population in the agriculture sector will continue to decline. When predicting occupational structures, it was also observed that occupations such as professionals, technicians, associate professionals, services and sales workers, plant or machine operators, and assemblers would grow in future with an indication that more and more jobs would be created mainly in services and industry sectors.

Although a shift from agriculture to industries is a feature that is usually observed during the first phase of an economic growth, Sri Lanka was expected to skip the industry sector's growth and move directly to services from agriculture. This can be seen as an economic achievement because Sri Lanka has started leapfrogging from an agrarian economy to a services economy.

A greater demand for employment will be generated in the services sector while the share of employed population in the agricultural sector will gradually decline.

COVID-19 and Sri Lanka's Labor Market Gaps

The COVID-19 pandemic emerged as a public health crisis, and morphed into a global economic crisis, with severe impacts on commercial activities, employment, and trade. The International Labour Organisation (ILO) describes COVID-19 as the "worst global crisis since the Second World War."

Sri Lanka has not escaped unscathed, and the pandemic has affected revenue streams of many businesses in the country. Due to the crisis, businesses across a range of economic sectors including manufacturing, travel and tourism, and services have experienced catastrophic losses, as a result of the control measures that restricted business operations and movements of workers. A significant drop in economic activities and demand for goods and services led to more redundancies. The impact was more harshly felt by unprotected workers. At a given stage, more than 1.7 million temporary employees in the private sector were at the risk of facing drastic wage cuts and layoffs.

The latest statistics from the Department of Census and Statistics (DCS) reveal that Sri Lanka's unemployed population rose by 100,000 during the first quarter of 2020, coinciding with the start of the lockdowns. It also indicated more job losses in the coming months, with those who were unemployed becoming desperate to find new jobs to survive in the time of uncertainty. Given this background, this chapter discusses key issues that need to be rectified in Sri Lanka's labor market policies to face similar emergencies in future.

The Precariousness of Temporary Employees

Sri Lanka has experienced an expansion of temporary forms of jobs in recent decades. As of 2018, out of the 2.8 million private-sector employees, 60% were temporary workers. Unlike those engaged in permanent jobs, these temporary workers have lacked the necessary protections such as job security and social security benefits.

IPS Research has revealed that most of the temporary employees are not given a written contract. Although there is a statutory obligation to issue a letter of appointment to employees, around 90% of temporary and casual employees do not receive a written contract. In a crisis situation like COVID-19, temporary workers who do not have an employment contract face the risk of drastic wage cuts and layoffs.

Although the Employees' Provident Fund (EPF) Act covers all employees, irrespective of whether they are permanent, temporary, casual, or shift workers, the majority of temporary workers do not benefit from social security schemes. In fact, of the temporary workers, 88% are not covered by the EPF Act.

Moreover, there are vast gaps in Sri Lanka's social protection system for informal workers, i.e., the daily wage earners, self-employed, and migrant workers. IPS Research reveals that with the current social security system, only 29% of the total employed benefit from employment-based, social protection schemes.

The Way Forward

The pandemic has been a wakeup call for Sri Lanka, revealing serious gaps in the country's labor market policies and social protection systems. The crisis shows the importance of increasing the flexibility of the labor market and the need to move toward income protection, rather than job protection. The government could facilitate permanent employment in the private sector by introducing strategic protective measures to safeguard workers' rights and benefits, such as unemployment insurance and universal pension schemes.

Given that the Employees' Trust Fund (ETF) provides some income support to workers when unemployed, the government can consider converting the ETF into a proper unemployment insurance (UI) scheme. The ETF can be transformed into an UI scheme for all categories of workers, based on a fair sharing of the cost between employers, workers, and the government. This is an essential step toward promoting decent work and supporting transitions from informal to the formal economy, and a job-rich recovery, in Sri Lanka.

With the existing social security system, Sri Lanka faces challenges in meeting the social security needs of a large and growing informal sector. A social insurance scheme could be introduced to extend the coverage to those currently ineligible for any existing scheme. It is necessary to ensure adequate social protection coverage for all informal, temporary, daily-wage, and self-employed workers. Such a social insurance scheme would safeguard those who lose livelihoods in a crisis.

It is also vital to implement active labor market policies to support re-employment. Due to the COVID-19 crisis, labor market changes that result in significant shifts of workforces from struggling sectors to booming sectors are possible. The government should take measures to reskill unemployed workers, as reskilling is key to their transition to new employment in booming sectors. Such programs should be more work-oriented and focus on skills that are in high demand.

The Sri Lankan economy contracted by 3.6% in 2020 on a year-on-year basis in the backdrop of unprecedented disturbances to socioeconomic activities due to adverse impacts of COVID-19. The pandemic itself, together with related restrictions to contain the spread of the pandemic, dragged down the performance of economies all over the world and Sri Lanka was no exception.

Some of the business sentiment indices compiled by the Central Bank recorded their lowest values in 2020, particularly during the second quarter, reflecting the adverse impact of the nationwide lockdown. The pandemic situation severely affected those economic activities for which physical engagement is vital, such as construction, manufacturing, and transportation, in addition to the whole ecosystem built around the tourism industry. The setback in construction and manufacturing activities caused a contraction in industry activities, while services activities were adversely affected predominantly due to contractions in transportation, other personal services, accommodation, and food and beverage services.

Meanwhile, agriculture also recorded a decline largely due to the pandemic-related disturbances, though a conducive policy environment supported the continuation of most agricultural activities even during the lockdown periods. Investment expenditure contracted in 2020, mainly due to uncertainty on the recovery timeline of the pandemic, locally as well as globally, while consumption expenditure recorded a slower growth. External demand also weakened during the year on grounds of a loss of growth momentum across geographies due to the pandemic. However, during the year, the rationalization of nonessential imports curtailing the merchandise imports, partly contributed to buffering the deterioration in net external demand amidst the contraction in exports.

In 2020, the national savings–investment gap as a percentage of the GDP narrowed on account of the considerable contraction in investment expenditure, though national savings recorded a decline of 3.6% during the year, compared with 2019. In line with the adverse impact that the COVID-19 pandemic had on economic activities, the labor market exposed its long-term fragilities and vulnerabilities, thus deepening structural issues and inequalities further. Accordingly, resulting in a loss of family incomes, the unemployment rate increased to 5.5% in 2020, the highest since 2009, amidst a considerable decline in labor force mainly due to the drop in female labor force participation. Meanwhile, the unemployment rate among females, youth, and educationally qualified persons increased considerably in 2020, thereby aggravating the inequalities further. In addition, departures for foreign employment declined sharply amidst the spread of COVID-19, while Sri Lankan migrant workers were also severely affected.

Strategic Policy Directions for Cultivating New Talent for Future

The then President Gotabaya Rajapaksa had declared 2021–30 the decade of skills development in Sri Lanka. The National Policy Framework Vistas of Prosperity and Splendour 2020–25 has identified 'a technology-based society' as one of the key policies that include

- introduction of ICT policy for government and national ICT policy;
- establishing National Innovation Agency (NIA) under the Presidential Secretariat;
- a government-initiated program to provide 13 years of continued education to students, under Ministry of Education;
- introduction of technology stream comprising engineering technology, bio-system technology, and science for technology, for advanced level under Ministry of Education;
- proposing National Policy on STEM education, expecting 1% contribution to GDP during the next decade from every student in taking up science, technology, engineering, and mathematics (STEM) under Ministry of Education;
- providing internship opportunities and conducting entrepreneurial development programs for the final-year university students under Ministry of Education;
- introduction of National Policy Framework for SME Development under Ministry of Industries; and
- launch of the National Export Strategy (NES) of Sri Lanka in 2018 to promote new export sectors under Ministry of Trade.

Direction and Solutions to Develop Professional Skills for Sri Lankan Workers

A wide gap exists between available skills and market demand in Sri Lanka. Many of the country's youth leave the formal school system without employable skills because their access to middle-level skills training and entry-level skills programs is inadequate. This is compounded by the low market relevance of TVET in the country. The Skills Sector Enhancement Program, supported by the Asian Development Bank's (ADB) results-based lending program, is helping to improve and ensure the effectiveness and efficiency of Sri Lanka's sector-wide reforms.

Direction of Strategy for VET Development in Sri Lanka during 2021–30

Sri Lanka has improved the quality assurance mechanism of all public and private TVET providers by developing a centralized management information system (MIS). This system has helped training centers manage training information from enrollment to graduation and deployment. It has also automated their training administration and resource management.

The implementation of a comprehensive vocational teacher development policy has complemented the new MIS. This initiative has upgraded instructors' skills through industry exposure training. It has provided performance management mechanisms, professional development, and allowances to retain and recruit qualified instructors.

To ensure that courses offered meet industry standards, effectiveness of training programs was also reviewed. Moreover, the project revised the National Vocation Quality (NVQ)-level descriptors to upgrade the country's TVET standards to industry-recognized qualifications. These revisions were applied to all Tertiary and Vocational Education Commission-accredited programs and registered training providers.

Program to Support Development of Sri Lanka's Labor Market up to 2030

The Sri Lankan government is confronting these challenges head-on through its Skills Sector Development Program, its first sector-wide, medium-term development program. It had envisioned a TVET sector that is efficient and ready to meet rapidly evolving labor market demands by 2020.

Conclusion

This research attempts to analyze the national labor training and reskilling strategies of Sri Lanka. Accordingly, the vocational education and training for the labor market is discussed in depth. As identified, VTA is spearheading the relevant trainings in the country. Moreover, in Sri Lanka, there are a number of ministries and agencies involved in VET training. Among them are the Ministry of Skills Development and Vocational Training; the Tertiary and Vocational Education Commission; the National Apprentice and Industrial Training Authority; the Department of Technical Education and Training; the Vocational Training Authority; and the National Youth Services Council.

Further, the report conducted an evaluation of Sri Lanka's vocational training development strategy. In doing so, it discussed the market transition opportunities like school-to-work transitions, labor market transitions, and occupational transition. Further, in this study the impact of the COVID-19 pandemic on Sri Lanka's labor market gaps was also assessed.

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THAILAND

Introduction

Today, Thailand is faced with many challenges including an aging population, globalization, digital disruption, and impacts of the recent COVID-19 pandemic. The labor market has been reshaped in terms of quantity and quality of the workforce as well as the skills and occupations needed in future.

Thailand is one of the fastest aging countries with an old-age dependency ratio that exceeds the ASEAN and OECD averages [1]. The aging population has led to a shrinking labor force. Also, the labor force participation rate has been declining and was below 75% in 2020 compared with almost 80% in 2011.

The country now has 37 million employed people. However, a large portion of workers are in low-productivity sectors. Around one-third of the employed people are in the agricultural sector, which contributes less than 10% to Thailand's GDP. Also, although 60% of the employed are in the services sector, most of them are working in traditional services such as retail and wholesale trade, construction, accommodation, and food services, which in general are the subsectors with low productivity, low technology adoption, and high labor intensity.

Another fact regarding the Thai labor market is skills mismatch, which has also been a structural challenge for the country. The number of workers required by employers with vocational education and training (VET) is far greater than the job applicants having VET. In short, there seem to be too many university graduates, yet too few VET graduates than what the market demands.

Moreover, science, technology, engineering, and mathematics (STEM) manpower in Thailand is inadequate. According to the Office of the Higher Education Commission report, the proportion of STEM graduates is low compared with graduates in other subjects such as business, administration, law, arts, and humanities. This is one of the biggest challenges as these STEM subjects will be increasingly essential for the country's development in the new world where technological advancement is causing shifts in jobs and skill demands.

With global megatrends such as digital disruption, aging society, globalization and international trade, and climate change, along with the COVID-19 pandemic, Thailand is required to prepare itself to overcome the challenges. Therefore, it is important to evaluate the country's current manpower strategies, labor market transition opportunities, and strategic policy directions for cultivating new talents for the future.

Review of National Labor Training and Reskilling Strategies

National Strategy, 2018–37

Preparing the manpower for the new era of world economy has been included in the main strategic plans of Thailand. The first national long-term strategy, National Strategy (2018–37), which aims to make Thailand a developed country with security, prosperity, and sustainability, also places a great emphasis on human capital development.

One of the strategies is Human Capital Development and Strengthening, which will help promote modern innovators, thinkers, entrepreneurs, and farmers, based on their personal skills and abilities.

The key development guidelines for this strategy include:

- promoting human development at all stages of life from pregnancy to the elderly stage (for working-age population, the focus is on enhancing skills and capacities to meet existing market demands);
- improving learning processes to accommodate changes in the 21st century by encouraging lifelong learning and development of learning skills;
- realizing multiple intelligences by creating career paths, working environments, and supporting systems that promote special skills through various effective mechanisms; and
- promoting conditions that encourage human capacity development, including embedding and developing skills outside of the school and developing database systems to facilitate human capital development.

The 12th Social and Economic Development Plan, 2017–21

In line with the National Strategy, the Thai government has implemented the 12th Social and Economic Development Plan (2017–21). A priority of the plan was to have people-centered development, with strategies under the plan focusing on promoting science, technology, and innovation, along with human resource development and economic reforms. An area of this five-year plan outlines a strategy for 'Strengthening and Realizing the Potential of Human Capital.' Key development pathways of the strategy consist of:

- developing Thai people of all ages to acquire the skills, knowledge, and capability needed for sustaining meaningful lives;
- promoting the working age population to acquire skills and knowledge demanded by the labor market to enable them to perform their jobs effectively;
- increasing the quality of education and lifelong learning by (1) adjusting the system of education management; (2) designing incentive mechanisms aimed at attracting medium-scale workplaces to participate in the Dual Vocational Education or Co-operative Education programs; and (3) promoting e-learning materials; and
- improving the standards of labor training centers, creating an integrated labor-demand-and-supply database, and providing one-stop labor information and data services centers.

Thailand 4.0 and Target Industries

Thailand 4.0 is an economic model aiming to overcome economic challenges facing the country. These challenges include a middle-income trap, an inequality trap, and an imbalanced trap stemming from previous economic development directions that, successively, placed emphasis on agriculture (Thailand 1.0); light industry (Thailand 2.0); and advanced industry (Thailand 3.0). The key objective of Thailand 4.0 is to transform Thailand into a high-income country driven by innovation and a value-based industry [2].

Under this model, the Thai economy is driven by upgrading technology as well as improving capacities for creativity, innovation, and research and development (R&D). One of the focuses of

the policy concerning manpower is to develop human resources with competencies in the 21st century and strengthen vocational training and education system.

Moreover, Thailand 4.0 model highlights 'target industries' (known as S-Curve industries) as the country's new engines of growth. The target industries for Thailand 4.0 are:

- **First S-curve industries:** These include next-generation automotive, smart electronics, affluent medical and wellness tourism, agriculture and biotechnology, and food for the future.

- **New S-curve industries:** These include digital, automation and robotics, aviation and logistics, medical and comprehensive healthcare, and biofuel and biochemical.

Additionally, two new industries were later included in the target industries. These were defense; and education and human resource development (HRD). Remarkably, as HRD has become one of the target industries, the country is incentivizing businesses to become training providers or invest in workforce development.

These target industries are supported through the Eastern Economic Corridor (EEC), which covers Rayong, Chonburi, and Chachoengsao provinces with a total area of 13,000 sq km. The EEC is set to be the new growth hub of the country by attracting investments in S-Curve industries by providing infrastructure, facilities, and incentives.

Thailand's Manpower Development Strategy, 2017–36

In 2016, Thailand's Ministry of Labor issued the 20-Year Manpower Development Strategy (2017–36). The strategy places an emphasis on STEM manpower development, consistent with the Thailand 4.0 agenda. The framework can be divided into four periods as follows:

(1) Productive manpower (2017–21): It aimed to eliminate the labor-related obstacles for the country's development, upgrade labor standard, promote multi-skilled labor, and upskill the manpower.

(2) Innovation workforce (2022–26): The aim is to develop workforce to apply technology and innovation in productivity enhancement, encourage the development of STEM skills for Thailand 4.0, amend regulations to suit employment in the digital era, and make the workforce ready for multi-cultural and cross-border work.

(3) Brain power (2027–31): This will aim to increase the number of STEM workers for high-productivity work in order to overcome the middle-income trap.

(4) Creative workforce (2032–36): This will aim to increase the number of STEM workers and create creative manpower with R&D skills for better work quality and efficiency.

Noticeably, the term 'STEM' exists in most parts of the strategy, implying that Thailand is recognizing the incoming demand for these skills. However, the STEM manpower supply still cannot keep up with the rising demand. This is indicated by the fact that the share of new graduates in STEM majors is much lower compared with other majors. Yet, the share has gradually increased from 2018 to 2021, implying a promising trend.

TABLE 1

NUMBER AND SHARE OF NEW GRADUATES BY MAJORS.

Major	2018		2021	
	Number	Share	Number	Share
Education	39,023	11.17%	27,349	10.94%
Arts and humanities	36,235	10.38%	28,124	11.25%
Social sciences, journalism, and information	25,629	7.34%	17,678	7.07%
Business, administration, and law	119,003	34.07%	77,994	31.19%
Natural sciences, mathematics, and statistics *	16,976	4.86%	11,238	4.49%
Information and communication technologies *	14,987	4.29%	11,493	4.60%
Engineering, manufacturing, and construction *	44,168	12.65%	34,138	13.65%
Agriculture, forestry, fisheries, and veterinary	10,443	2.99%	7,043	2.82%
Health and welfare	25,898	7.42%	21,326	8.53%
Services	16,886	4.83%	13,688	5.47%
Total	349,248	100%	250,071	100%

Source: Office of the Higher Education Commission.
* refers to STEM majors.

Department of Skill Development's Strategic Plan 2017–21

The Department of Skill Development (DSD) under the Ministry of Labor is responsible for providing skill development to workers as well as promoting skill standard tests. The DSD set its strategic plan during 2017–21. The plan outlined five strategies as follows:

(1) Development and upgrading of labor skill standards to meet international standards: The key indicators include an increase in the number of workers being tested for skill standards.

(2) Skills training to meet the challenges in the Thailand 4.0 era: This aims to prepare new workers and the unemployed to enter the labor market; to upgrade workers' skills to keep up with the changes in technology; and to develop a training system to be efficient, comprehensive, and easily accessible. The key indicators include an increase in the number of people trained in advanced technology courses.

(3) Developing the potential for entrepreneurs and informal workers: This is with the goal of developing skills for the informal sector; specific groups of workers (women, youth, people with disabilities, and the elderly); new entrepreneurs (startups), and community enterprises. The strategy also aims at increasing labor productivity and competitiveness of enterprises.

(4) Promotion and development of skill development networks: The goal of this strategy is to enable all establishments that are under the skills development law to develop skilled labor and create a network for expanding the development of labor skills inclusively. The key indicators include an increase in the number of trained workers in advanced technology courses by private and public training providers.

(5) Management of the organization and database system to be modern, flexible, and highly efficient: This strategy focuses on the database system, evaluation system, and skill development research system to be effective.

Overview of Skills Development Mechanism in Thailand

To develop employees' skills, enterprises or employers in Thailand can either do in-house training or on-the-job training or send their workers to be trained by private training providers. There are also public training supported by the government such as trainings organized by the DSD.

FIGURE 1

TRAINING PROGRAMS UNDER THE DEPARTMENT OF SKILL DEVELOPMENT.

Number of trainees by program type

Training program	2017	2018	2019	2020
Pre-employment training	7,256	11,906	5,719	3,761
Skill-upgrading training	154,401	168,199	101,556	93,657
Training for the job change	85,396	3,19,255	64,450	34,642
Total	**247,053**	**499,360**	**171,725**	**132,060**

Number of trainees by professional group

Professional group	2017	2018	2019	2020
Industrial Agriculture	2,977	13,832	3,644	2,610
Mechanic	23,870	27,720	15,377	12,233
Electronics and Computer	41,614	49,856	34,608	29,457
Construction	27,911	30,802	17,062	9,025
Industrial Art craft	29,237	80,701	22,329	14,921
Manufacturing	18,304	20,176	13,582	10,892
Services	103,140	276,273	65,123	52,922
Total	**247,053**	**499,360**	**171,725**	**132,060**

Top training courses (2017–21)

Course	Completed participants
Thai dessert making	1,08,647
Electrician	59,253
Thai food cooking	44,728
English for communication/work	35,593
Artificial art making	31,546
Tiling	20,554
Herbal product making	12,795
Agricultural product processing	10,971
Multipurpose technician (community technician)	10,375
Baking	7,870
Food preservation and food processing	7,253
Basketry	7,014
Teaching techniques	6,847
Tailoring	6,304
Drinks and snacks making	5,928

Source: DSD.

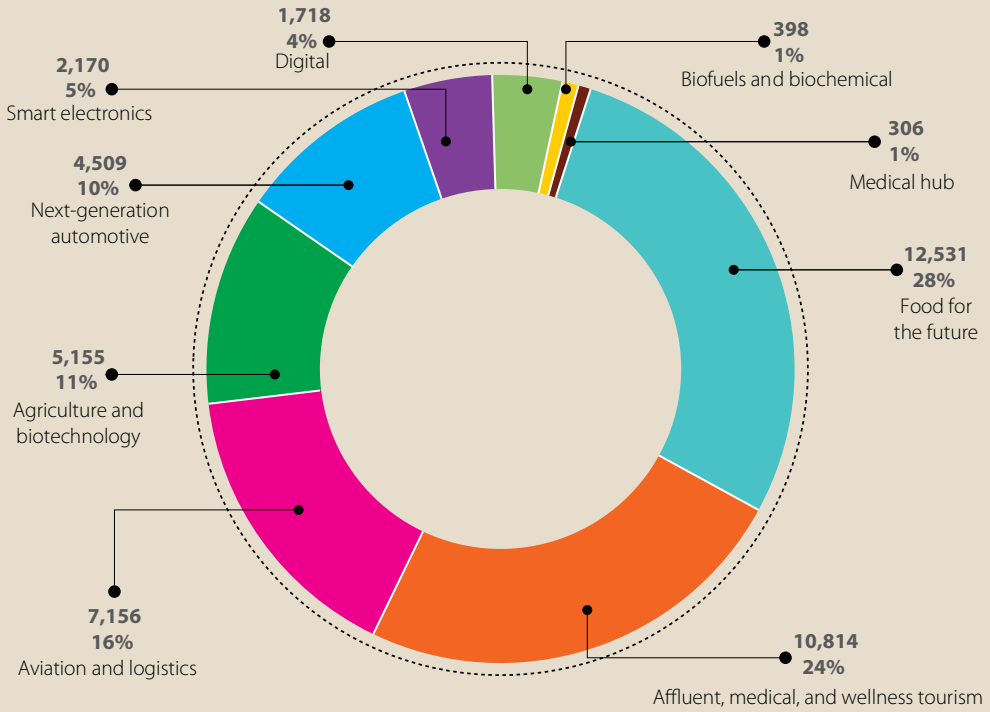
The DSD organizes training for around 100,000–500,000 workers each year, mostly in skill-upgrading training programs while top training course areas include food making, electrician, and English at work, as shown in Figure 1. Considering training related to Thailand's targeted industries (see Figure 2), advanced technology industries such as digital and smart electronics account for a small share of total trainings.

FIGURE 2

TRAININGS BY THE DSD IN TARGET INDUSTRIES.

Training in target industries (S-curve): High-tech industries accounts for small portion of total trainings

Number and share of persons who completed training programs by the DSD in 2020



Source: DSD.

Employers in Thailand are required to pay a training levy to the government while the government gives incentives to motivate the enterprise to train their workers. This mechanism is supported by Skill Development Promotion Act (SDPA) of 2002. The idea was to stimulate the private sector and establishments to set up and register with the DSD as training providers for workplace learning. With regard to the private sector, any private business that provides occupational skill training to the labor force in general or to its own employees in particular will be eligible for certain privileges as stipulated in the Act. These are:

- income tax exemption on a percentage of training expenses ;
- assistance granted by the DSD in providing training of the training personnel, skill standard testing provider, supervisors, and others as well as on curriculum and equipment development;

- consultation service from the DSD on skill development activities;
- exemption on import duty and value added tax (VAT) for tools and machinery brought into the kingdom for training purpose; and
- deduction on utility charges for electricity and pipe water bills in the amount of two times of the actual utility expenses.

According to the Act, employers or establishments with 100 employees and more are required to provide training for at least 50% of the annual average number of employees. If such an employer fails to do so, then that employer is required to contribute to the 'Skill Development Fund' before March of the following year. The fund includes subsidy by the government as well as the money contributed by business operators. It is intended to be used as a revolving fund for all the expenditures involving skill development promotion as follows:

- Loan is granted to trainees involved in training activities under the Act.
- Training providers, skill standard testing providers, and business operators can take loan from the Fund for expenses of providing skills training or skills testing, according to the Act.
- Aid or support is provided for any activity involving skill development promotion.

Such provisions in the Act enable large number of employees to be trained. However, most employees in small and medium enterprises are at risk of lacking access to training. According to DSD data, 4–5 million people are trained each year under SDPA, most of whom are service workers, followed by manufacturing workers and industrial agriculture workers.

However, concerning training by course level, enterprises mostly tend to provide fundamental training courses to their employees, e.g., courses related to safety, ISO standards, basic Microsoft Office programs, and English communication. Advanced courses, along with automation, technology, and professional courses account for only 6% of the total training courses (see Figure 3). This suggests that more advanced training need to be promoted.

Figure 4 visualizes the overall mechanism of skills development in Thailand. People in Thailand can be trained in-house, through on-the-job training, as well as by private and public training providers. There is SDPA incentivizing enterprises to provide training for their workers. However, with limited budgets, public training courses have limited number of participants and focus on some groups of people, which sometime is not consistent with the needs of the market (demand-driven) [3]. There is room for improvement in that more collaboration between public and private agencies as well as among government organizations should be initiated to overcome challenges of fragmented services and lack of one-stop platforms that have led to inefficient job matching and training. Moreover, more advanced technology-related training courses should be promoted to ensure that Thailand is well prepared to meet changing demands.

Overview of Vocational Education and Training Strategies

In Thailand, vocational education and training is mostly offered by the Office of the Vocational Education Commission (OVEC), which is the organization under the Ministry of Education responsible for vocational and professional learning [4]. OVEC has constantly promoted and managed vocational

FIGURE 3

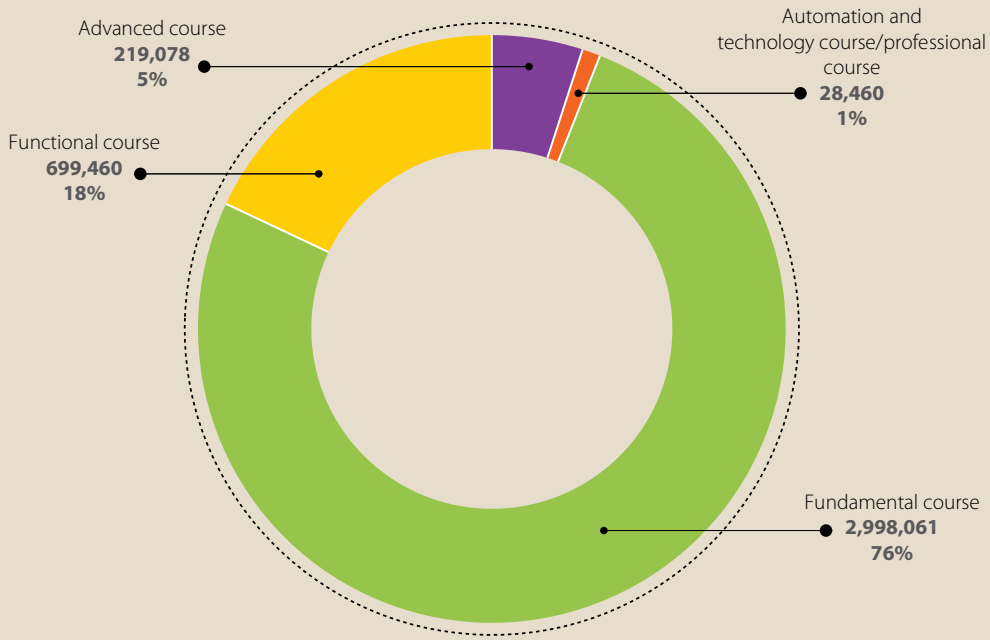
TRAININGS UNDER THE SKILL DEVELOPMENT PROMOTION ACT.

Mostly, enterprises provide fundamental training courses to their employees while advanced and automation/technology courses account for only 6%.

Training participants by professional group.

Professional groups	2017	2018	2019	2020
Industrial agriculture	140,736	195,228	301,339	308,065
Mechanic	79,456	69,150	71,801	79,629
Electronics and computer	194,679	211,331	275,672	255,105
Construction	63,197	102,921	141,853	174,458
Industrial art craft	62,328	74,568	87,169	87,043
Manufacturing	424,960	456,784	496,345	534,652
Services	3,178,405	3,400,209	3,900,905	3,596,777
Total	**4,153,393**	**4,541,277**	**5,305,248**	**5,059,278**

Training participants by type of course



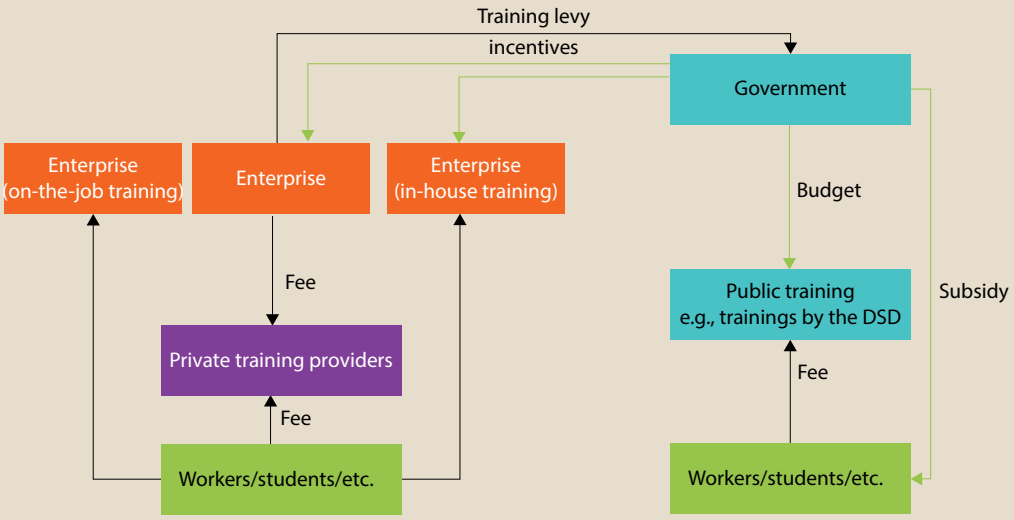
Source: DSD.

education and professional training to produce high-quality workforce in specific skills including skilled workers, technicians, and technologists. It also aims to manage VET to meet international standards and to apply modern technology to serve the country's strategic goals [5].

Currently, there are 429 public colleges and 481 private colleges providing formal VET programs nationwide with a combined strength of 959,598 students (see Table 2). Formal vocational education and training in Thailand is conducted at three levels: (1) upper secondary (Lower Certificate of Vocational Education); (2) post-secondary (Diploma or Vocational Associate Degree); and (3) university level (bachelor's degree). The main major fields of vocational study include industry; agriculture; fisheries; commerce and business administration; fine and applied arts; textiles industry; home economics; tourism and hospitality; and ICT [4].

FIGURE 4

THAILAND'S SKILLS DEVELOPMENT OVERVIEW.



Source: Pornpattanapaisankul [3].

TABLE 2

NUMBER OF VOCATIONAL STUDENTS IN PUBLIC AND PRIVATE COLLEGES.

Level	Public colleges	Private colleges	Total
Upper secondary (Lower Certificate of Vocational Education)	413,561	219,866	633,427
Post-secondary (Diploma or Vocational Associate Degree)	199,440	116,193	315,633
University level (bachelor's degree)	10,538	–	10,538
Total			**959,598**

Source: OVEC.

As Thailand has set the target industries to be the country's growth engine, vocational education is expected to play a vital role in producing skilled labor with knowledge and expertise to support development of S-curve industries and the government policy.

However, there are many challenges concerning vocational education in Thailand. First, the number of students entering vocational education is low because there have been negative perceptions regarding vocational education, with students as well as their parents placing more value on higher education. The quality of vocational intuitions, a fragmented system, and the limited progression of students into general or academic programs lead to an unattractive image of VET. Furthermore, some groups, such as female students, are underrepresented in VET in Thailand and are highly likely to enroll in business and commerce programs [1]. Second, the knowledge background of VET students is not as good as it should be. This causes some students to lack enough knowledge to study some professional courses. Specifically, English proficiency has been a major limitation of VET students.

Another obstacle is that vocational education still lacks new tools and technologies that keep pace with technological advancement due from inadequate budget. Even though the Ministry of Education has received the largest budget (around THB490 billion in the 2019 fiscal year) among the 19 ministries, the budget allocated is insufficient. Therefore, it is crucial that the government encourages enterprises to participate in organizing quality teaching programs to enable students to gain vocational training and professional experience in enterprises that use advanced technologies.

In terms of policy strategies, the vocational education policy is carried out in accordance with government policies through important projects such as the New Breed of Vocational Education Project; Excellent Center Project, Center of Vocational Manpower Networking Management (CVM Project); Science-based Vocational School Project; and training projects in three main subjects (agriculture, industrial, and services).

In future, there should be an integrated involvement of all sectors in the production of vocational workforce in connection with the professional world. The government should link educational qualifications with the professional world; create courses that truly respond to the needs of the private sector; increase the quality and quantity of the Dual Vocational Education (DVE), i.e., the program cooperated between vocational colleges and the industrial sector; and improve the processes for vocational training, professional experience, and evaluation.

In conclusion, in evaluating the overview of manpower strategies and current state of workforce development, Thailand has planned for the changing labor market in future. However, the outcomes are not yet achieved in all aspects. There is still room for policies to address issues related to human resource development as well as to prepare for more upcoming disruption in the market.

Labor Market Transition Opportunities

Transition in General and by Sector

With a rapid growth in technological advancement, businesses in Thailand are increasingly adopting new technologies. The COVID-19 has additionally driven the rate of adoption, with 50% of the companies surveyed by the World Economic Forum (WEF) [6] accelerating automation of tasks as a result of the pandemic.

Technologies that Thai companies have adapted more recently include cloud computing; internet of things (IoT) and connected devices; encryption and cyber security; e-commerce and digital trade; big data analytics; and artificial intelligence (AI) technologies such as machine learning, neural networks, and natural language processing (NLP).

According to a survey done by Deloitte Thailand [7], basic technologies such as traditional web technologies, mobile applications, and cloud have already been deployed by firms in Thailand while a smaller proportion of companies has implemented advanced technologies like data analytics, robotics, IoT, AI, blockchain, augmented reality (AR), and virtual reality (VR). Nevertheless, comparing the survey results from October 2019 with the results after the pandemic (late 2020–January 2021), the adoption of advanced technologies has grown substantially. Particularly, the consumer industry exhibits the highest proportion of companies that have implemented AI after the pandemic. Notably, the consumer sector comprises companies that relate to items purchased by individuals and households for their own use.

At the same time, blockchain was implemented the most in financial services; life sciences; and healthcare sectors whereas IoT was deployed the most in consumer; energy resources and industrials; and technology, media, and telecom sectors.

In terms of the automation trend, according to the International Federation of Robotics (IFR), the supply of industrial robots in Thailand was estimated to be around 900 in the 2000s, but surged to around 3,000 in the 2010s. The robot usage in Thailand in 2017 was mostly in the automotive sector, followed by the manufacturing subsector of plastic and chemical products. These two sectors accounted for more than 85% of total robot usage. Other sectors included metal, electrical/electronics, other manufacturing, and non-manufacturing [1].

Automation is on the rise in Thailand, especially in the manufacturing sector. According to a Thailand Board of Investment (BOI) report [8], manufacturing workers would be affected the most by technological advancement. It was forecasted that around 650,000 (15%) of manufacturing workers in Thailand would be replaced by robots by 2030. While the manufacturing sector contributed the largest value to Thailand's GDP in 2020, it faced a 5% drop in employment and a 431% rise in underemployment during 2016–20 as shown in Table 3.

The manufacturing activities have huge automation opportunities (60%) according to Mckinsey Global Institute [9]. Similarly, employing labor data in 2016, Leepipat-paiboon and Thongsri [10] found that 55% of the workforce in the industrial sector were at high risk of being replaced by computers. The corresponding rates for agriculture, trade, construction, and other service sectors were 57%, 55%, 28%, and 28%, respectively.

Another sector likely affected by technology is transportation and storage where underemployment has increased the second most and the automation potential is 59%. The agricultural sector is also at high risk due to computerization and high automation opportunities. Although agriculture absorbs the largest share of Thai workers, it contributes very little to GDP. Future automation and technology adoption in the sector will create higher values; however, challenges are also placed on workers and entrepreneurs in the sector.

Considering only the main sectors, the transition seems to be the most in the industrial or manufacturing sector, followed by agricultural and services sectors. Among the services, the concerns are high for wholesale and retail trade as well as accommodation and food service activities, since these two are traditional services with labor-intensive production and were affected severely by the COVID-19 pandemic.

The likelihood of automation is heterogenous across industries, jobs, and groups of workers. On one hand, missing workforce stemming from aging population has been a major concern for companies, which have been seeking to adopt new technologies such as robots and automation to compensate for the missing workforce. On the other hand, low-skilled workers, women, and low-wage workers are facing higher risks due to automation. Particularly, routine jobs such as shop sales assistants, food service counter attendants, cooks, office clerks, and accounting associate professionals are faced with higher risks. This trend implies that disparities in Thai labor market will get increased.

TABLE 3

EVALUATION OF AFFECTED SECTORS.

Sector	Main sector	GDP share1 2020	Employ-ment2 share 2020	Employment growth2 2016–20	2019 Per-hour labor productivity (THB)	Underemploy-ment growth2 2016–20	Risk of computerization3	Automation potential4
Agriculture, forestry, and fishing	Agriculture	6.2%	31.39%	0.54%	29.92	44.16%	57%	57%
Mining and quarrying	Industrial	2.0%	0.20%	12.07%	1,559.12		55%	51%
Manufacturing	Industrial	25.9%	15.88%	–4.97%	190.61	431.23%		60%
Electricity, gas, steam, and air conditioning supply	Industrial	2.7%	0.33%	1.12%	1,256.97	–		–
Water supply; sewerage, waste management, and remediation activities	Industrial	0.5%	0.26%	2.81%	285.32	181.82%		–
Construction	Service	2.8%	5.93%	–5.09%	57.22	–15.57%	28%	–
Wholesale and retail trade; repair of motor vehicles and motorcycles	Service	15.4%	16.68%	–0.86%	108.11	148.24%	55%	52%
Transportation and storage	Service	5.6%	3.53%	10.67%	231.89	397.92%	28%	59%
Accommodation and food service activities	Service	4.2%	7.63%	5.15%	100.32	208.13%		54%
Information and communication	Service	6.0%	0.59%	–3.96%	1,368.16	–		36%
Financial and insurance activities	Service	7.7%	1.40%	–3.79%	705.36	–		–
Real estate activities	Service	4.1%	0.62%	24.93%	924.28	–		–
Professional, scientific, and technical activities	Service	2.0%	1.03%	8.90%	254.12	23.00%		35%
Administrative and support service activities	Service	1.5%	1.42%	–8.01%	121.23	187.50%		39%
Public administration and defense; compulsory social security	Service	5.1%	4.37%	4.05%	167.45	225.30%		–
Education	Service	3.2%	3.22%	2.20%	150.57	–14.17%		26%
Human health and social work activities	Service	2.3%	1.83%	–2.35%	173.29	31.82%		33%
Arts, entertainment and recreation	Service	1.0%	0.73%	8.73%	198.10	230.69%		38%
Other service activities	Service	1.5%	2.36%	7.07%	76.13	105.44%		–

Sources: 1 The Office of the National Economic and Social Development Council; 2 National Statistical Office; 3 Leepipat-paiboon and Thongsri [10]; 4 Manyijka *et al* [9].

Occupational Transition

According to the WEF's Future of Jobs Survey 2020 [6], the top emerging jobs in Thailand in 2020–25 include data analysts and scientists, digital marketing and strategy specialists, big data specialists, AI and machine learning specialists, software and applications developers, and so on, as displayed in Table 4. One can notice that these jobs are related to digital technology and data.

TABLE 4

EMERGING AND REDUNDANT JOBS IN THAILAND.

	Emerging jobs	Redundant jobs
1	Data analysts and scientists	Data entry clerks
2	Digital marketing and strategy specialists	Administrative and executive secretaries
3	Big data specialists	Accounting, bookkeeping, and payroll clerks
4	AI and machine learning specialists	Assembly and factory workers
5	Software and applications developers	Construction laborers
6	Supply chain and logistics specialists	Sales representatives, wholesale and manufacturing technicians
7	Strategic advisors	Human resources specialists
8	Database and network professionals	Financial and investment advisers
9	Commercial and industrial designers	Client information and customer service workers
10	Business development professionals	Business services and administration managers

Source: WEF Future of Jobs, 2020 [6].

While certain jobs may be emerging, certain other jobs or roles will be declining in future. These include data entry clerks, administrative and executive secretaries, accounting, bookkeeping and payroll clerks, assembly and factory workers, construction laborers, and many more. In the second quarter of 2021, there were 1.7 million people working as clerks in Thailand, implying that almost 2 million workers are at risk of being laid off in future. This is in line with the trend in other countries where routine jobs would be replaced by automation.

This trend of job transition is consistent with the survey done by Deloitte Thailand [7]. Deloitte also elaborated that there were some roles that were highly important yet highly challenging to recruit. These included data analysts and scientists, digital transformation specialists, and digital marketing and strategy specialists. This is where the government should step in and design policies to cultivate the workforce in this high-demand field.

In addition to digital-related roles, Thailand Development Research Institute (TDRI) [11] also identifies other rising jobs resulting from global mega trends. Those include jobs in digital economy, care, and green economies. Some roles that are increasingly in demand are displayed in Table 5.

TABLE 5

JOBS WITH HIGH DEMAND AND HIGH SALARIES IN THE POST-COVID-19 ERA.

Digital economy	Care economy	Green economy
AI specialist	Behavioral health technician	Biofuel technician
Data scientist	Physical therapist aides	Renewable energy technician
Data engineer	Radiation therapists	Green marketers

(Continued on next page)

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Digital economy	Care economy	Green economy
Big data developer	Athletic trainers	Sustainability specialist
Cybersecurity specialist	Exercise physiologists	
	Recreation workers	
	Personal care aides	

Source: TDRI and WEF; Jobs of Tomorrow 2020.

Apart from specific and technical skills, these high-paying jobs also demand good English proficiency, analytical skills, people skills, communication skills, digital skill, and resilience. This suggests a rise in soft-skill needs. Additionally, according to an analysis based on company interview and big data of 500,000 online job postings in Thailand, skills increasingly demanded by employers after the pandemic are English, digital, and critical thinking skills. These skills are demanded in all kinds of jobs [11].

Surging internet users and digital literacy as well as the impact of COVID-19 have resulted in a growing platform economy in Thailand. Therefore, gig jobs will also become increasingly popular. However, the challenge is to promote working conditions and provide skills development for this group of workers.

In order to prepare the country for future development based on the new growth engine (i.e., the 12 target industries mentioned earlier), the Office of National Higher Education Science Research and Innovation Policy Council (NXPO) launched a survey on high-skilled workforce demands in the S-Curve industries.

The surveys were conducted through interviews and questionnaires with entrepreneurs in each industry on various topics including positions, competencies, skills, and knowledge required in the future. The survey results were used in outlining a manpower development strategy for target industries for the period 2020–24. Also, universities could apply the results to design appropriate degree and non-degree programs and curriculum to develop the Thai workforce with knowledge and skills required by these target industries.

Table 6 lists the projected number of personnel needed in these 12 industries, along with jobs that are in high demand as well as examples of key competencies required by each industry.

TABLE 6

HIGH-SKILLED MANPOWER DEMANDS IN TARGET INDUSTRIES.

Sector	Manpower demands	Top job demands	Competencies
Bioenergy and biochemicals	9,836	Biologist, mechanical engineer, mechanic technician, agricultural specialist	Downstream processing, biosafety
Digital	34,505	Data scientist, full-stack developer, full stack web developers, front-end developer	Data visualization and engineering, security assessments

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Sector	Manpower demands	Top job demands	Competencies
Aviation and logistics	29,735	Ground services officer, warehouse officer/inventory controller, project engineer	Accident and incident response management, aircraft emergency management
Medical hubs	20,153	Chemist, biologist, clinical investigator, pharmacist	Good manufacturing practices implementation, pharmacovigilance integration
Robotics	12,816	Data scientist, robotics control engineer, mechanical engineer, software integration engineer	Robot troubleshooting, robot programming and programming pendant, embedded systems
Food for the future	12,458	Mechanical engineer, food scientist, nutritionist	Food science, food technology and innovation, food and drug regulation, food design
Next-generation automotive	12,231	Product specialist, commercial designer, automation engineer	Engineering design, electronic technology, skills related to electric vehicle
Affluent, medical and wellness tourism	15,432	Digital marketing specialist, customer service specialist, travel stylist	English, design thinking, digital marketing, networking development
Smart electronics	6,434	Electrical engineer, mechanical engineer, industrial engineer	IoT governance, AI, electronic maintenance
Advanced agriculture and biotechnology	14,907	Marketing specialist, aerospace engineer, laboratory technician	Biotechnology, data science, machine learning, land survey and mapping, sales
National defense	5,219	Material engineer, weapon mechanic, aerospace engineer, ai specialist	Aerospace engineering and aviation, armament engineering, complex weapons, cybersecurity
Workforce development and education (vocational)	13,306	Vocational trainer, IT instructor, digital competency instructor	Curriculum development, vocational teaching, theoretical frameworks in practice, professional education

Source: Office of National Higher Education Science Research and Innovation Policy Council [12].

To prepare personnel qualified to work in the roles listed in Table 6 to support the target industries, many forms of actions can be implemented, namely:

- build (in-house personnel development);
- buy (recruiting new personnel);
- borrow (bringing outside personnel to work within the organization on a short-term basis); and
- release (letting those who are unable to develop their own potential leave the organization).

It should be noted that the strategies depend on the nature of a business, its competitiveness, and the skill level demanded.

Skill Transition

Corresponding to the transition of work, skills are affected by the changing world. The requirements of employers have changed. Specifically, the Future of Job survey by the WEF suggests that employers in Thailand will be looking for 15 key skills, namely [6],

(1) analytical thinking and innovation;

(2) complex problem-solving;

(3) active learning and learning strategies;

(4) critical thinking and analysis;

(5) creativity, originality, and initiative;

(6) troubleshooting and user experience;

(7) leadership and social influence;

(8) resilience, stress tolerance, and flexibility;

(9) technology design and programming;

(10) technology use, monitoring, and control;

(11) reasoning, problem-solving, and ideation;

(12) technology installation and maintenance;

(13) management of personnel;

(14) attention to detail and trustworthiness; and

(15) emotional intelligence.

Similarly, Thai companies are looking for individuals with analytical thinking, creativity, adaptability, leadership, and collaboration skills [7], implying that soft skills are increasingly important and required by companies in Thailand. The rise of soft skills results from the idea that hard skills can be replaced by automation and AI, and employees are therefore seeking soft skills even more these days. Table 7 summarizes the key hard and soft skills rising in Thailand. These skills should be promoted in training programs to provide the workforce with skills that employers require.

TABLE 7

SUMMARY OF KEY DECLINING AND EMERGING SKILLS IN THAILAND.

Obsolete skills	Emerging hard skills	Emerging soft skills
Core literacies	Data/programing skills	Communication
Physical abilities	• Python/R	Negotiation
	• Tableau/PowerBI	Teamwork/collaboration
	• SQL	Analytical thinking
	• Data visualization	Creativity
	Business skills	Adaptability
	• Digital marketing	Leadership
	• Product/project management	Active learning
	Technical skills	Emotional intelligence
	• Cloud computing	Planning and ways of working
	• Database design	Resilience and flexibility
	• Machine learning	Problem solving

Sources: Pornpattanapaisankul [3]; WEF [6]; and Deloitte [7].

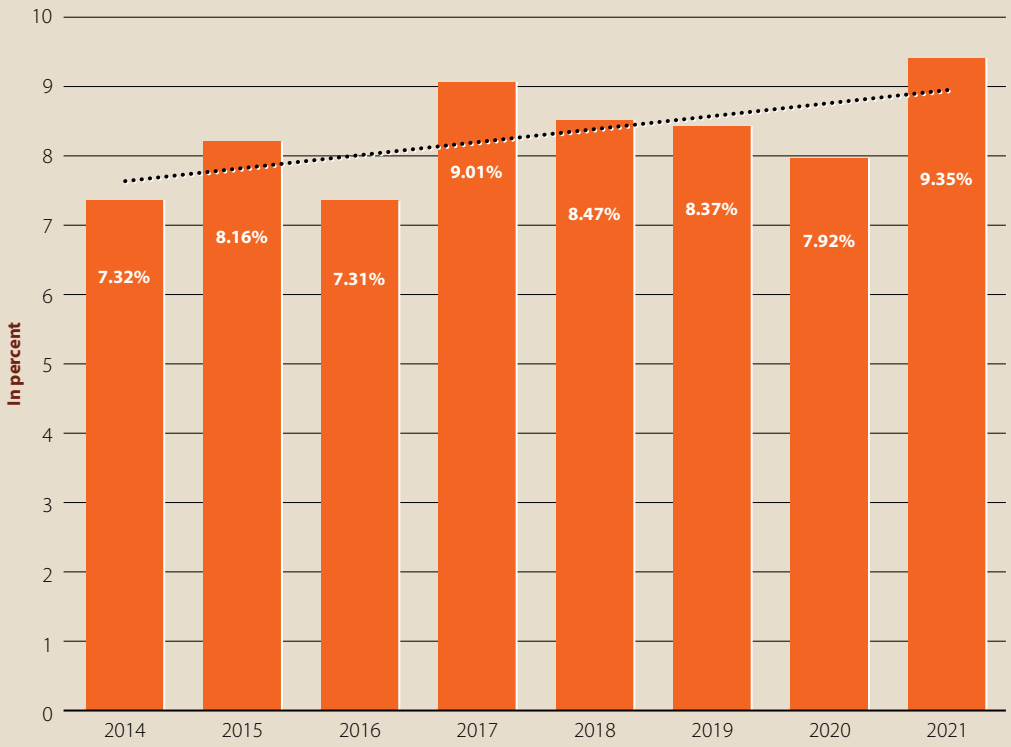
Even though the demand for new skills in the new world context is increasing, some statistics concerning skill development reflect some issues in Thailand.

To begin with, Thai youths show a weaker commitment to lifelong learning and growth mindset, compared with those in other ASEAN countries, according to the WEF ASEAN Youth Survey 2019. The survey was conducted in July 2019 and collected response from 56,000 youths (aged 15–35) across Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. According to Carol Dweck, a professor of psychology at Stanford University, a growth mindset is the belief that intellectual abilities are not fixed, but instead can be constantly developed. Specifically, 31% of Thai respondents believe that their current education and skills will last for most of their lives while the corresponding percentages for Singapore and Vietnam are very small at 11.2% and 9.7%, respectively. Moreover, many of the Thai youths think they cannot improve upon their intelligence and their abilities have reached maximum limits [11]. This places challenges before the policy design to promote changes toward growth mindset and lifelong learning.

Another concern is that although according to the skill development survey by the National Statistical Office (NSO), the share of population aged 15 and above, who desire skill development, is increasing over time, the figure is still lower than 10%. As illustrated in Figure 5, in 2021, 9.35% of the population 15 years and above wished to upgrade their skills, up from 7.92% in 2020. The survey asked respondents if they wanted to develop competencies in any area or not. The results also imply that COVID-19 has impacted jobs and skills of Thai people.

FIGURE 5

SHARE OF POPULATION AGED 15 OR ABOVE DESIRING SKILL DEVELOPMENT.



Source: National Statistical Office.

Youths are the ones who want skill development the most (11.9%), but the share of such population decreases with older age groups. Policies to support lifelong learning will increase this share for all age groups. Going by the education level, the survey suggests that populations attaining primary and secondary levels show the greatest proportion while those achieving higher education come next.

In terms of areas in which respondents wished to develop their skills, the survey found that skill development interests were mostly in cooking, followed by agriculture, beauteous makers, maintenance technicians, dressmakers and tailors, electrical and electronics technicians, product invention, commercial, construction technicians, and livestock.

The results suggest the requirement to develop skills of population aged 15 years and over in terms of building awareness and inclusion for skill development as many are not aware of current upskilling platforms or cannot access skill development programs due to financial limitations.

Strategic Policy Directions for Cultivating New Talent for Future

To respond to the changing labor market demand, Thailand has prepared and outlined manpower development plans. The details of relevant policies and strategies are discussed ahead.

The 13th Social and Economic Development Plan, 2023–27.

Ahead of the end of Thailand's current national development plan (the 12th plan), the Office of the National Economic and Social Development Council launched the 13th plan to outline the country's development directions in the next five years. The plan is based on four key conceptual principles, namely, the Philosophy of Sufficiency Economy; Resilience Concepts; Sustainable Development Goals (SDGs); and Bio-Circular-Green (BCG) Economic Model. This plan consists of five main objectives, which are:

(1) restructuring of production toward an innovation-based economy;

(2) human development for the new era;

(3) a society of opportunity and fairness;

(4) the transition to sustainability; and

(5) strengthening the country's ability to cope with risks and changes in a new global context.

The plan also sets '13 Milestones' corresponding to the main goals and indicating what Thailand wishes to be, to have, or to eliminate over the period 2023–27. One of the milestones aims for Thailand to have high-performance manpower that is continually focused on learning to meet the development needs of the future. Human resource development is placed to be a 'Key Enabler for Thailand's Transformation.'

Under the manpower development milestone, there are three main focuses: (1) human development across all ages (children, labor force, the elderly); (2) high-competency manpower development to meet future demands and jobs; and (3) promotion of lifelong learning. Strategies to achieve this milestone are outlined in Table 8.

TABLE 8

STRATEGIES UNDER THE MANPOWER DEVELOPMENT MILESTONE OF THE 13TH SOCIAL AND ECONOMIC DEVELOPMENT PLAN.

Main strategy	Sub strategy
Human development at all ages	Develop children from pre-natal stage to early childhood to have all-round development and good habits.
	Develop fundamental-level learners to have self-awareness and competencies necessary for learning, living, and working by improving curriculum, vocational education, quantity and quality of teachers, learners' evaluation, and learning support system.
	Develop higher education students to have competencies required for the future work and innovation by reforming the system to demand-driven education.
	Develop the working-age population to possess necessary skills for the world of work in the future by providing skill development opportunities for all groups of workers; and by developing learning and upskilling platforms.
	Develop the elderly to be valuable citizens of the society.
High-competency manpower development	Develop high-performance manpower in line with the needs of targeted sectors and future jobs by encouraging education and training collaboration between related organization and developing a database system for manpower management.
	Increase the number of quality manpower to support targeted sectors by establishing a national mechanism for collecting high-performing workforce.
	Build smart entrepreneurs with the ability to create and use technology and innovations.
Promotion of lifelong learning	Develop an ecosystem for lifelong learning by encouraging various sectors to create and develop diverse learning resources; and by creating learning platforms for all, developing credit bank system, and providing incentives for lifelong learning.
	Develop options for accessing learning for those who are unable to study in the normal education system.

In summary, looking forward, Thailand is planning to develop a high-quality education system that can provide important skills and contribute to the creation of a lifelong learning society. The country is also aiming to build quality manpower for the targeted sectors and promote training for those who are at risk of being substituted by automation. To achieve those goals, Thailand is working on lifelong-learning ecosystem improvement by creating a platform for manpower management of all ages as well as encouraging collaboration among stakeholders including public, private, and educational institutions.

Key Policies of the Ministry of Labor in 2022

In 2021, the Ministry of Labor aimed to develop labor skills to develop quality workers and prepare them for opening the country and supporting the new economy through the following measures:

- Upskill, reskill, and newskill the workforce, provide training for the unemployed to have sufficient knowledge to work, and increase labor productivity so that they are able to return to the labor market. The Ministry of Labor promotes learning new ways of working and increasing digital, technology, and innovation skills of both employed workers and new graduates through offline and online channels.

- Produce high-performing workforces to be able to adapt to new work/jobs resulting from the changes and risks in the new world context toward digital technology advancement. The Ministry of Labor must promote learning of skills for the future to respond to the country's manufacturing sector's needs and support the New S-Curve, in line with the national strategy. This is a Thai labor market restructuring aiming to drive the country's economy as well as build the competitiveness of the labor and the country.

- Develop professional skills for the youth and the new generation who are increasingly likely to become gig workers.

- Foster cooperation between the public sector, educational institutions, and the private sector for labor development to meet demands of the labor market, support foreign investment, and create a balance in the labor market.

One area of focus is to stimulate on-demand employment in the new economy by linking government agencies and private sector with labor market data (including labor skills data). This will provide information to the government on the required labor skills in training and development of workforces to meet changing market demands.

DSD Projects in the Budget Year of 2022

In line with the focus of the Ministry of Labor, the DSD was implementing certain projects in 2022 aimed at upgrading skills of the workforces. Remarkably, the emphasis was on skill development corresponding with technological changes and needs of the targeted industries. Examples of these are as follows:

(1) The 'Advanced Technology Excellence Training Center' project aimed to equip the labor force and entrepreneurs with knowledge and skills in accordance with six target industries including digital, robotics, smart electronics, logistics, next-gen automotive, and biofuel and biochemical. The goal was to cover 5,500 people. Sample courses included robotic welding control; application of programmable logic controller (PLC) in industrial sector; and IoT development and design.

(2) The project on development of labor skills in the Eastern Economic Corridor (EEC) aimed at improving the training center and basic equipment to support the need for skill development in the robotics and automation industries in the EEC as well as the EEC Model Type B (short-term training). The project on Special Economic Zones (SEZs) aimed to prepare and upgrade labor skills in the SEZ for supporting the investment and employment needs in the target industries in each province.

(3) The project to "develop the fundamentals of tourism industry" aimed to upskill and reskill for technology changes in the tourism industry. The project targeted 4,624 participants in the high-value and medical tourism sector.

(4) The project for "upgrading skill potential and labor capacity" aimed to develop the potential of workers to possess knowledge and skills in line with the future demands of the labor market, technological advancement, and innovations. The DSD targeted 10,500 persons to participate in this project.

(5) The project to "enhance workforce capacity with technology to support work in the 21st century" focused on 16 skills across three groups (foundational literacies, competencies, and character qualities) as noted by the World Economic Forum (WEF). This project targeted 6,360 persons to possess upgraded skills and offer high-quality work.

Education Strategies

The Office of Education Council has prepared a new 20-year National Scheme of Education (2017–36), which provides a framework for related organizations to follow in their development of education during the period.

The vision of this plan is, "All Thai people are provided with quality education and engage in lifelong learning as well as live happy lives on the basis of the principles of a sufficiency economy and global changes in the 21st century." The plan has the following two strategies to prepare for changing market demand:

(1) **Development of research and innovation workforce to enhance national competitiveness:** This strategy has the objective that the Thai workforce possesses essential skills and capabilities that meet labor market demands and requirements for the nation's economic and social development. To reach that goal, the plan aims to, for example, increase the proportion of vocational students to that of four-year university students and make the proportion of students in health science, science, and technology higher than that of social science students. Moreover, this strategy aims to make educational institutions and organizations produce graduates with specializations in specific fields. The key indicators include an increase in the proportion of middle-level workers to high-level workers in fields required by the market; an increase in the percentage of educational institutions with standardized dual-education programs, cooperative studies programs, and School in Factory (SIF) programs; vocational and higher educational institutions opening curriculums for specialized learners; and educational institutions' cooperation with the government, the private sector, workers, professional associations, and educational organizations.

(2) **Proficiency development for people of all ages and promotion of a lifelong learning society:** The main purposes of this strategy are: (1) learners possess necessary skills and qualifications for living in the 21st century; (2) people of all ages have essential knowledge and skills as indicated in the educational and professional standards and can use their potential to improve their lives; and (3) educational institutions at all levels can organize activities as required by the curriculum. It targets an increase in the number of educational institutions having an aim to develop students with 21st century qualities and learning skills as well as the number of vocational schools and universities whose curriculums aim to develop students to have qualities related to the Thailand 4.0 model.

Vocational Education and Training

As mentioned earlier, vocational education and training in Thailand are faced with many challenges. The small number of VET students is partly due to the poor image of VET, lack of proficiency in English, lack of skilled teachers, and inadequacy of budget and management. The VET policy has aimed at increasing the number of VET students and upskilling students through numerous projects.

VET Strategy 2018–21

During 2018–21, the OVEC drove vocational education as part of the goal of "vocational education for preparing Thai people for the 21st century." To achieve such a goal, the key strategies were to

- increase the number of vocational students compared with the number of academic students;
- develop excellence centers for vocational manpower development in target industries as well as in the EEC and special economic zones;
- encourage reskilling, upskilling, and newskilling through polytechnic and vocational colleges as well as through short-course training aimed at bringing education to employment and providing skills for startups and other businesses.
- increase OVEC management efficiency by focusing on budget usage for improving skills of teachers and students and providing more incentives to teachers and staffs; and
- develop vocational education to prepare Thai people for the 21st century through dual vocational education and integration of technological, digital, and English skills in the learning courses.

VET Policy and Focus in 2022

Continuing with the previous strategies, the OVEC set a strategy for vocational education development in 2022 with the theme, 'Holistic and Area-based Vocational Education Development (HAVE).' The strategy focused on two key aspects:

(1) One was to provide education for future careers and build the country's competitiveness. Toward this end, the steps were to:

- develop and improve the Center of Vocational Manpower Networking Management (CVM) and the excellence centers, especially in the EEC area;
- upskill, reskill, and newskill under the Career and Entrepreneurship Center (CEC); and
- partner with the private sector and entrepreneur to improve the quality of VET.

(2) The second aspect was to upgrade and improve the quality of vocational education with an area-based approach. The key steps were to:

- enhance VET quality by using big data at the provincial level;
- improve the operation of 'Dual Vocational Education Centers' in each area to upgrade VET quality;

- develop VET curriculum, credit bank, and enhancement of knowledge and skills for future jobs; and
- develop professional skills through practical experiences.

As vocational education in Thailand will play a significant role in providing skilled workforces to support the development of S-Curve industries and the Thailand 4.0 agenda, the VET strategies also need to focus on future skills arising from global megatrends and the COVID-19 pandemic. Since doing so alone may not be efficient, the OVEC has taken steps in the right direction by collaborating with the private sector and entrepreneurs in providing training programs to ensure that the skilled workers produced correspond with the market needs.

Higher Education Strategy

'Future Skill x New Career Thailand' Project

'Future Skill x New Career Thailand' is a platform by the Ministry of Higher Education, Science, Research, and Innovation (MHESI) under the concept of "enhance skills, develop people, increase opportunities, create jobs." It aims to be an open space to connect the needs of the private sector, employers, and educational institutions across the country and offer new courses that reskill, upskill, and newskill employees in various industries so that people of all groups have access to skill development and truly increase their job opportunities.

Courses aggregated on this platform were developed and designed by more than 100 training centers from public and private universities including government agencies and leading private training centers. There are both online and onsite learning options to offer flexibility of learning for all groups of people.

The focus of this platform is on enhancing, increasing, and developing skills for key industries of the future, base industries, as well as industries that are likely to be able to recover quickly after the COVID-19 crisis. These industries include smart farming, integrated medical industries, care giving services, smart tourism, digital and data, food for the future, and industrial robots and AI. Moreover, there are courses emphasizing skills for smart innovative entrepreneurs as well as skills for producing creative content.

The platform 'Future Skill x New Career Thailand' is thus a platform that (1) prepares Thai people to move forward and access new opportunities in future through learning; (2) develops capacity and skills for upcoming changes in the new normal era; and (3) increases the opportunity to work in large enterprises, companies in the EEC, and startups across various industries [13].

Out of the 31 courses under the 'Future Skill x New Career Thailand' project, eight courses are in smart tourism, followed by care giving (5), smart farming (4), data science (3), food for the future (3), robotics/AI (3), smart innovative entrepreneur (3), and creative content (2) [14].

New-breed Graduate Program

This project intends to create a new breed of graduates and manpower with high performance and potential for working in a new industry toward the new S-Curve and become new growth engines of the country. Furthermore, the program aims to build a platform for the development of higher education for future by creating a model of curriculum and teaching that emphasizes learning through real-world practices. This includes collaborating with enterprises or industrial sectors to produce graduates and manpower.

The scopes of the courses and the teaching-and-learning processes range from multidisciplinary content, experience-integrated learning, integration of life skills for a digital society and professional skills, and module-based learning outcomes and/or learning results to personalized learning.

Currently, there are 23 institutions of higher education participating in the program, totaling 221 degree and non-degree courses. This is reflective of a positive trend toward skill development of manpower, especially for the target industries.

TABLE 9

NUMBER OF NEW-BREED GRADUATE PROGRAMS BY SECTORS.

Industry/skill	Number of non-degree programs	Number of degree programs
Agriculture and biotechnology	33	18
Digital	26	23
Aviation and logistics	20	8
Next-generation automotive	13	14
Caregiver	8	1
Soft skill	8	0
Food for the future	6	6
Bioenergy and biochemicals	5	8
Robotics	3	11
Smart electronics	2	9
Total	123	98

Source: MHESI.

Registered Training Organization

Apart from conducting a survey to identify needs and strategic plans for human resource development for target industries, the Office of National Higher Education, Science, Research, and Innovation Policy Council (NXPO) has established a Registered Training Organization (RTO) system, along with the 'highly skilled employment verification system' to support the implementation of 'Thailand Plus Package,' which is an investment incentive package by the Board of Investment.

Thailand Plus Package was launched in 2019. The package includes fiscal measures supporting high-skilled manpower development. It offers a special tax deduction for (1) training expenses on advanced technologies to accelerate reskilling and upskilling of manpower; and (2) expenses on hiring new high-skilled manpower in science and technology fields. To facilitate the implementation of these measures, the NXPO has designed verification systems for the training and employment expenses on high-skilled workforce. The NXPO is responsible to identify future skillsets qualified for tax deduction, establish the RTO system to accredit organizations that can provide training in the fields as per the future skillsets, and create a high-skilled employment verification system to verify expenses claimed for tax incentives by companies.

E-Workforce Ecosystem

E-Workforce Ecosystem is an intelligent platform for manpower information management and development of competence through lifelong learning in Thailand. This initiative aims to overcome

a key limitation of human capital development in Thailand, which is the lack of integration of related organizations.

Therefore, E-Workforce Ecosystem Project arises from cooperation between labor, education, data, and economic organizations including Thailand Professional Qualification Institute (TPQI) as the main responsible organization; Ministry of Labor (Department of employment and Social Security Office); Bank of Thailand; Ministry of Education; Ministry of Interior; the MHESI; Ministry of Finance (Office of the National Economic and Social Development Council); and Digital Government Agency.

The purpose of this project is to develop a single-platform database system that provides Thai people of all ages, business sectors, educational institutions, training providers, and policy makers access to a comprehensive labor database containing personal information, education, training, and work status. This will lead to the design of assistance measures, incentive systems, social protection systems, and labor skill development systems that can track both quantitative and qualitative results through online channels.

TPQI gathers a large database of labor to be linked on the same infrastructure and opened to the public to access such information as an alternative to career planning through an intelligent individual portfolio system. There is also a system to support and promote learning across various age groups through the accumulation of sub-unit courses to collect certificates or compare qualifications [13].

E-Workforce Ecosystem enables data connection between many government organizations including the TPQI (professional qualification data), the Department of Employment (employment data), and the Social Security Office (employment with social security). This linkage leads to a useful analysis of the labor market. An example of analysis from such a data linkage suggests that study programs with higher job opportunities are those that are related to digital industry, ICT and digital content, and biomedical engineering. On the other hand, programs with lower job opportunities are those related to hotel and restaurant, high-speed train-and-rail system, and energy.

E-Workforce Ecosystem will allow workers to take advantage of digital technology channels so that they can do skill development to better meet market demands. This database will provide guidelines for continuous self-development toward lifelong learning in order to effectively enter the job matching mechanism between job seekers and employers. This will lead to fair employment at all levels as well as produce quality workers who have the skills and craftsmanship that meet the needs of employers.

However, there are some challenges in linking data and information between government agencies due to concerns about the Personal Data Protection Act (PDPA). Therefore, the security principle of personal information and consent must be taken into account. Moreover, e-portfolio is a system for students or workers who participate voluntarily. In order to effectively manage the manpower database, a large number of participants are required. Thus, the government needs to promote and encourage Thai people to enroll in the e-portfolio system.

EEC Model

EEC Sandbox is a model for geospatial and strategic labor development in the Eastern Economic Corridor (EEC). The highlight of the mechanism is the intense institutional cooperation between

government agencies, educational institutions, and private enterprises to work together from the policy level to the operations level in the area. This aims to transform teaching and learning models from supply-pushed to demand-driven models [13].

The EEC was developed with the concept of having economic and industrial development along with manpower development for producing quality workers possessing skills that meet market demands.

Connecting human development and industrial development starts with a five-year labor demand estimation to support the activities of target industries. This becomes a guideline for relevant organizations to plan and control the quantity and quality of labor supply at each level of qualification. They need to adjust teaching and staff-training models to encourage workers to adapt to the ever-changing technological dynamics.

To achieve the goals, the EEC Human Development Centre (EEC HDC) was established to supervise the development of education and labor production to support investment in 12 target industrial groups. EEC HDC has a target of producing 475,668 personnel, which is the estimated human resource demand in the EEC for the period 2019–23, in collaboration with Ministry of Education; Ministry of Labor; and Ministry of Higher Education, Science, Research, and Innovation.

EEC HDC has driven the workforce and educational development with a demand-driven approach that prioritizes new generation of workforce and educational development. The course and the learning methods must be designed to match the demands of enterprises. This covers basic education with the aim to improve language and coding skills as well as STEM education. At the same time, vocational and higher education levels are also adjusted to the demand-driven education in which learning is managed by the EEC Model that is divided into Type A and Type B.

Type A is a learning design for students in vocational and higher education, which aims to develop the workforce as per the industry needs in the long run. The degree and the course are codesigned by the educational institution and the establishment. That is, the establishment that participates in the project will express its desire for the quantity and quality of labor to the educational institution. When the students graduate, they will work with the said establishment. The establishment will pay 100% tuition fees for the students, with the expense being eligible for tax deduction. In this approach, students gain actual work experience and knowhow from businesses whereas businesses get suitably qualified students while also receiving tax incentives.

Type B is a short-course study (non-degree) with duration ranging from one day to one year. Similar to Type A, the establishment jointly designs the training course with the academic institute and co-pays 50% of the cost. As an incentive, this expense is eligible for 250% tax deduction. This model's goal is to reskill and upskill the workforce in the industrial sector to support new technologies. Currently, courses can be divided into:

- Group 1: Senior students that the establishment needs urgently can take a short course and work. Such students can take leave from study and maintain the student status while they work.

- Group 2: This is for employees who need skill development to be in tune with the change in technology.

- Group 3: This is for those who need reskilling, especially the unemployed, who work in unrelated fields, and lack work experience.

As of June 2021, as many as 100 courses under Type B model had been approved. These include courses related to robotics (55 courses); next-generation automotive (31 courses); logistics (five courses); aviation (four courses); smart electronics (four courses); and rail system (one course).

Upskilling Platforms

There are many platforms for learning and skill development in Thailand to support lifelong learning. These platforms can be divided into two types: (1) platforms that aggregate training courses; and (2) platforms that develop massive open online courses (MOOCs) [13]. Both types of platforms are discussed below:

(1) Platforms that aggregate training courses can be divided into public and private platforms. Platforms provided by the government for free include the DSD's platform; Digital Skill by the Digital Economy Promotion Agency (DEPA); and TPQI E-Training by the Thailand Professional Qualification Institute.

Examples of platforms provided by private providers include SkillLane which focuses on business, marketing, digital, and graphic courses; and UCourse which emphasizes on finance, investment, and real estate.

(2) Platforms that develop MOOCs can be divided into platforms by domestic and foreign providers.

Examples of platforms provided by domestic providers are:

- Chula MOOC developed by Chulalongkorn University;
- Gen Next Academy by Thammasat University;
- Mahidol University Extension (MUx) by Mahidol University; and
- Thai MOOC by the MHESI in collaboration with the Ministry of Digital Economy and Society.

Examples of platforms provided by foreign providers are:

- Coursera founded by Stanford University;
- edX established by MIT and Harvard University; and
- Udacity supported by Google, focusing on data science and coding.

Furthermore, there is the Cooperative and Work Integrated Education (CWIE) platform developed by the MHESI as a platform for labor development through cooperation between establishments and educational institutions by jointly designing a curriculum that emphasizes a balance between academics, professions, and life subjects.

During the pandemic, which affected the labor market severely, the Thai government launched a new platform called *'Thai-Mee-Ngan-Tam'* (meaning 'Thai people have jobs') at https://thaimengaantam.doe.go.th/ for recruiting more than 50,000 job positions. In addition to being a website for job matching, this platform also allows users to search for training courses to enhance professional skills. The service is free of charge.

The platform aims to address skill mismatches between the needs of establishments and the skills of workers through recruitments for suitable jobs. It also aims to reduce the skill gap through provisioning of learning courses to develop essential working skills.

A complete platform can facilitate upgrading the labor market structure through management of big data and can be an important mechanism for appropriate policy design up to the individual level [13].

Recommendations

While the world is changing rapidly due to factors such as digital disruption, aging society, globalization and international trade, climate change, and the COVID-19 pandemic, Thailand has been working hard on the human resource development front. However, some challenges related to workforce preparation remain and even become more pronounced with time.

In terms of skill development and training, an emphasis should be placed on both quantity and quality. The government should expand access to training opportunities to reach vulnerable groups including the poor, the elderly, and women. At the same time, adequate training should be provided to upskill the Thai workforce for the 21st century. More advanced technology or STEM courses as well as soft-skill courses must be encouraged more.

A manpower policy involving many government organizations and an efficient collaboration between relevant organizations will enable Thailand to get prepared for the rapidly changing demands. There needs to be an effective platform that links data on population, education, labor market, and training. Currently, the E-Workforce Ecosystem is aiming to address that. Yet the output and outcome of such a system is still invisible. Moreover, partnerships with the private sector are crucial to ensure that public training courses are of high quality and can serve the market demand.

Finally, since Thailand's strategies are moving to lifelong learning, active policies should be initiated to encourage lifelong learning, e.g., through a learning subsidy or other incentives for learners and training providers.

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VIETNAM

Overview of Vietnam's Human Resource Development Framework

Recognizing the important role of human resources in a country's socioeconomic development, the Vietnamese Communist Party had advocated for a strategic breakthrough in human resource development (HRD). In order to concretize the Party's viewpoint, the National Assembly promulgated the Law on Higher Education in 2012 (amended in 2018); the Law on Vocational Education in 2014; the Labor Code in 2019; the Education Law in 2019; Law on Public Officials; and Law on Public Officials, among others. The government has issued many legal documents guiding the implementation of the laws as well as mechanisms and policies on HRD. In addition, the Prime Minister has approved the Vietnam Human Resource Development Strategy for the 2011–20 period; the Vietnam Human Resource Development Master Plan for the 2011–20 period; and the Vocational Training Development Strategy for the 2011–20 period. These documents have created a legal framework and formed a driving force for HRD in terms of both quantity and quality.

The state management apparatus on HRD has been gradually consolidated in the direction of improving the effectiveness and efficiency of state management activities nationwide. Currently, the state management agencies on HRD in Vietnam include ministries performing the function of state management in specialized fields related to HRD such as: Ministry of Education and Training; Ministry of Labor, Invalids and Social Affairs; Ministry of Health; and Ministry of Home Affairs. Also included are ministries performing the function of state management in some specialized fields related to HRD such as the Ministry of Finance; and the Ministry of Planning and Investment. All ministries, branches and localities across the country have direct establishments providing public services related to HRD within the scope of management. These agencies have implemented HRD strategies and plans of their ministries, branches, provinces, and cities as well as applied many policy solutions to attract, recruit, train, foster, and develop human resources, especially high-quality human resources, and have initially achieved certain results.

According to the World Bank, Vietnam's human capital index (HCI) has increased from 0.66 to 0.69 over the 10-year period of 2010–20. Vietnam's HCI was higher than any other lower-middle-income country and above many countries at multiples of Vietnam's income level despite lower levels of public spending on health, education, and social protection. Vietnam is one of the countries with the highest score on the HCI in the east Asia–Pacific region. This reflects great achievements in general education and health over the years [1].

In addition, according to the Global Human Development Report 2020, Vietnam's human development index (HDI) in 2019 was 0.704, with a rank of 117 out of 189 countries and territories. Vietnam's HDI was higher than the 0.689 average for developing countries. However, it was lower than the high-HDI group's average of 0.753 and the average (0.747) of countries in east Asia and Pacific regions.

In general, the quality of human resources in Vietnam has improved, and has contributed to improving Vietnam's labor productivity in recent years. Vietnam's labor productivity growth was

5.11% in the 2011–20 period, higher than the ASEAN median (3.11%) as well as most of the ASEAN countries. It was second only to Cambodia. However, Vietnam's labor productivity is still lower than some countries. According to an APO report [10], Vietnam's labor productivity lagged Japan by 60 years, Malaysia by 40 years, and Thailand by 10 years. This indicates that Vietnam should make a significant effort to increase its labor productivity.

Vietnam's Education System and Qualification Framework

Vietnam's national education system is regulated in Decision 1981/QD-TTg approving the structural framework of the national education system. The Law on Education 2019 legalized the provisions of the national education system and the Vietnamese Qualifications Framework (VQF) in order to facilitate smooth transitions among various education and training levels. While the structural framework of the national education system indicates education and training levels of the national education system, the VQF regulates qualification levels and learning outcomes of different education and training levels.

Under the Law, the national education system is an open and permeable system, consisting of formal education and continuing education.

Education and training levels of the national education system include early childhood education, general education, vocational education, and higher education. Specifically, early childhood education includes nursery education and preprimary education; and general education consists of primary education, lower secondary education, and upper secondary education. Meanwhile, vocational education provides training at elementary, intermediate, and collegial levels along with other vocational training programs; and higher education provides training at bachelor's, master's, and doctor's levels.

The structure of the education system is shown in Figure 1, including education and training levels and the prescribed schooling duration for each level.

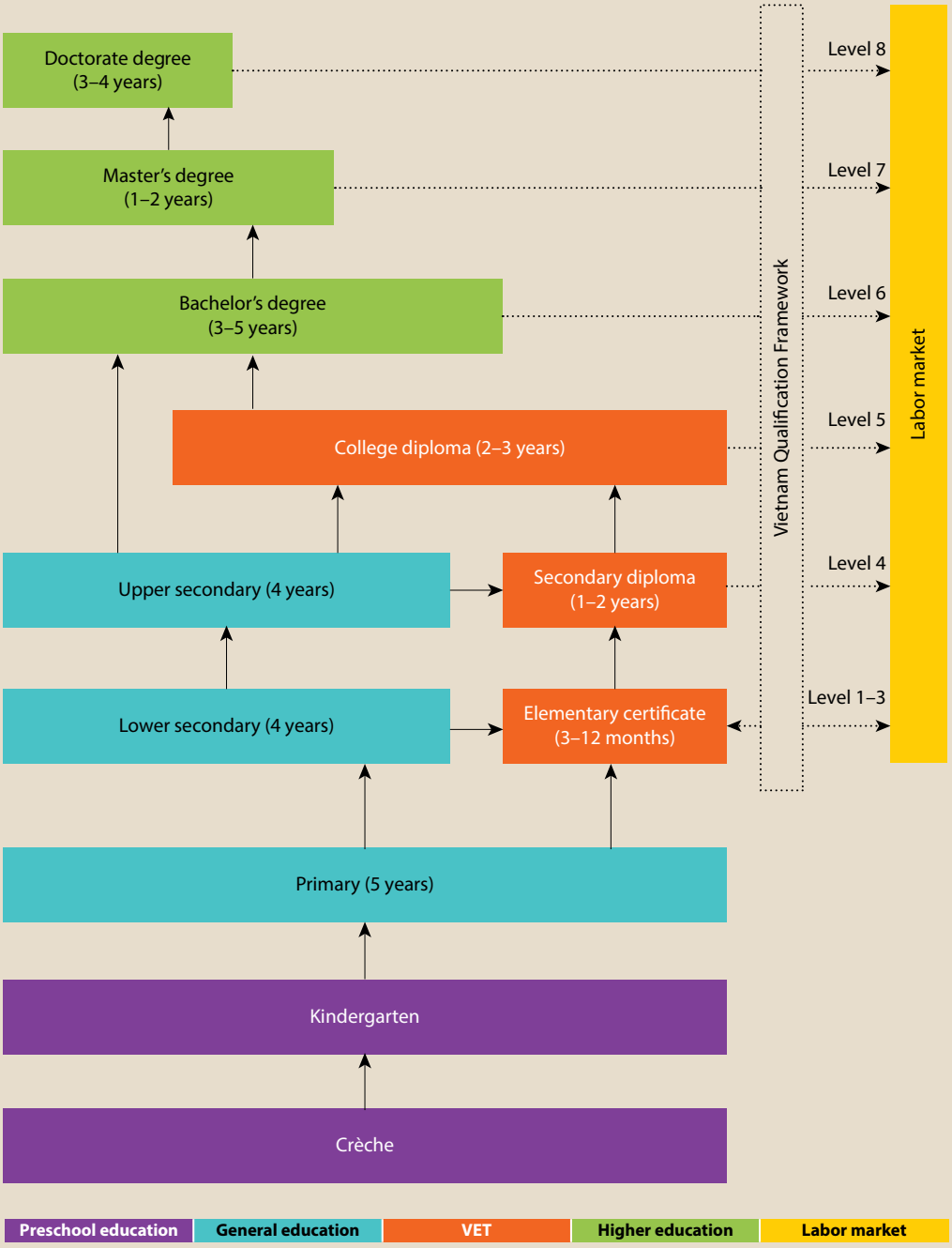
Currently, preschool education and general education are governed by the Law on Education; vocational education is governed by the Law on Vocational Education; and higher education is governed by the Law on Higher Education.

The VQF was approved by the Prime Minister on 18 October 2016 under Decision 1982/QD-TTg. VQF comprises (1) training levels; (2) learning outcomes (knowledge, skills, accountability, and responsibility); (3) academic volume (accumulated by credits or units of competency); and (4) credentials.

VQF has eight levels; Level 1 (Elementary 1); Level 2 (Elementary 2); Level 3 (Elementary 3); Level 4 (Intermediate); Level 5 (College); Level 6 (Bachelor); Level 7 (Master); and Level 8 (PhD). MOLISA takes charge of Level 1 to Level 5 of TVET while the MOET is responsible for Level 6, Level 7, and Level 8 belonging to higher education.

VQF was designed to be compatible with the ASEAN Qualifications Reference Framework, facilitating qualification recognition and lifelong learning, laying a foundation for training institutions to prepare appropriate training programs and help Vietnamese workers get more opportunities to seek jobs in the ASEAN region.

THE VIETNAMESE EDUCATION SYSTEM.



Vocational Education and Training for the Labor Market

Labor Supply

Population Aged 15 and above

By the fourth quarter of 2020, the Vietnamese population aged 15 and above was 74.76 million, representing a 4.44% increase compared with the corresponding quarter of 2016. Notably, 51.2% of the total population aged 15 and above were females while 48.8% were males. The urban population stood at 36.7%, while the rural population accounted for the remaining 63.3% (see Figure 1).

FIGURE 1

POPULATION AGED 15 AND ABOVE, 2016–20.

Source: Calculations based on Labour and Employment Surveys done in fourth quarter of 2016, 2017, 2018, 2019, 2020; GSO.

Labor Force

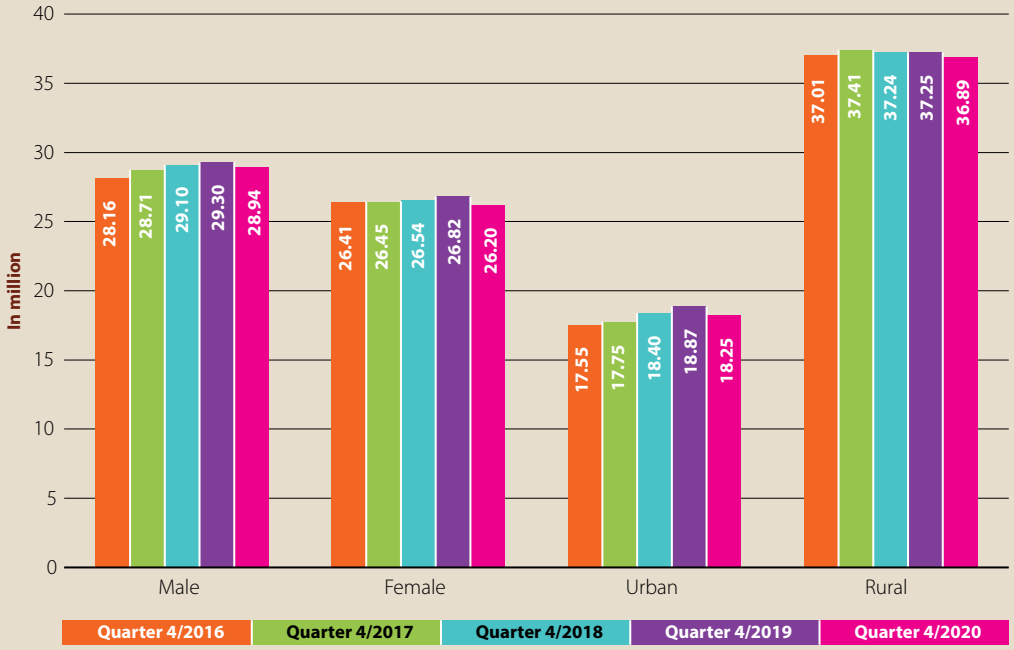
The labor force in fourth quarter of 2020 was 1.06% more than that in the corresponding quarter of 2016 (55.14 million persons). Female and male workers accounted for 47.5% (26.2 million persons) and 52.5% (28.94 million persons) of the total labor force, respectively (see Figure 2). Also, 33.1% of the labor force lived in urban areas, while the remaining 66.9% lived in rural areas. Due to the impact of the COVID-19 pandemic, the labor force in the fourth quarter of 2020 decreased by 1.75% (0.98 million people) compared with the corresponding quarter of 2019. Also, the labor force participation rate among the population aged 15 years and above was 73.8% (a decrease of 2.8% compared with the fourth quarter of 2019).

In fourth quarter of 2020, 24.63% (13.58 million persons) of the labor force aged 15 years and above had at least a three-month training qualification. Of them, 11.39% had university degrees and above (6.28 million persons); 3.84% had college degrees (2.12 million persons); 4.43% had intermediate degrees (2.44 million persons); and 4.97% had elementary certificates (2.74 million persons). A correlational comparison of the number of people with different qualifications shows that for every 100 persons with a university degree or above, there were 34 persons with a college degree, 39 persons with an intermediate degree, and 44 persons with an elementary certificate (see Figure 3).

The rate of trained workers in urban areas was 40.8%, i.e., 2.5 times higher than in rural areas (16.6%). This significant difference was due to the fact that workers in urban areas had more

FIGURE 2

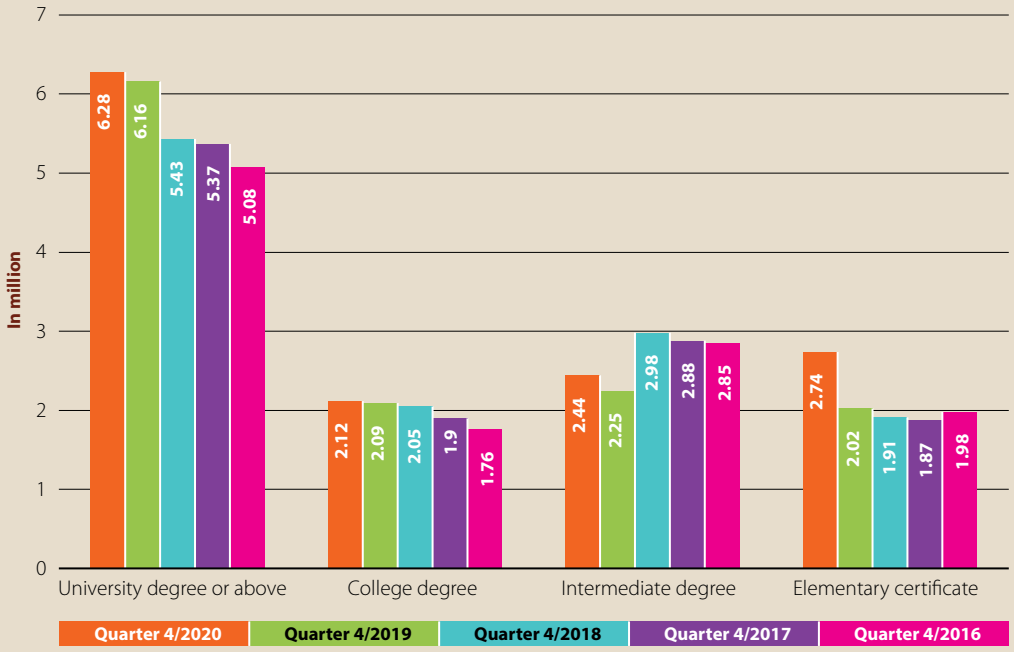
LABOR FORCE BY GENDER AND URBAN–RURAL DISTRIBUTION, 2016–20.



Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.

FIGURE 3

LABOR FORCE BY TECHNICAL/PROFESSIONAL QUALIFICATIONS.



Source: Vietnam labour market updates, Issue 12 (Q4, 2016); Issue 16 (Q4, 2017); Issue 20 (Q4, 2018); Issue 24 (Q4, 2019); Issue 28 (Q4, 2020); MOLISA.

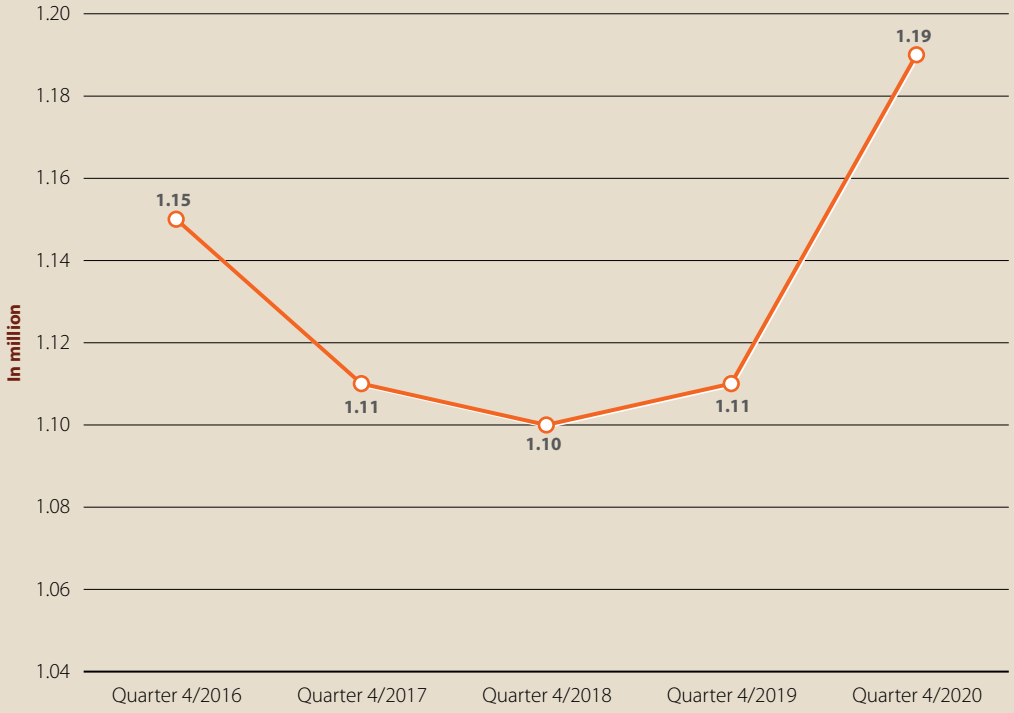
opportunities to be trained than workers in rural areas. On the other hand, jobs in urban areas require skilled workers, while in rural areas, there are mainly unskilled workers in agriculture, forestry, and fisheries.

Unemployment

By Q4 of 2020, the unemployed accounted for 2.16% (1.19 million persons) of the total population aged 15 and above, which was an increase of 7.2% compared with Q4 of 2019 (see Figure 4).

FIGURE 4

NUMBER OF UNEMPLOYED PEOPLE, 2016–20.



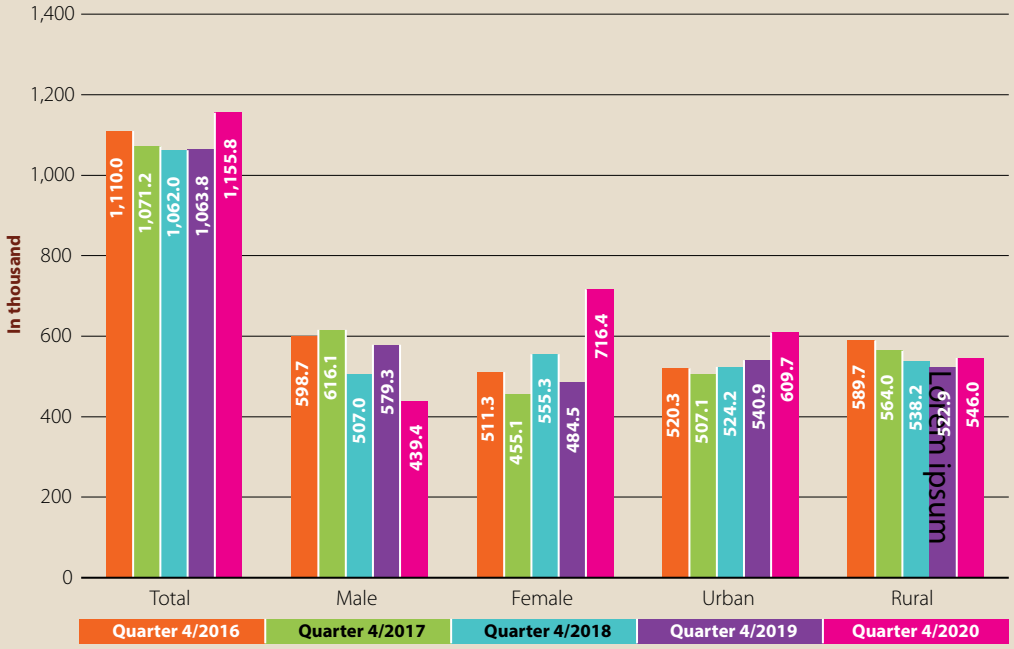
Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.
Note: The unemployed comprise all persons who during the reference week were without work, available for work, and seeking work; 2020 Labour and employment survey, GSO.

The COVID-19 pandemic made the unemployment rate of urban workers in Q4 of 2020 the highest in the past 10 years. In Q4 of 2020, the unemployment rate among the working-age population (15–60 years for males, 15–55 years for females) was 2.37%. Urban unemployment rate stood at 3.68% compared with 1.69% for rural areas. Male unemployment rate was 1.65% while female unemployment rate was 3.22% (see Figure 5). The number of unemployed people among working age population in Q4 of 2020 was nearly 1.2 million, representing an increase of 136.8 thousand people compared with Q4 of 2019.

Among the working-age unemployed, as of Q4 of 2020, 49.5% had elementary and higher qualifications compared with 33% in Q4 of 2019. Within this subgroup, the highest unemployment rate was found among people with a university degree and above, followed by college graduates, intermediate-level graduates, and people with an elementary certificate (see Figure 6).

FIGURE 5

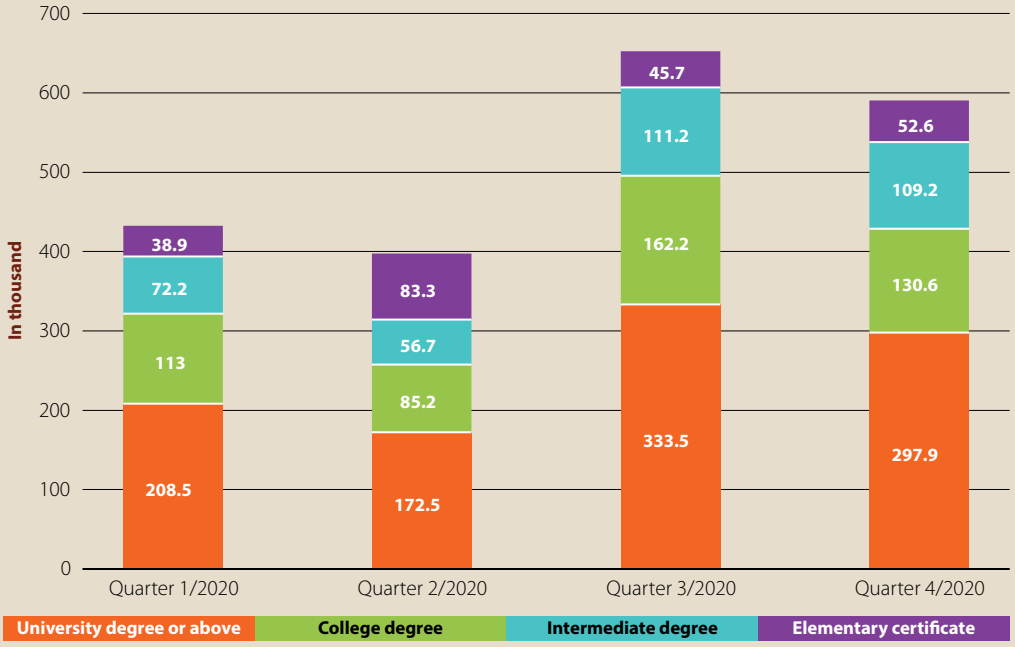
UNEMPLOYED WORKERS AMONG THE WORKING-AGE POPULATION.



Source: Vietnam labour market updates, Issue 12 (Q4, 2016); Issue 16 (Q4, 2017); Issue 20 (Q4, 2018); Issue 24 (Q4, 2019); Issue 28 (Q4, 2020); MOLISA.

FIGURE 6

WORKING-AGE UNEMPLOYMENT BY QUALIFICATION LEVEL IN 2020.



Source: Calculation based on Quarterly Labor Employment Survey data, 2020.

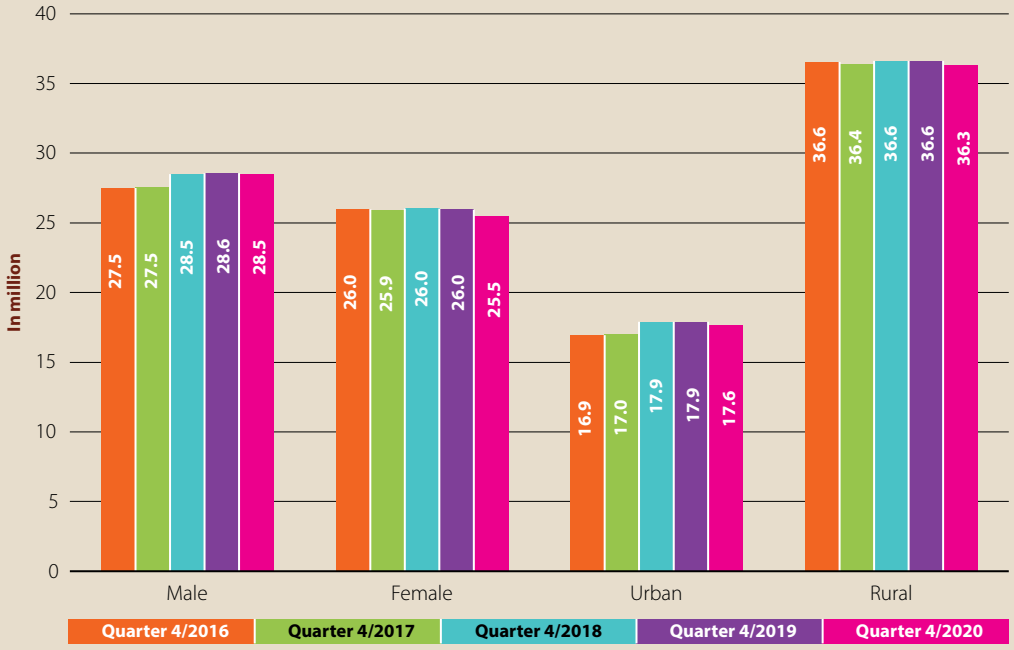
Labor Demand

Persons in Employment

By Q4 of 2020, a total of 54.0 million people were being employed, representing a 1.12% increase compared with Q4 of 2019. Male workers accounted for 52.8% of the employed population, outnumbering female workers (47.2%). The number of rural workers was nearly two times higher than that of urban workers, accounting for 67.3% and 32.7%, respectively, of the total population in employment (see Figure 7).

FIGURE 7

EMPLOYED WORKERS AGED 15 AND ABOVE BY GENDER AND URBAN/RURAL DISTRIBUTION.



Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.

Employed Workforce by Sector

Figure 8 illustrates the distribution of the workforce by economic sector. In 2020, the services sector had the largest share of the employed workforce (36.7%); followed by agriculture, forestry, and fisheries (31.7%); and industry and construction (31.7%).

Employed Workforce by Type of Enterprise

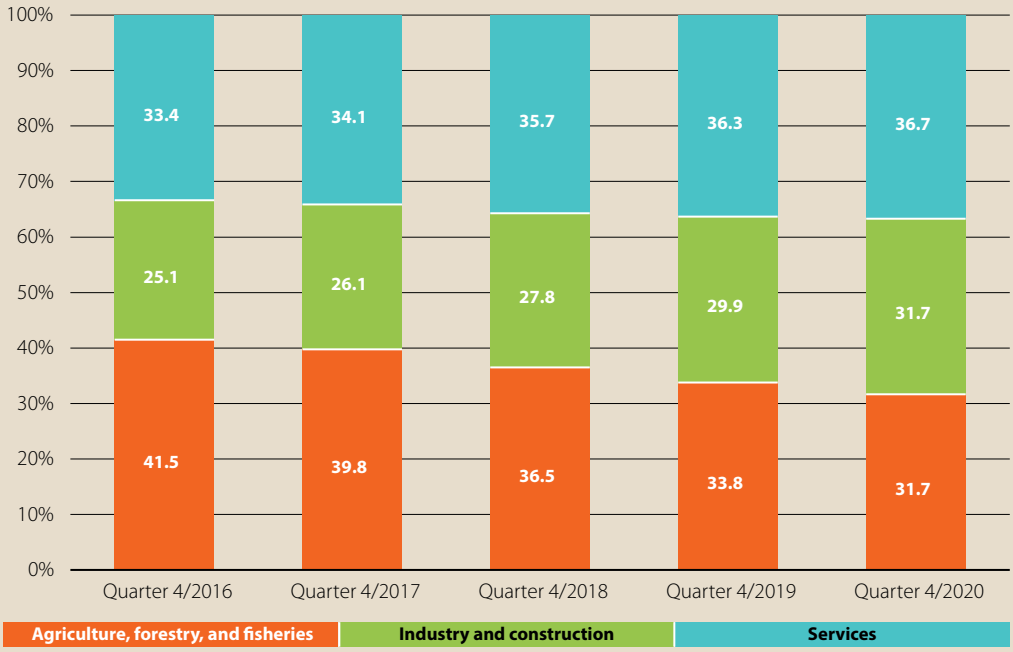
Non-state enterprises were by far the most important employers, accounting for 84.6% of the employed workforce; followed by state-owned enterprises (8.3%); and foreign-invested enterprises (7%), as given in Figure 9.

Employed Workforce by Occupation

In 2020, nearly a third (32.58%) of the employed, including trained workers, were working in jobs that required no professional qualifications. Personal guards, security guards, and salespersons with basic technical skills made up 18.27% of the employed population, followed by craftsmen and other related technicians (13.82%); high-skilled workers (8.02%); and technical people in agriculture, forestry, and fisheries (7.25%). Other occupations employed small percentages of the workforce (see Figure 10).

FIGURE 8

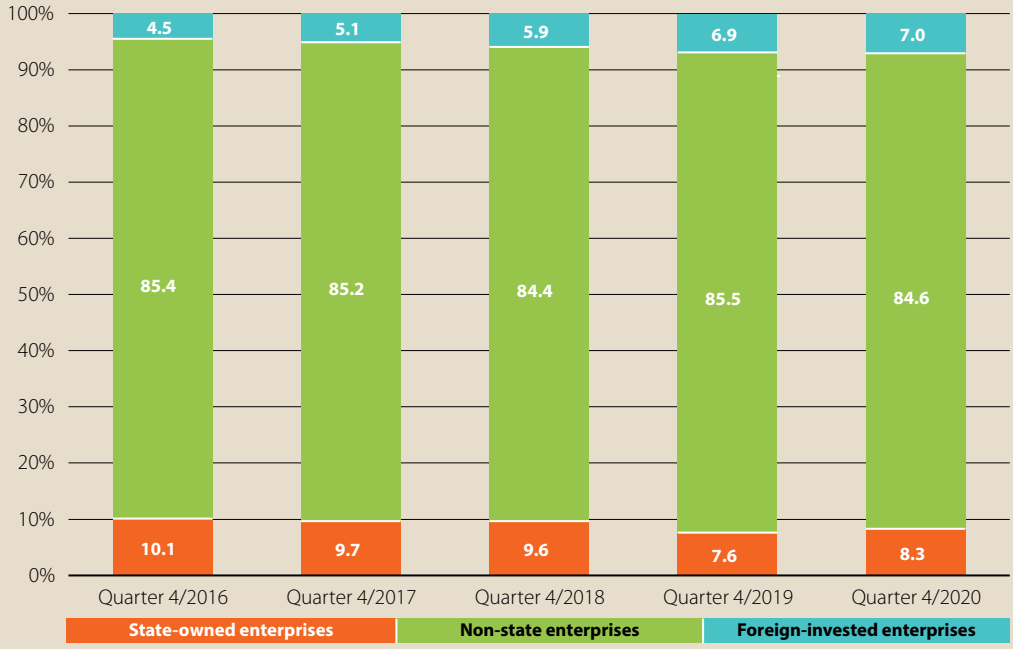
EMPLOYED WORKFORCE BY SECTOR, 2020.



Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.

FIGURE 9

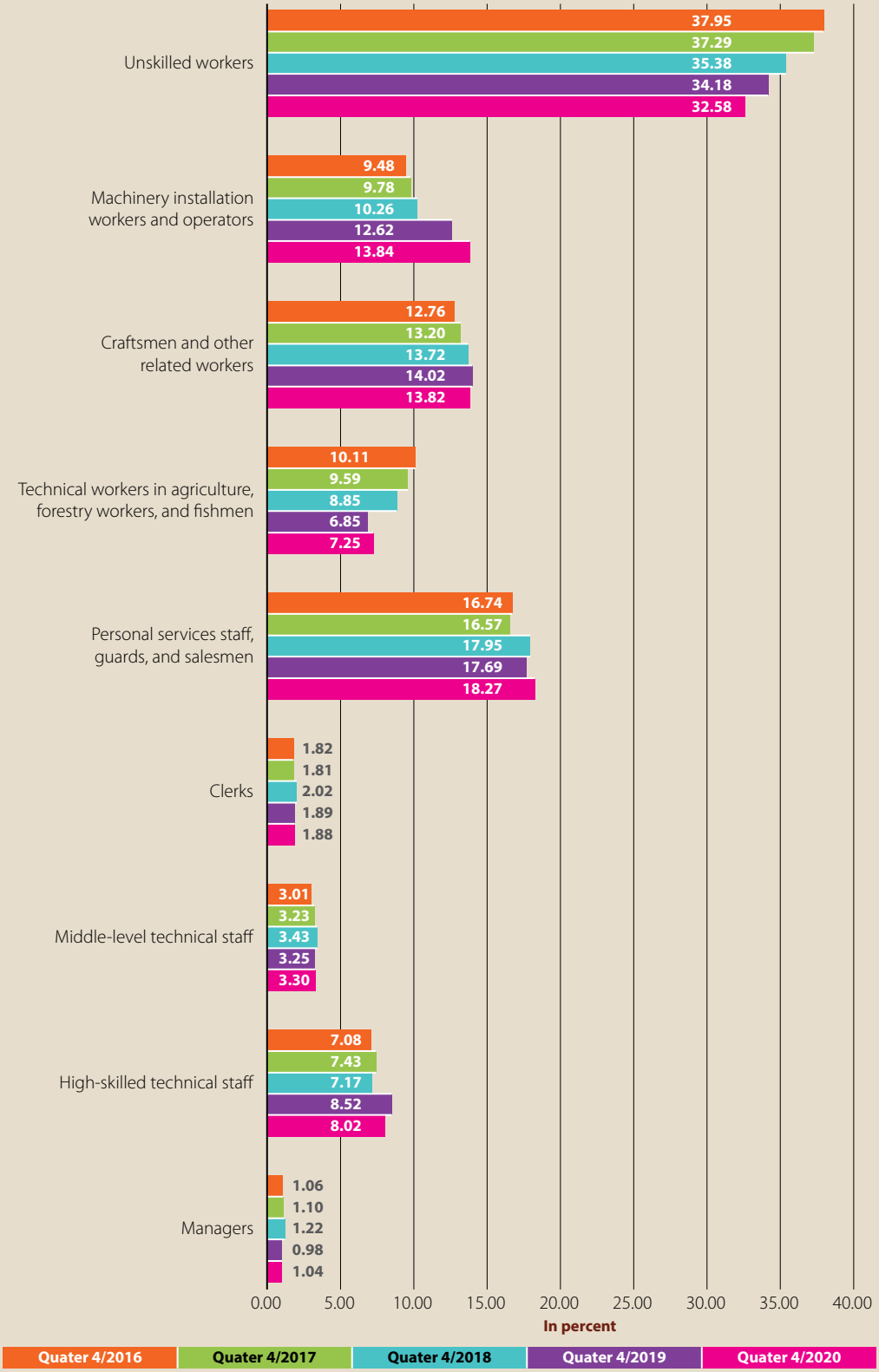
EMPLOYED WORKFORCE BY TYPE OF ENTERPRISE.



Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.

FIGURE 10

EMPLOYED WORKFORCE BY OCCUPATION.



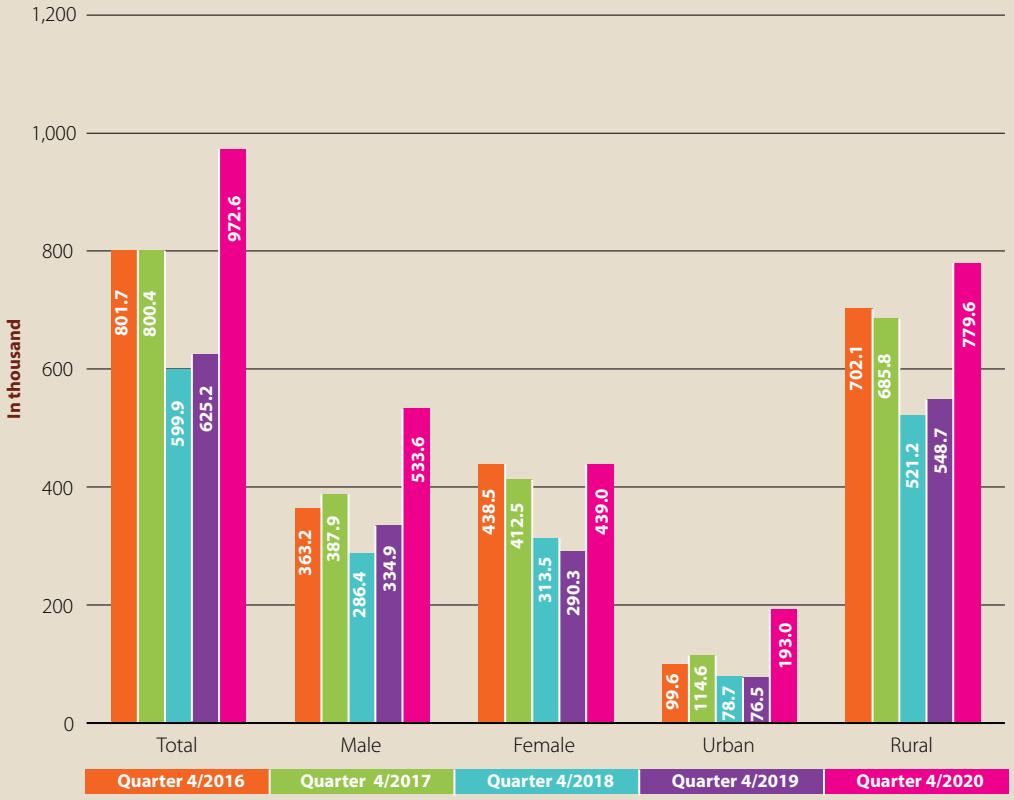
Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.

Persons in Underemployment

In Q4 of 2020, a total of 9,726,000 persons were in underemployment in Vietnam (55.6% increase over the same period in the previous year), of which the vast majority (80.2%) were residing in rural areas, against only 19.8% in urban areas (see Figure 11). There continues to be a great pressure for urban areas where a large portion of rural workers migrate in search of work. It will be very difficult for migrant workers to find good jobs and they will be forced to accept low wages and a difficult life when working in urban areas.

FIGURE 11

NUMBER OF UNDEREMPLOYED WORKERS BY GENDER AND URBAN/RURAL DISTRIBUTION.



Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.

Labor Demand from Enterprises

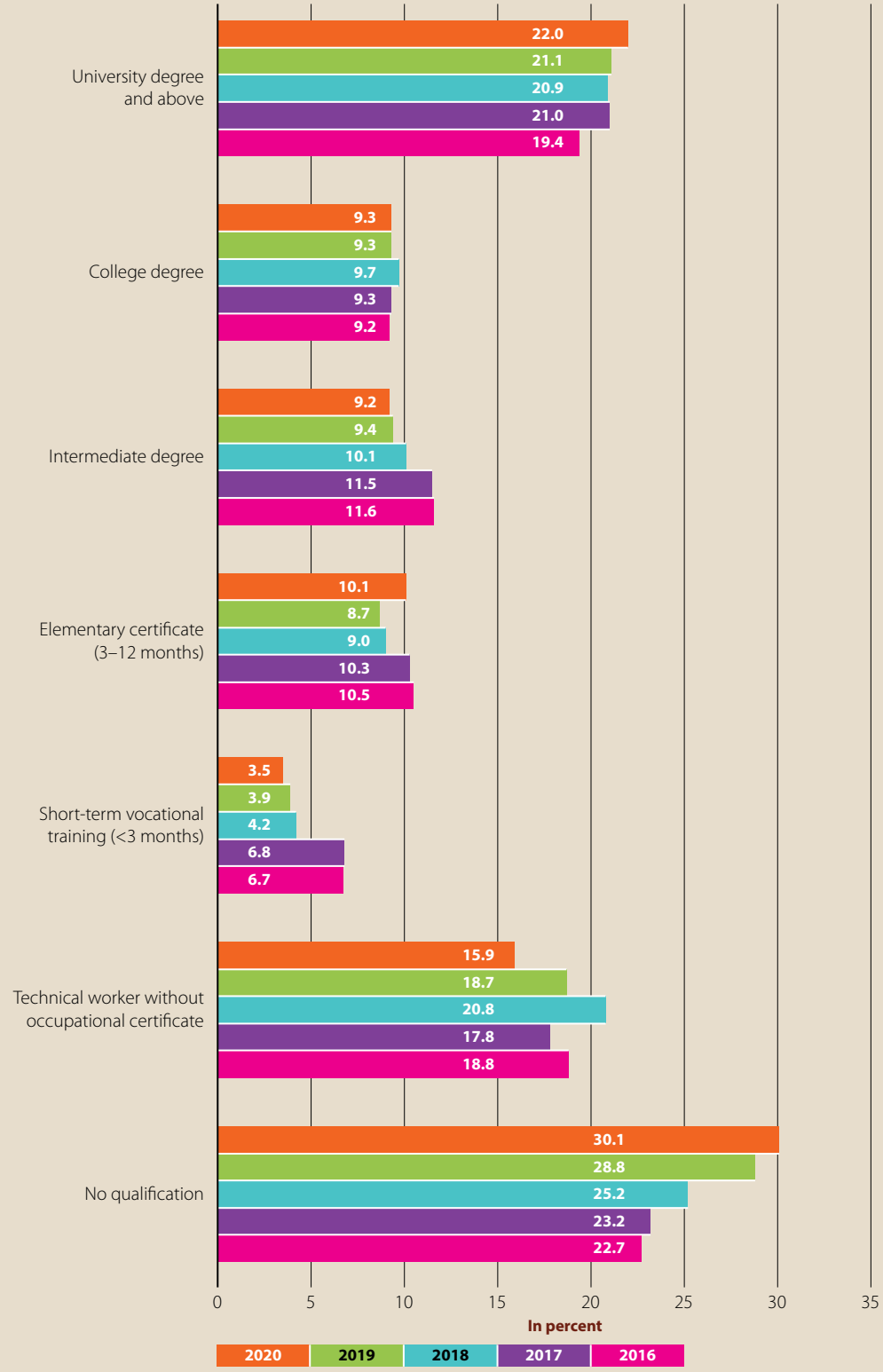
As of 30 June 2020, the total number of people working in all enterprises across the country was approximately 14.9 million, representing about 28.8% of the total employed population.

Unskilled workers made up 22.7% of all enterprises' workforce, followed by those with university degrees and above (19.4%). Technical workers without an occupational certificate/diploma represented 18.8%; and people with remaining qualifications/degrees accounted for less than 39.1% (see Figure 12).

Enterprises in the services sector had the highest percentage of employees with university degrees and above (37%) while the agriculture, forestry, and aquaculture sector had the highest percentage of unskilled workers (25%), as seen in Figure 13.

FIGURE 12

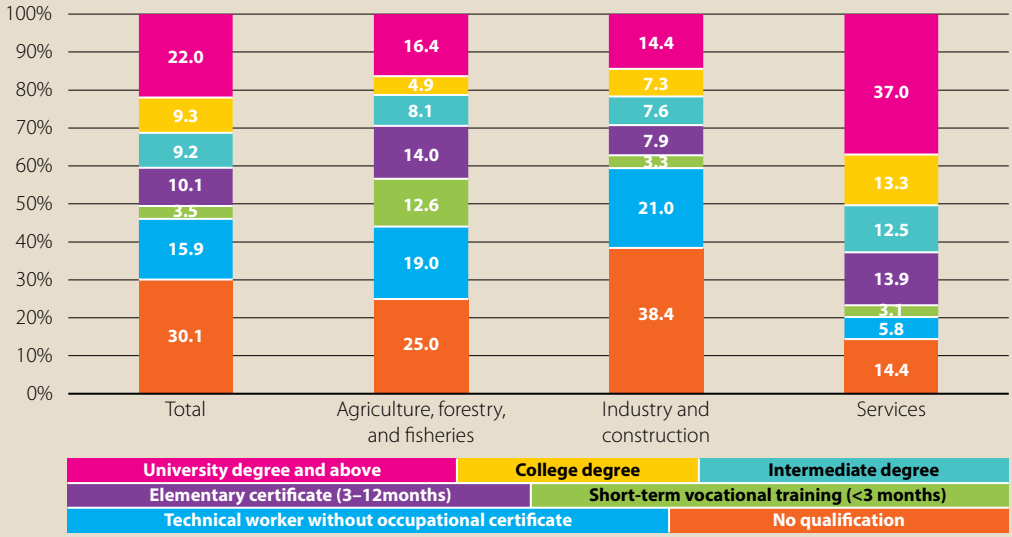
ENTERPRISE WORKFORCE BY QUALIFICATION LEVEL.



Source: Calculations based on 'Enterprises' workforce demand' surveys, 2017, 2018, 2019, and 2020; Department of Employment, MoLISA.

FIGURE 13

ENTERPRISE WORKFORCE BY QUALIFICATION LEVEL AND ECONOMIC SECTOR.



Source: Calculations based on the 'Enterprises' workforce demand 2020' survey, Department of Employment, MoLISA.

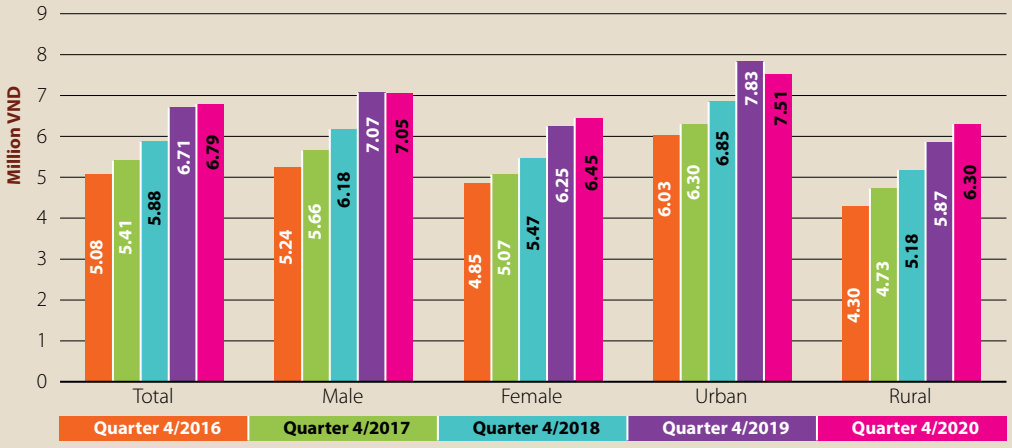
Income

The income in this report only refers to salaries/wages, bonuses, and allowances of all kinds such as wages (overtime, toxic, etc.) of the group of 'salaried workers.'

The average monthly income of the employed salary earners from the main job increased by 33.7% from VND5.08 million in Q4 of 2016 to VND6.79 million in Q4 of 2020. On an average, in Q4 of 2020, males received VND7.05 million (≈USD310) per month while females received VND6.45 million (≈USD284) per month. Urban workers earned VND7.51 million (≈USD331) per month while rural workers received VND6.30 million (≈USD278) per month (see Figure 14).

FIGURE 14

AVERAGE MONTHLY INCOMES OF EMPLOYED SALARY EARNERS.

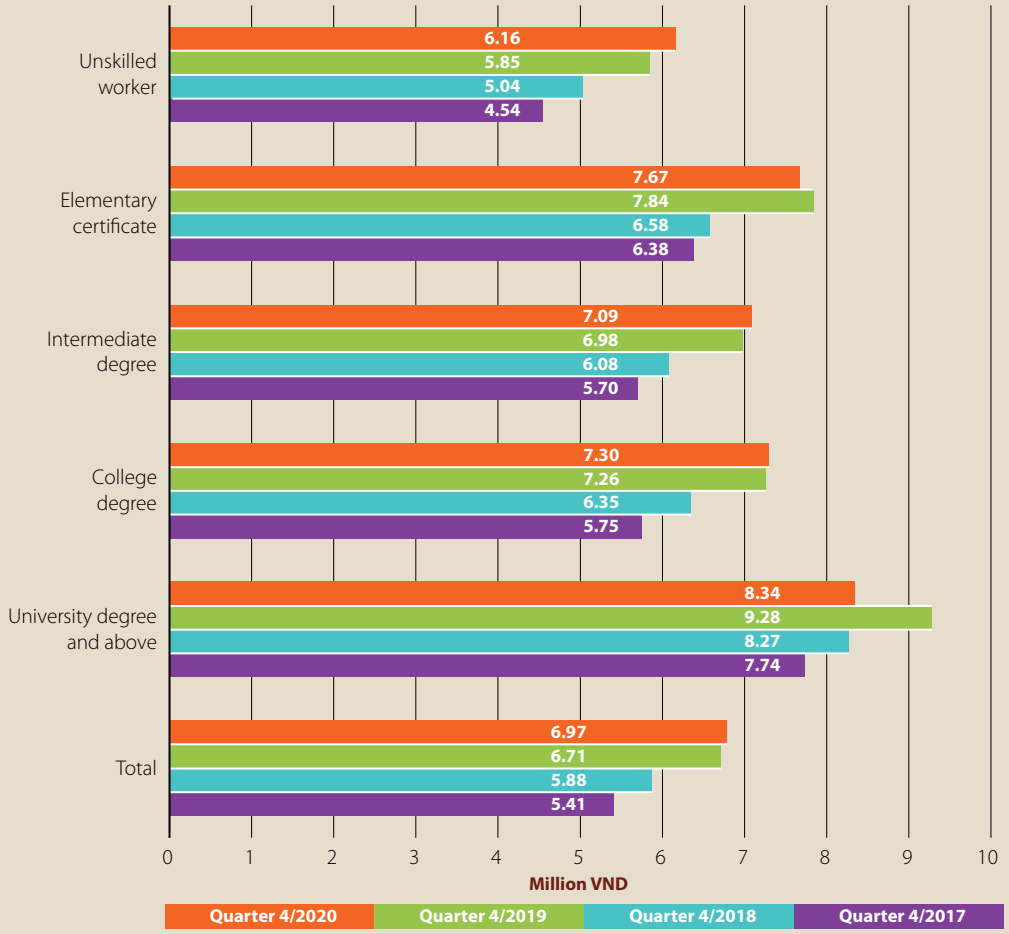


Source: Vietnam labour market updates, Issue 12 (Q4, 2016); Issue 16 (Q4, 2017); Issue 20 (Q4, 2018); Issue 24 (Q4, 2019); Issue 28 (Q4, 2020); MOLISA - GSO.

The pay gaps between different levels of qualification remained significant (see Figure 15). Unskilled workers earned only VND6.16 million (≈USD271) per month while the income of those with university degrees and above was 1.64 times higher at VND8.34 million (≈USD367). The average income per month of workers with elementary certificates was 7.67 million (≈USD338), which was higher than workers with college degrees at 7.30 million (≈USD321) and intermediate degrees at 7.09 million (≈USD312).

FIGURE 15

AVERAGE MONTHLY INCOMES OF EMPLOYED SALARY EARNERS BY QUALIFICATION LEVELS.



Source: Calculations based on Labour and Employment Surveys, Q4 of 2016, 2017, 2018, 2019, 2020; GSO.

Evaluation of Vietnam Vocational Training Development Strategy

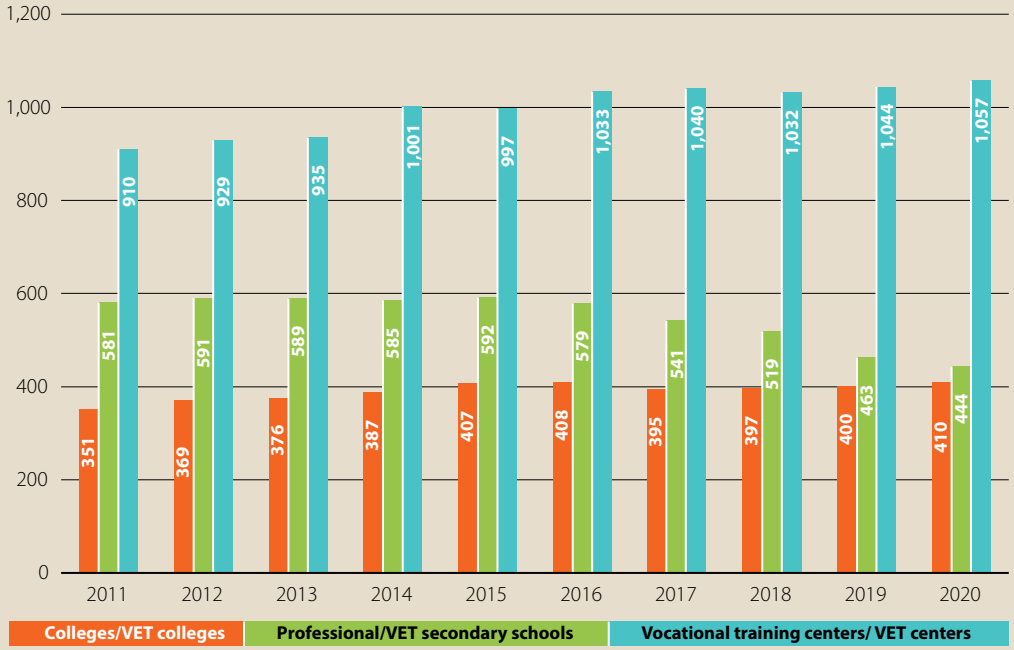
Some evaluation indicators for the implementation of the Vietnam Vocational Training Development Strategy for the period 2011–20 are discussed next.

The Network of VET Institutes

By the end of 2020, there were 1,911 VET institutes, including 410 VET colleges, 444 VET secondary schools, and 1,057 VET centers.

FIGURE 16

NUMBER OF VET INSTITUTES, 2011–20.



Source: Report on 'Evaluation of the vocational training development strategy for the period 2011–20,' NIVT [6].

There are 45 VET institutions that have been selected to prioritize concentrated and synchronous investment according to the criteria for high-quality VET schools. In addition to this, a list of key occupations at national, regional, and international levels has been issued in order to catch up with the regional and international developments.

A number of specialized VET institutions have been established to provide training for disadvantaged groups (e.g., people with disabilities, ethnic minorities, etc.); workers serving in marine economy development; and people in specific fields such as culture, physical training, and sports. This is to form a high-quality training model according to international standards through transfer training programs in order to meet the requirements of high-quality labor for the domestic and foreign labor market.

Decision No. 1769/QD-LDTBXH, dated 25 November 2019, by the Minister of the MOLISA approved key occupations and VET colleges and secondary schools that could choose key occupations for the period 2016–20 and orientations for 2025. These included (1) key occupations at international level (68 occupations), the ASEAN region level (101 occupations), and the national level (144 occupations); (2) public VET colleges and VET secondary schools that may choose key occupations; (3) private VET colleges and secondary schools, foreign-invested VET institutions, and state-owned enterprises that may choose key occupations; and (4) public-specialized institutions that provide training for some key occupations serving the marine economy development and training for ethnic minorities and people with disabilities.

VET Admissions

Enrollments in the period 2011–20 reached over 20 million people. Within the period, during 2011–15, the total number of enrollments reached over 9.8 million people, while during 2016–20 the number of enrollments reached over 11 million people.

TABLE 1

ADMISSIONS TO VET DURING THE PERIOD 2011–15.

Qualification	2011	2012	2013	2014	2015	Total
College	79,737	84,151	87,887	87,988	81,133	420,896
Intermediate	141,629	129,189	128,229	132,605	128,971	660,623
Elementary	894,719	909,265	876,788	816,911	779,816	4,277,499
Continuing training	878,772	583,314	855,228	1,206,374	989,279	4,512,967
Total	1,994,857	1,705,919	1,948,132	2,243,878	1,979,199	9,871,985

Source: Report on 'Evaluation of the vocational training development strategy for the period 2011–20,' NIVT.

TABLE 2

ADMISSIONS TO VET DURING THE PERIOD 2016–20.

Qualification	2016	2017	2018	2019	2020	Total
College	91,559	230,400	219,800	230,000	241,000	1,012,759
Intermediate	147,096	310,000	325,000	330,000	347,000	1,459,096
Elementary and others	1,836,012	1,664,000	1,665,000	1,700,000	1,740,000	8,605,212
Total	2,074,667	2,204,400	2,210,000	2,260,000	2,328,000	11,077,067

Source: Report on 'Evaluation of the vocational training development strategy for the period 2011–20,' NIVT.

Students participating in ASEAN and world skills competitions have won high prizes. Vietnam's representatives won a bronze medal at the World Skills Competition held in Abu Dhabi, UAE in 2017 and silver medal at the World Skills Competition held in Kazan, Russia in 2019. According to the ranking of the World Economic Forum in 2019, the quality of vocational training in Vietnam increased by 13 places, which was the highest increase in the ASEAN region.

VET Teachers

By the end of 2020, there were a total of 83,959 VET teachers, of which 37,235 were teaching in colleges, 13,295 in secondary VET schools, 23,086 in VET centers, and 10,343 in other institutes with VET activities (see Table 3).

TABLE 3

NUMBER OF VET TEACHERS DURING 2011–20.

Year	College/VET college	Professional /VET secondary schools	VET centers	Other institutes with VET activities	Total
2011	12,807	11,412	11,575		35,794
2012	14,277	10,874	14,109		39,260
2013	16,034	11,525	14,567		42,126
2014	16,006	9,834	14,775		40,615
2015	15,986	9,254	13,912		39,152
2016	19,711	9,905	16,028		45,644

(Continued on next page)

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Year	College/VET college	Professional /VET secondary schools	VET centers	Other institutes with VET activities	Total
2017	37,826	18,198	15,481		71,505
2018	37,826	18,198	15,481	14,845	86,395
2019	37,633	14,727	20,344	11,598	84,302
2020	37,325	13,295	23,086	10,343	84,049

Source: Report on 'Evaluation of the vocational training development strategy for the period 2011–20,' NIVT.

VET has coordinated with international organizations (e.g., EBG, APPE, and City&Guilds) and domestic VET institutes to organize 1,760 rounds of in-service training for teachers teaching national key occupations as well as at intermediate and college levels.

Specialized English training has been provided for 1,140 teachers teaching international and regional key occupations.

Overseas training has been provided for 1,008 teachers (340 teachers in Malaysia, 337 teachers in Australia, 56 teachers in the Republic of Korea, and 275 teachers in Germany).

Training Curriculum and Textbooks

VET of Vietnam has the widest range of occupations in the national education system. There are 825 intermediate-level occupations and 559 college-level occupations, distributed across 21 vocational areas and 90 categories, covering every economic activity, apart from thousands of elementary level occupations and short-term vocational training programs.

The Period from 2011 to 2015

The curriculum development is carried out by vocational training institutions (now VET institutions), according to the curriculum framework promulgated by the General Department of Vocational Training, which has also promulgated vocational training curriculum for national, regional, and international key occupations. During this period, the following activities have been carried out:

- Curriculum of common subjects were modified and supplemented (politics, informatics, law, national defense, and security education in six compulsory general subjects were applied to VET secondary schools and VET colleges).
- Curriculum framework was developed and issued at VET college and secondary levels for 265 occupations; 205 new sets of occupation analysis and job analysis sheets were developed; and curriculum frameworks were revised and supplemented at VET college and secondary levels for 32 occupations.
- VET curriculum and sets of graduation examination questions were developed and promulgated for 96 key national-level occupations at college and intermediate levels (of which, 14 occupations have been piloted to develop curricula at VET college and intermediate levels).
- 20 transferring curriculum meeting international standards were revised and supplemented.

The Period from 2016 to 2020

During this period, the following key developments took place:

- VET institutions were proactive in developing, appraising, and promulgating training curriculum.
- It was recognized that the development curriculum of TVET institutions must be based on the minimum amount of knowledge and capacity requirements that learners need to achieve after graduating (learning outcomes).
- The MOLISA promulgated regulations on the procedure of developing, appraising, and promulgating curriculum and textbooks. It also stipulated the minimum amount of knowledge and capacity requirements that learners need to achieve after graduating (learning outcomes) at intermediate and college levels to serve as a basis for VET institutions to develop and issue their training curriculum.
- By the end of 2020, DVET had coordinated with ministries, agencies, and VET institutions to develop and appraise the Regulation on minimum amount of knowledge and capacity requirements that learners need to achieve after graduating (learning outcomes) for 300 training occupations.

Training According to International High-quality Curricula

The Prime Minister issued Decision No. 371/QĐ-TTg for approving the project "Transfer of curricula; training teachers and vocational education managers; experimental training in key occupations that meet ASEAN and international standards during 2012–15." The MOLISA completed the transfer of 34/35 curricula for international key occupations (12 curricula from Australia and 22 curricula from Germany), reaching 97.12% of the strategy's target. In addition, VET institutions have been conducting pilot training for about 1,781 students, of which 725 students have graduated holding two degrees (the Vietnamese degree and the transferred country's degree), capable of participating in the international labor market.

The curricula transfer has also been carried out in a number of ODA loan projects from the French and Korean governments (transferring and revising seven competency standards, curriculum, and textbooks according to French standards; and transferring national competency standards and developing curriculum and textbooks for eight occupations according to Korean standards).

Actual Situation of Training and Reskilling/retraining for Employees in Enterprises

In recent years, mechanisms and policies to attract and encourage enterprises to participate in VET have continued to be concretized. The revised Labor Code was approved by the National Assembly with many new regulations, specifically facilitating enterprises to participate more deeply and widely in TVET. Enterprises were allowed to set up TVET institutes or conduct VET classes for training, retraining, fostering, and improving professional qualifications and skills for employees; and coordinate with TVET institutions to deliver training at elementary, intermediate, or college levels and other vocational training programs.

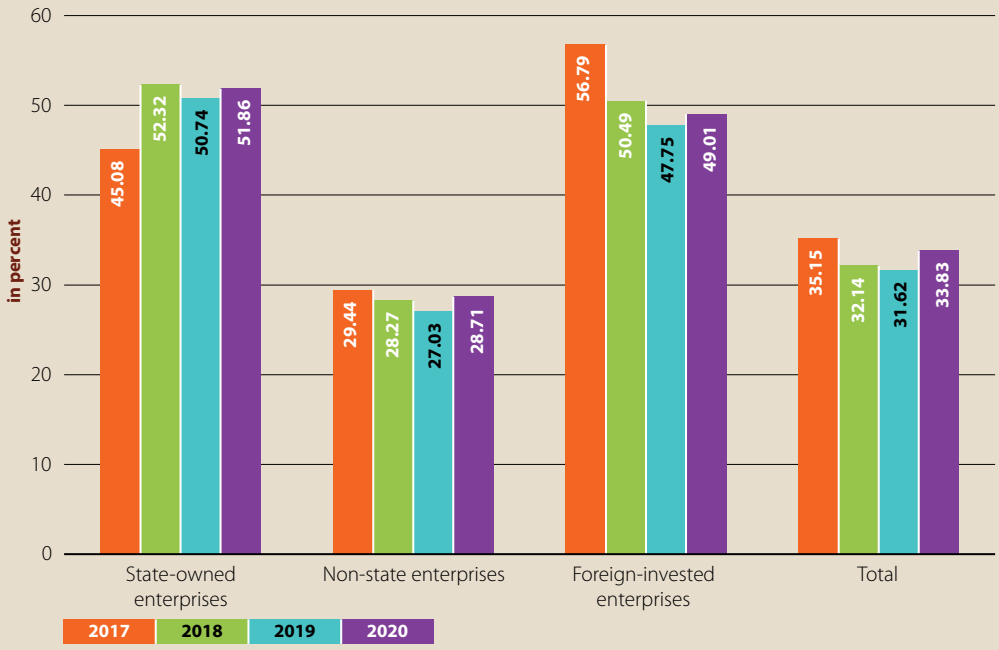
Training Provision for Enterprises' Employees

By June 2020, there were around 774,000 enterprises operating in Vietnam. Of these, 51.86% were state-owned enterprises and 49.01% were foreign-invested enterprises that provided training for

their employees. In addition, the percentage of non-state enterprises that provided training was 28.71% (see Figure 17).

FIGURE 17

ENTERPRISES THAT PROVIDED TRAINING FOR EMPLOYEES.



Source: Calculations from the survey "Enterprises' demand for workforce in 2020," Department of Employment, MoLISA.

In recent years, enterprises have mainly delivered entirely in-house training for their employees. In 2020, 81.23% of the participating enterprises delivered entirely in-house training for their employees, 35.16% cooperated with VET institutes to train employees, and others outsourced training activities to external providers. State-owned enterprises showed a relatively high percentage of providing joint training with VET institutes while non-state enterprises and foreign-invested enterprises preferred to conduct training by themselves (see Figure 18).

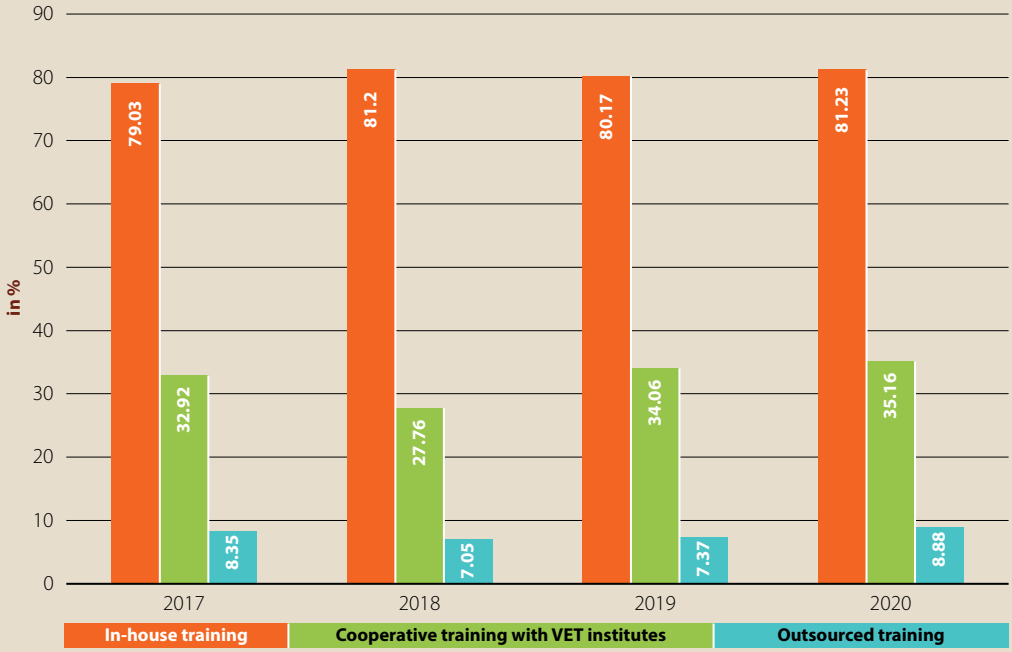
Training was provided for 7.9 million enrollments from workers. Out of these enrollments, 5.9 million were from direct functions, while the remaining were from indirect functions, supporting divisions, and management staff (see Figure 19).

This shows that in 2020 retraining was the most frequent type of training offered to employees from production and business divisions, while further training was offered more frequently for management staff, and initial training was offered mostly for employees in indirect divisions (see Figure 20).

In 2020, the percentage of enterprises that cooperated with TVET institutions was 11.97%. Non-state enterprises still showed the lowest percentage of cooperation with VET institutes (9.56%), while the figure for foreign-invested businesses was 15.98%. State-owned enterprises that had cooperations with VET institutes accounted for 30.08% (see Figure 21). Thus, all types of enterprises had a significantly increased rate of cooperation with TVET institutes compared with previous years.

FIGURE 18

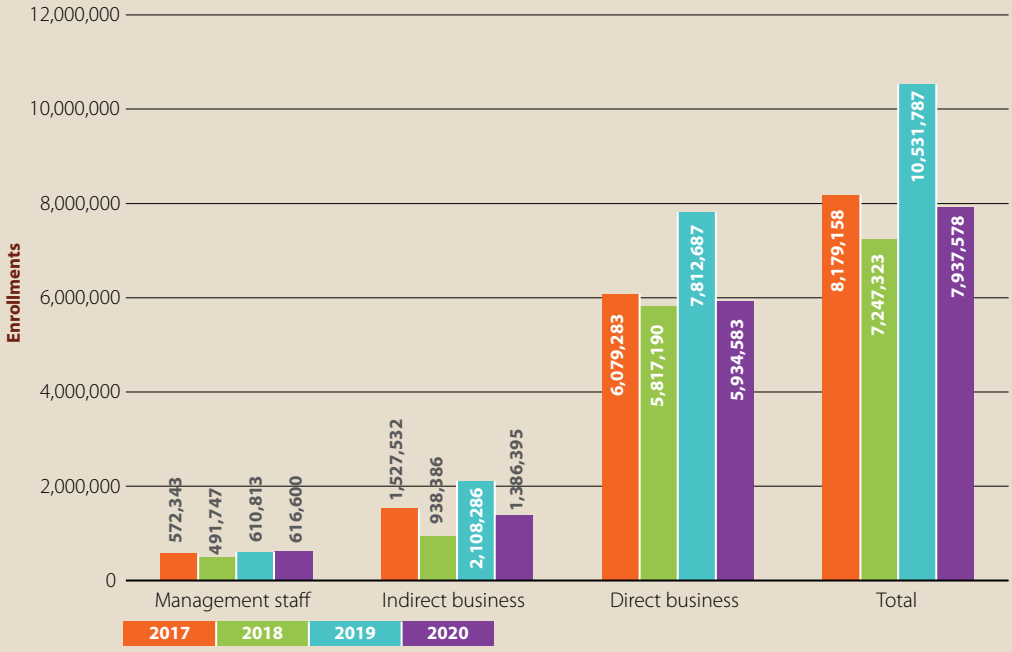
TRAININGS FOR EMPLOYEES BY TYPES OF TRAINING PROVIDERS.



Source: Calculations from the survey "Enterprises' demand for workforce in 2020," Department of Employment, MoLISA.

FIGURE 19

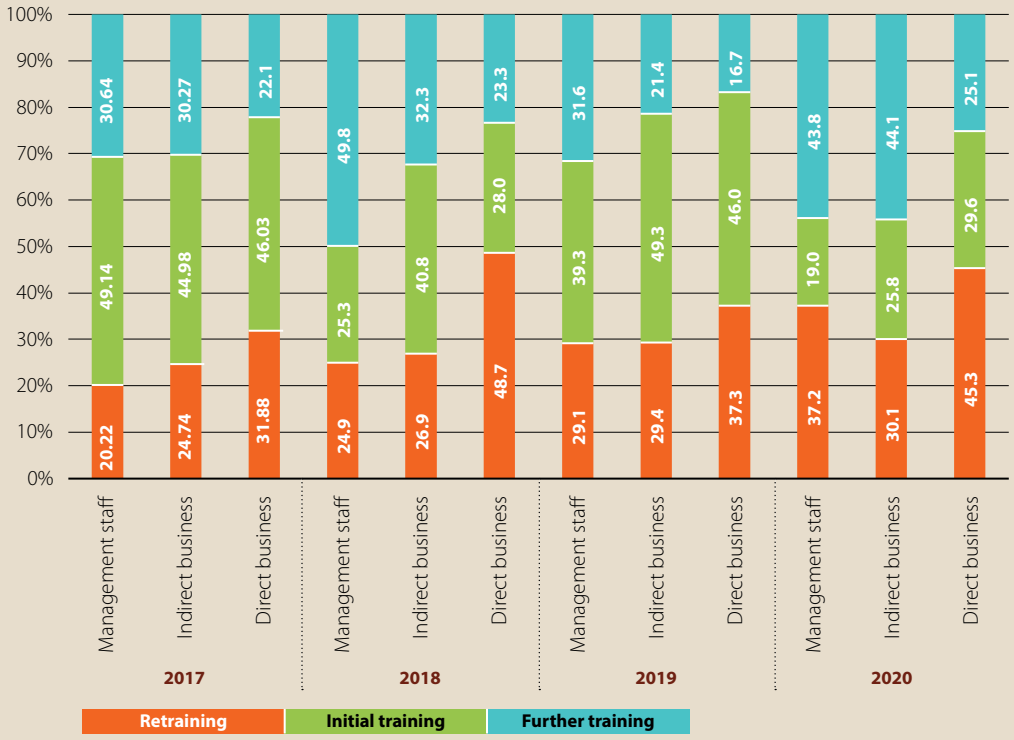
ENROLLED WORKERS FOR FURTHER TRAINING BY FUCTION TYPE.



Source: Calculations from the survey "Enterprises' demand for workforce in 2020," Department of Employment, MoLISA.

FIGURE 20

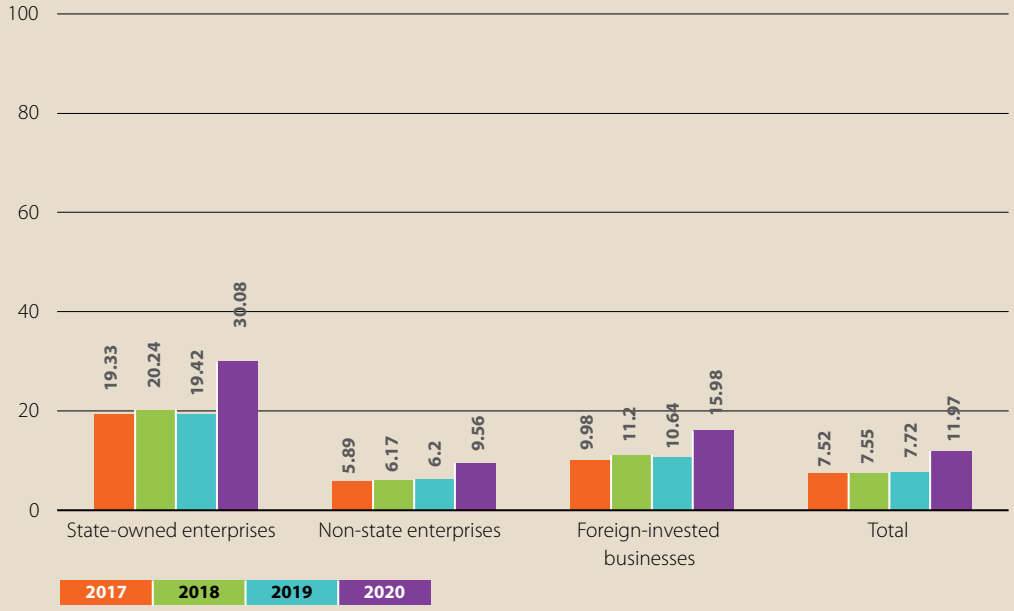
TYPES OF TRAINING BY EMPLOYEE CATEGORIES.



Source: Calculations from the survey "Enterprises' demand for workforce in 2020," Department of Employment, MoLISA.

FIGURE 21

PERCENTAGE OF ENTERPRISES HAVING COOPERATIONS WITH VET INSTITUTES.

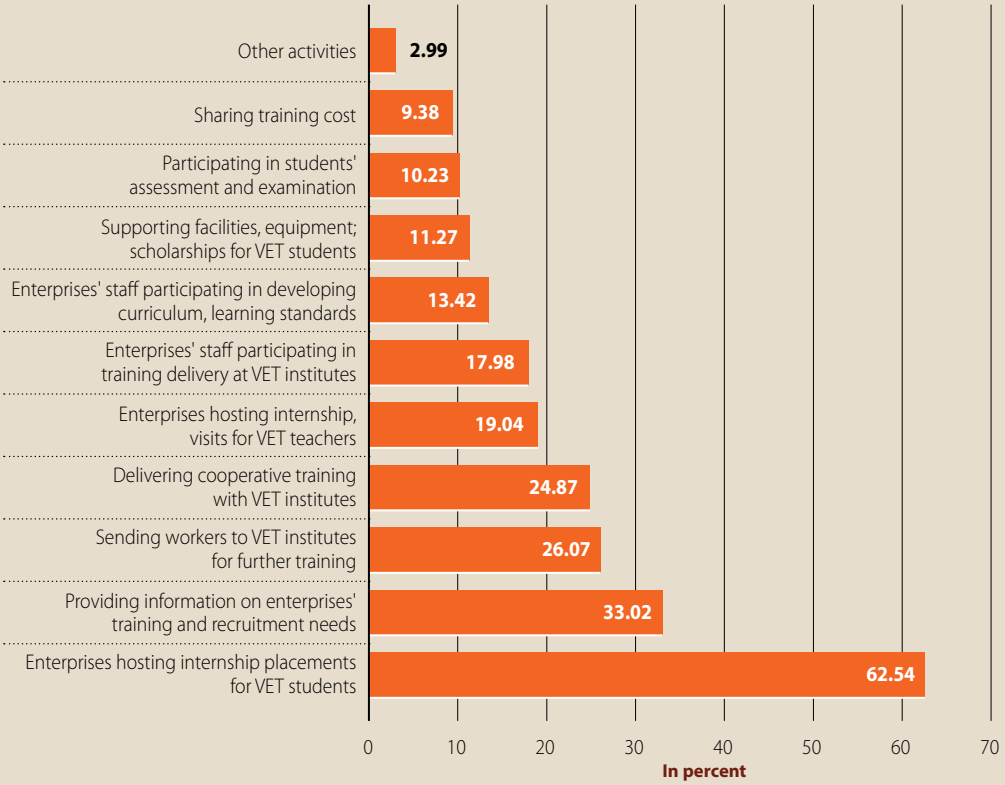


Source: Calculations from the survey "Enterprises' demand for workforce in 2020," Department of Employment, MoLISA.

In 2020, out of 89,000 enterprises cooperating with TVET institutes, the most common forms of cooperation between enterprises and VET institutes included providing internship placements (62.54%); providing information on enterprises' training and recruitment needs (33.02%); and sending workers to VET institutes for further training (26.07%). Other forms of cooperation, e.g., enterprises' participation in the development and delivery of training programs; sharing training costs; enterprises' involvement in the development of occupational standards and students' assessment and examination; and joint training were found to be very limited (see Figure 22).

FIGURE 22

FORMS OF COOPERATION BETWEEN ENTERPRISES AND VET INSTITUTES.



Source: Calculations from the survey "Enterprises' demand for workforce in 2020," Department of Employment, MoLISA.

Employee Competency Assessment by Employers

Employers' rating of employees' knowledge and skills was measured on a scale from one to five where one was understood as completely unsatisfactory and five as completely satisfactory. According to the results of the survey conducted by the Department of Employment, MoLISA, VET trained employees were rated more positively by employers than the average employees. Occupational competence of the employees was evaluated by employers as the most important, followed by occupational safety and health, innovative and critical thinking, and problem solving (see Figure 23).

According to the Global Innovation Index 2020 Report (GII 2020), Vietnam maintained its 42nd position for the second year in a row in the global innovation rankings [9]. Moreover, it held the

FIGURE 23

EMPLOYERS' ASSESSMENT OF THE SKILLS IMPORTANCE AND EMPLOYEES' PERFORMANCE.

Source: Survey of training needs in TVET associated with employment to meet the labor market 2020, NIVT.

No. 1 position in the group of 29 countries with the same income level, while also ranking third in southeast Asia. Vietnam was also among the top 50 economies that have made the most significant progress in their rankings over time. Out of the 80 subcriteria, the MoLISA (DVET) was responsible for the evaluation criterion of "enterprises with formal training" (meaning that the enterprise organized vocational education and training for its employees). On this criterion, in 2020, Vietnam had a score of 22.2 points and was ranked 66th, which marked an increase of four places compared with 2019, when the score was 24.8 points and the rank was 70. This indicated a positive change in the linkage between TVET and enterprises.

Labor Market Transition Opportunities

Skills Development of Vietnamese Workers for IR4

The Fourth Industrial Revolution (IR4), which is characterized by the development based on a highly integrated connection between the physical and digital worlds and the breakthroughs in technologies such as internet of things (IoT) and artificial intelligence (AI), has made a great impact on the world's production.

Vietnam is in the process of industrialization, modernization, and international integration. IR4 opens up many opportunities for improving technologies, enhancing production capacities, and

increasing competitiveness in the product chain; creates a big change in the form of service business; creates lots of opportunities for innovative startups; significantly reduces transaction and transportation costs; boosts attractive and potential investment in the field of digital technology and the internet; and offers a great opportunity for industrial production with advanced science and technology levels.

However, although Vietnam has focused on IR4 policy reforms, in terms of workforce digital skills, the nation dropped from 92nd rank in 2019 to 96th rank in the 2020 Global Talent Competitiveness Index (GTCI) [4]. This implies that there is a requirement for improving skills of workers to meet the needs of enterprises.

The forecast for the impact of IR4 on employment in Vietnam shows that work efficiency has increased and a restructuring of employment is likely to decrease the number of jobs by 2.9 million to 3.78 million compared with the 2030 baseline (Vietnam Central Economic Commission, 2019) [2]. The majority of the job losses were among unskilled workers (73%); followed by craftsmen and related workers (17%); machine, workshop equipment operators, and assemblers (6%); and skilled labor in the agriculture, forestry, and fishery sectors (5%).

However, it is expected that IR4 will also drive revenue growth by enabling businesses to improve products and services or enter new related industries. This revenue growth will offset job losses and create new jobs with an estimated net increase of 1.3 million to 3.1 million.

An ILO study [3] was conducted in five ASEAN countries including Cambodia, the Philippines, Indonesia, Thailand, and Vietnam across five sectors: automobile manufacturing and assembly; electrical and electronics; textiles and footwear; outsourcing business; and retail. It shows that the use of automation technology in production has become popular in ASEAN countries.

According to experts, the jobs lost are those related to unskilled workers in areas such as agriculture, textiles, footwear, assembly, and crafts. These industries currently account for a large share of the labor force in Vietnam (around 68% of the labor force) and will also account for a large share of the total number of unemployed workers in the labor market. These industries are the most affected by IR4 due to the high use of unskilled labor. Connected automation using IoT, cloud computing, 3D printing, big data, analytics, and AI will gradually replace workers in production lines in factories as well as in product supply chains. Therefore, there are two trends of training and retraining for employees working in these fields:

First is training and retraining in the same industry but in the direction of new technologies (e.g., from traditional agriculture to high-tech agriculture; from handmade textiles to industrial textile and garment with advanced technology and automation; etc.). Second is training and retraining to take up new jobs due to old-job losses (e.g., from the agricultural sector to the industrial or the services sector; from the industrial sector to the control automation sector; etc.).

Along with the development of technology, enterprises' demand for workers' qualifications and competencies has been increasing. These competencies and qualifications could be divided into three groups: (1) cognitive knowledge and skills, systems thinking, critical thinking, adaptive skills, and creative skills; (2) physical skills including language skills, digital skills, and networking skills; and (3) social skills such as communication, relationship building, and teamwork.

The report titled "Vietnam's Future Jobs: Leveraging Mega-trends for Greater Prosperity" [7] indicates that the limited skills of Vietnam's workers will put a negative impact on their job seeking. Along with the development of technology in all sectors, the Vietnamese workers need to enhance their sophisticated skills as well as other skills over their lifetimes. Some essential skills as suggested by a WEF Report [8] include (1) complex problem solving; (2) critical thinking; (3) creativity; (4) people management; (5) coordinating with others; (6) emotional intelligence; (7) judgment and decision making; (8) service orientation; (9) negotiation; and (10) cognitive flexibility.

Some occupations that workers need to be trained and retrained for to meet the new requirements of IR4 (as per the project "Pilot training and retraining to improve human resource skills to meet the requirements of the fourth industrial revolution") include:

- new occupations/fields that employees need to be trained in (e.g., blockchain-based solutions, robot system integration, IoT, digital farming, data security, and 3D printing);

- occupations that employees need to be trained in and fostered to update their knowledge and skills (e.g., information technology; electronics and telecommunication; electrics and electronics; automation; manufacturing industry; hi-tech agriculture and forestry; automotive, agricultural engineering, and medical equipment; transportation and logistics services; tourism services, hotels, and restaurants; textile and leather shoes; and new and renewables);

- occupations that employees need to be trained and retrained in order to change their jobs (agriculture, forestry, and fishery; engineering; textile and leather shoes; mining and geological mines; electrics and electronics; automation; other unskilled occupations with low labor productivity and low-skilled workers and workers at risk of unemployment).

The sectors that attract the most workers include high-tech agriculture, energy, tourism, hotels, restaurants, logistics, services, medical, healthcare, beauty care, media, ICT, equipment maintenance, and construction. These are sectors that require most workers holding occupational-skill certificates and need to be trained. It is estimated that these sectors will face difficulties in recruiting workers in the coming years.

Labor Market Transitions

According to a research conducted by ILO and NIVT, around 2.6 million people by 2025 and around 3.0 million people by 2030 will be attending VET at all levels. By 2030, as give in Figure 24, the number of people participating in VET at the elementary level will be 1.8 million (accounting for 61.7%); the number of people participating at the intermediate level will be 0.6 million (accounting for 20.9%); and the number of people participating at the college level will be 0.5 million people (accounting for 17.5%).

By 2030, the total job demand with elementary VET qualifications will be for 3.9 million people, an increase of about 1.3 million people compared with 2021, at an average annual increase of 4.5%. The job demand for intermediate-level VET qualifications will be for around 2.9 million people, which will be an increase of 0.3 million people compared with 2021. Also, the job demand for VET qualifications with college degrees will be 6.8 million people, which will be an increase of 4.3 million workers (12%) compared with 2021.

FIGURE 24

PROPORTION OF VET STUDENTS BY 2030.

Source: Skills Forecast Report, ILO–NIVT.

The transportation and warehousing industry will have the highest demand for workers with VET elementary certificates, with 1.2 million jobs in 2025 and 1.5 million jobs in 2030. The percentage distribution of job demand for elementary VET qualifications by various sectors is given in Table 4.

TABLE 4

LABOR DEMAND SHARES OF 21 SECTORS FOR ELEMENTARY VET QUALIFICATIONS.

Sector	2021 (in %)	2025 (in %)	2030 (in %)
Agriculture, forestry, and fisheries	6.79	5.86	5.08
Extractive industries	1.39	1.32	1.25
Manufacturing	14.73	13.10	11.73
Electricity, gas, steam, and air conditioning supply industry	0.54	0.52	0.50
Water supply, sewerage, waste management, and remediation activities	0.49	0.50	0.51
Construction	5.73	5.57	5.43
Wholesale and retail trade; repair of cars, motorcycles, motor-bikes, and other motor vehicles	14.45	14.81	15.11
Transportation and storage	36.94	38.74	40.25
ICT	2.67	2.77	2.86
Accommodation and catering services	0.80	0.83	0.86
Finance, banking, and insurance activities	1.23	1.36	1.47

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Sector	2021 (in %)	2025 (in %)	2030 (in %)
Real estate business	0.63	0.70	0.75
Professional, scientific, and technological activities	0.76	0.75	0.75
Administrative activities and support services	1.14	1.21	1.26
Activities of the Communist Party and sociopolitical organizations; state management and national security; and compulsory social guarantee	5.24	5.59	5.89
Education and training	2.13	2.27	2.39
Health and social assistance activities	1.01	0.92	0.84
Art and entertainment	0.40	0.41	0.41
Other service activities	2.89	2.74	2.62
Household activities and production of material products and services for household self-consumption	0.02	0.01	0.00
Activities of international organizations and agencies	0.03	0.03	0.04

Source: Skills Forecast Report, ILO–NIVT.

Meanwhile, the manufacturing industry tends to use a lot of workers with VET intermediate qualifications. The demand for jobs with intermediate qualifications in this industry will be around 667,000 people by 2025 and 790,000 people by 2030. The percentage distribution of job demand for intermediate-level VET qualifications by various sectors is given in Table 4.

TABLE 5

LABOR DEMAND SHARES OF 21 SECTORS FOR INTERMEDIATE-LEVEL VET QUALIFICATIONS.

Sector	2021 (in %)	2025 (in %)	2030 (in %)
Agriculture, forestry, and fisheries	12.34	11.78	10.87
Extractive industries	0.98	0.77	0.56
Manufacturing	22.44	24.49	26.73
Electricity, gas, steam, and air conditioning supply industry	1.37	1.23	1.05
Water supply, sewerage, waste management, and remediation activities	0.52	0.47	0.40
Construction	5.40	5.23	4.92
Wholesale and retail trade; repair of cars, motorcycles, motorbikes, and other motor vehicles	16.63	17.75	18.84
Transportation and storage	5.71	5.73	5.64
ICT	4.87	5.66	6.67
Accommodation and catering services	0.95	0.77	0.58
Finance, banking, and insurance activities	0.87	0.81	0.72
Real estate business	1.16	1.74	2.84
Professional, scientific, and technological activities	0.89	0.76	0.61
Administrative activities and support services	0.96	1.02	1.08
Activities of the Communist Party and sociopolitical organizations; state management and national security; and compulsory social guarantee	8.14	6.64	5.04

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Sector	2021 (in %)	2025 (in %)	2030 (in %)
Education and training	6.41	5.04	3.66
Health and social assistance activities	6.82	6.14	5.27
Art and entertainment	0.48	0.46	0.43
Other service activities	2.99	3.44	4.03
Household activities and production of material products and services for household self-consumption	0.08	0.07	0.05
Activities of international organizations and agencies	0.00	0.00	0.00

Source: Skills Forecast Report, ILO–NIVT.

The manufacturing industry also tends to use lots of workers with college degrees. It is forecasted that by 2030, the number of workers with college degrees in this industry will be about 2.2 million (accounting for 32.7% of overall demand at the given level). The demand from wholesale and retail trade, along with repair of cars, motorcycles, motorbikes, and other motor vehicles will be for 1.5 million people with college degrees by 2030 (accounting for 21.8% of the workforce with college degrees). The percentage distribution of job demand for VET qualifications with college degrees by various sectors is given in Table 6.

TABLE 6

LABOR DEMAND SHARES OF 21 SECTORS FOR VET QUALIFICATIONS WITH COLLEGE DEGREES.

Sector	2021 (in %)	2025 (in %)	2030 (in %)
Agriculture, forestry, and fisheries	6.51	5.68	4.54
Extractive industries	0.49	0.41	0.31
Manufacturing	25.14	28.93	32.69
Electricity, gas, steam, and air conditioning supply industry	1.34	1.36	1.33
Water supply, sewerage, waste management, and remediation activities	0.29	0.25	0.19
Construction	4.02	3.88	3.52
Wholesale and retail trade; repair of cars, motorcycles, motorbikes, and other motor vehicles	19.19	20.77	21.76
Transportation and storage	4.42	4.67	4.73
ICT	4.35	4.77	5.07
Accommodation and catering services	2.10	1.91	1.61
Finance, banking, and insurance activities	1.28	1.14	0.93
Real estate business	1.67	2.36	3.47
Professional, scientific, and technological activities	1.51	1.72	1.93
Administrative activities and support services	1.29	1.48	1.67
Activities of the Communist Party and sociopolitical organizations; state management and national security; and compulsory social guarantee	2.91	1.98	1.16

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Sector	2021 (in %)	2025 (in %)	2030 (in %)
Education and training	14.44	8.69	4.37
Health and social assistance activities	6.19	6.81	7.27
Art and entertainment	0.65	0.67	0.66
Other service activities	2.14	2.42	2.68
Household activities and production of material products and services for household self-consumption	0.06	0.07	0.09
Activities of international organizations and agencies	0.01	0.01	0.01

Source: Skills Forecast Report, ILO–NIVT.

In 2021, there were around 2.0 million highly skilled workers; 4.5 million workers with intermediate skills; and 0.7 million workers with low skills (doing unskilled jobs) that had received vocational training. By 2030, there will be about 2.1 million highly skilled workers; 6.3 million workers with intermediate skills, and nearly 1 million workers with low skills that would have received vocational training (see Figure 25).

FIGURE 25

DEMAND FOR TRAINED WORKERS BY SKILL GROUP.

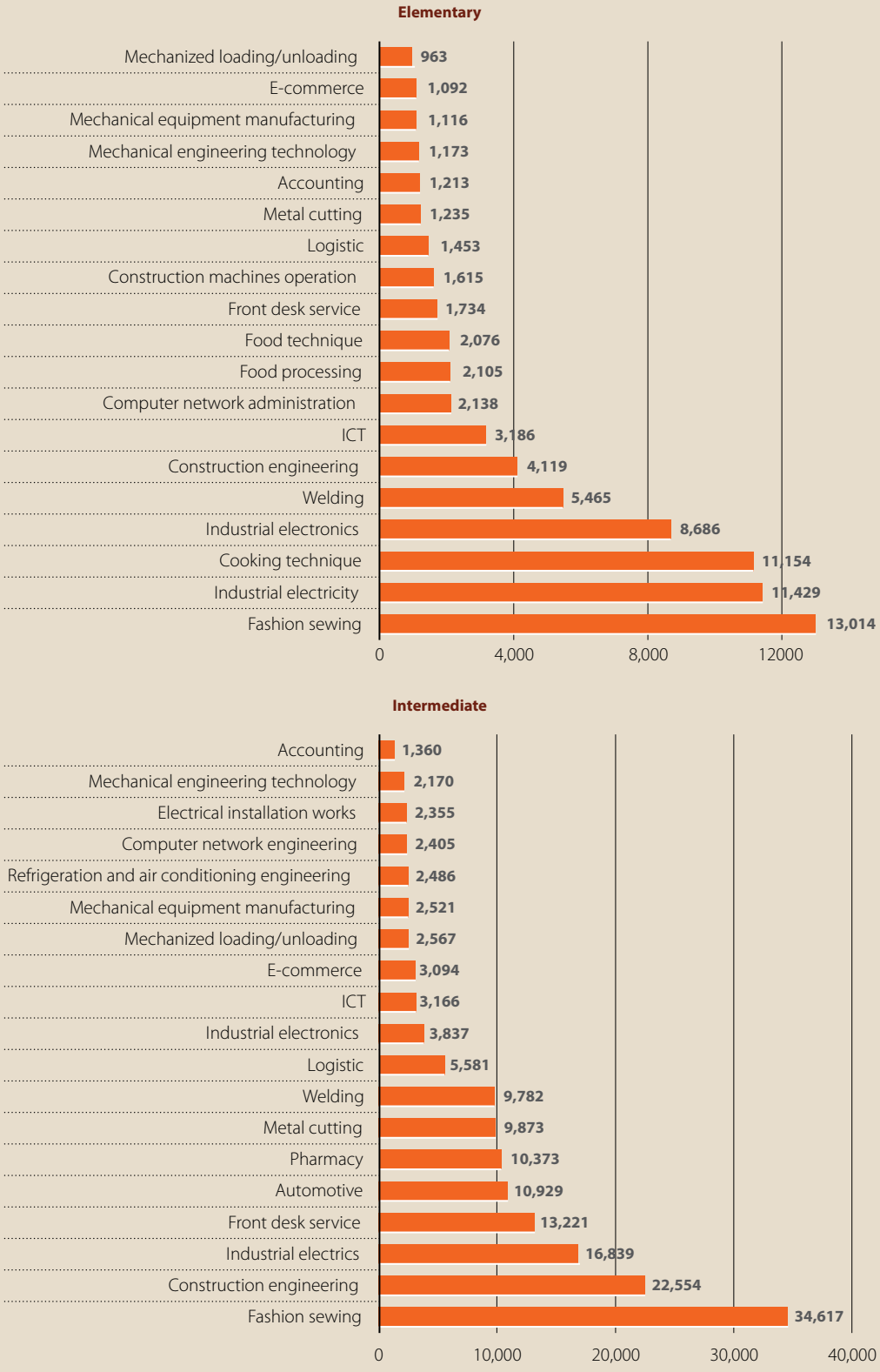
Source: Skills Forecast Report, ILO–NIVT.

Trained Labor Demand for Some Key Occupations in Enterprises

In 2022, for elementary-level workers, the biggest demand for new recruits was estimated for fashion sewing (13,000 people); followed by industrial electricity (11,500 people); and food processing techniques (9,000 people). For intermediate-level workers, the biggest demand for new recruits was also estimated for fashion sewing (36,600 people); followed by industrial electricity (16,800 people); and construction engineering (16,700 people). For college-level workers, the biggest demand for new recruits was estimated for welding (43,700 people); followed by front desk service (42,200 people); and industrial electricity (28,500 people), as shown in Figure 26.

FIGURE 26A

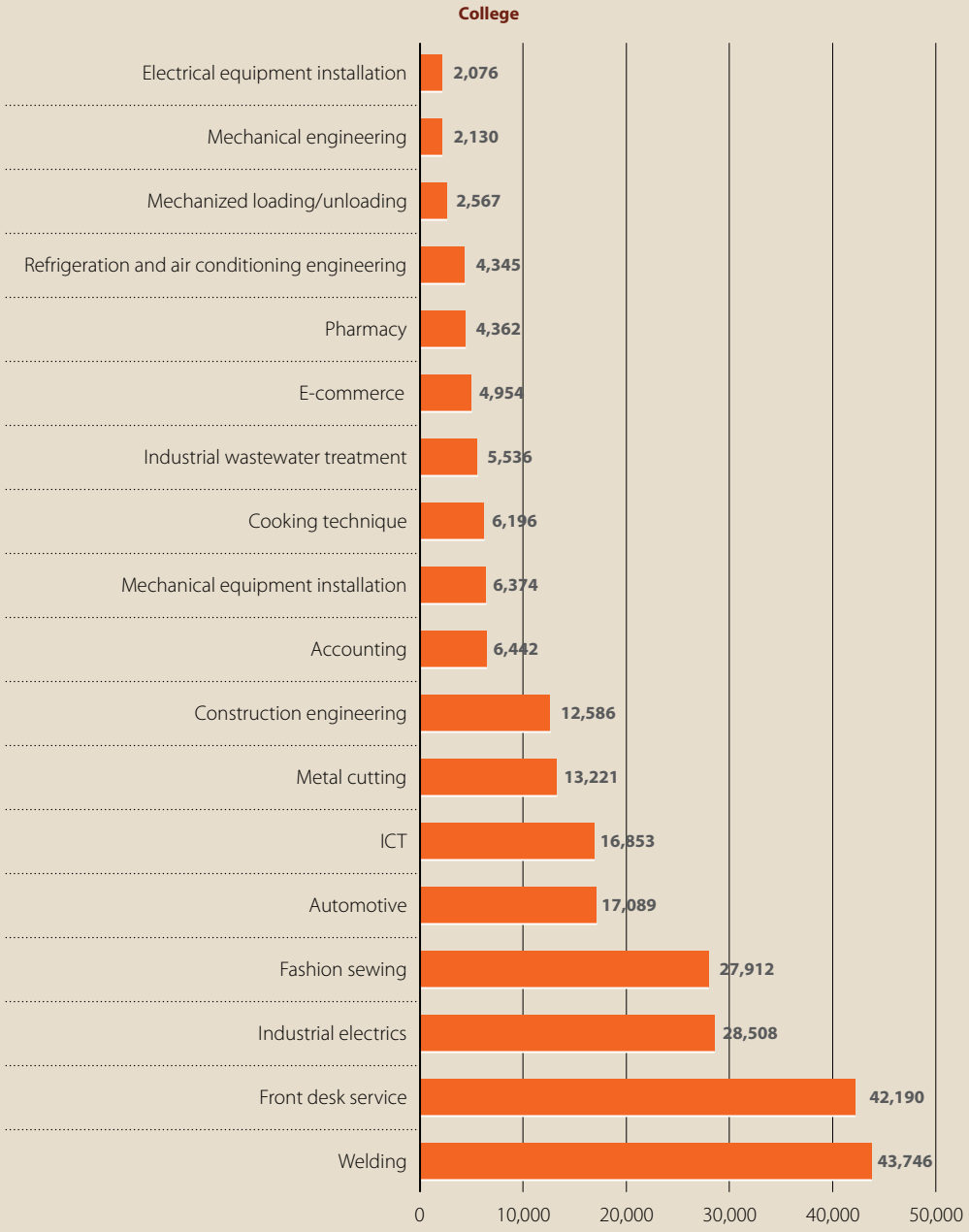
OCCUPATIONS WITH THE HIGHEST DEMAND FOR NEW HIRES BY QUALIFICATION IN 2022.



Source: Survey of training needs in TVET associated with employment to meet the labor market 2020, NIVT.

FIGURE 26B

OCCUPATIONS WITH THE HIGHEST DEMAND FOR NEW HIRES BY QUALIFICATION IN 2022.

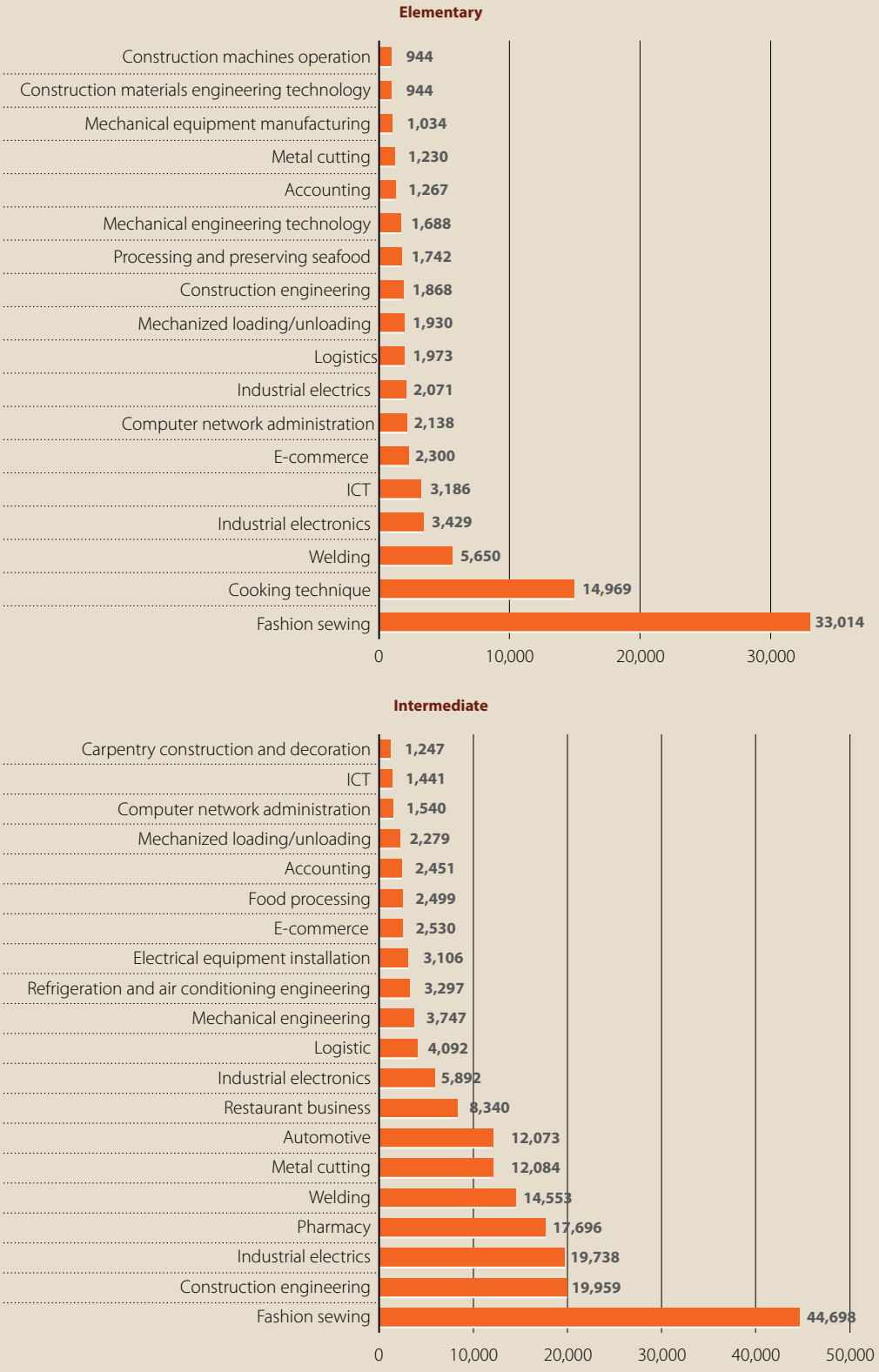


Source: Survey of training needs in TVET associated with employment to meet the labor market 2020, NIVT.

In 2023, the biggest demand for new recruits at elementary level will be for fashion sewing (33,000 people); followed by food processing techniques (12,100 people); and welding (5,700 people). At the intermediate level, the biggest demand for new recruits will be for fashion sewing (44,700 people); followed by construction engineering (20,000 people); and industrial electricity (19,700 people). At the college level, the biggest demand for new recruits will be for automotive (41,823), followed by fashion sewing (35,000 people); industrial electricity (33,300 people); and welding (22,500 people), as shown in Figure 27.

FIGURE 27A

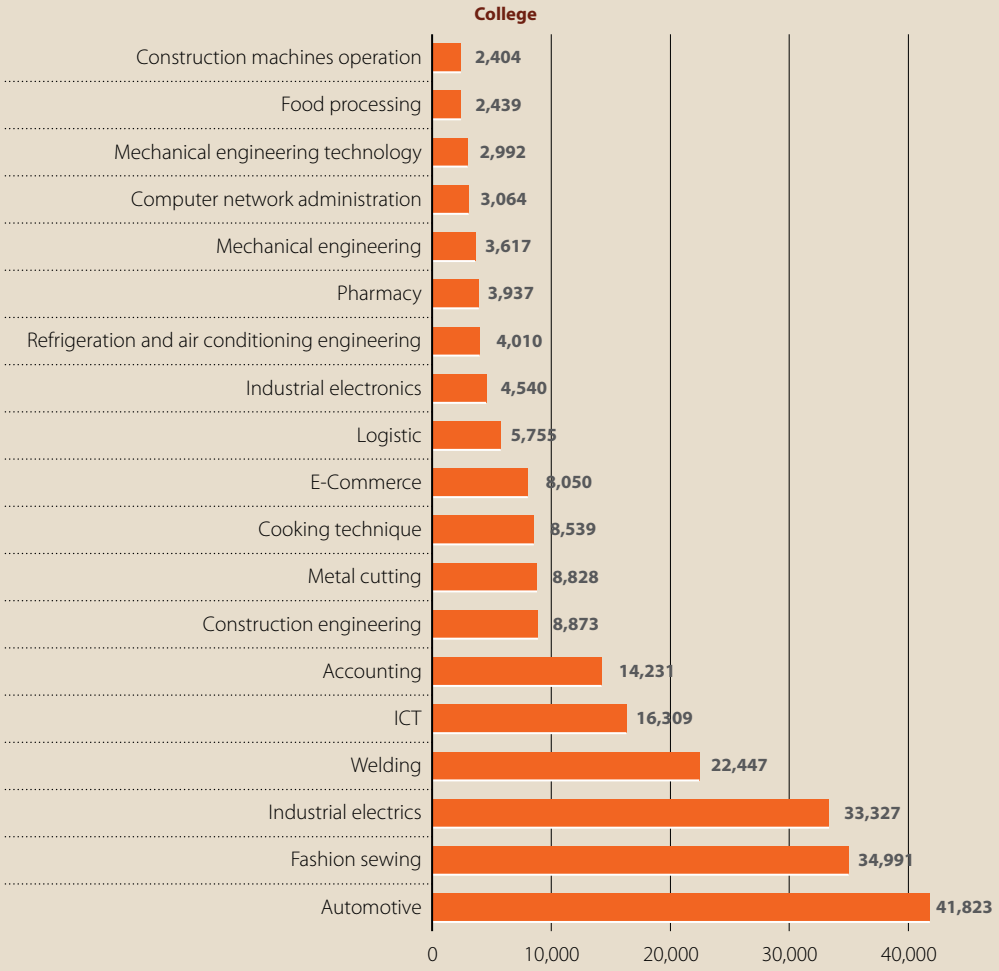
OCCUPATIONS WITH THE HIGHEST DEMAND FOR NEW HIRES BY QUALIFICATION IN 2023.



Source: Survey of training needs in TVET associated with employment to meet the labor market 2020, NIVT.

FIGURE 27B

OCCUPATIONS WITH THE HIGHEST DEMAND FOR NEW HIRES BY QUALIFICATION IN 2023.



Source: Survey of training needs in TVET associated with employment to meet the labor market 2020, NIVT.

Strategic Policy Directions for Cultivating New Talent for Future

Direction and Solutions for Vietnamese Workers' Skill Development

The 13th National Party Congress of the Vietnamese Communist Party has set out the country's development orientation for the period 2021–30, which is developing human resources, particularly high-quality human resources by improving education and training quality with a mechanism to employ, use, and treat talented people well; and promoting scientific and technological research, along with its transfer and application. This is the premise for implementing solutions to develop human resources in Vietnam.

There are wide range of policies regarding HRD in general and VET in particular:

As per "Vietnam's socioeconomic development strategy for the period of 2021–30, with a vision to 2045," Vietnam will become a developing country with modern industry, reach the middle-income level, and strive to become a high-income developed country by 2045. To achieve this goal, it is necessary to focus on developing high-quality human resources to meet the requirements of

IR4 and international integration. In addition, the following are important: renovating the VET system in an open and flexible manner; ensuring consistency with the policy of fundamental and comprehensive reform in education and training; focusing on improving the quality of human resources; restructuring labor; forming a skilled workforce; increasing national competitiveness; and closely linking training and employment.

Resolution No. 52-NQ/TW of the Central Committee on a number of guidelines and policies to actively participate in IR4 sets out goals for Vietnam's next development period. In terms of human resource development, the resolution indicates the need for "strengthening VET and supporting skills training for job change." It says, "The State has policies to support employees when participating in retraining, further training to improve their professional skills to change jobs."

On 4 February 2020, the Prime Minister issued Directive 07/CT-TTG on solutions to promote national labor productivity, which requested relevant bodies from central to local levels, within their jurisdiction, to effectively direct and carry out major reform orientations to increase labor productivity in Vietnam. In particular, the MOLISA was given the tasks of "improving policies to encourage enterprises to participate in VET activities; providing VET training programs delivery methods and assessment; linking training with enterprises, employers, and sustainable jobs; and promoting training, retraining workers, and training high-quality technical workers capable of participating in smart production and technology-based business model."

Directive No. 24/CT-TTg dated 28 May 2020 on promoting skilled workforce development to contribute to improvement of productivity and national competitiveness in the new situation was issued. The Prime Minister requested ministries, central authorities, and local governments to focus on performing the following tasks: continue to properly implement mechanisms and policies for development of vocational education and a skilled workforce; further carry out digital transformation and online training, with a focus on retraining and regularly training the workforce to bring about great changes in terms of size, quality, and efficiency of vocational education; ensure that learners acquire professional skills, digital skills, soft skills, entrepreneurship skills, languages, etc. required by the labor market; and strive to reach the vocational education level of ASEAN-4 countries by 2030 and of G20 countries by 2045. It also focused on increasing communication activities to change social consensus and mindset about development of vocational education and the position and role of the skilled workforce. The aim was to mobilize participation and resources from the whole of society, especially enterprises' cooperation in developing a skilled workforce for Vietnam's development.

Direction of Vietnam's VET Development Strategy

The Vietnam Government, particularly the Ministry of Labor, Invalids, and Social Affairs, has assigned the Directorate of Vocational Education and Training to organize the development of a VET strategy for the 2021–30 period, with vision for 2045 [5]. Up till now, the basic features of the strategy have been shaped to submit to the government.

VET Development Perspectives

The key perspectives are listed below:

VET development is one of the most important tasks for the country's socioeconomic development in order to take advantage of the golden population structure, contributing to improve the quality of human resources, labor productivity, quality, efficiency, and the economy's competitiveness. It

is about adapting to the rapid changes in the labor market and meeting the requirements of the industrial revolution and international integration.

There is a need to focus on VET training scale, structure, and quality, while selectively absorbing international experience on VET institution models and training in key occupations/fields.

It is important to develop VET to meet the labor market's needs in association with decent work, social security, and sustainable and inclusive development; maximize learners' capacity; and promote entrepreneurship and innovation. For improving professional skills and quality of Vietnamese workers in a period of global integration, there is a need to gradually popularize VET among young people.

Budgetary allocation for VET should be made a priority in the state's budget as well as in programs and projects of branches and localities. Strengthening the socialization of VET in suitable areas, industries, and occupations is equally important.

Vocational education development is the responsibility of all levels of the government, as well as of agencies, organizations, enterprises, VET institutions, and the people. VET should be given focus in the development plans, programs, schemes, and projects of sectors and localities.

Specific Goals

Up to 2025

The goal is to meet the demand for skilled human resources for the economy with modern industry. The training quality of some VET institutions is close to the level of ASEAN-4 countries. A number of occupations have caught up with the levels of developed countries in the region and the world, thus contributing to 30% increase in the number of trained workers with degrees and certificates.

Some of the key indicators include

- attracting 40–45% of junior-high and high-school graduates into the VET system; with female students achieving over 30% of the total new enrollment target;
- providing retraining and continuing training for about 25% of the workforce;
- the percentage of VET trained employees from ethnic minorities reaching 45%;
- the percentage of employees who are disabled and have the ability to work with vocational training reaching 35%;
- the rate of workers with information technology skills reaching 80%;
- at least 30% of VET institutions and 50% of training programs for key occupations meeting quality accreditation standards;
- having 100% qualified teachers;
- having around 80% of managers trained and fostered to improve management and governance skills in the digital era;

- developing and updating learning outcomes for about 80% of training occupations based on the VQF;

- having 70 high-quality VET institutions, of which three institutions perform the function of national centers for high-quality VET training and practice, 10 institutions perform the function of regional centers for VET training and practice, 40 institutions approach the training process level of ASEAN-4 countries, three schools approach the level of developed countries in the G20 group, and 5–10 occupations and fields have outstanding competitiveness in ASEAN-4.

Up to 2030

The goal is to focus on improving the quality and effectiveness of VET to meet the needs of skilled human resources for the economy with modern industry; actively participating in the international human resource training market; some VET institutions catching up with the level of ASEAN-4 countries, with some occupations approaching the level of developed countries in the G20 group; and contributing to increase in the rate of trained workers with degrees and certificates to 35–40%.

Some key indicators include,

- attracting 50–55% of junior-high and high-school graduates into the VET system, with female students achieving over 40% of the total new enrollment target;

- providing retraining and continuing training for about 50% of the workforce;

- the percentage of VET trained employees from ethnic minorities reaching 50%;

- the percentage of employees who are disabled and have the ability to work with vocational training reaching 40%;

- the rate of workers with information technology skills reaching 90%;

- at least 70% of VET institutions and 100% of training programs for key occupations meeting quality accreditation standards;

- having 100% qualified teachers;

- having around 90% of managers trained and fostered to improve management and governance skills in the digital era;

- developing and updating learning outcomes for about 90% of training occupations based on the VQF;

- having 90 high-quality VET institutions, of which six institutions perform the function of national centers for high-quality VET training and practice, 20 institutions perform the function of regional centers for VET training and practice, 40 institutions are equivalent to the level of ASEAN-4 countries, 10 institutions are equivalent to the level of developed countries in the G20 group, and 15–20 occupations and fields have outstanding competitiveness in the region and the world.

Vision for 2045

The vision is to promote VET to meet the needs of highly skilled human resources of a developed country; become the leading developing country in VET in the ASEAN region, catching up with the advanced level VET; and have outstanding competitiveness in a number of training fields and occupations.

Program to Support Development of Vietnam's Labor Market up to 2030

The Prime Minister issued Decision No. 176/QD-TTg dated 5 February 2021 on promulgating the program to support labor market development up to 2030 in order to concretize the views, guidelines, and policies of the Party and the state in developing the labor market, contributing to ensure social security, and promoting socioeconomic development.

Perspectives on Labor Market Development

The key labor market development perspectives include

- developing a comprehensive and sustainable labor market in a modern and effective direction, in line with the characteristics of each region and locality;
- the state playing the role of creating and supporting the development of the labor market by completing and improving the effectiveness and efficiency of mechanisms, policies, and legal documents on labor market development;
- promoting reforms in administrative procedures to limit risks related to workers' rights in the context of IR4; and
- actively integrating into the world and promoting the connection between domestic labor supply and demand in association with the international labor market.

Specific Goals

The specific goals can be listed under five broad categories:

(1) **Increasing the number of skilled workers to meet the labor market demand:** To meet this goal, it is envisaged that

- the rate of trained workers with degrees and certificates reaches 30% by 2025 and 35–40% by 2030;
- the 'index worker' with specialized knowledge in global innovation and GII belongs to the top 60 countries by 2025 and the top 55 countries by 2030; and
- the percentage of workers with information technology skills reaches 80% by 2025 and 90% by 2030.

(2) **Creating better jobs for workers:** Toward this goal, it will be important to maintain

- the general unemployment rate at a level below 3% and the unemployment rate in urban areas below 4%;

- the proportion of laborers working in agriculture to be less than 30% by 2025 and less than 20% by 2030; and

- the annual growth rate of labor productivity to be a minimum of 6.5% per year.

(3) **Reducing the proportion of youth not in employment, education or training (NEET):** To meet this goal, Vietnam will need to

- reduce the proportion of NEET to less than 8%; and

- maintain the urban youth unemployment rate at a level below 7%, and the rural youth underemployment rate below 6%.

(4) Ensuring a safe working environment for employees: The proportion of workers participating in social insurance will reach 45% by 2025 and 60% by 2030, of which farmers and informal sector workers who participate in voluntary social insurance will account for about 2.5% of the workforce by 2025 and about 5% of the workforce by 2030.

(5) Developing a modern, synchronous, unified, and interconnected national labor market information system: Specifically, the aim should be that

- by 2025, 80% and by 2030, over 90% of high school students and graduates receive career guidance;

- by 2025, 40% and by 2030, 45% of employees are consulted by the system of Employment Service Centers for job placement; and

- by 2025, setting up of technical infrastructure, application software, data connection, sharing, and integration systems is completed, and the national database on labor force is transformed and standardized.

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CONCLUSION:

PROSPECTS OF LABOR MARKET POLICIES AND RECOMMENDATIONS

Lessons from Member Countries

The impact of technological changes on work is real. Although it will take a long time to replace labor, in the long run, job opportunities in all walks of life will be greatly affected, including many white-collar careers, such as lawyers, accountants, and programmers, which were once seen as guaranteed routes to at least a middle-class living. These shifts in demand indicate that some skills are either obsolete or need to be restructured. At the same time, we can also observe that the demand for soft skills, such as good English proficiency, analytical skills, people skills, communication skills, digital skills, and resilience, is rising across member countries. Governments in these countries are preparing their citizens for this demand shift, either actively (by equipping them with the capabilities demanded by the market), or passively (by maintaining their livelihoods with safety nets). After reviewing the labor market policies, including surveys or in-depth interviews with stakeholders, or secondary statistical data from member countries, experts have indicated that skill levels have been improved through educational or vocational training systems over the past decade. However, with the growth of the market, either international or domestic, employers in all member countries have more or less noted insufficiency of skills when recruiting workers. Industrial Revolution 4.0 (IR4) is mentioned by almost all the experts as a catalyst for shifts in skill demands in their countries. Lessons from member countries (in alphabetical order) are discussed in this chapter.

Cambodia

Aiming at improving the quality of labor forces, the Cambodian government has put in more efforts, especially in its current mandate, to improve the education and skill levels of labor forces by setting out several national and sectoral policies. From the demand side too, there has been a structural shift in demand from agriculture to manufacturing and services. It was the case even during the pandemic period of 2020–21. For instance, in the current labor market, employment has shifted from less productive to more productive sectors and to better-skilled and higher-paid occupations. Given that, technical and vocational education and training (TVET) needs a strong and modern system to supply labor forces as demanded by the market.

Currently, the TVET system in Cambodia is under the management of the Directorate General of TVET (DGTVET) with supervision and direction from the National Training Board (NTB). The number of TVET graduates, especially in priority fields like electronics, electricals, mechanics, IT, and business, have increased in recent years. To create an enabling environment, the DGTVET, under the Ministry of Labour and Vocational Training, launched a distance learning program and an e-learning platform to assist learning and teaching during and after the pandemic. These initiatives are expected to contribute toward increasing both the quantity and quality of TVET graduates.

Review of National Labor Training and Reskilling Strategies

The Cambodian government has set out several policies to improve the quality of education in Cambodia. There is also a clear vision and commitment to improving the quality of the labor force. Also, the labor forces with upper-secondary and post-secondary education have seen improvement over time. However, there is still a gap to fill as the majority of the country's labor force still have a low education level (most of them have only primary school education or below), and the government continues to improve the education level of the labor force. Human resource development is one of the priority fields in the Rectangular Strategy Phase IV while the Ministry of Education Youth and Sports is working to improve the quality of education by focusing on (1) improving teachers' qualifications with concrete incentives; (2) expanding the scope of schools by investing in building schools at the village level; (3) strengthening comprehensive inspections to ensure the quality of education; (4) promoting technical education in upper secondary schools; (5) providing skills education for the job market; and (6) developing comprehensive curricula and textbooks.

TVET is an important element of education in Cambodia. The Royal Government of Cambodia (RGC) has made education and training a priority, especially in the current mandate, by focusing on human resource development, including the improvement of the TVET system. This is to meet the demands of the labor market in order to contribute to poverty alleviation and improvement of livelihoods of Cambodia's people as well as to sustain economic development. The findings are summarized below.

Skill Shortages and Skill Gaps

Educational attainment has been improving over time across all levels in Cambodia. In spite of the achievement, training quality still presents a challenge, given that technical skills are not yet fully responsive to the current and future demands of the labor market. Based on Cambodian employers' perceptions, skill shortages and skill gaps remain. The hard-to-fill vacancies can be due to the quality or number of vacancies, or both, while skill shortages can be due to lack of skills, qualifications, and experience. This reflects that Cambodia needs to reskill or upskill its current labor force and produce a more skilled labor force for the labor market.

Increased Prominence of Soft Skills

Soft skills are regularly regarded as the main concern by the Cambodian employers. It is a key demand of the current labor market. In the current workforce, both general-education and TVET graduates are lacking these skills. There was not much improvement in 2021, with most of the employers in both ICT and non-ICT firms claiming that communication, language, digital, leadership, and management skills were among the top skill shortages among their current labor forces.

Reoriented Focus on Competency-based Learning

The skills gap is expected to reduce due to high commitments from the Cambodian government. The NTB has approved competency-based learning materials for soft skills and numeracy skills from CQF levels 1 to 4 to be applied to all training institutions nationwide. These materials have already been uploaded to the e-learning platform of DGTVET for all schools to access and apply. The six modules in each CQF level aim at addressing the skill problems facing the labor market such as communication, problem-solving, leadership and management, teamwork, and numeracy.

Labor Market Transition Opportunities

The Industrial Revolution 4.0 (IR4) is a catalyst and driver for the growth of small- and medium-sized enterprises that are the mainstay for job creation and income generation in Cambodia.

Cambodia faces relatively more challenges in adopting new technologies compared with the more advanced countries due to its businesses and human resources having relatively limited capacity. The capacity of the country to use new technology is limited. The level of ICT infrastructure as well as the percentage of its population that can access the internet is relatively low. The adjusted years of schooling for Cambodia were only 6.8 while neighboring countries like Vietnam and Thailand had 12.7 and 15.0, respectively, in 2020. What is more, the majority of its labor force are not in high-skill employments.

Opportunities

The opportunity for Cambodia lies in catching up with more advanced countries in the region during and after the COVID-19 crisis. In the last two years, Cambodia has increased the use of mobile apps for e-commerce and e-learning. Also, this crisis provided opportunities for Cambodia's businesses in agro-tech, mobile, and fintech to learn and adopt new skills and technologies. There is also a positive development trend for distance learning in Cambodia that has allowed students and teachers to use new technologies during and after COVID-19. It is also an opportunity for trainers to use digital technology platforms to produce online training content in order to share with students and teach them. This new TVET training enabling environment provides a wider opportunity for skills development, including upskilling and reskilling of Cambodian workforces.

Employment Transition

The employment share of agriculture has gradually decreased from 57.4% in 2004 to only 35.5% in 2019 while the employment shares of both service and industrial sectors have increased. The agricultural sector, however, was an important source of employment in Cambodia during the years 2020 and 2021 because this sector is understood to have absorbed employees who temporarily lost their jobs in the service and industrial sector in the wake of the COVID-19 pandemic. For the industrial sector, the share of employment had rapidly increased between 2014 and 2019, likely due to the speed of economic and industrial transformation in the country.

Status of Employment

The employment status of workers in Cambodia has gradually changed from own-account workers, self-employed, and unpaid family workers to that of paid employees. In 2009, paid employment accounted for only around 27% of the labor force while vulnerable employments accounted for around 73%. Based on the available data before COVID-19, in 2017, the share of paid employments had gone up to 51% while that of vulnerable employments had come down to 49%.

Occupational Transition

In terms of skills demand, the trend has changed in Cambodia. While growth in employment took place in the industrial and services sectors, there was a declining trend in the agricultural sector. This reflects that the current labor market is gradually demanding more medium- and high-skilled workers. Occupations such as plant-and-machine operators and assemblers, and clerical support workers grew more than double while occupations in skilled agriculture, forestry, and fishery decreased by around 25% during the same period. This shifting trend may reflect that more formal technical vocational training is required to equip those who move from one occupation to another, especially to occupations that require high skills.

Sectoral Transition

The structural shift in employment away from agriculture, along with the internal rural-to-urban migration trend, has resulted in services and manufacturing sectors absorbing many low-skilled

workers. Two main subsectors in which employment has significantly increased are garments and construction. Employment shares of other emerging manufacturing subsectors have also increased, thanks to the government's efforts to set various policies to diversify its industries and export both products and destinations. With the three recently signed free trade agreements (FTAs), namely, Regional Comprehensive Economic Partnership (RCEP), Cambodia–China FTA, and Cambodia–Korea FTA, employments in new emerging sectors, especially in non-garment manufacturing, digital, and ICT, are expected to increase. This means that TVET needs to play a more effective role in building medium-skilled and skilled labor forces for responding to the demands of the labor market. Some labor forces that may shift away from agriculture and are unable to find jobs in other sectors may end up in either formal or informal employment in industry and services sectors such as trade, and hotel and restaurant.

Strategic Policy Directions for Cultivating New Talent for Future

National TVET Policy 2017–25

In line with the aforementioned policies, the National Technical Vocational Education and Training Policy (TVET) 2017–25 set out the framework to develop a strategy in TVET for labor forces with better response to the demands of current and future labor markets. This policy also contributes to industrial diversification and creation of decent jobs while ensuring high quality and productivity of labor forces to better compete with other competitive countries in the regions and beyond. The National TVET policy lays out four goals that include: (1) improving the quality of TVET to meet national and international standards; (2) increasing access to TVET for job creation; (3) promoting public–private partnership and engaging with relevant stakeholders for a sustainable TVET system; and (4) improving the governance of TVET.

TVET Strategic Action Plan 2019–23

Building upon the above-mentioned national policies, and the achievements of the previous TVET strategic plan 2014–18, DGTVET under the MLVT set up the TVET Strategic Action Plan 2019–23, aimed at addressing the labor market demands by setting out five main goals. Last, but not least, in 2020, the government adopted the Cambodia Digital Economy and Society Policy Framework 2021–35. These were aimed at building a vibrant digital economy and society by laying the foundations to promote digital adoption and transformation among all social actors including the state, citizens, and businesses, to accelerate new economic growth and promote social welfare in the new normal. One of the policy directions is to "build digital citizens" by focusing on promoting digital skills training and providing guidance on digital skills and careers (by leaders) to catch up with the development of digital technology usage in current and future labor markets.

Fiji

The challenges of the Fiji labor market of the twenty-first century are rooted in the legacy of the colonial economic structure and human resource development. International economic demands have impacted Fiji's economy to expose its skill shortages and mismatches, especially among the youth; and have led to an enlarged informal sector. Skill mismatches include soft skills at workplaces. A critical response to human resource development, led by efforts to expand and extend TVET education, appears to be the only strategic way forward to ensure economic growth and productivity. While labor migration to Australia and New Zealand contributes to addressing increasing unemployment, it appears insufficient to ensure economic development (the increasing volume of remittance notwithstanding). Investments in technologies for green jobs will have impact on the labor market with demands for new skills. A recent assessment of 'green

employment in Fiji' provides indications for employment creation in different sectors of the economy. This is underscored by demonstrable efforts by industry employers from all sectors to introduce climate friendly and energy-saving technologies. The enduring question will continue to be the availability of requisite skills and training from educational institutions to meet the new labor market demands.

Fiji's economy remains susceptible to adverse outcomes determined by multiple factors. These include its geography and environment, international commodity prices, changes/crisis in advanced economies, and international trade agreements and internal issue of indigenous land ownership with implications for land use. A post-independence diversification of the economy, especially with tourism and manufacturing, has broadened the country's economic base. It is nevertheless impacted by perennially unmet labor demands due to skill shortages and mismatches between education and industry needs, along with limited productivity. Agriculture remains significant in the country's economy and society, and its share of total national employment is over 40%. More recently, the exports sector has expanded to include fish, garments, and niche products.

Of relevance to Fiji's development strategies, with implications for a fragile labor market, are (1) the existential threat of climate change and the required skills to complement and sustain new adaptation/mitigation-related technologies for the economy; (2) the deficit of skills partly due to an enduring migration and demonstrable skill mismatch between the education and the industry; and (3) the 'youth bulge' with limited skills. The policy challenge for economic growth and development is skilling/reskilling, especially of youth, to complement a changing labor market with demands and skills generated by new technologies and opportunities for innovation and entrepreneurship.

Review of National Labor Training and Reskilling Strategies

Efforts to reset TVET education were revitalized with a government policy paper on 'Technical, Vocational, Enterprise Education and Training' in 2007. This was meant to provide standards for the many TVET providers and a clear, manageable, and quality-assured structure for the effective delivery of TVET programs through schools, private institutions, non-formal training providers, relevant ministries, and tertiary institutions. The renewed strategy required the many TVET providers to administer programs that met established criteria. These were:

- meeting national standards of accreditation;
- allowing learners to achieve optimal holistic education and training outcomes;
- addressing community needs, resource utilization, labor market, and business needs;
- promoting lifelong learning; and addressing issues such as those pertaining to equity, inclusion, access, gender, and people with disabilities.

The critical challenge for TVET education at this stage included an effective coordinating authority for policy, planning, management, implementation , assessment, and supervision. This underpinned the establishment of the Fiji High Education Commission (FHEC) with a mandate to provide quality assurance in the post-secondary school education training sector, including TVET delivery, and to develop the Fiji Qualification Framework (FQF). To promote a new attitude, a name change was introduced in 2013, and TVET became Technology Employment Skills Training (TEST). Other strategies included the mainstreaming of TVET subjects within the secondary school

curriculum to enhance their availability and reduce the stigma attached to them. The establishment of the Fiji National University in 2009, described as entailing 'the most significant TVET reform in Fiji' was a demonstrable government objective to enhance the stature and visibility of TVET education. With its five colleges and as a dual sector with over 30,000 students, it provided a pathway from TVET to higher degree programs with university accreditation.

Critical support from development partners, especially Australia, has contributed to enabling an effective TVET training in Fiji (and the regional South Pacific). The National Employment Policy, 2018 endorsed the revitalization of TVET education with a suggestion for more effective alignment between education and training providers and employers. The policy also recognized the need for skill training to take advantage of the new technologies that will drive climate-change-induced green economy and green jobs as the country seeks to enhance sustainable development through its key sectors.

Labor Market Transition Opportunities

Tourism has emerged over the past two decades to become the dominant sector and the economic lifeline of Fiji, thanks to the determined, enterprising, and proactive attitude of the industry stakeholders as they engage with the government to explore relevant concessions in the face of multiple challenges. Interviews with hotels' managements show there is a keen interest in digitizing relevant aspects of the sector, especially in areas of accommodation and human resources to enhance efficiency, though aspects of traditional booking systems still exist. COVID-19-related effects were primarily in readjustment of employments and jobs for many. The recent easing of COVID-19 restrictions on travel, together with a regime of preventive strategies, has seen a bouncing back of the industry.

Other areas of industry-related investments include the revamping of the international airport and acquisitions of additional and new aircrafts. Recent investments in fuel-efficient fleets were aimed at expanding the fleet size and enhancing passenger/visitor numbers by around 27% or 1.7 million, over a five-year period. This appears to have been successful with positive implications for the labor market. The accommodation sector has been resilient in the face of significant reductions in passenger bookings but with the optimism of a bounce back. In response to the challenges of climate change, hotels and resorts with high energy costs are adopting climate friendly strategies with measures such as installation of solar panels and recycling. The domino effect of tourism provides a combination of direct and indirect employment to over 140,000 people with added contribution to, and higher share of GDP. These also include employment creation in rural and outer-island areas where resorts linked with villages provide employment and livelihood for locals.

The manufacturing industry has also remained resilient and retained workers. Significantly, and in response to climate-change challenges, there is evidence of a restructuring of the industry accompanied by reskilling of workers and decent jobs. The three manufacturing facilities that were visited had all taken to new technologies accompanied by retraining. A resurgence in the garments industry has also contributed to the provision of employment.

Strategic Policy Directions for Cultivating New Talent for Future

Through its dialogs and consultations, the National Employment Policy (NEP) has provided 10 policy areas, which, as noted, 'will change as new variables intervene in the labor market.' Thus, the NEP will be reviewed on a periodic basis to ensure its relevance and applicability to address Fiji's real labor market needs. The 10 policy priorities are to:

- create more opportunities for the young people aged 15–24 years to follow clear pathways from education to productive employment;
- promote private investments to create jobs;
- boost action on a just transition of the workforce as well as creation of decent work and quality jobs in the context of climate change by identifying and promoting green jobs and new green skillsets;
- promote self-employment in the formal economy;
- promote access to overseas employment opportunities;
- create more income-generating opportunities for those reliant on subsistence activities for their livelihood;
- promote greater gender equality in employment and working conditions;
- make it easier for disabled persons and the elderly to earn;
- eliminate child labor and social injustice in workplaces; and
- strengthen good-faith employment relations and promote safe and productivity driven workplaces.

India

India is currently facing a shortage of technological skills in spite of being favored with a demographic dividend. This is primarily because the institutions responsible for skilling the population seem to be inefficient in catering to skill-related demands of the industry. Second, a sizeable percentage of India's working population is engaged in the economy as a casual or informal labor force, which mainly remains outside the ambit of the formal education-and-training system. Third, majority of the policies deployed are more focused on imparting basic formal education instead of focusing on the skill development of the present and future labor forces.

India's problem is more of a quantitative rather than qualitative skill gap between what is needed and what is available. Thus, it is imperative that requisite and adequate skilling of the labor force should be done at a faster rate than the current rate of economic growth, providing equal and sustainable opportunities of livelihoods to all sections of the society in an era of technological revolution. Also, changing technologies and shifting globalization patterns are bringing manufacturing-led development strategies into question. Technologies such as internet of things (IoT), advanced robotics and three-dimensional (3D) printing are causing production facilities to be shifted to economically attractive locations, thereby threatening significant disruptions in employment, particularly for low-skilled workers.

Review of National Labor Training and Reskilling Strategies

India's most pressing labor market challenge going forward will be to generate a large number of good jobs. These jobs tend to be formal-sector jobs. Two obstacles to job creation in the formal

sector are regulation-induced taxes on formal workers and spatial mismatch between workers and jobs. Encouragingly, to deal with these obstacles, firms and workers are finding solutions that are even more varied than the obstacles themselves, as we have described in this chapter. Meeting the challenges ahead will require more of such ingenuity, and the private sector, state governments, and the central government will all have important roles to play.

Measures to shore up labor demand were essential in the early phases of this crisis and the speed of their application demonstrated their use in fighting immediate and acute demand shocks. As the recovery proceeds, training programs that are responsive to business needs are essential so that displaced workers can be easily reintegrated into the labor market. Particular attention should be given to more vulnerable workers, such as the young and low skilled, so that programs can address specific needs and provide opportunities that enable an inclusive and widely shared recovery.

Governments have provided rapid and substantial responses to this crisis thus far with far reaching policy changes to cope up with the significant challenges to their labor markets. As support to jobs via job retention schemes is gradually wound down and more permanent structural demand shifts become evident, the challenge will be to ensure that the policies they have currently implemented are sufficient. This encompasses both the coverage of the individuals they reach and the extent to which investment in reskilling matches the labor market needs. The latter will require good tools to identify the skills in demand and strong dialogs with the social partners and businesses now as well as in future. Moreover, the effectiveness of new and adapted measures will also depend on their successful implementation.

Labor Market Transition Opportunities

With automation and technological adoption comes the risk of exacerbating income inequality in a number of ways. On one hand, changing skill demands in the labor market driven by technological adoption will require individuals to invest in upskilling and reskilling. Individuals who are better able to quickly adapt to these changes and make private investments are already on the right side of income distribution. Not only will reskilling and upskilling be crucial, but basic digital skills will also be essential for individuals to adapt to changing demands. In the Indian context, the gender divide is also a concern when it comes to internet usage and digital literacy, with 70% of internet users in India being males. This presents a risk of greater inequality of opportunities and outcomes, including wages for India's women, as digital literacy becomes increasingly important for accessing job opportunities and employability.

At the same time, however, high-skilled workers' wages increase at a faster pace than those of low-skilled workers. This is evident in India's manufacturing sector, where the wages of production workers declined as a share of total wages, from 58% to 49% between 2000 and 2012, while the wage share of supervisors and managers increased from 26% to 36% during the same period.

The relatively faster growth of capital-intensive industries in recent decades will likely lead to greater concentrations of income among owners of equipment, machines, firms, and technologies, rather than among workers. This is already occurring in India's manufacturing sector, where the share of gross value addition (GVA) paid in wages to workers decreased from 22.2% to 14.3% between 2000–01 and 2011–12.

Technological adoption and digitization also present an opportunity to reduce inequalities by bringing new workers into the workforce; increasing wages; and replacing jobs that are hazardous

and where employers fail to provide for the workers' welfare. India must find ways of leveraging this opportunity, while managing the real risks of increasing inequality.

However, if substitution of labor for the sake of replacement picks up momentum, the effects can be catastrophic. The failure of these technologies to bring about substantial increases in productivity will result in technological unemployment of an unprecedented scale.

It has been argued that automobile manufacturers have 'learnt' from the foregoing events (such as strikes) and increased automation in their plants. The period revolving these strikes witnessed a 27% increase in the purchase of industrial robots by the automobile industry. COVID-19 has shown the relative elasticity of labor supply like never seen before and will surely add weight to this. Perverse incentives and socially undesirable impetuses must be kept under check.

The new-age digital skills include emerging technologies such as big data analytics, artificial intelligence (AI), machine learning (ML), automation, cloud computing, cyber security, IoT, robotics, and telemedicine. There is a severe shortage of such skills, given that the demand during the recent years in particular has been exponential, but the supply has been moderate. Technology service providers have witnessed around 30% growth in digital deals, 80% jump in cloud spending, and 15% rise in customer experience spending since the coronavirus outbreak.

The number of workers in India requiring digital skills will need to increase nine times by 2025. The average worker will need to develop seven new digital skills by 2025 to keep pace with technological advancements and the corresponding demand, according to a recent report commissioned by Amazon Web Services (AWS). This will amount to a total of 3.9 billion digital skill trainings from 2020 to 2025. At present, digitally skilled workers represent only 12% of India's workforce.

The impact of automation in India will also vary substantially between sectors, occupations, and geographies. In manufacturing, for example, evidence points to a decreasing demand for middle-skilled workers and increasing demand for low- and high-skilled workers. In the services sector, low-skilled and manual tasks are at the greatest risk of automation.

Through some of the recent studies, three major findings offer significant reasons for optimism. First, a new research suggests that automation is more likely to replace tasks and activities within an occupation rather than completely eliminate jobs. Second, greater demand due to rising incomes is likely to offset job displacement due to automation, which is particularly the case in developing Asian market including India, as per Asian Development Bank (ADB). Third, technology adoption will not be economically feasible at all levels, and therefore, displacement due to automation will not be immediate or as widespread as previously predicted.

Firms in India exist on a spectrum from very low-tech to those leading in innovation and technology. Technological changes and digitization will affect low-tech and high-tech firms differently. The pace of digital change and technological adoption varies vastly across firms and, consequently, so does the risk of job displacement or the opportunity for job creation. Skill requirements too vary between firms with dissimilar levels of technological adoption.

A recent study has found that new jobs are majorly concentrated in the non-routine and cognitive categories requiring higher-order cognitive and soft skills that are less susceptible to automation. A study by PriceWaterhouseCoopers (PWC) shows that emerging technologies support additional

jobs that are more difficult to automate, primarily in the services sector. ADB finds that the demand for jobs that require a non-routine cognitive task is growing faster than the demand for jobs requiring routine and manual tasks. Analyses of four economies in developing Asia show that over the past decade, employment in jobs intensive in non-routine cognitive tasks expanded 2.6 times faster than the total employment. Examples of non-routine cognitive jobs include those of researchers and managers. Routine manual tasks, such as assembly line workers, and routine cognitive tasks, such as data collection, are more likely to be displaced by automation than the non-routine cognitive ones.

Recent reports have attempted to estimate the potential impact of automation on jobs in India. A 2017 McKinsey report, for example, explores how automation will impact employment by analyzing the feasibility of automating individual activities and capabilities within occupations. The report finds that 52% of Indian jobs can be automated using proven technologies. A second report finds that enough new jobs will be created to offset those displaced by automation and to accommodate a growing labor force. Instead of mass job displacement driven by technological adoption, there will likely be a simultaneous process of job creation in different sectors and occupations, leading to a shift of workers instead of a net displacement. The kinds of occupations projected to see significant increases in employment in India include construction workers; jobs in unpredictable environments, such as machinists and cooks; jobs requiring customer interaction; and care providers.

Strategic Policy Directions for Cultivating New Talent for Future

The Indian government has recognized the need to impart skills to place them in a better position in the ruthless market. Ministry of Skill Development and Entrepreneurship has launched various schemes toward this end. Pradhan Mantri Kaushal Vikas Yojana (PMKVY), a flagship scheme of the government, aims at skilling the youth in industry-demanded skills. 'Skills Acquisition and Knowledge Awareness for Livelihood Promotion' also has similar aspirations. Projects in the past have indicated that attempts at scaling up skilling of the workforce have not met with increase in labor demand or job creation as expected. These, and other efforts by the government, though well-intentioned, may not be the steps in the right direction. A key requirement for workers in the coming years would be their ability to undertake cognitive tasks. Though routine tasks in general get automated, routine manual tasks are usually affected worse than their cognitive counterparts.

IR Iran

Review of National Labor Training and Reskilling Strategies

University Graduate Internship Plan

By the end of 2020, 39,283 employers of economic enterprises had registered their desire to participate in the internship system and enjoy its benefits, including the internship system. It is worth mentioning that the number of contracts concluded for the admission of interns by the mentioned workshops reached 50,501 contracts by the end of 2020. Some of the most important challenges facing the implementation of the graduate internship program are:

(1) Temporary closure and stagnation in the activities of many economic enterprises in the country due to the outbreak of coronavirus disease has weakened the financial strength of economic enterprises and their ability of developing or even maintaining the existing activities.

(2) Not considering the associate degree to enjoy the benefits of the plan, even though employers welcome graduates with associate degrees, the opportunities for internship training, and consequently, for employment for this group have been limited.

(3) Studies performed on the results of the pilot implementation of the project in previous years indicate that after the end of the probationary period, at least 21% of the interns were employed in the same firm of the internship and entry into the labor market for other interns' skills upgrades were facilitated in the same field.

Employer Insurance Exemption

The implementation of the Employer Insurance Exemption Plan resulted in 7,383 firms benefiting from government insurance support, which ultimately created new job opportunities for 18,180 university graduates by the end of 2020. The creation of this number of jobs had created a cost of 2,672 billion rials for the government by the end of 2020.

The per capita job creation cost in this plan is 147 million rials, which is much lower than the per capita cost of job creation in the sectors of agriculture, industry, and services. In this regard, the implementation of the employment-creating plan of employer insurance exemption is very cost-effective for the government. In addition, the maximum two-year support period for the employer provides a relatively good opportunity for the recruited workforce to accumulate sufficient knowledge, experience, and skills in doing the work and be profitable for the employer.

Skills Plan in the Real Work Environment

The Organization of Technical and Vocational Education of IR Iran, in terms of its mission, structure, and goals, has the highest compliance with the provisions of the plan and has been primarily responsible for the implementation of the plan in recent years. Other agencies such as the Ministry of Cooperatives, Labour and Social Welfare and Social Security, have had the necessary cooperation in the implementation of this project. The main objectives of the plan are: (1) familiarity of young job seekers with the business environment, gaining experience and preparation, and building self-confidence in skills to enter the field of employment and entrepreneurship; (2) preservation and sustainability of traditional and indigenous jobs; (3) assisting active enterprises in identifying and attracting talented and capable workforce; and (4) reducing the costs of attracting and employing unskilled workers and using the capacity and ability of practical training of economic enterprises.

The Wage Subsidy Payment

Of the 23,340 contracts, 62% are for male job seekers and 38% are for female job seekers. With the implementation of the wage subsidy scheme, male job seekers have been attracted more than female job seekers to the participating enterprises. The significant difference between the percentages is debatable from a policy point of view because women make up more than half of our country's population, and if their enormous capacity is not used in economic activities, the country will undoubtedly face difficulties in economic development and growth. A study of countries that have moved to higher levels of economic development shows that the presence of a trained and well-educated workforce, especially women, as one of the components and pillars of human capital, has been effective in the transition of such countries.

Labor Market Transition Opportunities

The Fourth Industrial Revolution is creating demand for millions of new jobs, with vast new opportunities for fulfilling people's potential and aspirations. The current situation in the Iranian economy is based on the intensification of economic sanctions against the country and the need to implement the general policies of the resistance economy by increasing support for domestic production and efforts to provide appropriate production infrastructure, especially in the industrial

sector (as a growth engine of the economy). The private sector in IR Iran is largely dominated by microenterprises in terms of numbers, particularly when trade and services are considered. There have been several supply-oriented initiatives to create jobs in small and medium enterprises (SMEs) through cash incentives. However, the overall conducive policy and regulatory environment is more critical for sustained growth in the creation of jobs in small enterprises. Women entrepreneurs face particularly difficult social and procedural barriers in starting and operating enterprises, which need to be considered in improving the policy and regulatory environment.

There has been a singular focus on industrial firms without much attention to trade and service sectors, which have greater potential for job creation. At present, several ministries are involved in the promotion of small enterprises, with at least four ministries involved in the registration, licensing, and certification of the activities of small enterprises. So far, entrepreneurs have felt that no particular benefit is received by complying with the various regulatory requirements. Moreover, the compliance cost differential has been two-thirds of what it costs in establishing and operating a formal business. It is essential that a mechanism for coordination among various ministries is created and the regulatory provisions are simplified.

All small enterprises suffer from problems of outdated technologies, poor quality, and unstandardized products signifying the lack of business development services. Although these enterprises have greater efficiency in the use of capital for the creation of jobs and thereby are more labor-intensive, their labor productivity, however, remains low. Small enterprises are squeezed out of the banking system due to a larger share of the public sector in institutional credit. Targeted lending to the public sector and specific firms has not made the situation easier for small borrowers, who are often unable to offer the kind of collateral desired by banks. Nonbank loans are exorbitantly costly at the rate of at least 25%, thereby undercutting the competitiveness and growth opportunities for small enterprises.

Strategic Policy Directions for Cultivating New Talent for the future

Some notable observations are:

(1) Review and amend the executive instructions of the internship plan to facilitate the participation of economic enterprises active in the private and cooperative sectors, especially due to the closure and stagnation of activities of some economic enterprises during the coronavirus outbreak in IR Iran.

(2) Promote a more effective participation of some executive bodies in the field of informing and identifying the receiving units and removing the obstacles and problems.

(3) Use the capacities of organizations such as, Chamber of Commerce, Industry, Mining and Agriculture; Cooperative Chamber; and Chamber of Guilds and Organizations of the Building Engineering System, Agricultural Engineering System, and Natural Resources.

(4) Provide appropriate information to students and graduates by universities and higher education centers.

(5) Review the number and capacity of fields and academic orientations; modify the content of courses; and increase the provision of practical and applied education of university fields of study based on the needs and capacities of regions and the labor market.

(6) Lay the groundwork for the implementation of this plan in the Seventh Development Plan by applying the necessary reforms, including providing internship grants based on the extent of enjoyment or deprivation of the region;

(7) Reap the favorable effects of active labor market policy programs, including graduate internship program and employer insurance exemption on increasing employment and graduation.

(8) It should be noted that achieving the maximum goal of creating employment and increasing employability for graduate students is associated with economic policies, employment policy, science and technology policy, and industrial and commercial policies. So, to achieve the goal, the executive apparatus and relevant organizations must avoid sporadic actions in the field of job creation.

(9) Given the economic downturn and the crises caused by sanctions and the outbreak of the coronavirus, which have led to slow economic growth and employment growth throughout the country, the following is recommended in connection with the implementation of the wage subsidy scheme:

(10) Considering the positive achievement of the wage subsidy payment plan in 16 provinces of the country, its cost-effectiveness compared with the bank facility payment plans, and the vulnerability of all provinces to the spread of coronavirus, this plan should be implemented in all provinces of the country.

(11) The target group of the project should be extended from primary jobs to other vulnerable groups such as female and male heads of households.

(12) In addition to the wage subsidy scheme, in times of recession and slow economic and employment growth, successful active schemes and programs of other countries should be applied. These could be public service programs in areas such as health services in public health clinics, sustainable housing, private tutoring, and environmental protection.

(13) Creation of small-scale infrastructure should be done to enable the unemployed, especially young people, to play an active role in the society and in national development, introduce them to new skills, and increase their employability.

(14) The results of surveys conducted in the informal economy and informal employment in the labor market confirm the tendency of a relatively wide range of labor force, especially the unskilled or semi-skilled labor to work with wage conditions less than the annual approval of the Supreme Employment Council.

Nepal

Review of National Labor Training and Reskilling Strategies

Enhanced Vocational Education and Training Project

Enhanced Vocational Education and Training Project (EVENT) has been carrying out training programs in different occupations and conducting training under result-based and voucher-based schemes. The primary beneficiaries of the project are approximately 115,000 Nepali youths, who will get access to short-term skills training, technical education, and the opportunity for certifying

their existing skills. The institutions providing Technical School Leaving Certificate (TSLC)/ Diploma, which are part of the project, will benefit through improved facilities, trained instructors, use of high-quality teaching and learning materials, and improved delivery processes including regular monitoring and evaluation.

Skills Development Project

The Skills Development Project (SDP), financed by the ADB and the Government of Nepal, was established to support the government to implement key aspects of the Technical and Vocational Education and Training (TVET) Policy 2012. The project being run under the Ministry of Education, Science and Technology is being implemented by the Council for Technical Education and Vocational Training (CTEVT) through a Project Implementation Unit (PIU). The SDP is helping the government to (1) initiate strategic sectoral reforms that aim to improve overall management and performance of all sectors; (2) improve the quality and relevance of public training; and (3) increase the private sector's engagement in training delivery and job placement. Each intervention has been designed to increase the efficiency and result-orientation of the TVET system, making it more market-driven. The impact of the project will be increased employability of the Nepalese workforce. Its outcome will be the establishment of a market-responsive and social- and gender-inclusive TVET system [28].

National Vocational Qualification System

The Nepal Vocational Qualifications System (NVQS) Project, a bilateral initiative between the Government of Nepal and the Government of Switzerland, is funded by the Swiss Agency for Development and Cooperation (SDC) and implemented by the Council for Technical Education and Vocational Training (CTEVT)/National Skill Testing Board (NSTB) with full technical assistance provided by the Swiss Foundation for Technical Cooperation (the Swiss contact). The overall goal is to contribute to systemic changes in the TVET system to enable women and men, including disadvantaged groups, to get access to increased employment and self-employment and to perform at higher productivity levels.

Enhanced Skills for Sustainable and Rewarding Employment

Enhanced Skills for Sustainable and Rewarding Employment (ENSSURE) is a project funded by the Government of Nepal and the SDC. The ultimate aim of the project is to help Nepalese workers, particularly from disadvantaged groups, to benefit from continuous employment and an improved standard of living.

The project will achieve the following three interrelated outcomes:

(1) at workers' level (both female and male workers improve their employability);

(2) at employers' level (partner companies establish a favorable work environment); and

(3) at the system level (the TVET system is expanded and is more inclusive of the private sector).

TVET Practical Partnership Program SAKCHYAMTA.

TVET Practical Partnership Program is a project funded by the European Union and implemented by the British Council and CTEVT. Over the course of four years, the project aims to contribute to Nepal's inclusive and sustainable growth through investment in human capital and by creating better employment opportunities [28].

The specific objectives of this project are to strengthen and implement more effective policy in the TVET sector that is responsive to labor market needs. The program will pilot an integrated public partnership approach in three key economic sectors: (1) agriculture; (2) construction; and (3) tourism, offering opportunities for promoting the transition to a greener, climate-resilient, and low-emission economy.

Labor Market Transition Opportunities

The Overseas Development Institute (ODI) has surveyed 43 businesses in four sectors (tourism, ICT, light manufacturing, and agro-processing). The survey reveals that the labor market is tight in many sectors. All these sectors have the potential to expand. These four sectors could help Nepal to transform the economy and create various employment opportunities. There could be other sectors like hydropower, education, and health, which may directly or indirectly support Nepal in improving its productive capacity.

Creating productive employment opportunities and shifting the existing surplus and unproductive labor in agriculture to service sectors such as industry, trade, tourism, education, and health as well as employing young workers can contribute to a structural change in the economy. The extensive use of automation, robotics, and digitalization will have serious implications for skills, competences, jobs, and professions. The development of Industry 4.0 will be accompanied by a change in tasks and requirements for workers in the factory.

Strategic Policy Directions for Cultivating New Talent for Future

The Nepalese government has made TVET a top priority to create jobs in the country and help reduce poverty. To achieve a faster economic growth to attain the goal of a middle-income country (MIC), Nepal, as discussed in the earlier section, needs to develop its productive capacity. Skill development is the key to achieving productive capacity and could help Nepal achieve the MIC status faster. The TVET system should be able to adapt to the fast-changing nature of workplaces and impart training accordingly so that the graduates are competent enough to deliver.

Direction and Solutions to Develop Professional Skills for VET Workers

The most challenging issue with the present TVET system is to mitigate the mismatch between the existing training programs and the needs of the labor market. The industry can work together with the government to set up occupational standards that are required in the working environment and define levels of competence to perform the designated tasks. Such arrangements should be legally mandated with clearly assigned roles and responsibilities. It would be easier to engage employers at the implementation level. They can contribute to industry-specific soft-skill-training programs. In addition to the regular technical classroom training programs, on-the-job training programs and apprenticeships can be included with the support of employers. Trainees would benefit from working in the real world of work with some level of income. Employers would be willing to participate as they can retain the talented trainees within their organizations.

Direction of Strategy for VET Development in the Period 2021–30

The industry is suffering from the fact that the majority of skilled and semi-skilled workers in the industry are not suitably trained for minimum levels of competencies that are required to accomplish their respective tasks. The TVET system should be able to adapt to this fast-changing nature of the workplace and impart training accordingly so that the graduates are competent enough to deliver. TVET training carriers and workers pertaining to the specified IR4 abilities need to set and enable an IR4 working environment. The CTEVT Strategic Plan integrated the 2030 Strategic Vision with

a mission statement, goals to achieve the vision, and strategies to achieve each goal. Each strategy was developed with response activities, action plans, and indicators, but the detailed action plan to meet its objectives was never finalized. The development of strategic plans, supported by comprehensive action plans, should be mandatory for all TVET organizations. This desired outcome will be achieved only if evidence-based TVET strategies are developed, human resources are properly produced and capacitated, infrastructures are adequately developed, and the private sector is properly engaged and involved. Within the MoEST TVET function, the authority should establish interdepartmental coordination, and the technical committee should develop strategic plans to ensure coordinated planning and management.

Program to Support Development of VET Labor Market up to 2030

Nepal aspires to achieve the aim of graduating from the least-developed-country (LDC) status by 2022 and become an upper MIC by 2030. In addition to various other strategies, special priority has to be given to improve skills and productivity of workers to achieve the target faster. It is important to consider the key sectors for development, e.g., ICT, tourism, agro, and light manufacturing, for increasing growth and productive employment. Employment opportunities should be provided to all, with a safe, healthy, and competitive market. Vocational training and education should be the top priority in any sector so that the baseline of any worker is strong.

Special programs, including the Prime Minister Employment Program (PMEP), should be leveraged. Labor productivity needs to be increased by developing the capacity of the labor force based on the demand of the labor market, and necessary arrangements should be made for migrant workers to acquire skills through necessary training and coaching before departure. Coordination with the National Technical Training Institute should be maintained to impart skills to those who are looking for employment to meet market demands and are registered with the authority.

A National Planning Commission or CTEVT mainframe is needed to collect both supply and demand information using a labor management information system (LMIS); MoEST/CTEVT should have a legal mandate to coordinate the system; and trained professionals should strengthen the Employment Information and Support centers under MoLESS. Employment information centers should be expanded at all local levels and integrated into the employment system of the organized sector.

Policy support to offer incentives for skills training programs, including work-based learning in partnership with businesses and the industry, should be developed. Universities should be encouraged to offer degrees in occupational education or TVET, and organizational capacity should be enhanced to produce quality human resources. The government should also allocate budget for on-the-job training in partnership with the private sector.

Pakistan

Review of National Labor Training and Reskilling Strategies

In Pakistan, there is no comprehensive information on skill development. Even publicly funded services are not routinely collected and analyzed. There is no systematic or complete census of TVET activities that encompass both the public and private sectors as well as non-governmental organizations' operations. There is little sustained review of the investment in skills development, though it is typical to hear comments that persons who complete training lack the abilities that the

labor market demands. There is no national structure for developing and validating qualifications or certifying the talents of those who successfully finish training programs. Some businesses in the private sector, notably exporters and those with international ties, give world-class training, but they are in the minority. According to estimates, less than 10% of employed workers obtain training. The policy is not functioning because there are only around 22,000 apprentices at present. Because of the perceived costs, many firms are hesitant to invest in training.

The government requires a commitment to the development of a national integrated TVET system. As a result, a single national certification system for recording and recognizing qualifications, as well as quality assurance standards and processes, should be implemented. It should be investigated how the existing reliance on public funds might be reduced. In order to meet the TVET Policy's goals, the government should continue to seek funding from international donors. Mutual trust between national and provincial TVET entities, as well as among education and training providers, should be encouraged.

Labor Market Transition Opportunities

Private institutions currently provide 70% of higher education and 40% of primary and secondary education. There is no similar engagement with TVET, and the private-sector organizations may play a bigger role by training more of their own employees and contributing more broadly to TVET reform. A more competent workforce will be an advantage and contribute to growth, while lack of skills will stymie and frustrate development. To fulfil the demands of a changing economy, training supply must be linked with industrial and economic policies.

Around 59% of the population is aged 15–59 years, while 27% is aged 15–29 years. Only if the young have skills that are compatible with the demands of a contemporary economy will this youth bulge convert into economic gains [1]. However, the transition of Pakistan's young population to work is slow.

The dynamics of the market are changing and the statistics regarding the employment patterns of the market are also showing interesting facts. First, the number of employees is increasing with the decline of self-employment, which is the sign of a more organized workforce. Second, entrepreneurship, which had grown earlier and then declined, has now emerged again. Third, a growth in unpaid family workers was seen earlier but now it has decreased.

Strategic Policy Directions for Cultivating New Talent for Future

Direction and Solutions to Develop Professional Skills for Pakistani Workers

Skill development is considered as a key factor in the time of fourth industrial revolution, especially for Pakistan. For low- and middle-income economies, the lack of professional and management skills in youths may lead to unemployment or resistance to acquire quality jobs with decent work environment. The issue is becoming more serious with rapidly changing economies that require more innovative skills. Workers need to be updated, flexible, and adaptive in order to exploit the market opportunities, both at national and international levels. Thus, the focus should be on the skills demanded in future. Competency-based training can play a vital role in professional development of labor. Thus, it can be assumed that professional skills can be enhanced by training in contemporary skills, especially soft skills, IT skills, and technical skills; and emphasis on competency-based training as well as on-the-job training.

Direction of Strategy for VET development in Pakistan in the period of 2021–30

Special attention to budgetary allocation by the government and private institutions is required to fulfill the skilling requirement of labor at this time of change. Assistance from foreign donors can

also be a good option. Another important issue is that the government had introduced some tax reliefs and incentives for apprenticeship providers, but provisioning of these incentives gets delayed due to bureaucratic procedures. Same bureaucratic hurdles are there in provisioning of trainings. There is a need to simplify the procedures in order to cope with challenges faced by TVET institutions. In addition, there is a need for a 'skill development university' and revision of curriculum. Also, the scale of skill development requires to be broadened.

Program to Support Development of Pakistan's Labor Market up to 2030

The Government of Pakistan has initiated Prime Minister's *Hunarmand Program,* also called 'skills for all program.' Similarly, the government has also introduced Youth Entrepreneurship Scheme and Prime Minister's Startup Pakistan Program to instill the entrepreneurial spirit among youth and to provide loans ranging from PKR100,000 to PKR25 million with 3–5% markup for eight years.

Likewise, the fourth Industrial revolution has raised the demand of digital and e-learning-based education and such programs should be initiated. The government is aiming to address this, and a program is initiated as Pakistan talent hunt program as Prime Minister had nominated 2022 as the 'Youth Year.' Some of the initiatives taken in this regard are contracts with international athletes to train the youth of Pakistan.

Continuity of policies is necessary for gaining the true results of the initiated programs. Conclusively, it is a reality that labor market dynamics are changing in the time of IR4. This time is an opportunity as well as a threat for underdeveloped countries like Pakistan. If we see opportunities, then Pakistan has a huge bulge of young population that can potentially boost an economy if equipped in the right manner. Skills formation has become vital at this time. If the industry and the academia liaison is developed, growth opportunities are created, and better utilization of funding is done with continuation of policies, then Pakistan can emerge as a progressive country in this phase of transition.

The Philippines

Review of National Labor Training and Reskilling Strategies

The Philippines is preparing its workforce, mainly the Filipino youth, through skills development, skills qualifications, and alignment; ensuring up-to-date labor market information (LMI); and carrying out timely policy research and advocacy. The Department of Labour and Employment's (DOLE)'s mandate is to promote full employment, and its mission is to develop and protect human resources. Particularly, DOLE is committed in the following relevant endeavors:

JobStart Philippines Program

DOLE collaborates with partner employers from the private sector to implement the flagship youth skills development and employment facilitation initiative, the 'JobStart Philippines' program. With a pilot done in 2014–15 and institutionalized in 2016 through the Republic Act (RA) No. 10869, JobStart helps the youth to be more employable through a full-cycle employment facilitation framework that involves the following: life skills training (LST) with one-on-one career coaching; technical training; job matching; and referrals to partner employers either for further specialized training, internship, or decent employment. While face-to-face registration for the program is still allowed, online registration is implemented through the JobStart Digitization initiative and in consideration of the restrictions enforced by the government due to COVID-19.

Special Program for the Employment of Students

Special Program for the Employment of Students (SPES) provides poor but deserving Filipino youth the opportunity to augment their income to finish their education and gain on-the-job experience for increased employability and practical skills. For further improving this program for its beneficiaries, the DOLE, through the Bureau of Local Employment (BLE), is considering the inclusion of a specialized LST module as part of the orientation for SPES beneficiaries. During the coronavirus spread, partner employers and establishments of the program were encouraged to adopt alternative work arrangements (e.g., work from home). Should SPES beneficiaries be required to report to work on-site physically, they could only fulfill desk work/s or related tasks that did not require them to travel or stay outside for an indefinite period. Likewise, SPES beneficiaries were assigned works within their respective areas or barangays to reduce their exposure from unintended COVID-19 risks due to interzonal or intrazonal travel.

Government Internship Program

DOLE's Government Internship Program (GIP) provides internship opportunities for high school, technical-vocational, or college graduates aged 18–30 years who intend to pursue careers in the public sector. Like the SPES implementation during the pandemic, heads of partner agencies were also encouraged to allow alternative work arrangements for GIP beneficiaries. Likewise, should GIP beneficiaries be required to report physically to offices of partner agencies, tasks were also limited to desk work/s as beneficiaries were discouraged from engaging in assignments that would expose them to COVID-19.

Career Guidance Advocacy Program

DOLE's Career Guidance Advocacy Program (CGAP) aims to immerse parents and students in the realities of the labor market and convince career advocates to use career guidance as an effective tool for addressing job–skill mismatches. To expand the program's reach in response to the demands of Industry 4.0 and the increased digitized communication during the pandemic, DOLE, through the BLE, was developing the Enhanced Career Guidance and Employment Coaching modules and the CGAP microsite where interested stakeholders could access self-taught modules. Included were modules on life skills, LMI, basic productivity, and other information materials from relevant government agencies such as NWPC, DepEd, CHED, TESDA, DOST, and PRC. While the CGAP microsite was being developed, the Public Employment Service Offices (PESOs) all over the Philippines were conducting career fairs via video conferencing platforms.

Labor Market Transition Opportunities

The pandemic drove micro, small, and medium enterprises (MSMEs) to adapt to technological changes. The strict quarantine measures imposed by the Philippine government since 16 March 2020 left many establishments with no other options but to go digital, automate, and innovate. Establishment owners knew that offering their services online was a way to survive during the unprecedented time. This pandemic transformed ideas about how and where workers could work and put flexibility, adaptability, and technology in the workplace.

Adopting Digital Technology

Adoption of digital technologies in the Philippines before the pandemic was slow and it could have taken years for enterprises and workers to make the shift. The pandemic situation caused a sudden shift and pushed workers and industries into freelance opportunities. Now, jobs amenable for alternative work arrangements can be found across sectors.

Job Opportunities and Relevant Skills

When the government imposed quarantine measures and restrictions in the first quarter of 2020, enterprises had to alter their businesses by implementing continuity plans and changing working locations of their workers overnight. As many as 79 occupations were identified as in-demand occupations by DOLE after the COVID-19 pandemic. The Philippine Green Jobs Act of 2016 (RA 10771) was another source of disruption. This law provides a policy framework for fostering low-carbon, resilient, and sustainable growth and decent job creation by giving incentives to enterprises generating green jobs and focusing on developing human capital to enable and sustain the transition to a greener economy. A list of green careers has also been identified by the department. In addition, more Filipinos ventured into freelance works amidst the pandemic, and the freelance economy continues to grow. Freelance jobs are essential since there are tasks that outsourced service providers can efficiently do. Lastly, most Philippine employers look for viable traits and behaviors rather than skills and competencies. This is where soft skills or 21st-century skills play an essential role in establishing oneself at work or in other areas of life.

Strategic Policy Directions for Cultivating New Talent for Future

Strategic Policy Directions on the Changing Labor Market Demands

There is a need to ensure that alternative work arrangements will not compromise the well-being of Filipino workers or expose them to any forms of occupational or health hazards. Through the updated PDP 2017–22, the Philippine government aims to accelerate human capital development, focusing on the strategic framework guiding its goal. It includes

(1) improving the nutrition and health outcomes for all;

(2) enhancing income earning ability and adaptability of Filipinos; and

(3) ensuring a flexible lifelong learning opportunity for all Filipinos.

Amidst the anticipations for the Philippines' recovery from the pandemic and automation and digitalization, the government identifies effective strategies for the labor sector based on the updated PDP 2017–22. Its focus is on "increasing income-earning ability and enhancing the adaptability of workers to the changing demands of the labor market." The National Economic Development Authority (NEDA) has provided the updated indicators and revised targets and result matrices for increasing the income-earning ability and enhancing the adaptability of the Filipino workforce.

The identified strategies will improve the ability of Filipino individuals to operate and thrive in the digital environment. The strategic direction is toward expanding and strengthening the upskilling and retooling programs and employment facilitation services given to workers and individuals, mainly through digital technologies. The strategies identified are expected to improve individuals' access to employment opportunities and ensure their employability and productivity, thereby translating into increased income-earning ability and enhanced adaptability of workers. Policies and programs related to these strategies should be evaluated and assessed to further improve, enhance, and strengthen to achieve the full potential of Filipinos and transform the human capital toward greater agility for a healthy and resilient economy.

Developing New Talents and Skills for the Future Filipino Workforce

DOLE highlights the in-demand and hard-to-fill occupations of the key industries, projected to be the primary source of employment in the Philippines, in the strategic policy directives for cultivating new talents of the future. These are:

(1) **Sectors influenced by technology change and advancement:** The industry will shift to high-value services by attracting highly skilled talents and developing a globally competitive Filipino workforce to create an ecosystem that promotes lifelong learning.

(2) **Special technical skills required:** A combination of policies is required to allow workers to keep their skills up to date, help them shift between jobs, and assure that employers have a skilled, highly productive, and innovative workforce.

(3) **Core employability skills that are valuable across sectors and occupations:** In the JobsFit LMI Report, DOLE–BLE mentioned that employers demand skills in five years. The findings from the DOLE–BLE COVID-19 LMI survey were considered complementary to the WEF report on the 2020 Future of Jobs.

Sri Lanka

Review of National Labor Training and Reskilling Strategies

In Sri Lanka, the Vocational Training Authority (VTA) spearheads providing relevant training. VET in Sri Lanka is expected to offer special attention for its career-oriented courses geared toward the improvement of the country's economy. The Department of Technical Education and Training (DTET) operates with a network of 29 Technical Colleges throughout the country, while nine Colleges of Technology (upgraded from Technical Colleges) offer diploma-level courses within the National Vocational Qualification framework. Moreover, more than 38 Career Guidance Centers, and 21 Learning Resource Development Centers are also in operation in this system.

A centralized system where courses are consolidated would help ensure efficient tracking, grading, and teaching processes. In Sri Lanka, there are a number of government ministries and agencies involved in VET training. The development of a VET system is to prepare people for the work roles to meet the needs of a developing economy. In this regard, the Ministry of Skills Development and Vocational Training; the Tertiary and Vocational Education Commission; the National Apprentice and Industrial Training Authority; the Department of Technical Education and Training; the Vocational Training Authority; and the National Youth Services Council play prime roles.

The National Apprentice and Industrial Training Authority (NAITA) is the leading agency in providing apprenticeship training and developing National Competency Standards. It manages three national training institutes: the Apprenticeship Training Institute (ATI); Automobile Engineering Training Institute (AETI)' and Institute of Engineering Technology (IET), along with eight career guidance centers and 51 training centers. The National Youth Corps (NYC) organizes vocational training courses in urban and rural areas, and is responsible for the implementation of the entrepreneurship program and career guidance services.

The University for Vocational Technology (UNIVOTEC) provides degrees to people with NVQ qualifications, and those who work in the industry as well as those who wish to acquire degree-level education. UNIVOTEC delivers NVQ level-7 degree courses as well as training instructors for Colleges of Technology, along with assessors for course accreditation. It also develops curriculum and teaching and learning resources. SLIATE, under the Ministry of Higher Education manages and supervises 11 separate Advance Technical Institutes and five sections housed in the Technical Colleges. It also offers programs for Higher National Diplomas in civil engineering,

electrical engineering, quantity surveying, building service engineering, and agriculture; apart from National Diploma in business and finance.

Labor Market Transition Opportunities

The expansion of Sri Lanka's IT industry, mainly oriented at international markets, is likely to increase demand for high-skilled technical jobs around data analysis and cyber security. A large portion of Sri Lanka's youth could bear the burden of job losses in the retail industry, particularly those moving out of agriculture and plantations, for whom retail is an easy steppingstone into formal work. On the contrary, a rise in e-commerce is expected to match this development through technological feasibility and low investments.

Employment in the services sector will continue to grow during the next 14-year period while employment in the industry sector will grow at a slower pace. Employed population in the agriculture sector will continue to decline. When predicting occupational structures, it was also observed that occupations such as professionals, technicians, and associate professionals; services and sales workers; and plant or machine operators and assemblers will grow in future with an indication that more and more jobs will be created mainly in service and industry sectors.

Although a shift from agriculture to industries is a feature that is usually observed during the first phase of an economic growth, Sri Lanka will show a different status by skipping the industrial growth and moving directly from agriculture to services. This can be seen as an economic achievement because Sri Lanka has started leapfrogging from an agrarian economy to a services economy. A greater demand for employment will be generated in the services sector while the share of employed population in agricultural sector will gradually decline.

Strategic Policy Directions for Cultivating New Talent for Future

The Sri Lankan government had declared 2021–30 the decade of skills development in Sri Lanka. The National Policy Framework, 'Vistas of Prosperity and Splendour 2020–25' has identified 'a technology-based society' as one of the key policies. Some of the significant steps taken include

(1) introduction of ICT policy for government and national ICT policy (ICTA);

(2) establishing National Innovation Agency (Presidential Secretariat);

(3) government-initiated program to provide 13 years of continued education to students (Ministry of Education);

(4) introduction of technology stream (engineering technology, bio-system technology, science for technology) for advanced level (Ministry of Education);

(5) proposing National Policy on science, technology, engineering, and mathematics (STEM) education, with 1% contribution to the GDP during the next decade expected from per student intake (Ministry of Education);

(6) providing internship opportunities and conducting entrepreneurial development programs for the final-year university students (Ministry of Education);

(7) introduction of National Policy Framework for SME Development (Ministry of Industries); and

(8) launch of the National Export Strategy (NES) of Sri Lanka in 2018 to promote new export sectors (Ministry of Trade).

Direction and Solutions to Develop Professional Skills for Sri Lankan Workers

A wide gap exists between available skills and market demand in Sri Lanka. Many of the country's youth leave the formal school system without employable skills because their access to middle-level skills training and entry-level skills programs is inadequate. This is compounded by the low market relevance of TVET in the country. The Skills Sector Enhancement Program, supported by the ADB's results-based lending program, is helping provide the impetus to improve and ensure the effectiveness and efficiency of Sri Lanka's sector-wide reforms.

Direction of Strategy for VET Development in Sri Lanka during 2021–30

Sri Lanka has improved the quality assurance mechanism of all public and private TVET providers by developing a centralized management information system (MIS). This system has helped training centers manage training information from enrollment to graduation and deployment. It has also automated their training administration and resource management.

The implementation of a comprehensive vocational teacher development policy has complemented the new MIS. This initiative has upgraded instructors' skills through industry exposure training. It has provided performance management mechanisms, professional development, and allowances to retain and recruit qualified instructors.

To ensure that courses offered meet industry standards, training programs' effectiveness was also reviewed. Moreover, the project revised the National Vocation Quality (NVQ) level descriptors to upgrade the country's TVET standards to industry-recognized qualifications. These revisions were applied to all Tertiary and Vocational Education Commission-accredited programs and registered training providers.

Program to Support Development of Sri Lanka's Labor Market up to 2030

The Sri Lankan government is confronting these challenges head on through its Skills Sector Development Program, which is its first sector-wide, medium-term development program. It envisions a TVET sector that is efficient and ready to meet rapidly evolving labor market demands by 2020.

Thailand

Thailand is one of the fastest aging countries with an old-age dependency ratio that exceeds the ASEAN and OECD averages. The aging population has led to a shrinking labor force. Also, the labor force participation rate has been declining and was below 75% in 2020 compared with almost 80% in 2011. Another stylized fact in the Thai labor market is skill mismatch, which has also been a structural challenge in the country. This is a phenomenon when the proportion of workers with vocational education required by employers is far greater than that of job applicants with VET. In short, there seem to be too many university graduates, yet too few VET graduates, as compared with demands, resulting in a qualification mismatch. Moreover, the STEM manpower in Thailand is inadequate. This is one of the biggest challenges as STEM subjects will increasingly be essential for the country's development in the new world where technological advancement is causing a shift in jobs and skill demands.

Review of National Labor Training and Reskilling Strategies

Thailand's Manpower Development Strategy, 2017–36

In 2016, Thailand's Ministry of Labour issued the 20-Year Manpower Development Strategy (2017–36). The strategy places an emphasis on STEM manpower development which is consistent with the Thailand 4.0 agenda. The framework can be divided into four periods:

- **Productive manpower (2017–21):** The aim is to eliminate labor-related obstacles for the country's development, upgrade labor standards, promote multiskilled labor, and upskill the manpower.

- **Innovation workforce (2022–26):** The aim is to develop the workforce to apply technology and innovation for productivity enhancement, encourage the development of STEM skills for Thailand 4.0, amend regulations to suit employment in the digital era, and make the workforce ready for multicultural and cross-border work.

- **Brain power (2027–31):** The aim is to increase the number of STEM workers for high-productivity work in order to overcome the middle-income trap.

- **Creative workforce (2032–36):** The aim is to increase the number of STEM workers and create creative manpower with research and development skills for better work quality and efficiency.

Department of Skill Development Strategic Plan 2017–21

The Department of Skill Development (DSD) under the Ministry of Labour is responsible for providing skill development to workers as well as promoting skill standard tests. The DSD set its strategic plan during 2017–21. The plan outlines five strategies as follows:

- **Developing and upgrading labor skill standards to meet international standards:** The key indicators include an increase in the number of workers being tested for skill standards.

- **Skill training to meet the challenges of the Thailand 4.0 era:** This aims to prepare new workers and the unemployed to enter the labor market; upgrade workers' skills to keep up with the changes in technology; and develop a training system to be efficient, comprehensive, and easily accessible. The key indicators include an increase in the number of people trained in advanced technology courses.

- **Developing the potential of entrepreneurs and informal workers:** This is with the goal of developing skills for the informal sector; specific groups of workers (women, youth, people with disabilities, and the elderly); new entrepreneurs (startups); and community enterprises as well as increasing labor productivity and competitiveness of enterprises.

- **Promotion and development of skill development networks:** This is with the goal of enabling all establishments that are under the skill development law to develop skilled labor and create a network to expand the development of labor skills inclusively. The key indicators include an increase in the number of trained workers in advanced technology courses by private and public training providers.

- **Management of the organization and database system to be modern, flexible, and highly efficient:** This is with a strategy for the development of the database system, evaluation system, and skill development research system to be effective.

Overview of Skill Development Mechanism in Thailand

To develop employees' skills, enterprises or employers in Thailand can do in-house, on-the-job training or send their workers to be trained by private training providers. There are also public trainings supported by the government, such as trainings organized by the DSD. Employers in Thailand are required to pay a training levy to the government while the government gives incentives to motivate the enterprises to train their workers. This mechanism is supported by the Skill Development Promotion Act 2002 (SDPA). The idea was to stimulate the private sector and establishments to set up and register with the DSD as training providers for workplace learning.

Overview of Vocational Education and Training Strategies

In Thailand, VET is mostly offered by the Office of the Vocational Education Commission (OVEC), which is the organization under the Ministry of Education responsible for vocational and professional learning. Currently, there are 429 public colleges and 481 private colleges providing formal VET programs nationwide with 959,598 students. Moreover, blockchain was implemented mostly in the financial services, life sciences, and healthcare sectors, while IoT was deployed mostly in consumer, energy resources and industrials, and technology, media, and telecom sectors.

Labor Market Transition Opportunities

Technologies such as traditional web technology, mobile applications, and cloud have already been deployed by firms in Thailand while a smaller proportion of companies has implemented advanced technologies like data analytics, robotics, IoT, artificial intelligence (AI), blockchain, augmented reality (AR), and virtual reality (VR). Nevertheless, the adoption of advanced technologies has grown substantially, especially in the consumer industry, which exhibits the highest proportion of companies that have implemented AI after the pandemic.

The likelihood of automation is heterogenous across industries, jobs, and groups of workers. As the missing workforce stemming from aging population has been a major concern for companies, the sectors are seeking to adopt new technologies such as robots and automation to compensate for the missing workforce. What is more, low-skilled workers, women, and low-wage workers are facing higher risks of job automation while certain routine jobs such as shop sales assistants, food service counter attendants, cooks, office clerks, and accounting associate professionals are also incurring higher risks. This trend implies that disparities in the Thai labor market will be increased.

Occupational Transition

Deloitte Thailand elaborates that there are some roles that are highly important yet highly challenging to recruit. These include data analysts and scientists, digital transformation specialists, and digital marketing and strategy specialists. This is where the government should step in and design policies to cultivate the workforce in these high-demand fields. Thailand Development Research Institute (TDRI) also identifies other rising jobs resulting from global mega trends. These include jobs in digital economy, care, and green economies. Apart from specific and technical skills, these high-paying jobs also demand good English proficiency, analytical skills, people skills, communication skills, digital skills, and resilience. This suggests a rise in soft-skill needs.

Strategic Policy Directions for Cultivating New Talent for Future

Key Policies of the Ministry of Labour in 2022

The Ministry of Labour indicated the urgent policies to implement in 2022. One area of focus was to stimulate on-demand employment in the new economy by linking labor market data including labor skills between government agencies and the private sector. This was to provide the government with an information center on labor skills for use in training and development of workforces to meet changing market demands. The focus areas were to:

- Upskill, reskill, and newskill labor; provide training for the unemployed to have sufficient knowledge to work; increase labor productivity; and enable workers to return to the labor market. The Ministry of Labour promotes learning new ways of working, and increasing digital, technology, and innovation skills for both employed workers and new graduates through offline and online channels.

- Produce high-performing workforces to be able to adapt to new jobs resulting from the changes and risks in the new world context with the digital technology advancement. The Ministry of Labour must promote learning of skills for the future to respond to the country's manufacturing sector, support the new S-Curve, in line with the national strategy. This is a Thai labor market restructuring aiming to drive the country's economy as well as build the competitiveness of the country and its labor force.

- Develop professional skills for the new-generation youths who are increasing likely to become gig workers.

- Foster cooperation between the public sector, educational institutions, and the private sector in labor development to meet the demands of the labor market, support foreign investment, and create a balance in the labor market.

DSD Projects in the Budget Year of 2022

In line with the focus of the Ministry of Labour, the DSD was implementing certain projects in 2022 aimed at upgrading skills of the workforces. Remarkably, the emphasis has been on skill development that corresponds to technological changes and supports the target industry. The key projects are listed below:

(1) The 'Advanced Technology Excellence Training Center' project aims to equip the labor force and entrepreneurs with knowledge and skills in accordance with six target industries including digital, robotics, smart electronics, logistics, next-gen automotive, and biofuel and biochemical.

(2) Projects on 'Development of labour skills in the Eastern Economic Corridor (EEC) and Special Economic Zones (SEZ)' are notable.

(3) The 'Develop the fundamentals of tourism industry' project aims to upskill and reskill for technological changes in the tourism industry. The project targets 4,624 participants in the high-value and medical tourism sector.

(4) The 'Upgrading skill potential and labour capacity' project aims to develop the potential of workers to possess knowledge and skills in line with the future demands of the labor

market, technological advancement, and innovations. The DSD has targeted 10,500 persons to participate in this project.

(5) The 'Enhance workforce capacity with technology to support work in the 21st century' project focuses on 16 skills across three groups (foundational literacies, competencies, and character qualities) for the 21st century by the WEF. This project targets 6,360 people to possess upgraded skills and offer high-quality work.

Vocational Education and Training

VET Strategy 2018–21

During 2018–21, the OVEC drove vocational education with the goal, "vocational education for preparing Thai people for the 21st century." To achieve the goal, the key strategies were to

- increase the number of vocational students compared with academic students;
- develop an excellence center for vocational manpower development in target industries as well as in the EEC and special economic areas;
- encourage reskilling, upskilling, and newskilling through polytechnic and vocational colleges as well as through short-course trainings, aiming at bringing education to employment and providing skills for startups or businesses;
- increase OVEC management efficiency by focusing on budget usage for improving skills of teachers and students and providing more incentives to teachers and staffs; and
- develop vocational education to prepare Thai people for the 21st century through dual-vocational education and integration of technological, digital, and English skills in the learning courses.

VET Policy and Focus in 2022

Continuing with the previous strategies, the OVEC has set a strategy for vocational education development in 2022 with the theme of "Holistic and Area-based Vocational Education Development (HAVE)." Its key objectives are:

1. Providing education for future careers and building the country's competitiveness by
    - developing and improving the Center of Vocational Manpower Networking Management (CVM) and the 'Excellent Center,' especially in the EEC area;
    - upskilling, reskilling, and newskilling under the Career and Entrepreneurship Center (CEC); and
    - partnering with the private sector and entrepreneurs to improve the quality of VET.
2. Upgrading and improving the quality of vocational education with an area-based approach by
    - enhancing VET quality by using big data at the provincial level;

- improving the operation of dual vocational education centers in each area to upgrade VET quality;
- developing VET curriculum, credit bank, and enhancement of knowledge and skills for future jobs and the 21st century; and
- developing professional skills through practical experiences.

As vocational education in Thailand will play a significant role in providing skilled workforces to support the development of S-Curve industries and the Thailand 4.0 agenda, VET strategies also need to focus on future skills arising from global megatrends and the COVID-19 pandemic. Since doing so alone may not be efficient, the OVEC has stepped in the right direction by collaborating with the private sector and entrepreneurs in providing training programs to ensure that the skilled labors produced correspond to the market needs.

E-Workforce Ecosystem

The E-Workforce Ecosystem is an intelligent platform for manpower information management and development of competence through lifelong learning in Thailand. This initiative aims to overcome a key limitation of human capital development in Thailand, which is the lack of integration of related organizations. The purpose of this project is to develop a single-platform database system that helps Thai people of all ages, business sectors, educational institutions, training providers, and policy makers to have access to a comprehensive labor database comprising personal information, education, training, and work status. This will lead to the design of assistance measures, incentive systems, social protection systems, and labor skill development systems that can track both quantitative and qualitative results through online channels.

Vietnam

According to the World Bank, Vietnam's Human Capital Index (HCI) increased from 0.66 to 0.69 in the 10-year period of 2010–20. Vietnam's HCI was higher than any other lower-middle-income country and many countries at multiples of Vietnam's income level, despite lower levels of public spending on health, education, and social protection. Vietnam is one of the countries with the highest HCI scores in the east Asia–Pacific region. This reflects the great achievements in general education and health over the years.

Review of National Labor Training and Reskilling Strategies

Overview of Vietnam's Human Resource Development Framework

Understanding the important role of human resources in socioeconomic development, the Vietnamese Communist Party has advocated a strategic breakthrough in human resource development (HRD). In order to concretize the Party's viewpoint, the National Assembly promulgated the Law on Higher Education in 2012 (amended in 2018); the Law on Vocational Education in 2014; the Labour Code in 2019; the Education Law in 2019; Law on Public Officials; and Law on Public Officials, among others. The government has issued many legal documents guiding the implementation of the laws as well as mechanisms and policies on HRD. In addition, the Prime Minister approved the Vietnam Human Resource Development Strategy for the 2011–20 period, the Vietnam Human Resource Development Master Plan for the 2011–20 period, and the Vocational Training Development Strategy for 2011–20 period. These documents have created a legal framework and the driving force for HRD in terms of both quantity and quality.

Vietnam Education System and the Vietnamese Qualification Framework

Vietnam's national education system is regulated through Decision 1981/QD-TTg approving the structural framework of the national education system. The Law on Education 2019 legalized the provisions of the national education system and the Vietnamese Qualifications Framework (VQF) in order to facilitate a smooth transition between education and training levels of the national education system. The structural framework of the national education system indicates education and training levels of the national education system while the VQF regulates qualification levels and learning outcomes of different education and training levels.

Under the Law, the national education system is an open and permeable system, consisting of formal education and continuing education. Education and training levels of the national education system include early childhood education, general education, vocational education, and higher education. Specifically, early childhood education includes nursery education and preprimary education; while general education consists of primary education, lower secondary education, and upper secondary education. Vocational education provides training at elementary, intermediate, and collegial levels along with other vocational training programs; while higher education provides training at bachelor's, master's, and doctor's levels.

Labor Market Transition Opportunities

Vietnam is in the process of industrialization, modernization, and international integration. IR4 opens up many opportunities in improving technologies and enhancing production capacity and competitiveness in the product chain; creates a big change in the form of the service business; creates lots of opportunities for innovative startups; significantly reduces transaction and transportation costs; boosts attractive and potential investment in the field of digital technology and the internet; and provides a great opportunity for industrial production with advanced science and technology levels.

However, although Vietnam has focused on IR4 policy reforms, in terms of workforce digital skills, the nation dropped from 92nd rank in 2019 to 96th rank in the 2020 Global Talent Competitiveness Index (GTCI). This implies a requirement for improving skills of workers to meet the needs of enterprises. The forecast for the impact of IR4 on employment in Vietnam shows that work efficiency will increase, while the restructuring of employment will likely decrease the number of jobs by 2.9 million to 3.8 million compared with the baseline (Vietnam Central Economic Commission, 2019). The majority of the job losses will be for unskilled workers (73%); followed by craftsmen and related workers (17%); machine, workshop equipment operators, and assemblers (6%); and skilled labor in agriculture, forestry, and fishery sectors (5%).

The sectors that will attract maximum workers include high-tech agriculture, energy, tourism, hotels, restaurants, logistics, services, medical, healthcare, beauty care, media, ICT, equipment maintenance, and construction. These are the sectors that require most workers to hold occupational skill certificates and be trained. It is estimated that these sectors will face difficulties in recruiting workers in the coming years.

Strategic Policy Directions for Cultivating New Talent for Future

Direction and Solutions for Vietnamese Workers' Skill Development

As per Vietnam's socioeconomic development strategy for the period of 2021–30, with a vision to 2045, Vietnam will become a developing country with modern industry, reaching the middle-income level and strive to become a high-income developed country by 2045. To achieve this goal, it is necessary to focus on developing high-quality human resources to meet the requirements of

IR4 and international integration. In addition, it is important to focus on renovating the VET system in an open and flexible direction, ensuring consistency with the policy of fundamental and comprehensive reforms in education and training, focusing on improving the quality of human resources, restructuring labor, forming a skilled workforce, increasing national competitiveness, and closely linking training and employment.

Resolution No. 52-NQ/TW of the Central Committee on a number of guidelines and policies to actively participate in IR4 sets out goals for Vietnam's next development period. In terms of HRD, the resolution indicates the need for 'strengthening VET and supporting skills training for job change.' The State has policies to support employees when participating in retraining or further training to improve their professional skills to change jobs.

On 4 February 2020, the Prime Minister issued the Directive 07/CT-TTG on solutions to promote national labor productivity, which requested relevant bodies from central to local levels, within their jurisdiction, to effectively direct and carry out major reform orientations to increase labor productivity in Vietnam. In particular, the MOLISA has the task of "improving policies to encourage enterprises to participate in VET activities; providing VET training programs delivery methods and assessment; linking training with enterprises, employers, and sustainable jobs; and promoting training, retraining workers, and training high-quality technical workers capable of participating in smart production and technology-based business model."

The Directive No. 24/CT-TTg, dated 28 May 2020, on promoting skilled workforce development to contribute to the improvement of productivity and national competitiveness in the new situation has been issued. Prime Minister requests ministries, central authorities, and local governments to focus on performing the following tasks: continue to properly implement mechanisms and policies for development of vocational education and a skilled workforce; further carry out digital transformation and online training, with a focus on retraining and regular training of the workforce to bring about great changes in terms of size, quality, and efficiency of vocational education; and ensure that learners acquire professional skills, digital skills, soft skills, entrepreneurship skills, languages, etc. required by the labor market. Vietnam is striving to reach the vocational education level of ASEAN-4 countries by 2030 and that of G20 countries by 2045; and increase communications activities, change social consensus, and mindsets about development of vocational education and the position and role of the skilled workforce to mobilize participation and resources from the whole society, especially enterprises' cooperation in developing a skilled workforce for Vietnam's development.

Direction of Vietnam VET Development Strategy for 2021–30, with Vision to 2045

VET development is one of the most important tasks for the country's socioeconomic development in order to take advantage of the golden population structure; contributing to improving the quality of human resources, labor productivity, quality, efficiency, and the economy's competitiveness; adapting to the rapid changes in the labor market; and meeting the requirements of the industrial revolution and international integration. Some of the focus areas include:

- focusing on VET training scale, structure, and quality; selectively absorbing international experience on VET institution models; and training key occupations and fields;

- developing VET to meet the labor market's needs in association with decent work, social security, and sustainable and inclusive development; maximizing learners' capacity; and promoting entrepreneurship and innovation;

- improving professional skills and good qualities of Vietnamese workers in the integration period, and gradually popularizing VET for young people;

- prioritizing budgetary allocation for VET in the total state budget expenditure for education and training as well as in programs and projects of branches and localities; and

- strengthening the socialization of VET in suitable areas, industries, and occupations.

Vocational education development is the responsibility of all levels of government, agencies, organizations, enterprises, VET institutions, and people. There is a need to focus on VET in development plans, programs, schemes, and projects across sectors and localities.

Program to Support Development of Vietnam's Labor Market up to 2030

The focus areas include:

- developing a comprehensive and sustainable labor market in a modern and effective direction, in line with the characteristics of each region and locality;

- the State playing the role of creating and supporting the development of the labor market by completing and improving the effectiveness and efficiency of mechanisms, policies, and legal documents on labor market development; and promoting administrative process reforms to limit risks related to workers' rights in the context of IR4; and

- actively integrating into the world and promoting the connection between domestic labor supply and demand in association with the international labor market.

Policy Recommendations

In the era of IR4, the role of technology is accelerated. Technological and digital adoptions are still low, both at the firm and the country level, and so, there is a need to raise awareness about the technology and its benefits as well as risks. At the same time, TVET training providers also need to work with the private sector in order to produce skilled labor forces, especially those having technical skills, soft skills, ICT skills, and digital skills. In future, more investment in technical manpower such as systems engineering, data analysis, and AI personnel will be required. These are important trends and policy experiences across member countries.

However, some challenges remain regarding skill gaps and shortages in the labor market for both technical and soft skills. To tackle these challenges, both the government and the private sector are working together aiming to cultivate qualified labor forces. The government should also develop soft-skills training materials and introduce them to all TVET training institutions to apply. In terms of skill development and training, an emphasis should be placed on both quantity and quality. The government should expand access to training opportunities to reach vulnerable groups including the poor, the elderly, and women. At the same time, adequate training should be provided to upskill the Thai workforce to work in the 21st century. More advanced technology or STEM courses as well as soft-skill courses must be encouraged more.

Besides, some firms in the private sector have also initiated training programs to fill the gaps in the labor market. Skill development is a long-term investment with proper planning and implementation.

More commitments from the private sector are also needed. After reviewing member countries, the following two guiding principles are suggested:

Do not hamper automation, and let the market experiment: Automation has the potential to bring in substantial improvements in the aggregate quality of life and work opportunities. The quest for realizing such a technology must not be thwarted by restrictive policies stemming from a Luddite paranoia. Hence, market forces should be left to interact freely. To enable market forces to realize the greatest benefits, it is crucial for the labor supply to be adequately equipped to withstand changing tides of automation. More specifically, labor must be skilled enough to shift jobs within and between sectors. Such mobility is possible if workers possess skills covering a range of tasks in demand, especially cognitive, both routine and non-routine.

Right to decent work (do not plan for mass technological unemployment but facilitate reinstatement): Work is essential to humans and provides benefits that transcend the individual person it originally concerned. Accordingly, policy must give space for automation, but at the same time ensure that the hollowing out of mid-skill jobs (and jobs in general) does not violate the labor's right to decent work. This can be achieved by skilling and facilitating mobility; incentivizing labor engagement; and having a social protection system in place. Another consideration to keep in mind is that interventions must be wary of making labor more expensive (higher monthly wages, extra contributions to labor funds, etc.) as that would bring down the relative cost of automation.

Based on these two principles, policy imperatives should be as follows:

Imperative 1: Skilling and Labor Mobility

It becomes important to re-envision skilling and education in general. Various labor competencies are determined by which schools people go to at a young age. Policymakers need to stop treating educational and skills training as they have conventionally been understood. Workers from all spheres will have to keep upskilling throughout their careers as and when disruptive technology keeps emerging. One cannot allow labor to compete solely on the privilege of good education received in childhood, and competencies have to be developed in individuals that go beyond specific tasks. An example of this is soft-skills training for integrating individuals into the hotels and accommodation industry, as these skills can be utilized in other jobs as well.

Imperative 2: Social Security

There is an urgent need for simultaneously devising a social security measure. The job polarizing effect of automation will result in two ills revolving social security. First, many mid-skill workers are displaced from formal employment structures where they received social security benefits. Second, the wage polarizing effect reduces the dispensable income available to workers, which could result in reduction in the income being utilized for health purposes. The role of the state in financing social-security scheme is important as the funding aspect should not burden the industry too much. Rather, if the industry considers the costs for engaging labor to be substantial, it would catalyze automation.

Imperative 3: Labor's Competitive Edge over Automation

Government policies can aim at giving labor a competitive edge over automation in industries where automation is intended to merely substitute labor with capital. This can be done by increasing the relative cost of capital, thereby disincentivizing automation. Other possible options include reduction in tax deductions for interest, increased cost of acquiring automation technology,

elimination of capital subsidies, and so on. More explicit moves include implementation of 'robot taxes' repeatedly promoted by Bill Gates.

Other Concerns

First, automation has also been suspected of deskilling labor due to its polarizing effect on jobs. Automation pushes existing mid-to-low-skill workers into low-to-unskilled work and reduces the aggregate skill composition. This has been observed even when automation brings about a strong reinstatement effect. Second, availability of opportunities and attempts at skilling may not be sufficient. Third, automation has become a tool for subverting democratic forces and progress. Specifically, the following concrete policy recommendations may be considered to facilitate sustainable employment in the face of changing skill demand with IR4:

(1) improving the skill levels of human resources, given the recognized known needs of each field of activity;

(2) holding training courses in areas required for the field of business activities;

(3) facilitating the recruitment of skilled labor appropriate to each field of activity;

(4) creating or strengthening educational and executive institutions and improving the skills of human resources using existing capacities;

(5) helping workers absorb technical knowledge tailored to the real needs of each field of activity;

(6) creating or supporting actors of venture capital or other similar types of investment;

(7) facilitating the relationship between businesses and employment in each target activity;

(8) facilitating the connection between the local businesses and their respective sectors;

(9) facilitating the recruitment of temporary foreign skilled labor, if allowable; and

(10) contributing to the direct presence of business units and workers in regional and global markets.

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POLICIES FOR ENHANCING PRODUCTIVITY WITH NEW SKILLS