# Inclusive Innovation Policies for Economic Growth

Asian Productivity Organization

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# INCLUSIVE INNOVATION POLICIES FOR ECONOMIC GROWTH

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Inclusive Innovation Policies for Economic Growth

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# FOREWORD

In today's interconnected world, the pursuit of economic growth goes hand in hand with fostering inclusive innovation. As the landscape of global economies evolves, it is imperative to seek innovative, sustainable solutions to the challenges of the 21st century. Inclusive innovation is a guiding principle for economic prosperity to ensure the welfare of all.

There is increasing awareness of unequal rates of participation in innovation, meaning that women, minorities, people with disabilities, immigrants, and those from disadvantaged socioeconomic backgrounds are underrepresented. The COVID-19 pandemic magnified the impacts of this unequal access so that the need for greater social inclusion in innovation across demographic groups, industries, and geographic regions is more urgent. The pandemic also underscored the need to address societal and environmental challenges that affect marginalized and vulnerable groups. Tackling these structural challenges requires a focus on inclusive innovation.

The APO conducted this research to examine the social, environmental, and economic potential of inclusive innovation policies in India, Japan, Malaysia, the Republic of Korea, Turkiye, and Vietnam. Based on that research, this publication recommends policies that can contribute to more inclusive, innovation-led productivity growth in the Asia-Pacific under the APO Vision 2025.

The APO extends sincere gratitude to chief experts Alex Glennie, Innovation Growth Lab, NESTA, London, UK, and Dr. Robyn Klingler-Vidra, King's Business School, London, UK, and the national experts who conducted the research and wrote this publication. Without their support, this publication would not have been possible. The APO hopes that *Inclusive Innovation Policies for Economic Growth* will serve as a useful guide for readers and offer insights on inclusive innovation policies to contribute to innovation-led productivity and economic growth.

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# INTRODUCTION

There is increasing awareness about the lack of equal participation in innovation. Women, minorities, people with disabilities, immigrants, and those from disadvantaged socioeconomic backgrounds are underrepresented. The COVID-19 pandemic magnified the impacts of this unequal access to innovative employment on livelihoods making the need for greater social inclusion in innovation across demographic groups, industries, and geographic regions more urgent. The pandemic has also underscored the need for novel ways to rapidly address societal and environmental challenges that affect society's marginalized and vulnerable most acutely.

The causes of under-representation in innovation activities are many, and include constraints on the supply of labor, such as insufficient training or desire to participate, which leads to a small set of initial applicants from under-represented groups. It also includes demand-side challenges such as conscious or subconscious preferences that inhibit sufficient investment in, or employment of, applicants based upon demographic traits. Addressing these structural challenges requires an explicit focus on inclusive innovation.Definition of Inclusive Innovation

Innovation is not neutral. It has a direction, and while it can be a positive force for economic and social development, it can also fuel inequality, destroy livelihoods and harm the planet. This needs to be taken into account by those who innovate and those who support them, including policymakers and funders. In recent years this has prompted an increased focus on inclusive innovation. For this report, we define inclusive innovation as:

*The pursuit of innovation that has environmental and social aims, and local context, at its heart. It arises from an understanding that inclusion is about people and the planet, and so ecological concerns need to be at the center.*

This definition draws on an extensive body of academic theory and policy analysis, outlined in more detail below.

## Evolution of Inclusive Innovation in Theory and Practice

The notion of inclusive innovation has roots in the "appropriate technologies" movement that emerged in the 1970s, advocating the pursuit of context-relevant and environmentally enhancing technologies in emerging economies [1]. The language used to describe these ideas evolved in the mid-2000s, and Mark Dutz was the first to use the phrase "inclusive innovation" in a 2007 World Bank report on sustainable innovation in India. He defined it as "knowledge creation and absorption efforts that are most relevant to the needs of the poor" [2]. This definition emphasizes social imperatives and contours, though it does not explicitly engage the environment. In this societal context, inclusive innovation is, in some ways, the convergence of an emphasis on entrepreneurship and innovation, or as the meeting point between the ideas of Joseph Schumpeter (who is often considered synonymous with the idea that new entrants drive society's productivity advances by challenging incumbent firms and technologies) and E.F. Schumacher, the author of Small is Beautiful, who advocated for economic activity that is ecologically and socially oriented [3, 4]. In

this sense, inclusive innovation comprises the pursuit of innovation that strives to deliver both productivity-enhancing aims and environmental and social benefits.

As research into inclusive innovation advanced, researchers often employed a producer and consumer dichotomy. This binary implicitly refers to inclusion through either the advance of production capabilities across groups underrepresented in innovation activities [5, 6] or the purposeful development of innovative products for disadvantaged consumers [7, 8]. Producer-oriented strategies aim to activate more segments of society as producers of innovation. Consumption-focused initiatives, in contrast, focus on encouraging the development of technologies, business practices, or services to solve social and environmental challenges for particular demographic groups, such as applying innovation to agriculture to improve crop production and benefit farmers. A contemporary, consumer-focused segment of this movement emphasizes designing solutions for the Base of the Pyramid' (BOP) consumers.

**TABLE 1**

**INCLUSION IN PRODUCTION AND CONSUMPTION.**

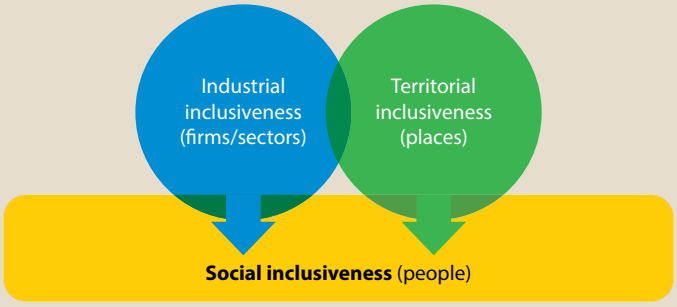
| | Production: Inclusion in the Innovation Process | Consumption: Use of Technological Innovation to Aid Social Inclusion |
|---|---|---|
| **Aim** | To increase the inclusion of underrepresented groups as producers of innovation activities. | To encourage the consumption of technological innovations to ameliorate social challenges faced by particular groups. |
| **Target populations** | Underrepresented demographics (e.g., age, disability, ethnicity, gender, race, religion, sexuality), disadvantaged socio-economic regions, and traditional industries. | People with disabilities, BoP, traditional industry. |
| **Examples** | Enable Code, Zero Bhat Shop | DMaps, Litre of Light, Pink Banh Mi (ABC Bakery), Rice ATM |

**Source:** Adapted from Appropriate Technology: Problems and Promises and Unleashing India's Innovation: Toward Sustainable and Inclusive Growth [1, 2]. For further detail on the examples mentioned, see https://www.inclusiveinnovation.io/#featured-stories.

The OECD's 2017 [9] report on inclusive innovation policy delineates efforts into striving to address either demographic, industrial, or spatial dimensions in terms of who is included in the production of innovation (see Figure 1).

**FIGURE 1**

**DIFFERENT TYPES OF INCLUSIVENESS.**




**Source:** Adapted from Inclusive innovation policies: Lessons from international case studies , OECD Science, Technology and Industry Working Papers, 2017 [9].

Demographically-motivated or social inclusiveness efforts point to ascriptive groups, which refer to the disadvantaged groups based on factors assigned by birth, such as gender, age, and minority or ethnic status [10]. These are not based on achievements. Spatial or territorial efforts aim to diminish the gap between urban and rural, wealthy and poor, and core and periphery [11]. The third realm is that of promoting innovation in traditional industries and firms, which strives to infuse technological innovations or socially innovative approaches into production processes.

The Nesta [12] inclusive innovation framework assesses innovation policy in terms of its direction, participation, and governance attributes. In terms of direction, it contends that the promotion of innovation has distributive implications, and as such, purposeful efforts need to be made to positively include groups that are otherwise marginalized or excluded, and to encourage a "green recovery." The direction has to do with the intentionality, or the objective, of activities.

Participation, in a similar way, speaks to considerations for who and how to broaden inclusion in action, in terms of including underrepresented demographic groups, disadvantaged regions, or economic sectors. Finally, governance involves how innovation policy engages a wide section of society in the policymaking process, ranging from agenda and priority setting to governance and regulation of ongoing initiatives so that different perspectives can be included. The notion of governance as being inclusive has to do with how the agenda is set, how outcomes are assessed, and how lessons are drawn. For instance, ensuring that the stakeholders who are conceived as beneficiaries of the policies are represented across different stages of the policymaking process.

**TABLE 2**

**NESTA'S INCLUSIVE INNOVATION POLICY FRAMEWORK.**

| Dimension | Indicator of an Inclusive Approach |
|---|---|
| **1. Overall objectives**<br>Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. |
| **2. Direction of innovation**<br>Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs.<br>2.1. Support for innovation addressing the particular needs of excluded groups. |
| **3. Participation in innovation**<br>Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy.<br>3.2. Measures to increase the participation of disadvantaged or lagging regions or districts.<br>3.3. Measures to promote innovation in low-productivity or low-innovation sectors.<br>3.4. Measures to involve civil society and social economy organizations in innovation. |
| **4. Governance of innovation**<br>Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting.<br>4.2. Measures to broaden participation in the regulation of innovation.<br>4.3. Measures to mitigate the risks of innovation.<br>4.4. Measures to promote fair distribution of the benefits of innovation. |

**Source:** How inclusive is innovation policy? Insights from an international comparison, Nesta, 2018 [12].

Work on inclusive innovation policy has also expanded into thinking about the types of capital, e.g., finance, human, and social capital that may cause underrepresentation and exclusion for demographic groups [11]. In this vein, research notes that policy initiatives include governments directing financial capital, such as Research and Development (R&D) spending or startup loans, towards under-represented groups, to increase their participation. They also include policy measures that invest in human capital, in the form of skills training. For example, coding boot camps and targeted provision of Science, Technology, Engineering, and Mathematics (STEM) education for women, ethnic minorities, and socio-economically disadvantaged population groups. Such provision is based on the presumption that a lack of specialized skills and experience is excluding particular demographic groups from work in innovative sectors, and so targeted computer and STEM training programs are provided to help fill the skills gap that is undermining demand from these potential applicants [10].

Studies show that inclusive innovation policies may also boost deficient social capital, e.g., social networks and the access that they portend. Policies that strive to endow social capital for underrepresented demographic groups have done so through mentorship, training, and networking programs, to drive "bonding" (e.g., close relations) and "bridging" (e.g., distant connections) forms of social capital [13].

**TABLE 3**

**SOCIAL CAPITAL STRATEGIES FOR BOOSTING INCLUSIVE INNOVATION.**

| Social Capital Deficiency | Social Capital Strategy | Policy Instrument | Objectives of Inclusive Innovation Policies |
|---|---|---|---|
| Insufficient personal network | Bonding | Networking and meetings | Build social networks through the provision of mentorship and networking activities. This helps develop closer relationships with successful members of the same demographic group to encourage participation and provide relatable advice. |
| Few 'weak ties' across the innovation system | Bridging | Networking and introductions across the innovation system | Make contacts across the innovation system, particularly with individuals from other demographic groups, to access finance and other resources. |
| Unconscious bias | Bridging | Campaigns, role model campaigns, awards, competitions | Encourage change towards greater valuing of participants from under-represented groups, often by showcasing representative examples. |
| Lack of desire to participate | Bonding | Role model campaigns, awards, prizes, competitions | Promote role models to encourage members of particular groups. |

**Source:** Inclusive innovation policy as social accumulation strategy, International Affairs, 2020 [13].

Building on the Nesta framework, UNDP Asia Pacific's Regional Innovation Centre commissioned Nesta to lead a study of inclusive innovation strategies in the ASEAN region, by assessing the direction, participation, and governance dimensions of policy and practice initiatives. The result was the UNDP-Nesta Strategies for Supporting Inclusive Innovation: Insights from South-East Asia study [14], which identified three primary approaches to inclusive innovation.

1. **Technology should save us:** It involves the development of technology-based solutions to address social or economic challenges such as waste collection, education provision, low incomes in the agricultural sector, or infrastructure issues facing excluded groups.

2. **Innovation everywhere:** This refers to interventions where high-value activities are intended to be further regionally distributed.

3. **Innovation for the foundations:** It aims to enhance the quality of life and work in poor communities, sectors, and regions.

Consolidating the growing body of work, the book by Klingler-Vidra [11] on inclusive innovation develops a framework asking the "big five W" questions of who, what, where, when, why–and the "how." The who is understood as the individual or group experiencing the challenge and it is at the center of any initiative. The why has to do with the observation of an "unjust equilibrium" (e.g., exclusion, inequality) and the desire to address it through an innovative process or product.

The framework then examines inclusive innovation according to the answers to its how, what, and where questions. How is primarily conceived as the social process by which innovation is organized, recognizing the need to understand inclusive innovation beyond (information) technology solutions. What pertains to solutions to address social or environmental challenges; it engages with technology in a broad sense, again making the case for a conceptualization of technology that goes beyond information technology. Finally, the engagement with where emphasizes the geographic distribution of innovation activities, acknowledging the tendency for uneven production and consumption of innovation amongst urban areas and "clusters" of activity.

**TABLE 4**

**INCLUSIVE INNOVATION: KEY QUESTIONS.**

| | Rationale | Target Issues or Groups |
|---|---|---|
| **1. How** | The process of innovation should be Inclusive, by problem owners, often in collaboration with multiple stakeholders, rather than "heropreneurs" acting alone to address others' challenges. | Climate change and related vulnerabilities; Disadvantaged socioeconomic areas and groups; Environmental degradation; Low- income individuals; People with disabilities. |
| **2. What** | Technology-based solutions can exacerbate inequality and exclusion, but also ameliorate inequality and drive environmental benefits. | Increase participation of underrepresented demographic groups; Advance the productivity of low-tech sectors; Rural and disconnected areas. |
| **3. Where** | Innovation needs greater spatial reach in terms of where it occurs, to address challenges in rural and urban areas. | Climate change and related vulnerabilities; Low-income or low productivity areas; Rural and mountainous regions. |

**Source:** Adapted from Inclusive Innovation, Routledge, 2022 [11].

## Methodology

Research for this report was conducted between September 2022-January 2023 by six National Experts who worked on the case studies from their countries. It was coordinated by the Chief Experts and the APO Secretariat. The methodology involved identifying key inclusion challenges and flagship innovation policies in each of the six countries identified for the case study. To do so, national research teams conducted desktop research and stakeholder interviews. Cross-national team meetings were held in October and November 2022 to share emerging results for clarification and comparison purposes.

**Desktop research:** The data collection sought information on the context for innovation in each country, around demographic, industrial, and spatial attributes. To identify areas of inclusion, at the

outset, the Chief Experts shared an initial bespoke dictionary of inclusive innovation for country teams to calibrate for their local context.[1]

The desktop research involved identifying flagship innovation policies through a two-fold approach. First, it entailed identifying the relevant government agencies, departments, and ministries. Secondly, it involved identifying the country's primary flagship innovation policies. By examining the activities of key innovation agencies and exploring high-profile innovation policies, the national team was able to identify their respective sets of national policies for analysis.

**Stakeholder interviews:** The next stage was to identify key stakeholders for interviews. In searching for key agencies and policies, the country research teams sought information on the teams and individuals responsible for making and analyzing the flagship innovation policies. A shortlist of potential interviewees was created, consisting of key stakeholders from innovation agencies, institutes, and think tanks. From September to December 2022, each team conducted stakeholder interviews to assess policymakers' perceptions of the identified policies' direction, participation, and governance aspects. The interviews also aimed to gauge how effectively existing innovation policies address the country's key challenges. See Appendix on page number 98 for the Interview Protocol Template.

**Analysis:** The analysis was guided by Nesta's inclusive innovation policy framework (see Table 2). This analysis helped the national experts' assessment of the "direction, participation, and governance" attributes of each flagship innovation policy. Each country team completed the table, noting the extent to which there was alignment between the policies and the various prompts for each indicator.

## Report Structure

The chapters in this report take a closer look at how inclusive innovation is understood and operationalized within the policy ecosystems of six APO member economies: India, Japan, the Republic of Korea (ROK), Malaysia, Turkiye, and Vietnam. Chapters 2 to 7 provide an overview of the main challenges and inclusive dimensions of innovation policies in each of the six economies. The concluding chapter provides key insights and policy recommendations for both the APO and its members to take this work further.

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# INDIA

## Inclusive Innovation Challenges in India

India is among the fastest-growing economies globally and innovation has played a critical role in achieving this status. India is a vast country inhabited by 1.417 billion people out of which the female population is 670 million. A welcome feature of India's population is that 60% of its population is in the range of 15 to 59 years. One-fifth of the youth population of the world is in India. No other country in the world has as much diversity as there is in India. There are 766 districts in 28 states and nine union territories (UTs) in the country. There are 22 scheduled languages but more than 200 major languages and dialects are spoken which at times act as a language barrier for inclusive development across the nation. The government intends to utilize India's demographic dividend to drive innovation and the nation's quest to develop into a knowledge economy. India has made rapid and significant strides in almost every field.

Limits in technology and market access are barriers to inclusive innovation in India. People are not fully aware of the available technological solutions that may help alleviate their problems. There are several reasons for such a lack of awareness. A proper market delivery mechanism is either missing or underdeveloped. Other reasons include the lack of dedicated suppliers and networks, insufficient physical infrastructure like roads and railways, and unsatisfactory telecommunications networks [1]. Financial constraint poses an additional barrier to inclusive innovation, as individuals face limited access to necessary funds to overcome their inability to pay [2, 3].

Technology access is the other barrier to inclusive innovation where technology that can help the poor exists but needs adaptation to the local context. Adoption of appropriate technology innovation needs the services of subject matter experts but they are not available locally. This situation can lead to a high cost of technology access and a breakdown of the market mechanism which connects the supply and demand aspects of the market [4].

Innovation and creativity are vital to achieving progress in socio-economic fields, education, healthcare, and agriculture-related areas. India has begun to carve a path toward an enabling environment by establishing an ecosystem that fosters innovation. As emphasized by the Prime Minister of India, innovation is pivotal in promoting the country's resilience and self-reliance.

Never before the need to adapt and adopt new technologies and innovations was felt more urgently than with the onset of the COVID-19 Pandemic. The role of innovation inter-alia inclusiveness has assumed bigger proportions and gained paramount importance. This pandemic stimulated rigorous R&D including business model innovations in the health sector.

With this backdrop, the creation of the India Innovation Index 2021 is one such step towards fostering and furthering the ongoing wave of innovation in the country. India Innovation Index brings out the innovative landscape at the national and sub-national levels. The index is a thorough instrument that underscores the capabilities of states and UTs and draws comparisons among them, fostering their competitive spirit. International comparisons drawn by the index could help India develop capabilities to global standards. By ranking different UTs and states based on different

paradigms and encouraging healthy competition among them, the index helps stimulate growth and development and contributes towards nurturing the nation's innovation ecosystem.

Inclusive development entails more inclusive innovation. This includes 'horizontal' expansion to bring in sectors that matter most to socially marginalized persons, like education, health, and e-governance. With this background this study presents a new paradigm highlighting the policy connection between innovation and inclusion in fostering inclusive development through four policies: (1) National Education Policy 2020, (2) National Health Policy 2017, (3) Science, Technology, and Innovation Policy 2013 and (4) e-Governance Policy Initiative under Digital India [5].

## Existing Innovation Policies in India

### National Education Policy (NEP), 2020

The NEP 2020 was initiated by the Government of India on 29 July 2020. It seeks to universalize education from preschool to secondary level with a 100% Gross Enrolment Ratio (GER) by 2030 while introducing large-scale transformational reforms in school and higher education. This policy replaces the 34-year-old NEP 1986 and aims to develop India into a vibrant knowledge society and an international knowledge superpower by ensuring multidisciplinary, flexible, and holistic college and school education compatible with international standards. It envisions an India-centric education system and the provision of quality education and equitable access to all students in a sustainable manner. One of the main features of NEP 2020 is its focus on the inclusion of disadvantaged groups. It seeks to create special education zones in areas with a significant proportion of disadvantaged groups [6].

The policy considers equity as an inclusive notion focusing on Socio-Economically Disadvantaged Groups (SEDGs). It draws attention to disparities experienced by sociocultural groups based on caste, tribe, and religion, especially targeting girls and women who cut across all underrepresented groups. This ensures inclusion and equal participation of children with disabilities in Early Childhood Care and Education (ECCE) and supports teachers in identifying learning disabilities early and planning for their mitigation [7].

**Direction:** NEP's motto of "equitable and inclusive education" emphasizes that quality education should not be denied to any child due to their sociocultural background. The policy also assures support to Higher Education Institutions (HEI), the National Institute of Open Schooling (NIOS), and State Open Schools. The government has also created a Gender Inclusion Fund to develop the nation's capability to provide fair and quality education to girls and transgender students.

Kasturba Gandhi Balika Vidyalaya (special schools), Jawahar Navodaya Vidyalaya, and Kendriya Vidyalaya have been strengthened and expanded for the poor and marginalized population of adolescent girls. New National Assessment Centre PARAKH or Performance Assessment, Review, and Analysis of Knowledge for Holistic Development, Digital Infrastructure for Knowledge Sharing (DIKSHA), and the establishment of a National Research Foundation (NRF) projects have helped in improving the quality of education to achieve 100% literacy and ensure equitable access and opportunities for all students.

**Participation:** From an inclusion perspective, the main focus of NEP 2020 is to boost the participation of SEDGs which includes Gender Identities (female and transgender); Sociocultural Identities like Scheduled Castes (SCs), Scheduled Tribes (STs), Other Backward Classes (OBCs),

and minorities; Geographical Identities (villages and small towns); Disabilities (learning disabilities); and Socioeconomic Conditions (migrants, low-income households, victims of trafficking, urban poor, etc.).

**Governance:** The NEP affirms bridging social category gaps in access, participation, and learning outcomes in education. The success of this new education policy will depend on how it is implemented. The establishment of a digital innovation ecosystem in India has helped reimagine the field of education by expanding access to quality learning experiences and boosting student engagement. Similarly, a world-class digital university can be developed to focus on providing quality education in different languages. The government plans to expand the PM eVidya 'one class one-TV channel' program for classes 1 to 12 to include higher classes, which will be telecast by 200 TV channels in various vernacular languages. The National Innovation and Startup Policy (NISP) 2019 for HEIs enables institutions to actively engage students, faculty members, and staff in activities related to entrepreneurship and innovation and seeks to create a robust innovation and startup ecosystem across these institutions [8].

### National Health Policy (NHP), 2017

The NHP 2017 sought maximum well-being and health for everyone through promotive and preventive healthcare orientation across developmental policies. Especially pertinent in the context of inclusion, the policy aimed to make quality healthcare services accessible to everyone through better access to technologies, development of human resources, enhanced medical pluralism, development of knowledge base and superior financial protection strategies, and decreasing healthcare delivery costs [9].

The policy is based on the key principles of *Professionalism, Integrity, and Ethics; Equity; Affordability, Universality; Patient-Centered and Quality of Care; Accountability, Inclusive Partnerships; Pluralism; Decentralization; and Dynamism and Adaptiveness.*

**Direction:** The policy aligns with the international Health in All Policies (HiAP) approach and identifies the following key dimensions to improve the health environment: *Swachh Bharat Abhiyan*; balanced, healthy diets and regular exercise; *Yatri Suraksha* (to prevent deaths related to road traffic and rail accidents); *Nirbhaya Nari* (action against gender violence); reduced stress and better safety at the workplace; and reducing outdoor and indoor air pollution. NHP seeks to offer superior healthcare to vulnerable sections of society. The policy also enunciates *Swasth Nagrik Abhiyan*, a social movement for health. AYUSH or Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy promote healthy living and prevention strategies at the workplace, in schools, and in the community. It has also gained much popularity in the Indian context. It seeks to improve life expectancy at birth from 67.5 to 70 and decrease the infant mortality rate to 28 by 2025.

The *Ayushman Bharat*-National Health Protection Scheme covers more than 100 million poor and vulnerable families in India, offering coverage up to INR500,000 per family annually for secondary and tertiary care hospitalization.

**Participation:** The policy emphasizes specific health requirements of tribal and socially vulnerable population groups. The policy focuses on addressing the primary healthcare needs of the urban population with a special focus on the poor population living in listed and unlisted slums and other vulnerable populations in urban areas. The policy emphasizes specific health requirements of tribal and socially vulnerable population groups and puts forth measures for the provisioning and delivery

of services. It also supports better public healthcare outreach through Mobile Medical Units (MMUs) and other means and stresses that medical colleges be developed in rural areas. NHP aspires to achieve and maintain a cure rate of >85% in new sputum-positive patients for TB and reduce the incidence of new cases, to reach elimination status by 2025 in the country.

**Governance:** The policy institutionalizes intersectoral coordination at the subnational and national levels to enhance health outcomes. The government followed a consultative and participative approach to devising the policy. One way of widening inclusion was by emphasizing India's traditional systems of medicine to ensure an integrative health services program. Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa Rigpa, and Homoeopathy covered under the Ministry of AYUSH represents such a health service scheme. NHP 2017 stresses the integration of AYUSH in the National Health Mission, research, and education, and envisions an amplified role for it.

Introduced in 2018, the Ayushman Bharat scheme sought to achieve the vision of Universal Health Coverage (UHC) and encourage inclusiveness in the health domain. Ayushman Bharat entails two key components: Health and Wellness Centers (HWCs) and *Pradhan Mantri Jan Arogya Yojana* (PM-JAY). Under the initiative, existing sub-centers and Primary Health Centers (PHCs) were transformed to create 150,000 HWCs that sought to deliver Comprehensive Primary Health Care (CPHC), making healthcare more accessible. Maternal and child health services and non-communicable diseases, free essential drugs, and diagnostic services were also included as part of the initiative.

The Pradhan Mantri Jan Arogya Yojna, or PM-JAY, was introduced on 23 September 2018 and it is the largest health assurance scheme in the world that seeks to provide health cover of INR500,000 per family per year for secondary and tertiary care hospitalization. This covers more than 107.4 million vulnerable and poor families. PM-JAY provides cashless access to healthcare services at the point of service. It covers up to three days of prehospitalization and fifteen days of posthospitalization, such as medicines and diagnostics.

### Science, Technology, and Innovation Policy (STIP), 2013

Since independence, India has had four Science, Technology, and Innovation (STI) Policies, which have guided the evolution of the country's STI ecosystem. The first Scientific Policy Resolution of 1958 laid the foundation of the scientific enterprise and scientific temper in India. Technology Policy Statement 1983 sought technological self-reliance through the development and promotion of local technologies. S&T Policy 2003 aimed to keep pace with developments in S&T and stay competitive amid globalization to realize equitable and sustainable development [10]. The Government of India seeks to adopt and promote new and emerging technologies such as Blockchain, Artificial Intelligence (AI), Augmented Reality (AR) and Virtual Reality, Machine Learning (ML) and deep learning, robotics, and the Internet of Things (IoT).

**Direction:** India has built a healthy STI ecosystem through its four consecutive national S&T policies to enable national development as well as inclusive and sustainable growth. It seeks expenditure on innovation and R&D technology to ensure gender parity in STI activities and to attain global competitiveness in particular technological domains through global association [11].

The government introduced Scientific Social Responsibility (SSR) to pass on the benefits of science to wider society. Emphasizing R&D infrastructure resources, human resources, and knowledge resources and the role of scientists, scientific organizations, and universities, the

initiative aims to extend resources to society and encourage micro-and small-and-medium-enterprises (MSMEs), as well as communication with farmers and startups. It also contends that institutions can play a role in developing the imagination of students.

The SRIMAN or Scientific Research Infrastructure Sharing Maintenance and Networks guidelines seek to enable the efficient use and broader access of Research Infrastructure (RI) to researchers, scientists, and professionals across the nation through the creation of a network of pertinent stakeholders. SRIMAN could enable better access and sharing of scientific research infrastructure for the benefit of the community and the development of the wider workforce in the country. Another aspect of the STI policy is SRISHTI or Science, Research and Innovation System for High Technology which emphasizes the enhancement of youth's skills for scientific applications.

**Participation:** STIP 2013 seeks to place India as one of the five key international scientific powers by enhancing the percentage of international scientific publications from 3.5% to 7%, developing an environment for more private sector participation in R&D, translating R&D output into commercial and societal applications, and duplicating successful models and establish novel PPP structures.

A thrust of STIP efforts is startup support, without necessarily indicating demographic, industrial, or spatial inclusion aims. Part of STIP efforts is the Startup India initiative, which seeks to develop a robust ecosystem to foster innovation and startups in the country, promote sustainable economic growth and create large-scale employment opportunities. Another program is the Atal Incubation Centers (AICs), which were established to support innovators and startup businesses in their pursuit to become successful entrepreneurs. Established incubation centers in the nation would boost startups in certain domains including production, energy, transport, education, health, agriculture, sanitation, water, etc., and aid them with requisite infrastructure facilities and other value-added services.

National Initiative for Developing and Harnessing Innovations (NIDHI) is another scheme aimed at nurturing ideas and innovations (knowledge-based and technology-driven) into successful startups. It seeks to function in line with national priorities and goals to create an innovation-oriented entrepreneurial ecosystem towards socioeconomic development and wealth and job creation. NIDHI aims to nurture startups through scouting, supporting, and scaling innovations and a collaborative approach. The chief stakeholders of NIDHI include different departments and ministries of the state and central governments, academic establishments, R&D institutions, financial institutions, mentors, angel investors, private sector bodies, and venture capitalists. NIDHI programs are implemented through Technology Business Incubators (TBIs) available across the country.

Other elements have more specific demographic targets, particularly youth and women. For instance, the Atal Innovation Mission focuses on nurturing imagination, curiosity, and creativity in young minds, and developing skills including computational thinking, design mindset, physical computing, adaptive learning, and others. With a similar focus on youth, Atal Tinkering Laboratories (ATL) was established to shape young ideas through hands-on, do-it-yourself modes and impart innovation skills. The scheme promotes the use of equipment and tools and aspects of STEM. Through ATLs and AICs, the government aims to develop scientific temper at the very initial stage among children and to promote innovation from school to industry [12].

Another initiative focused on youth is the CSIR *Jigyasa* Scheme, run by the Council of Scientific and Industrial Research (CSIR) under the Ministry of Science and Technology (S&T). It launched a unique student-scientist connect program Jigyasa in collaboration with central schools with the sole objective of extending classroom learning and focusing on well-planned research-laboratory-based learning. Jigyasa aims to inculcate a culture of inquisitiveness and scientific temper among school students and their teachers [13].

Women are an important section of the workforce, particularly in the S&T domain. Recognizing the importance of women in the workforce, especially in S&T, the Department of Science and Technology (DST) introduced women-scientist-centric schemes. The initiative aims to offer opportunities to women scientists and technologists between 27-57 years who had an interruption in their careers but are keen to join the workforce. The Knowledge Involvement in Research Advancement through Nurturing (KIRAN) initiative offers chances to women scientists and technologists to enable them to continue their education in science and technology post-interruption in their careers. The scheme seeks to create gender parity in the S&T domain by bringing in more women through different programs and empowering them. The government also initiated Gender Advancement for Transforming Institutions (GATI) scheme to inculcate inclusiveness in the S&T ecosystem.

Focusing on industrial inclusion, the government launched the Make in India initiative that focuses on creating additional employment opportunities by encouraging innovation and investments in the country's manufacturing sector [14].

**Governance:** The STIP was launched by the government, and can emerge successful only if it is implemented and governed systematically with an effective, accountable, and transparent mechanism for monitoring and evaluation. India's performance has been consistently improving in fostering innovation, as per the Global Innovation Index (GII) 2021, where India moved up two positions since 2020 [15]. To further strengthen the STI policy governance and research, a DST-IISC Center for Policy Research was established in Bangalore. It provides knowledge support for coordination, evaluation, and capacity building and also helps in identifying policy gaps, and provides evidence for effective policymaking. Further efforts are needed to systematically monitor the inclusiveness of policy efforts [16].

### e-Governance Policy Initiatives under Digital India, 2015

The government pursued several initiatives to improve the delivery of public services. This umbrella of efforts called the Digital India program was launched in June 2015 to transform the country into a digitally-empowered society and knowledge economy [17]. The scheme seeks to boost key growth domains through initiatives like Reforming Government through Technology, *e-Kranti*–Electronic Delivery of Services, Broadband Highways, Universal Access to Mobile Connectivity, Public Internet Access program, Electronics Manufacturing, Information for All, IT for Jobs and Early Harvest programs. The e-Kranti program, which is the strongest pillar of e-governance, covers 44 Mission Mode Projects (MMP) across the central, states and integrated services in various rural areas.

**Direction:** The National e-Governance Plan (NeGP) under the Digital India policy has two important activities: e-Governance for Reforming Government through Technology and e-Kranti for Electronic Delivery of Services. There are MMPs under e-Kranti including several social sector projects, namely Social Benefits, Women and Child Development, Urban Governance, *e-Bhasha*, and Financial

Inclusion, etc. These are additions to the novel MMPs under e-Kranti.[1] Collectively, these programs are aimed at promoting the digital payments ecosystem to transform the Indian economy by providing inclusive financial services through Unified Payment Interface (UPI), BHIM Aadhaar Pay, debit cards, etc. Thus, a core direction is one of digital financial inclusion related to socioeconomic attributes.

**Participation:** The National Digital Policy strives to incorporate participants in several dimensions, such as industries, government departments, businesses, employees, and citizens. It strives to transform the country into a digitally empowered society and a knowledge economy with high intellectual capital.

Efforts have also been made to advance inclusion in terms of the intersection of socioeconomically disadvantaged and rural populations. For instance, the policy strived to include mobile banking amongst people who earn their living by doing menial jobs mostly in urban areas like rickshaw pullers, street hawkers, laborers, and daily wagers, etc. With a similar orientation, the Unique Identification (UID) project sought to offer real-time service for authenticating the identification of every Indian resident using biometrics and demographic data via the Aadhaar number and promoting hassle-free people-centric governance.

The Common Service Center (CSC) scheme is another demographic-focused mission project under the Digital India program. CSCs are intended to act as access points for the delivery of essential public utility services, social welfare schemes, and financial, healthcare, education, and agriculture services. Finally, the *Pradhan Mantri Gramin Digital Saksharta Abhiyan* (PMGDISHA) aims to enhance digital literacy, touching nearly 40% of rural households by covering one member from every eligible household. The scheme sought to plug the digital divide by particularly targeting the rural population, especially the marginalized sections of society [18, 19].

**Governance:** The Digital India program is managed by a monitoring committee headed by the Prime Minister, a Digital India Advisory Group chaired by the Minister of Electronics and IT (MeitY), and an Apex Committee chaired by the Cabinet Secretary. Mission modes are implemented through central ministries and departments and state governments. The MyGov platform seeks to bring the government and the citizens closer through an online platform offering an interface for a healthy exchange of ideas and views [20]. In a similar vein, the National e-Governance Division (NeGD) was established by MeitY to facilitate the effective implementation of the NeGP by various ministries and state governments. NeGP takes a holistic view of integrating e-governance initiatives across the country to expand access and large-scale digitization, even in remote areas.

As a policy reform for current processes of public procurement, the government established a Government eMarketplace (GEM) which is a portal for public procurement of goods and services for central and state government bodies. The aim of establishing GEM is to drive inclusiveness and ease of doing business even for MSMEs, cottage industries, and small entrepreneurs. The government is the biggest buyer of goods and services in the country and the policy reform protects the business interests of small-time entrepreneurs, MSMEs, and cottage industries and brings them into the mainstream [21].

[1] Key programs under e-Kranti include Technology for Education (e-Education) with emphasis on broadband connection for secondary and higher secondary schools, free WiFi with Massive Online Open Courses (MOOCs), Technology for Health (emphasis on online medical consultation, records, medicine supply, pan-India patient info exchange), Technology for Farmers (emphasis on facilitating farmers for real-time price info, online ordering of inputs and online cash, loan, and relief payment with mobile banking), Technology for Security (emphasis on mobile-based emergency services and disaster-related services), Technology for Financial Inclusion (emphasis on mobile banking, Micro-ATM program, and CSCs/Post Offices), Technology for Justice (emphasis on e-Courts, e-Police, e-Jails, and e-Prosecution), Technology for Planning (emphasis on GIS-based decision making for project conceptualization, planning, development, and design), Technology for Cyber Security (emphasis on ensuring a secure cyber-space within the country).

Direct Benefit Transfer (DBT) is another scheme focusing on e-governance as a means of boosting activity amongst disadvantaged demographics, industries, and spatial groups. It aims to reform the government delivery system by reengineering the present processes in welfare schemes to ensure a quicker flow of funds for better targeting of beneficiaries. Under the scheme, the benefit or subsidy is directly transferred to eligible citizens. The DBT scheme has achieved significant growth since its launch. At present 310 schemes from 54 ministries and departments are being implemented under DBT [22].

The Government of India has used modern technologies to boost inclusive development in the country. The UPI, for instance, has had widespread use, as it improves the efficacy of unified platforms and applications that promote and facilitate digital financial transactions. More than 1 billion Aadhar cards and a similar number of mobile connections in India provided the unique opportunity to implement DBT in all welfare schemes meant for poor and marginalized people.

## Recommendations for Policymakers

**Direction:** Inclusive development is a key priority for the Government of India. Analysis suggests a shift towards an *Atmanirbhar Bharat* (self-reliant India) that aims to achieve inclusive development of citizens (poor and marginalized people, women, and rural communities). The findings of the study support the notion that e-governance (digitization of business process) of citizen-centric services and mobile telephony tend to benefit the common people and informal sector, including business activities of small enterprises [23]. This is in line with the Indian philosophy of *Vasudaiv Kutumbhkam* (the whole world is our family) meaning there is one earth, one family, one future, and *Sabka Sath, Sabka Vikas* (collaboration with all, development of all).

Therefore, policies that are inclusive and sensitive to the aspirations and needs of the country need to be further developed. The draft proposal of the STIP 2020 offers a good example. It emphasizes inclusiveness through rationality and scientific temperament, and equitable representation of women, disabled persons, and other regional, social, and economically diverse groups as well as its recommendation for spousal benefits for partners of lesbian, gay, bisexual, transgender, and queer (LGBTQ) persons, irrespective of their gender.

**Participation:** Equity and Inclusion (E&I) in STI is needed to build equitable STI capacity and to create social, industrial, and territorial inclusivity.

An E&I charter needs to be developed to do away with discrimination in STI based on gender, caste, religion, etc. This charter should be India-centric and institutionalize the equity and provisions to safeguard the rights of LGBTQ and pay special attention to differently-abled individuals.

**Governance:** Integrating e-governance services by state and central governments is critical for bringing inclusivity. It is also important to expand digital governance access, including growing the digital economy and digital infrastructure, especially in the context of rural populations. The government also needs to improve the provision of services in different languages; rural populations cannot use government services in English or Hindi. This enforces the need to do governance in the local language. Further, there is a need for advanced systems and mechanisms to convert the present demographic dividend into high-quality human capital, capable of doing cutting-edge research and innovation, startup ecosystem, and deep-tech entrepreneurship.

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## List of Interviews[#]

| Job Title | Organization | Date of Interview |
|---|---|---|
| Government Officials | Council of Scientific & Industrial Research, Ministry of Science & Technology | 1 Nov 2022, 15 Nov 2022, 7 Dec 2022 |
| Government Officials | Digital India Corporation, Ministry of Electronics & Information Technology | 5 Nov 2022, 7 Nov 2022, 30 Nov 2022 |
| Government Official | Department of Science & Technology, Government of India | 22 Dec 2022 |
| Government Official | Department of Science & Technology, IICB Centre for Policy Research | 11 Nov 2022, 12 Nov 2022, 13 Dec 2022 |
| Government Official | National Institution for Transforming India (NITI Aayog), Government of India | 4 Nov 2022 |
| Coordinator | Honey Bee Network | 23 Nov 2022 |
| Professor | IIT Roorkee | 15 Nov 2022, 21 Dec 2022 |
| Professor | Delhi Skill and Entrepreneurship University | 7 Nov 2022 |
| Professor | Swami Rama Himalayan University | 1 Nov 2022, 10 Nov 2022 |
| Professor | National Centre for School Leadership at National Institute of Educational Planning & Administration | 10 Oct 2022, 21 Oct 2022 |
| Professor of Eminence | Guru Nanak Dev University | 12 Nov 2022, 3 Dec 2022 |
| Distinguished Professor | BLM Munjal University | 13 Nov 2022, 16 Nov 2022 |

# The views expressed in the chapter are the authors' interpretation and do not reflect the organizations' views.

# Appendix

**TABLE 1**

## INCLUSIVE INNOVATION POLICY ANALYSIS OF INDIA

| Dimension | Indicator of an Inclusive Approach | National Education Policy 2020 | National Health Policy, 2017 | Science, Technology and Innovation Policy, 2013 | e-Governance Policy Initiatives under Digital India |
|---|---|---|---|---|---|
| **1. Overall objectives**<br><br>Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | NEP 2020 aims to universalize education from preschool to secondary level with 100% GER by 2030 while making way for large-scale transformational reforms in both school and higher education sectors.<br><br>"Equitable and Inclusive Education" | Attainment of health and well-being for all at all ages, through a preventive and promotive health care orientation without anyone having to face financial hardship.<br><br>"Health for All" | Keeping pace with S&T, staying competitive in an increasingly globalized world, and meeting the primary goal of equitable and sustainable development. | Leveraging the power of digital technology for transforming India into a digitally empowered society and knowledge economy. |
| **2. Direction of innovation**<br><br>Whose needs are being met? | 2.1. Support for innovation addressing societal challenges and needs. | Policy foundational pillars of access, equity, quality, and accountability for sustainable development and aims to transform India into a vibrant knowledge society and global knowledge superpower through initiating the Gender Inclusion Fund. | The vision supports various health schemes Ayushman Bharat, Swasth Nagrik Abhiyan, Nirbhaya Nari (action against gender violence), AYUSH, etc. for every man of the society. | Supports gender parity in STI activities and gains global competitiveness in select technological areas through international collaboration and alliances and contributes to knowledge creation and development of human resources. | Facilitates two important digital activities:<br><br>1. e-Governance: Reforming Government through Technology<br><br>2. e-Kranti: Electronic Delivery of Services |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | Inclusion of disadvantaged groups and seeks to create special education zones in the areas having a significant proportion of disadvantaged groups. | The vision focuses on the healthcare needs of the population, especially the poorest and marginalized people, and the special health needs of tribal and socially vulnerable population groups. | Focuses on farmers, MSMEs, startups, youth, women and institutions, school students, and LGBTQ to fire up their imagination. | Strives for the wider adoption of digital payments across the country for every industry, government department, business, employee, and citizen. |
| **3. Participation in innovation**<br><br>Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | The government established a Gender Inclusion Fund to build the nation's capacity to provide equitable quality education to all girls and transgenders. | focuses on medical colleges being located in rural areas; preference for students from under-serviced areas, to suit the rural health needs of backward area people. | Formation of SRIMAN (Scientific Research Infrastructure Sharing Maintenance and Networks Guidelines) which aims to promote efficient utilization and wider access of Research Infrastructure (RI) to scientists, researchers, and industry professionals across the country by creating a network of relevant stakeholders. | 44 national Mission Mode Projects (MMP) under e-Kranti and many new social sector projects namely for Women and Child Development, Social Benefits, Financial Inclusion, Urban Governance e-Bhasha, etc. |

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| Dimension | Indicator of an Inclusive Approach | National Education Policy 2020 | National Health Policy, 2017 | Science, Technology and Innovation Policy, 2013 | e-Governance Policy Initiatives under Digital India |
|---|---|---|---|---|---|
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | Mentioned under "girls as well as transgender students and other Socio-Economically Disadvantaged Groups". | The policy is dedicated to enhancing the health benefits in the country through various health schemes. | Promotes the domestic instrumentation industry by encouraging universities and research-and-development institutions to set up startups to manufacture research instruments and develop the workforce for its maintenance within the country. | The policy is dedicated to transforming the country into a digitally empowered society and a knowledge economy with high intellectual capital. |
| **3. Participation in innovation**<br><br>Who participates in innovation? | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | Socio-Economically Disadvantaged Groups (female and transgender, SCs, STs, OBCs, minorities, villages, small towns, learning disabilities and migrants, low-income households, victims of trafficking, urban poor, etc.). | Promotion of healthy living and prevention strategies from AYUSH systems at the workplace, schools, and community in the Indian context. The policy also recognizes the risks arising from physical, chemical, and other workplace hazards, and advocates for providing a greater focus on occupational health. | Spread scientific temper amongst all sections of society, especifically for promoting careers in science for educated young women and girls. | Rickshaw pullers, street hawkers, laborers, and daily wagers have access to banking services through mobile banking. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | Special Schools, New National Assessment Center PARAKH, Digital Infrastructure for Knowledge Sharing, and National Research Foundation projects help improve the quality of education to achieve 100% literacy. | Through the vision of Universal Health Coverage inculcating inclusiveness in the health domain a flagship scheme of the Government of India namely Ayushman Bharat (Health and Wellness Centers and Pradhan Mantri Jan Arogya Yojana implemented. | STI builds a strong ecosystem for nurturing innovation and Startups in the country that drive sustainable economic growth and generate large-scale employment opportunities among young minds to foster curiosity, creativity, and imagination in young minds and inculcate skills such as design mindset, computational thinking, adaptive learning, physical computing, etc. | The reference above: Pradhan Mantri Gramin Digital Saksharta Abhiyan scheme to make digital literate people in rural areas, specifically targeting the rural population including the marginalized sections of society like Scheduled Castes (SC), Scheduled Tribes (ST), minorities, Below Poverty Line (BPL), women and differently-abled persons. |

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| Dimension | Indicator of an Inclusive Approach | National Education Policy 2020 | National Health Policy, 2017 | Science, Technology and Innovation Policy, 2013 | e-Governance Policy Initiatives under Digital India |
|---|---|---|---|---|---|
| **4. Governance of innovation**<br><br>Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | The formulation process of the plan is undertaken by the Ministry of Education, with views/suggestions/ comments taken from Principals/ Head Teachers/ Teachers from various institutions. | The key pillars of policy are professionalism, integrity and ethics, equity, affordability, universality, patient-centered and quality of care, accountability, inclusive partnerships, pluralism, decentralization, dynamism, and adaptiveness, all of which encourage health for all in India. | The formulation process of the plan undertaken by DST involved multi-stakeholders; various institutions and various schemes such as KIRAN, GATI, and CSIR Jigyasa Scheme by the Council of Scientific and Industrial Research (CSIR) under the Ministry of S&T. | The formulation process of the Digital India plan is headed by the Prime Minister, a Digital India Advisory Group chaired by the Minister of Electronics & IT, and an Apex Committee chaired by the Cabinet Secretary. The central ministries, departments, and state governments concerned have the overall responsibility of implementing various Mission Mode and other projects. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | National Programme for Civil Services Capacity Building (NPCSCB) – Mission Karmayogi aims to create a competent civil service rooted in Indian ethos, with a shared understanding of India's priorities, working in harmonization across ministries and departments. | Democratization of Competency Development Opportunities across the board. | Mission Karmayogi – NPCSCB will radically improve the Human Resource Management practices in the government. | Imbuing citizen-centricity in public service delivery with the development of behavioral, functional, and domain competencies and cultivating accountability with reporting, regulation, and performance analysis. |
| | 4.3. Measures to mitigate the risks of innovation. | Mission Karmayogi adopts a citizen-centric approach to civil service reforms. Creation of a citizen-centric governance structure to address the need for inclusive, transparent, and citizen-centric administration. | Establishing Capacity Building Commission aimed at shared capacity-building architecture to reduce silos and promote a shared understanding across 58 ministries and 93 departments. | Credible and Autonomous Institutional Framework. Making institutions vibrant, responsive, and accountable. | Empowering the civil services to shift from rule to role-based and re-engineering processes to make governance citizen centric through digitalization, e-governance, and adoption of appropriate emerging technologies. |

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| Dimension | Indicator of an Inclusive Approach | National Education Policy 2020 | National Health Policy, 2017 | Science, Technology and Innovation Policy, 2013 | e-Governance Policy Initiatives under Digital India |
|---|---|---|---|---|---|
| **4. Governance of innovation**<br><br>Who sets priorities, and how are the outcomes of innovation managed? | 4.4. Measures to promote fair distribution of the benefits of innovation. | The policy enables the institutes to actively engage students, faculties, and staff in innovation and entrepreneurship-related activities while creating a robust innovation and startup ecosystem. | Attempts for free drugs, free diagnostics, and free emergency and essential health care services in all public hospitals to provide access and financial protection to the pursuit of health. Government, State Health Society, and District Health Mission Directors at each state and district level are involved to make it successful. | Policy works in line with the national priorities and goals and its focus is to build an innovation-driven entrepreneurial ecosystem for socioeconomic development through wealth and job creation. | Attempt to make all Public Services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency, and reliability of such services at affordable costs to realize the basic needs of the common man. |

# JAPAN

## Inclusive Innovation Challenges in Japan

The central aim of Japan's science, technology, and innovation (STI) policy has been the promotion of science and technology. Recently, however, the policy has adopted a new overarching aim: to provide a means for transforming society into one where "the individual can achieve their distinctive happiness." While sustainability and inclusiveness are well recognized as essential backdrops for shaping STI policy, these concepts are not well articulated at the level of implementation in the Japanese policy documents examined in this study. Some sections of the documents state the aim of "leaving no one behind." Yet, the target of inclusion is not always clearly identified, and is rather expressed in generic terms, such as "the well-being of the citizen." It indicates that the STI policy in Japan has expanded over the years, from being narrowly defined around scientific research and higher education to the more recent goal of addressing a much broader social agenda. In this context, inclusivity is likely to become increasingly relevant as a key component for shaping future STI policy in Japan.

Before discussing the STI policy documents, it is important to grasp the current socio-economic challenges that Japan faces. This is because, as our stakeholder interviews and policy document analyses showed, STI policy is increasingly being considered as a means of addressing such challenges. Hence, the directionality of STI policy strongly reflects these challenges. Many of Japan's current challenges are structural, including a rapidly aging population due to the low birth rate; regional depopulation and hollowing out of the industry due to migration of the younger population towards urban areas, in particular to Tokyo; income inequality due to the increase in non-regular employees among the younger generation; low female participation in the workforce and the large wage gap resulting from less flexible working arrangements; and slowness in adopting digital and low carbon technologies [1]. As these structural problems are interrelated, addressing them will require collaboration among actors that extends across conventional sectoral boundaries.

For instance, taking the issue of aging, with a median age of 48.4 years, Japan is aging rapidly at a time when the overall population is shrinking. By 2060, it is expected that the working-age population will be almost equal in number to the elderly (retired) population [2]. This means that the more effective use of human resources will become increasingly important in maintaining the societal and economic status quo. At present, the female workforce is not well utilized compared to other OECD countries due to inflexible working practices. Japan ranked 116th among 146 countries in terms of gender equality compared to other industrialized nations and its Asian neighbors [3].

Furthermore, during the past two or more decades of slow economic growth, the industry has failed to sufficiently restructure and wages have stagnated. During the same period, the income gap has increased, especially among younger generations. According to a report that used the Gini coefficient to measure income inequality in the age groups between 20 and 59 from 2002–2017, income gaps widened among those between 25–29 and 30–34 while they have shrunk across other age groups [3]. The report explained that a major cause of this increase is the growth in the number of non-regular workers among the younger generations. The low birth rate can be understood as resulting from the decline in the household income of those aged 25–35, where having a family is

increasingly costly for young couples. The younger population is also migrating from rural to urban areas, particularly to Tokyo, for education and better job opportunities, which increases spatial disparities[1].

COVID-19 also clearly demonstrated the digitalization challenge in Japan, especially in the regions. The government was unable to link medical data and financial tools effectively to meet the urgent financial needs of citizens during the pandemic due to the under-provision of digital infrastructure and lack of digital proficiency. This shock, however, stimulated the uptake in digitalization in some parts, though digital divides persist.

While it is increasingly recognized that STI can provide a means for supporting Japan's future development, in comparison to other advanced and East Asian neighboring countries, there has been a relative decline in Japan's S&T performance as measured in investment in R&D, scientific publications in numbers, top 10% publications, and international co-authored publications. Moreover, there are fewer members of the younger generation wanting to acquire a doctoral degree in science, while those who have earned their doctorate degrees are seldom willing to go abroad to engage in collaborative research due to the fear of losing their posts at their primary institutions. The declining popularity of science as a profession and the inward-looking nature of young researchers are considered worrying features for future scientific performance in Japan.

As for innovation, fewer entrepreneurial activities are being undertaken in Japan compared to other countries. For instance, Japan has lower numbers of startups for the level of its economy [1]. Furthermore, there are only six unicorns[2] in Japan at present, putting the country behind many emerging countries in Asia [4]. Innovation ecosystems are still underdeveloped, with the notable absence of actors such as venture capital and angel investors. As startups are forces for the re-regeneration of the industrial structure, creating an ecosystem conducive for startups to support growth is critical in transforming society, according to a respondent from the government sector.

## Existing Innovation Policies in Japan

This study has examined the three key policy documents concerning STIs in Japan today. These are the 6th Basic STI plan (Basic Plan) 2021–2026, the Integrated Innovation Strategy (IIS) 2022, and the Vision for a Digital Garden City Nation (DGCN) 2021. The first two documents comprise the core of Japan's STI policy: the Basic Plan sets out a five-year plan (2021–2026) for Japanese STI policy and the IIS specifies the annual actions under the Basic Plan. The DGCN, through the utilization of digital technology, aims to stimulate growth in the regions of Japan. This policy strongly reflects the government's agenda under Prime Minister Kishida, "New form of Capitalism (*Atarashii Shihonshugi*)," which claims to generate a virtuous circle of growth and distribution.

The study is based on desktop research and interviews conducted with policymakers. The desktop research has been utilized in the above three policy documents and various government websites regarding STI policy. The interviews were conducted online with various key actors in the government from 16–31 October 2022. The policymakers interviewed are those involved in the process of drafting or implementing each of the documents mentioned above.

[1] Post-Covid statistics demonstrate a positive population inflow in the rural areas across the country. It remains to be seen if this positive inflow will continue following the short-term Covid shock.
[2] Some databases indicate up to only 12 unicorns in Japan (startup DB) https://lp.startup-db.com/, which is a much smaller number relative to the size of the economy and population.

### Basic Plans for S&T and the 6th Basic Plan for STI

There are several policies listed under Science, Technology, and Innovation on the website of the Cabinet Office[3], Government of Japan. Among these policies, the key policy that covers the overall STI policy is called the STI Basic Plan. This is coordinated and drafted by the Council for Science, Technology, and Innovation (CSTI), located in the Cabinet Office. The Basic Plan sets out the STI policy of Japan for the next five-year period. The current plan is the sixth one and covers the period from 2021 to 2026.

The 6th Basic Plan for STI policy is the first Basic Plan formulated under the revised Basic Act of STI policy in 2021. The Basic Act of STI in 2021 replaced the Basic Act of S&T in 1995 by changing several critical points concerning Japan's basic approach towards STI policy. These changes are: first, expanding the scope of STI policy from one narrowly focused on science and technology (S&T) areas to one that includes innovation; and second, the Act officially integrated the humanities and social science as the policy domain for STI policy[4]. Innovation, as understood here, is essentially the new combination of existing knowledge, making it available to potential users [5]. By covering innovation in the policy domain, it became evident that the knowledge from the humanities and social science, helpful in understanding the users and their behavior, has become relevant.

The intention behind these changes, as explained by the chairperson of the CSTI during the interview, was to shift the overall orientation of the S&T policy away from one that focused narrowly on scientific research and higher education to one that addresses the need for social transformation. The above changes were considered necessary for the country to transform structurally toward a society where individuals can achieve their happiness.

The Revised Act of STI of 2021 marked this change of orientation in STI policy; however, it can be argued that Japanese STI policy has gone through a more incremental and gradual change over time [6, 7]. The contents of the past six Basic Plans demonstrate a gradual transition over the years. The first three Basic Plans (1996–2001, 2001–2006, 2006–2011) focused on policies for science, technology, research, and higher education. These helped address issues such as increasing the number of postdoctoral students and identifying the priority areas for scientific research. In the 4th Basic Plan (2011–2016), implemented after the Great East Japan Earthquake of 2011, the focus of the policy started to shift towards innovation that aimed to address social goals.

This tendency continued in the 5th Basic Plan (2016–2021), which introduced the concept of Society 5.0 as the overarching goal of STI policy. It entailed the development of "a human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space" [8]. This concept was inspired by Industry 4.0; however, it also addressed the importance of inclusivity in innovation [7]. The term "inclusiveness" is therefore emphasized in the 5th Basic Plan, shaping the global collaborative network for STI areas [7]. This could be because the drafting period of the 5th Plan coincided with the launching of the UN SDGs in 2015.

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[3] See https://www8.cao.go.jp/cstp/english/index.html. The website lists STI policies that are managed under CSTI. Apart from the Basic Plan and Integrated Innovation Strategy, which addresses the STI policy in general, there are other policies targeted more at prioritized technologies (such as specific policies on Quantum Technology, AI) or more thematic programs (Moonshot Research and Development, Cross Ministerial Strategic Innovation Promotion (accessed on 29 October 2022). Though these are all relevant as part of the STI policy, the focus of this report is on the Basic Plan and IIS.

[4] The subject area of humanity and social sciences was officially excluded from the S&T policy in the Basic Act of S&T of 1995.

The 6th Basic Plan developed the idea of Society 5.0 further and attempted to mainstream the idea of Society 5.0 in the activities under the STI policy. The revision of the Act of STI policy in 2021 provided a broader policy space while the drafting period of the 6th Basic Plan coincided with the pandemic. This incident made it clear that rapid adaptation to digital technology and the transformation of public services are now considered urgent. As can be seen from the above overview, the Basic Plans of STIs in Japan went through gradual changes in their content. Their orientation was becoming progressively broader, progressively addressing innovation and the social agenda by applying not only science but also humanities and social sciences. The concept of inclusiveness, in this context, is expected to become more relevant.

**Overall Objectives:** The 6th Basic Plan identifies Society 5.0 as the overarching goal for the future. Society 5.0 is described as a "sustainable and resilient society that ensures the safety and security of the people" and "a society in which each individual can realize diverse happiness (well-being)." The above statement indicates that the objective of Japan's STI policy described in the Basic Plan is not limited to economic growth but supporting much broader social changes that value the well-being of citizens utilizing the STI.

**Direction:** Three pillars of activities are identified within the 6th Basic Plan [9]. Pillar 1 emphasizes resilience and safety, and it articulates the need to embrace digitalization and utilize science to solve global societal problems. Pillar 2 focuses more on developing the frontiers of knowledge and research. Pillar 3 looks at education and human resource development so that all citizens are capable of realizing "diverse happiness" and overcoming their challenges. These three pillars are expected to enable social transformation towards Society 5.0 by stimulating investment and advancing the future frontier of knowledge (see Figure 3.1).

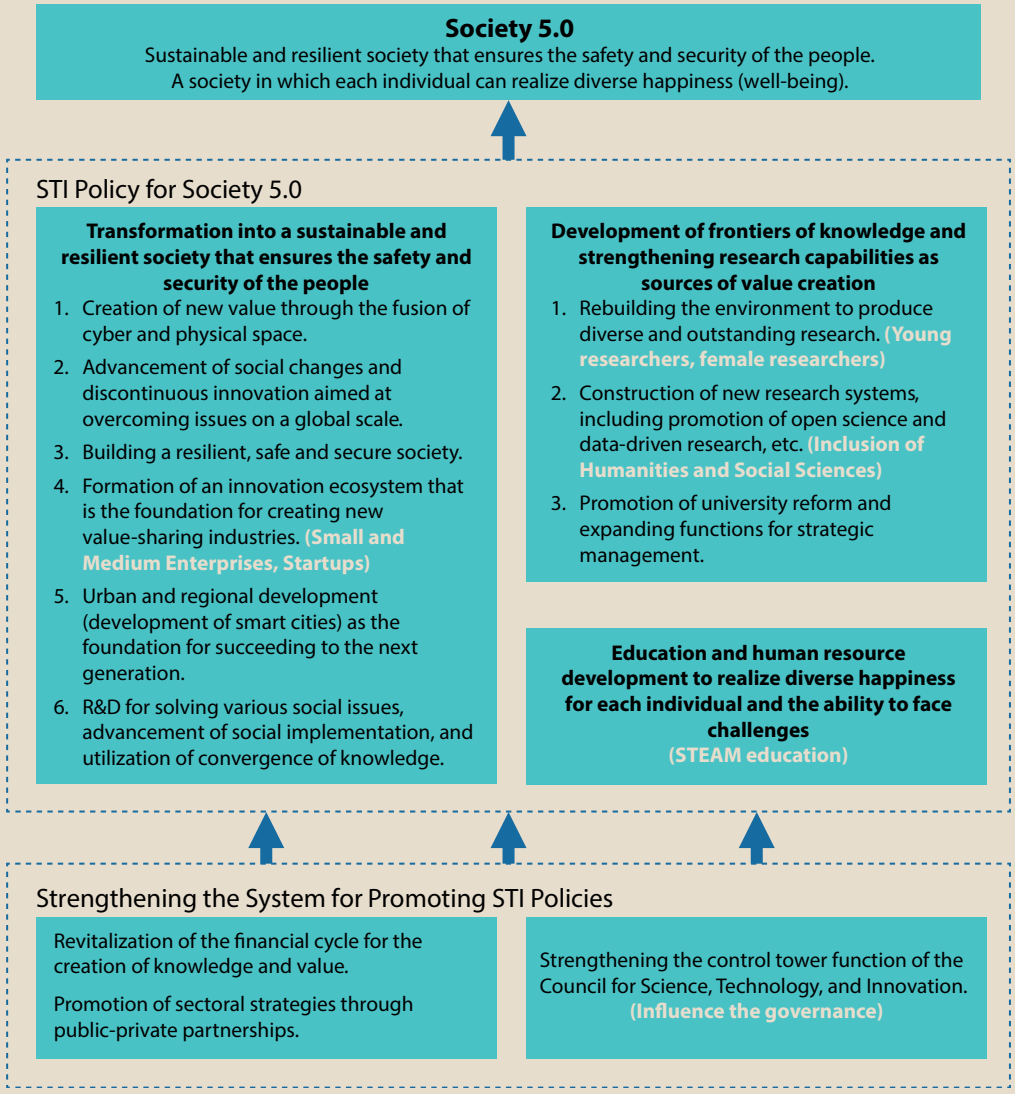
Despite mentioning the sustainable future of society, the references to inclusivity are somewhat limited to implementable activities. While "inclusivity" is considered important considering the overall objectives, a closer examination of the activities carried out under each pillar reveals limited references to inclusivity as the primary target.

For instance, under Pillar 1, small and medium-scale enterprises and startups have been identified as the target for introducing a Small Business Innovation Research (SBIR)-like system, entrepreneurial education, and hub cities. Regional actors are instead discussed in relation to promoting smart cities. The goal of supporting young researchers by securing their posts and promoting the participation of female researchers in academic research has been included under Pillar 2. Moreover, Pillar 3, which focused on education, incorporated "inclusivity" directly into the subheading, to realize the individuals' happiness and promote Science, Technology, Engineering, Arts, and Mathematics (STEAM) education. The above examples, while limited in number, suggest that "inclusive activities" are aimed at dealing with Japan's future challenges, namely, a greying and regionally depopulating society as well as facing a declining position in the scientific world.

**Participation:** There is no direct reference made in the policy regarding the creation of mechanisms to increase the participation of underrepresented and excluded groups in the policymaking process. Several mechanisms have been identified to serve specific groups to achieve the target of inclusivity, namely, the academic research system for young and women researchers, innovation ecosystems for small and medium enterprises, smart cities for regions, and education programs, such as STEAM education, GIGA school, and recurrent education for the population in general. These mechanisms have been established in response to the need to tackle social challenges in the

**FIGURE 1**

**THE SIXTH STI BASIC PLAN.**




Japanese context but they were not consciously developed to increase participation of under-represented and excluded social groups.

**Governance:** The 6th Basic Plan for STI policy was formulated by the CSTI. Located in the Cabinet Office, the Council is coordinated by the expert group headed by the chairperson. The expert group consists of council members, from academia, public agencies, and the private sector, who work in the areas closely associated with science, technology, and innovation. The Cabinet Office, headed by the minister, along with the heads of related departments and representatives from other related ministries, attended the meetings[5]. In preparing the 6th Basic Plan, 12 meetings were held from August 2019 to February 2021. In these meetings, experts and representatives of diverse sectors and groups related to STI policy were invited to express their views. In addition,

[5] Many public officials working at the Cabinet office are seconded from different ministries.

the chairperson of the council conducted interviews with various actors separately from the meeting to gather as many views as possible.

The advanced draft of the 6th Basic Plan was presented at the series of events called "Caravans" from September to October 2020. A total of nine Caravans were organized side-by-side with already scheduled events on STI-related activities to collect public comments (e.g., Science Council of Japan, academic associations). The comments collected were incorporated into the final draft of the 6th Plan. The draft of the 6th Plan was then opened for public comments on the website of the Cabinet Office from January to February 2021. The website of the Cabinet Office recorded that 741 comments were collected from researchers (401), businessmen (81), civil servants (61), agencies (59), students (11), and others (128). These comments were incorporated into the final version.

The procedure used for drafting the 6th Plan shows that external opinions are being incorporated at the latter stages of the drafting process. It demonstrates an "open process" but is limited to which experts are involved, and to what degree. While opportunities are provided for public participation in the policy formulation process, the overall policy orientation is very much dependent on the members of the expert committee, who have significant expertise in STI. This can potentially be a limit to the goal of being inclusive in the process of policymaking; however, as one government official (respondent) noted, this can be due to the nature of S&T policy, which requires highly technical and scientific knowledge in deciding and prioritizing the activities.

*"You would not be able to ask an ordinary citizen whether they think the government should invest more between, say, quantum computing or artificial intelligence... when it comes to specialized areas, there is a limit…"* (interview, government official C)

It is also worthwhile paying attention to the budget allocated to the Basic Plan, which has shown an increasing trend over the years. Under the 6th Basic Plan, the government allocated JPY30 trillion for five years. This, if private-public funds are included, totals JPY 120 trillion. This shows a clear increase from prior Basic Plans such as the 5th (JPY26 trillion), the 4th (JPY25 trillion), the 3rd (JPY25 trillion), the 2nd (JPY24 trillion), and the 1st (JPY17 trillion). While this increase in the overall budget is encouraging, the CSTI does not have a budget of its own to implement the STI policy. The CSTI has a coordinating function over the various ministries that work on areas related to STI; however, as it does not have a budget of its own, CSTI is limited to mobilizing other ministries. For this reason, the 6th Basic Plan specifically mentions the importance of strengthening CSTI's role as a leading actor in STI policy to mobilize those engaged in implementing the STI policy.

The 6th Basic Plan proposes to structurally transform society into a "sustainable and resilient society that ensures the safety and security of the people" and where "each individual can realize diverse happiness (well-being)." The plan was formulated by the council with the participation of multiple stakeholders and the draft was open for public comments. However, by the time the draft was formulated, the priorities had already been determined by the CSTI. Based on the procedural process described above, the priority-setting process did not directly include the target of inclusion.

One civil servant expressed his view that realizing the transformation is challenging due to the nature of civil servants. He explains that they are:

*"By their nature of existence, good in continuing and maintaining the existing tasks but not good in taking new initiatives and risks for drastic transformation"* (interview, government official B).

### Integrated Innovation Strategies (IIS) of 2022

Integrated Innovation strategies specify the implementable activities under the 6th Basic Plan. This document is produced annually. Like the Basic Plans, CSTI coordinates ministries and the private sector parties that are involved in sharing "scenarios and goals" in generating these activities.

The document consists of 1) reviews of the 6th Basic Plan, 2) policy by the current administration, and 3) current international and domestic affairs that influence the STI policy. In the IIS of 2022, the following items are recognized as significant points to be included in the strategy. These are (a) climate change and the social agenda, (b) threats manifested in infectious diseases, natural disasters, and cyberterrorism, (c) the need to enhance the presence of Japan in the international community, (d) security issues, and (f) the decline in Japan's research and innovation capabilities.

**Overall Objectives:** IIS reflects the overarching goals of the 6th Basic Plan by specifying the activities. As IIS is produced annually, it has an important function in reflecting the policy agendas of the current government in addition to the Basic Plan. As the government usually changes during the five years specified by the Basic Plan, an integrated plan enables it to accommodate the agenda of any new government in its implementation.

The IIS of 2022 has been created under Prime Minister Fumio Kishida, who took office in October 2021, while the 6th Basic Plan was formulated under former Prime Ministers Shinzo Abe and Yoshihide Suga, in office until 16 September 2020 and October 2021, respectively. The Kishida administration has proposed a "New Form of Capitalism." This pays attention to the investment in sustainability and human capital and aims to achieve growth through investment by creating a virtuous cycle of growth and distribution. As per the policy mooted by Prime Minister Kishida, STI is considered one of the essential pillars for the future growth strategy and for strengthening research institutions to ensure they are globally competitive in research. The IIS, therefore, specifies that the concept of a "New Form of Capitalism" aligns with the 6th Basic Plan, which focuses on "Social transformation based on knowledge convergence" and "Investment in knowledge and people." It states that growth can be achieved through implementing a social agenda. Hence, the government invests in capacity and knowledge that would contribute to easing disparities.

The policy document identifies the importance of utilizing science and technology to support digital infrastructure, as well as startups, ensuring economic security and re-enforcing human resources development by providing training in digital technology to revive regional economies. It further embraces the idea of Society 5.0 to create "a virtuous cycle of growth and distribution" through the convergence of knowledge (*Sogo-chi*), from the humanities and social sciences to science.

**Direction:** Under the overarching agenda described in the previous section, IIS organizes the activities under three pillars, 1) Enhancing knowledge bases, research capabilities, and human resource development, 2) Creating innovative ecosystems, and 3) Promoting advanced science and technology. Under Pillar 1, activities are grouped under the following subheadings: (a) Promotion of next generation of research bases led by university funds and university reform, (b) Promoting regional core and distinctive research universities, and (c) Promotion of inquiry-based STEAM education and recurrent education.

Similarly, under Pillar 2, these are 1) "Thorough support for startups and the promotion of fund circulation with the involvement of private funds, and 2) Accelerating the Vision for a Digital

Garden City Nation. It should be noted that the "Vision for a Digital Garden City Nation" has been proposed by the current government in power. Pillar 3 includes: 1) Promoting national strategies for key technologies and responding to critical national issues, promotion of measures for safety and security; 2) Promoting measures for safety and security; and 3) Promoting R&D to address social issues and advance social implementation and utilization of convergence knowledge. The document assigns a reference indicator for each activity, provides a justification for the 6th Basic Plan, and lists the responsible ministries and agencies [1].

The activities related to inclusiveness can be found under the subheadings of each pillar. These are the greater inclusion of young and female researchers (Pillar 1-1), strengthening regional universities and research centers (Pillar 1-2), providing better access to a holistic education for a broader segment of the population (i.e., specialized training for talented children, re-training, re-learning for those in the workforce, STEAM education), the promotion of startups, venture capital, and small businesses (Pillar 2-1), promoting regional smart cities and developing regional human resources through digitalization (Pillar 2-2). Pillar 3 concentrates its activities on specific technologies (i.e., Quantum Computing and AI); however, there are no details regarding inclusivity (see Figure 2).

**FIGURE 2**

**INTEGRATED INNOVATION STRATEGY, 2022.**

Three Pillars of Science, Technology and Innovation Policies

**Enhancement of Knowledge Bases (research capabilities) and Human Resource Development**

1. Promotion of next-generation research bases led by the university fund and university reform.
2. Promotion of regional core and distinctive research universities.
3. Promotion of inquiry-based/STEAM education and recurrent education.

**Creation of Innovation Ecosystem**

1. Thorough support for startups and promotion of fund circulation involving private funds.
2. Accelerating the Vision for a Digital Garden City Nation.

**Strategic Promotion of Advanced Science and Technology**

1. Promoting national strategies for key technologies and responding to critical national issues.
2. Promotion of measures for safety and security.
3. Promotion of R&D for solving social issues and advancing social implementation and utilization of convergence knowledge.

**Participation:** As the IIS is the compilation of action plans under the Basic Plan, activities around participation follow those of the Basic Plan, namely, the mechanisms of participation are designed to be targeted toward young and women researchers, Small and Medium Enterprises (SMEs), and regional cities. It also broadly addresses the investment in human resources so that everyone can be ready to adapt rapidly to the changing socioeconomic context concerning employment and access to infrastructures.

**Governance:** The IIS is drafted by the CSTI members and the performance of IIS is subject to monitoring and evaluation by the evaluation committee attached to CSTI. The committee is composed of external experts representing academia, the private sector, and the members of CSTI. They monitor and evaluate the achievement by applying a logical framework and reference indicators and evidence that are set at the start of the activities.

### Vision for Digital Garden City Nation

DGCN is an initiative to revitalize the rural regions of Japan through the use of digitalization, ultimately shifting the population concentrated in a few large cities to more distributed centers in rural and regional areas. It is intended to re-activate regional economies by realizing a "society in which everyone can live conveniently and comfortably anywhere in Japan" [3]. By achieving the above goal, it hopes to solve critical societal issues such as the aging population, the hollowing out of industries, and depopulation in rural and regional areas. This vision is based on Prime Minister Kishida's "new form of capitalism." To help the concept materialize, the Council for a Vision for a Digital Garden City Nation Realisation was established in November 2021 in the Cabinet Secretariat to formulate the policy document. The "Basic Policy for the Vision for a Digital Garden City Nation" was adopted at the eighth meeting by the cabinet in June 2022.

**Overall Objectives:** DGCN aims at leveraging the power of digitalization to solve local social issues. The DGCN tries to achieve this goal by creating jobs in rural areas so that there will be a flow of people from the city to the regions. It assumes that, by offering a better quality of life to fulfill the hopes and expectations of marriage, childbirth, and child-rearing, regions can attract people. The DGCN aims to provide cross-sectoral support that takes advantage of regional characteristics.

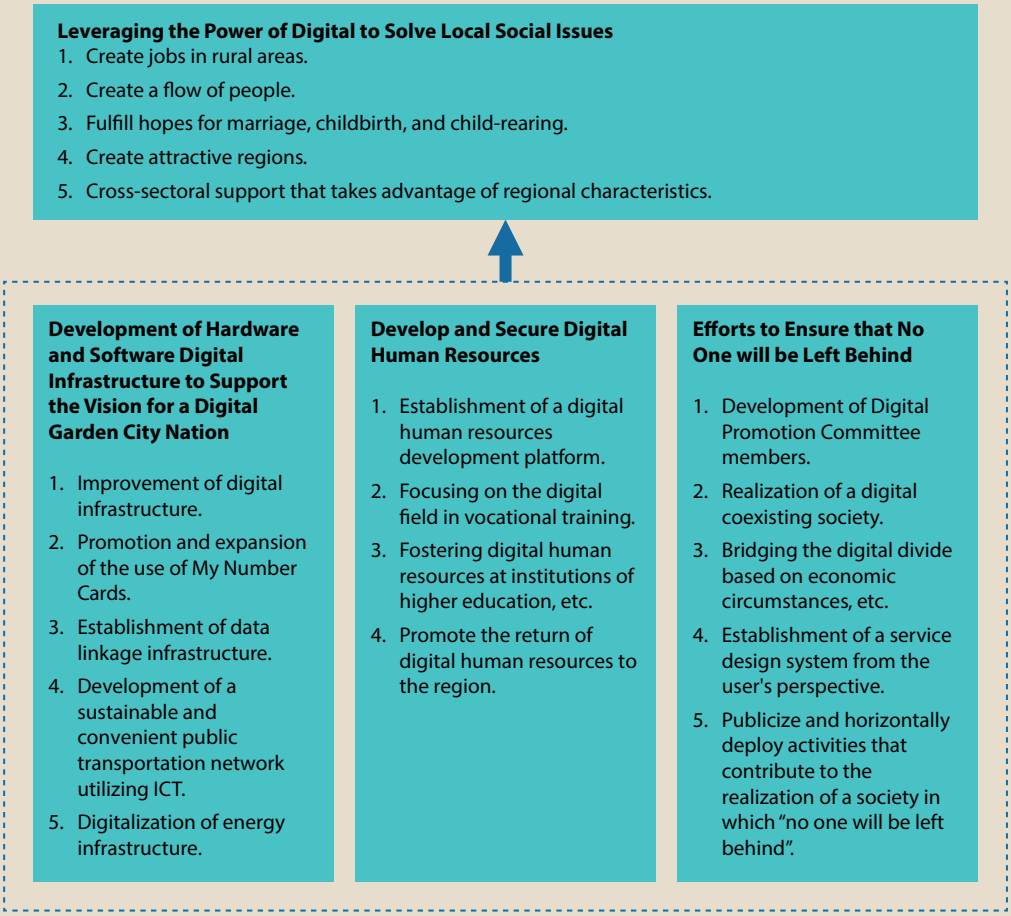
DGCN promotes inclusiveness by stimulating activities in the regions of Japan through supporting digitalization. Although the focus is placed on the regions, a more comprehensive approach towards "inclusiveness" is being explored under each pillar of activities. It is worth noting that Pillar 3 seeks to build an inclusive mechanism by combining short and longer policy horizons, such as providing access to a digital device (short) and introducing longer-term measures, such as awareness building, creating an ICT mutual help community and incorporating human-centered design in public services.

**Direction:** To further the above-mentioned overall objectives, DGCN operates through three pillars of activities. Pillar 1 centers around enhancing digital infrastructure, national identification cards, and collaborative data usage. These efforts aim to improve the quality of public services. It also seeks to improve public transport and energy infrastructure using digital technology. Pillar 2, focuses on human resource development, with an emphasis on building a platform for digital human resources, integrating digital technology in vocational and higher education, and facilitating the flow of these skilled human resources to the various regions. Pillar 3 sets up a mechanism to enable the development of an inclusive society. It includes: 1) Setting up a Digital Promotion Committee, specifically aimed at providing to support those who have less exposure to digital devices or difficulties in using digital services; 2) Creating a place to access digital devices for disadvantaged groups such as children in the regions, or low-income households with physical challenges; 3) Promote designing services from the user's point of view; and 4) Disseminating the concept of "no one is left behind" by awareness-building, and rewarding the best practices (i.e. *Degital Koshien*) (see Figure 3).

The DGCN recognizes the importance of utilizing digital technologies that enable the generation of added values and the overcoming of regional challenges in Japan. The vision is not only aimed at economic activities but places importance on achieving well-being, sustainability, and diversity to encourage the participation of citizens residing in the regions. The emphasis on improving the regions already existed in the policies of previous governments. However, the DGCN, by combining digital technology and policy instruments such as PPP and PFI, as well as enhancing the regional community, aims to enrich well-being in the regions. The DGCN primarily targets regions but it also pays attention to underrepresented groups, namely, women and youth, the elderly, and people with disabilities, through the effective use of digital technology.

**FIGURE 3**

**VISION FOR A DIGITAL GARDEN CITY NATION.**




**Participation:** To achieve the above overarching goals, the policy is designed to ensure collaboration among regional actors, such as universities and the private sector. Besides, the goals are specified with KPIs and create roadmaps to monitor and evaluate the progress. This suggests the inclusion of regional actors in the decision-making process. In addition, as mentioned in the section on directionality, under Pillar 3, various mechanisms to sustain the activities are offered. Many of the mechanisms listed under Pillar 3 consider the participation of some broader segments of citizens. For example, there was a mention of promoting designing services from the user's point of view. There was also an educational perspective on awareness building and rewarding the best practices. This scheme is called the "Digital Koshien." It is a competition for the best practices from the bottom up that was developed to promote and encourage good regional business models.

**Governance:** DCGN was drafted by the Council for a Vision for a Digital Garden City Nation Realisation, established in November 2021. The council is under the strong influence of the Cabinet formed by the current government, represented by the ministers of relevant ministries. The members of the council included experts from academia (experts in digital technology), representatives from the private sector (Japan Post, Japan Railways, and Keidanren), and the chief of the regional government. The draft was discussed by six different regional groups before the document was approved by the Cabinet in June 2022. These included three groups of distinctive chiefs from prefectures (governors),

cities (mayors), municipalities (heads of districts), and three councils at the prefectural, city, and municipal levels. This ensured that the views of the regions were incorporated into the policy.

The DCGN is located in the Cabinet Secretariat. This enables the oversight of collaboration beyond the conventional ministerial boundaries and across different levels of government (i.e., national, regional, and municipal). Although this structure is effective in sharing the consensus to set the directionality of the digital strategy, the Cabinet Secretariat, like the Cabinet Office, does not have an executive body, and implementation of the policy requires reliance on other ministries and regional governments. Hence, the structure may make it difficult to forge ahead with the plans developed in the policy document.

## Recommendations for Policymakers

To understand the inclusiveness of STI policy in Japan, three policy documents[6] have been reviewed from the perspective of directionality, participation, and governance. The concept of inclusivity can be explored from three key perspectives. Firstly, directionality focuses on determining the target audience of inclusivity efforts, answering the question of "Who should be targeted?" Secondly, participation examines the practical implementation of inclusion, considering how it should be operationalized. Lastly, governance involves examining inclusivity within the policymaking process, specifically in terms of agenda-setting, monitoring, and evaluation, and drawing lessons and raises the question of "Who sets the agenda?" [10].

**Direction:** Japan's STI policy has gone through a gradual change from being narrowly focused on S&T areas to a broader approach to meet social challenges. This process has been gradual, and the transition is marked by the Revised Act of STI of 2021. Here, STI is increasingly seen as a means of achieving the sustainable future development of Japan. With this shift in policy orientation, inclusiveness is increasingly recognized as an integral part of STI policy. The specific reference to inclusivity in implementable actions, however, is still limited. In the 6th Basic Plan and IIS, the reference was limited to the backdrop (the introductory section), while DGCN provided a more explicit reference on inclusivity through building mechanisms. The specific targets of inclusion mentioned are youth, women, those living in the regions of Japan, and those without access to digital devices.

**Participation:** The policymaking process is relatively open, with the involvement of multiple stakeholders. All three documents are produced at the council situated within the Cabinet Office and Cabinet Secretariat, where it is possible to oversee multiple policy areas. The council is composed of experts from academia, the private sector, and relevant government agencies. It held meetings to hear views from other stakeholders, with the agenda and priority-setting phase being multi-stakeholder and relatively open; however, in the case of the 6th Plan, documents are not open to participation by the general public until the very end. The other two documents do not mention whether they incorporated an open public process.

The difficulties of opening the priority-setting process to the public can be due to the strong notion that "science" is a subject that requires expertise. This view continues among the policymakers, as one officer expressed in the quote in the previous section.

With the Basic Act of STI, the policy focus has shifted from S&T to ST&I with the incorporation of additional research domains, social science, and the humanities. Furthermore, there are

[6] These are the 6th Basic Plan, Integrated Innovation Strategy (IIS), and Vision for a Digital Garden City Nation.

occasional mentions of ideas such as "citizen science", "open science" and "civic tech" in these documents. However, the implementation of these ideas is still under exploration.

The implementation of STI policy is rather limited due to the unique position of the Cabinet Office and Cabinet Secretariat, which have no implementation body nor budget lines of their own. The implementation of the 6th Basic Plan and ISS, therefore, relies on other ministries that have their budgets and distinctive mandates in STI-related areas. The implementation of DGCN, however, relies on distinctive levels of regional governments. This was recognized as a problem in the 6th Basic Plan, as it included the strengthening of CSTI in its list of aims.

**Governance:** All three STI policies have a multi-stakeholder committee to set agendas and place priorities. Although the committee invites experts and consults with the parties involved in implementation, much of the agenda is already determined by the council of experts. In the case of the Basic Plan, the draft documents are open to the general public in the form of Caravans with scope for public comments at a later stage and, as a consequence, the governance structure can be considered more top-down than bottom-up. Governance structure can be strongly influenced by the nature of "science," in that it requires a certain degree of expertise; however, as the overarching aim of STI policy has broadened to include a social agenda, greater inclusion of the general public in the agenda and priority-setting process could be considered. For the Basic Plan, the evaluation is carried out by an external committee based on the KPIs and the logical framework. The structure of the evaluation process for the other two documents is not indicated, though both have KPIs.

**Policy Recommendations:** STI policy in Japan has gone through gradual changes since its establishment in 1996 when the first Basic Plan was implemented. Today, the STI policy aims to solve existing challenges and transform society towards a sustainable future. The term "Inclusivity" was mentioned for the first time in the 5th Basic Plan, and it continues to be important in the current 6th Plan; however, there is no shared consensus on how inclusivity should be addressed within the scope of STI policy. Based on the findings of this report, policy recommendations that could be used to enhance "inclusivity" in the STI policy are as follows:

- Clarify and diffuse the understanding of the importance of inclusivity for policy effectiveness among the STI policy community.
- Assign a person at the level of the council to oversee the issue of inclusivity in the design process of the STI policy (possibly in each council).
- Devise a mechanism to incorporate the general public's view in the policymaking process.
- Include evaluation criteria for inclusiveness in policy design.

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## List of Interviews

| Job Title | Organization | Date of Interview |
|---|---|---|
| Government Official A | Cabinet Secretariat, Garden City Nation Initiative Realisation Secretariat | 19 October 2022 |
| Government Official B | Ministry of Education, Science, Technology and Culture (MEXT) | 19 October 2022 |
| Government Official C | Principal Senior Director, National Institute of Science and Technology Policy (NISTEP), MEXT | 27 October 2022 |
| Government Official D | Chairperson for 6th basic plan, CSTI, Cabinet Office | 28 October 2022 |

# Appendix

**TABLE 1**

## INCLUSIVE INNOVATION POLICY ANALYSIS OF JAPAN.

| Dimension | Indicator of an Inclusive Approach | 6th Basic STI Plan and Integrated Innovation Strategy | Vision for a Digital Garden City Nation |
|---|---|---|---|
| **1. Overall objectives**<br>Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | YES: The aim is to create a sustainable and resilient society that ensures the safety and security of the people; a society in which each individual can realize diverse happiness and well-being. | YES: Leveraging the power of digital technology to solve local social issues by creating jobs in rural areas to attract people from urban areas. Promoting cross-sectoral support to enhance the quality of life by fully utilizing regional characteristics so that people can enjoy family life. |
| **2. Direction of innovation**<br>Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs. | Realizing Society 5.0 through transformation into a sustainable and resilient society using the creation of knowledge and development of human resources | The vision supports regional transformation through digitalization. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | Young researchers, women researchers, SMEs, and startups. | The vision focuses on regional firms, SMEs, and startups. There are references made to women, youth, the elderly, and people with disabilities. |
| **3. Participation in innovation**<br>Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | Formation of innovation ecosystems where SMEs can participate, rebuilding the research environment to produce diverse and outstanding research, in which women and young researchers can participate more, offering education opportunities (GIGA school, recurrent education) to realize diverse happiness for the general public. | N/A |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | Mentioned under urban and regional development (development of smart cities). | The policy is entirely dedicated to enhancing the regions of Japan through means of digitalization. |
| | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | Reference to SMEs and startups (see above). | SMEs and startups in the regions. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | STI policy now includes humanities and social sciences. This, by way of expanding the focus, would allow the involvement of civil society and possibly a greater opportunity for participatory innovation/open science. | Mechanisms to include participation from the bottom up, Digital Koshien. |

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| Dimension | Indicator of an Inclusive Approach | 6th Basic STI Plan and Integrated Innovation Strategy | Vision for a Digital Garden City Nation |
|---|---|---|---|
| **4. Governance of innovation**<br><br>Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | The formulation process of the plan undertaken by CSTI involved multi-stakeholders; meetings were held with representatives from various institutions. The draft of the plan was opened for public comments. | Pillar 3 lists some mechanisms aimed at awareness building and rewarding best practices. For example, Digital Koshien is a competition to recognize best practices from the bottom up to promote and encourage good regional business models. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | N/A | N/A |
| | 4.3. Measures to mitigate the risks of innovation. | N/A | N/A |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | There is an attempt to invest in human resources | Under Pillar 3, there are attempts to make digital devices and capacity-building opportunities available to a broader segment of the population, especially in the regions. |

**Sources:** Compiled from The Science, Technology and Innovation Basic Plan, 2021; Digital Garden City Nation Initiative, 2022; and Integrated Innovation Strategy 2022. [1, 4, and 10].

# REPUBLIC OF KOREA

## Inclusive Innovation Challenges in the ROK

The Government of the ROK has actively invested in R&D. The public R&D expenditure was KRW27.2 trillion (USD23.8 billion), which was 1.3% of the country's GDP in 2021 and high compared to other countries. The Korean government has set technology development for economic growth as a top priority of public research institutes since the 1970s. Researchers in public research institutes have also considered technology development for national development and individual academic achievement important. This system was quite effective from the 1980s to the 2000s and several major Korean technology developments such as the world's first 256 MB Dynamic Random Access Memory (DRAM) and Code Division Multiple Access (CDMA) commercialization came from public research institutes. Consequently, inclusive innovation was not the main concern for the country's government and researchers in public research institutes until the 2000s.

To achieve a higher growth rate, the government strategically allocated resources toward fostering innovation in competitive firms, sectors, and regions. The approach aligns with the overall economic development plan that emphasizes selectivity and concentration. This makes innovation activities and distribution of resources highly uneven across firms, regions, and sectors. For example, just 200 large firms[1] account for 70% of private R&D in 2021 [1] and half of private R&D funds were invested in electronics, ICT, and automobile sectors. Similarly, in 2021, 48.3% of public R&D expenses were concentrated across two cities of Seoul and Daejeon. The gender gap in R&D activities is also noticeable, with 82% of lead researchers in public R&D projects being male as per the 2021 data, although it has been gradually decreasing [2].

However, the government changed its position and started to consider inclusive innovation in the 2010s. It established the first comprehensive plan for solving social problems based on science and technology (2013–2017) in December 2013. It was the first public innovation plan focusing on social problems and inclusion. The plan selected 30 social problems such as chronic diseases, sex crimes, weather disasters, and educational gaps, and sought to solve them through science and technology. The government established the second comprehensive plan for solving social problems based on science and technology (2018–2022) in June 2018. In the Second Plan, the government added 10 social problems such as fine dust, invasion of privacy, side effects of cryptocurrency, and low birth rate to the 30 existing social problems. Governance and participation were also improved in the Second Plan. Citizens and non-government organizations can participate in discovering social problems and finding solutions in some pilot R&D projects.

The government also announced a national innovation plan for a new National Innovation System (NIS) in July 2018, which focuses more on quality of life and people's participation, balanced development of regions, and creating social values. To drive this, the country's government implemented several policies such as strengthening regional leadership in R&D, strengthening support for high-risk innovative research and research to solve social problems, and increasing employment in the R&D and ICT sectors.

[1] Big firms refer to organizations that employ more than 1,000 employees in 2021.

Despite the importance of inclusive innovation, interest and budget allocations for this purpose remain limited in the country. In 2021, the public R&D expenditures for solving social problems was KRW1.6 trillion, accounting for only 5.9% of the total expenditure. However, even this small percentage seems exaggerated because several R&D projects simply rebranded themselves as initiatives solving social issues. For example, the Bio-big data construction pilot project and development of geostationary public communication satellites are classified as R&D for solving social problems.

Thus, policy interest in inclusive innovation in the ROK seems to be at an initial stage. This research indicates that the Government of the ROK considers economic effectiveness as a top priority for public R&D. It invested public R&D funds primarily in promising sectors such as AI, system semiconductors, future cars, bio-health and materials, parts, and equipment sectors that can urgently boost international competitiveness due to geopolitical situations such as trade disputes with Japan in 2021. The government and public research institutes have traditionally focused on economic growth, international competitiveness, or catching up with developed countries as a goal of public R&D. This has been effective since the 1980s, and thus, there is little reason to change the existing system of public R&D. It, however, makes it challenging for the spread of an inclusive innovation system in the country. An interviewee at a public research institute highlighted that the innovation system in the ROK, which focuses on catching up, should be changed. He, however, indicated that not much has changed even after 20 years of discussion.

Such perceptions and existing systems based on past successes are extremely powerful that the current administration is taking the position that if it can maintain or strengthen the global competitiveness of the semiconductor industry, it may sacrifice one inclusive goal, which is narrowing the regional gap. Korean semiconductor companies complained to the government about the shortage of semiconductor workers in 2022, and the government announced that it would ease restrictions on the quota of universities in the capital area, which were introduced for balanced regional development.

## Existing Innovation Policies in the ROK

To evaluate the impact of the initiatives taken up by the ROK, this research reviewed five flagship innovation policies in the country, including (1) The 4th Basic Science and Technology Plan (2018–2022); (2) The Second Comprehensive Plan for solving social problems based on science and technology (2018–2022); (3) Material, Parts, and Equipment Industries Promotion Policy; (4) Semiconductor Industries Promotion Policy; and (5) Digital Strategy Korea. The 4th Basic Science and Technology Plan is the top-level plan of Korean innovation from 2018 to 2022 while the second comprehensive plan focuses on solving social problems using innovation. It is the only innovation policy that takes full account of inclusive innovation. The three innovation policies strive for sectoral promotion and they are included because the Korean government has devoted its core capabilities to these policies.

### The Fourth Basic Science and Technology Plan

The plan has four main strategies and 24 main projects. Among the four main strategies, “makes everyone happy through science and technology” is related to inclusion. Inside the strategy, the project “the realization of a warm and inclusive society” is most strongly related to inclusive innovation.

**Direction:** The 4th Basic Science and Technology Plan comprises several R&D projects for underprivileged groups, regions, and sectors. These include SMEs, low-productivity service

sectors, and persons with disability (PWD). For SMEs, the government has implemented several promotion policies since the 1980s, comprising several R&D projects for SMEs such as 'Development of Life Innovation Technology for Small Business Owners and the Self-employed' and 'Development of Joint Demand Technology for SMEs' in the plan. R&D projects for higher value-added like making a manufacturing-service convergence business model have been included for low-productivity service sectors such as education, tourism, sports, and culture. For PWD, the technology development of Community-based Rehabilitation Movement Services for the Disabled is conducted. For general social problems, the government supports startups using public data to alleviate social problems and help find solutions.

Similar projects are also conducted for implementing ideas that can solve local issues and social problems using ICT. The project 'the realization of a warm and inclusive society' includes a sub-R&D project for developing auxiliary engineering equipment that can provide life assistance such as visual aids and AI care robots for the disabled and the elderly.

**Participation:** Participation is primarily focused on women, SMEs, and regions. The 4th Basic Science and Technology Plan increases women's employment in public research institutes and supports career-interrupted female scientists to return to R&D work. The supports comprise the spread of time-selective jobs, the operation of smart work centers linked to childcare, and the establishment and spread of childcare facilities in science and technology fields. To increase the participation of SMEs, the plan conducted a tax cut for SMEs' R&D and supported SMEs to employ young researchers by using public R&D and introducing a pension system for young researchers employed by SMEs. For non-capital regions, the 'Establishment of a Regional Innovation System by Regional Leadership' is one of the main projects in the plan. The plan increases the R&D budget of local governments and ensures the autonomy of local governments as much as possible in the planning of state-funded R&D projects. The plan supports not only local governments but also the capacity of local R&D innovators such as local universities and local public research institutes.

**Governance:** The 4th Basic Science and Technology Plan was conceived mainly by government officials and private experts from businesses, universities, and public research institutes. Around 200 private experts participated in the conception of the plan. Ordinary citizens can also participate in the plan through an online platform and public hearing, but it was limited. Although participation in the innovation of women, SMEs, and regions is supported, they can't affect the policy agenda and priority of innovation policies. They can affect the plan in terms of individuals, rather than target groups.

The main project 'expanding public participation and strengthening the control tower' is related to the governance of the public R&D system. It increases citizen participation in R&D planning and innovation policies by gathering public opinions on national and social issues and idea contests, as well as an open employment system to science and technology-related government committees such as the National Science and Technology Advisory Council. People can recommend committee members (including self-recommendation) online. It expands public participation throughout the innovation process, such as problem selection, demonstration, and evaluation. R&D project like Living Lab, which enables users to actively participate in the innovation process based on their living experiences to solve problems, is expanding into areas closely related to public life such as security, safety, and the environment. Living Lab R&D has been emphasized in the second comprehensive plan.

Thus, the 4th Basic Science and Technology Plan considers inclusive innovation in terms of direction, participation, and governance even though it doesn't cover some sub-areas of inclusive innovation such as innovation for poor households and working individuals. The plan stated that the direction of Korean S&T policies will change from economic growth to an increase in the quality of life and human problem-solving. However, this strong argument was not supported by the budget, wherein the main innovation system has largely persisted "as is".

### The Second Comprehensive Plan for Solving Social Problems Based on Science and Technology

The Second Plan is closely related to inclusive innovation. It is a sub-plan of the 4th Basic Science and Technology Plan.

**Direction:** There are 40 social problems that the Second Plan tries to solve using science and technology. It covers various social problems for different underprivileged groups, regions, and sectors. For example, it covers rare intractable diseases for the sick, addiction, lack of cultural space for rural households, sex crimes for women, energy poverty for low-income households, old housing for rural or low-income households, alienation of the elderly, domestic violence for women, the educational gap for underprivileged regions, discrimination of labor for working individuals, and so on.

Underprivileged groups, regions, and sectors are defined according to social problems. For example, the social problem "energy poverty for low-income households" defines energy-poor households as "households that do not have adequate heating and cooling due to excessive burden of actual energy expenditure among low-income households". According to these 40 social problems, 380 R&D projects were conducted in 2021. For example, The R&D project 'Remote language rehabilitation system for children with disabilities' is for people with disabilities. Similarly, the project 'Technology for easily screening olfactory disorders, which are precursor symptoms of dementia, with scent' is for the elderly.

The R&D project 'Fine Dust Reduction Technology in Road' is for general environmental improvement, while the project 'Small-scale field farming machines suitable for the elderly and women and small multi-purpose machines with workability and convenience' is for women and the elderly. For the households living in rural areas and islands, the R&D project 'Establishment of a cargo delivery system using drones and logistics platforms for islands and backwoods' is conducted. In the event of unexpected social problems (disasters such as earthquakes, infectious diseases, cyber terrorism, and so on), a budget for emergency response research is invested to analyze timely causes and develop solutions.

**Participation:** The Second Plan established a regular network in which citizens, researchers, and social and economic organizations can participate together in discovering social problems and finding solutions. It operates an open online platform, ntis.go.kr/scisoplatform, where anyone can find social problems and obtain information. Among R&D projects under the Second Plan, 223 R&D projects have participation systems of users. The most commonly used is the type in which users directly promote R&D. For example, local governments that participate through living labs directly discover problems and plan and conduct research projects. The second most commonly used type is the type in which users participate in living labs.

The plan focuses on discovering social problems and solving them, wherein it did not consider how to promote the participation of underprivileged groups, regions, and sectors in R&D. It also

focuses on users' participation in R&D, wherein users are defined according to each R&D project. For example, users in the R&D project "Technology for easily screening olfactory disorders, which are precursor symptoms of dementia, with scent" are elderly people who want to be tested for dementia. The Living Lab project allows residents, Civic Society Organizations (CSO), and experts to participate in the process of solving local problems. Their main participation is a demonstration of technology in the living environment.

**Governance:** The Second Plan was drawn up mainly by the central government including the Ministry of Science and ICT, local governments, and private experts. Selecting 40 social problems reflected an opinion poll. The Second Plan, 'Public Sympathy and Participation R&SD[2] project' shows the most inclusive governance case in the ROK. The Ministry of Science and ICT and the Ministry of Public Administration support this project jointly. Researchers, residents, and local governments form a living lab in this project, while residents and local governments can select researchers and operate living labs autonomously. Problem-solving plans are drawn out under consultation.

Living Lab is an open-lab type that allows other researchers and stakeholders to participate freely. This project is the only R&D project in which civil society can participate in the initial stage of problem definition. Examples of this project are technology development of processing through plasma drying of decay tangerines, development of products and systems to promote rainwater utilization, and development of paper tray ports and transplant machines to reduce plastic use in agriculture.

Overall, the Second Plan is the only innovation policy that deals with inclusion as a main interest and citizens can participate in the initial stage of problem definition. It frequently uses Living Lab-type participatory governance. However, the limitation also exists and it is unclear what social problems have been solved or whether there has been any progress in solving social problems by R&D projects in the plan. Participation is an important factor for inclusive innovation, but there is little incentive for users, customers, or people to participate in the R&D process. The plan evaluated that participation in "the first comprehensive plan for solving social problems based on science and technology (2013–2017)" was superficial and most of the involvement from civic society was a one-off contact such as a survey, interview, or workshop, but Lee (2021) argued that a similar problem exists in the Second Plan [3]. Users or residents can participate in problem definition and individual R&D projects, but they can't affect a higher level of the policymaking process or overall agenda of policy. People in target groups can also participate as an individual or users, rather than groups who can affect policymaking.

### Material, Parts, and Equipment Industries Promotion Policy

In July 2019, Korean and Japanese trade disputes began with updated licensing policies and procedures on the Japanese export and transfer of controlled items and relevant technologies[3]. The Japanese government mandated exporters from the country to obtain individual export licenses for specific items, namely fluorinated polyimide, resist, and hydrogen fluoride. These items are crucial imports for the ROK, and this new regulation had a significant impact on the country's reliance on Japanese supplies. In response, the government tried to reduce the high dependence on Japanese materials, parts and equipment by focusing public R&D on material, parts, and equipment industries. It rolled out the materials, parts, and equipment industries promotion policy in 2019.

[2] Research & Solution Development.
[3] The root cause of the trade dispute lies in the complex history of the two countries during the Second World War II.

According to the policy, the Korean government enacted "the Special Measures Act to strengthen the competitiveness of the materials, parts, and equipment industries" and expanded support for these sectors. Consequently, public R&D expenses for materials, parts, and equipment industries rapidly increased from KRW800 billion in 2018 to KRW2.3 trillion in 2022. It is a promotion policy for particular industries, but the Korean government has focused on these sectors, wherein its R&D expense is greater than the total public R&D expense under the Second Comprehensive Plan in 2021.

**Direction:** Although it is a promotion policy for particular industries, it has some inclusive factors, which support the low-productivity sectors. Korean economic growth since the 1960s was mainly based on exports of consumer goods made by big manufacturing firms because low labor costs gave a comparative advantage to Korean big manufacturing firms in the 1960s and 1970s. Using capital and experiences accumulated in the 1960s and 1970s, Korean big firms moved to higher valued-added consumer goods sectors using intense public and private R&D. However, material, parts, and equipment sectors are not labor-intensive sectors and they require sufficient experiences and tacit knowledge from the long-term relationship with consumer firms [4]. Since Korean big firms didn't enter these sectors and domestic SMEs and Japanese imports fulfilled the demands, the productivity in the material, parts, and equipment sectors has been lower compared with that of the consumer goods sector. From this perspective, the Material, Parts, and Equipment Industries Promotion policy provided a new turning point for the industry. Domestic firms in these sectors have grown faster than other firms since 2019. There are industries with lower productivity, such as the food and lodging service sector, but the material, parts, and equipment industries promotion policy played a role in supporting at least those sectors that had low productivity within the manufacturing industry.

**Participation:** No consideration exists about the participation of underprivileged groups, regions, and sectors in innovation activities in the material, parts, and equipment industries promotion policy. The R&D projects were conducted by public research institutes and private companies. Private companies that participated were mainly manufacturing firms in the material, parts, and equipment industries and both large firms and SMEs participated. The main focus of the promotion policy is how well and how quickly developed the key technologies are to reduce the high dependence on Japanese products, wherein inclusive participation was not a consideration.

**Governance:** The governance system is also similar to other R&D projects. The Korean government responded quickly to the regulations of the Japanese government. Trade dispute started on 1 July 2019 and the first policy about the promotion of material, parts, and equipment sectors was announced on 5 August 2019. Thus, the policy was mainly made by government officials from various ministries, including the Ministry of Trade, Industry, and Energy, as well as the Ministry of Science and ICT, and reflected the opinions of public research institutes, private experts, and private companies. In this process, there was little room for the general public or other civil society organizations to influence policy decisions.

Thus, the policy has some inclusion in terms of the direction of innovation, but the policy did not consider inclusive participation or governance because the main focus of the policy is the increasing competitiveness in the relatively low productivity sectors. The Korean government even said the promotion policy is a special measure to devote all of its national resources and capabilities, wherein inclusive innovation was not named as a primary concern.

### Semiconductor Industries Promotion Policy

Similar to the material, parts, and equipment industries promotion policy, the semiconductor industries promotion policy is also affected by international circumstances, which is a dispute related to semiconductors between the United States and China. Amid fierce competition between the U.S. and China to secure leadership in the semiconductor industry, some of the Korean press and research institutes warned that the Korean semiconductor industry could experience a crisis and Korean semiconductor companies have also complained to the Korean government that it is difficult to secure semiconductor workers. The Korean government accordingly conducted the semiconductor industry promotion policy in the summer of 2022 and made it a key innovation policy in the early days of the new regime elected in March 2022.

**Direction:** There is no evidence of consideration of inclusive innovation in terms of the direction of the national semiconductor promotion policy. R&D projects under the policy aim to make competitive industries even more competitive, without concerns explicit mentions of distribution or representation. For example, the semiconductor industry already accounts for 19.9% of Korean exports in 2021.

**Participation:** Similar to the material, parts, and equipment industries promotion policy, there is no evidence of considering the participation of underprivileged groups/regions/sectors in innovation activities in the semiconductor industries promotion policy. However, demand companies in the semiconductor field actively participated from the beginning of the R&D. Demand companies comprise firms in renewable energy, electric vehicle, drone, and healthcare industries.

The characteristic thing In the semiconductor industry promotion policy is that there are some aspects in which inclusive innovation reverses. The core competencies of the ROK are concentrated in the capital area in most fields such as the economy, politics, culture, and innovation. It generated large gaps in the students' preference for universities across regions. Thus, the Korean government has regulated the quota of university students in the capital area for a balanced development across regions. However, semiconductor companies complained to the government about the shortage of semiconductor workers, wherein the Korean government would ease restrictions on the quota of universities in the capital area. Several regulations about safety management of hazardous chemicals and overtime work have been eased, which may affect the environment and workers' health negatively. These deregulations can be seen as taking an increase in risk in labor and the environment to create a business-friendly environment.

**Governance:** The semiconductor industry promotion policy was also mainly created by government officials, researchers in public research institutes, and private firms. Private firms included large manufacturing firms as well as SMEs in the semiconductor equipment, packaging, foundry, and fabless industry. Other forms of inclusive governance were absent.

Thus, the semiconductor industry promotion policy is an interesting case because it is a policy to improve the international competitiveness of the semiconductor industry seemingly at the expense of inclusion. It seems to reflect the Korean government's traditional perspective on R&D or changes in international situations related to competition in the semiconductor industry.

### Digital Strategy Korea

Digital Strategy Korea is a recently announced policy to promote digital competitiveness and digital transformation in September 2022. It focuses on the digital transformation of various sectors, such as agriculture, manufacturing, service, and government. It also covers digital inclusion.

**Direction:** The strategy focuses on sectoral inclusion and improved access to digital technology for underprivileged groups, regions, and sectors. Digital Strategy Korea covers support policies to improve competitiveness in the low productivity sectors such as tourism, manufacturing SMEs, agriculture, and fishery using digital technology. Interestingly, only this strategy contains inclusive innovation for workers among the reviewed innovation policies. The main form is the installation or distribution of digital safety equipment or smart safety equipment in dangerous areas in the workplace. Smart care systems are provided to protect the spirit and safety of the elderly living alone. This includes care robots and health care systems by public health centers using AI and IoT.

This strategy also comprises the establishment of a Digital Bill of Rights that declares digital a universal right. Related to that, various projects will be conducted to increase access to digital technology for underprivileged groups, regions, and sectors. First, a digital learning center will be built across the country to enhance the ability of the entire nation to use digital technology. Second, support projects to increase digital utilization will be implemented in low-productivity sectors such as small business owners and traditional markets. It includes establishing big data platforms in commercial districts across the country, expanding the supply of smart stores, and establishing smart payment infrastructure. Third, a high-speed maritime communication network will be established to bridge the gap in communication welfare between land and sea. Fourth, an easy kiosk UI for the disabled and the elderly will be developed and distributed.

**Participation:** The main consideration is regional inclusion. Digital innovation bases will be designated and created in each region (non-capital area), enabling them to serve as a hub for growth in new digital industries. Governmental support such as digital infrastructure, R&D, university innovation capabilities, and tax benefits is concentrated here. Local SW promotion institutions, technology support institutions, and digital training institutions are located to support local participation in digital innovation. A project to support the digital innovation of SMEs and venture companies by providing computing resources such as data and AI will also be conducted.

**Governance:** Digital Strategy Korea was mainly created by government officials and researchers in public research institutes. However, this strategy plans to enact a Digital Inclusion Act that deals with the implementation of digital inclusion policies, guaranteeing digital use by underprivileged people, and developing inclusive technologies and services, wherein there seem to be some aspects of inclusive governance in the strategy. Furthermore, Digital Strategy Korea regularised the Regional Digital Policy Council for policy cooperation between the central and local governments. It can be a weak form of regional inclusion even though it does not comprise other underprivileged or target groups.

The strategy is the most inclusive innovation policy as compared to the other two sectoral promotion policies; the Material, Parts, and Equipment Industries Promotion Policy and the Semiconductor Industries Promotion Policy. While the two promotion policies cater to the existing sectors and were created to mitigate the risk that domestic industrial competitiveness may decline due to trade disputes or competition with foreign countries, the Digital Strategy Korea focuses on the emerging sectors. These are sectors undergoing digital transformation, wherein the pressure to strengthen industrial competitiveness seems to be relatively weak. Also, there can be more room for inclusion.

## Recommendations for Policymakers

**Direction:** Since the 1970s, Korean innovation policies have consistently prioritized economic growth and international competitiveness, which proved successful and it has worked well until the 2000s. As a result, this perspective has become deeply ingrained among policymakers, researchers, and private companies, posing a significant obstacle to the adoption of a more inclusive innovation system in the country. Since the 2010s, innovation policies to solve social problems have been introduced in the ROK. These policies are distinct as they directly align their objectives with the ultimate goal of benefiting a broader segment of society through the application of innovations, rather than solely focusing on increasing participation in the innovation process. However, despite their importance, inclusive innovation remains peripheral to the government's core tasks and the proportion of R&D expenses allocated to inclusive innovation within the total public R&D budget is relatively low. While inclusive innovation is included in the long-term plan with inspiring rhetoric, it tends to take a backseat when urgent technological developments are required due to changes in the geopolitical situation. Thus, it is crucial to prioritize improving people's lives through public innovation, rather than focusing on the challenging goal of increasing the economic growth rate through public innovation.

**Participation:** There already exist several R&D projects that citizens can participate in from the initial stage of problem definition under the Second Comprehensive Plan. However, increasing the participation level of people with more than one-off contact was difficult, although it was pointed out repeatedly across various government documents and arguments from researchers.[4]

The Second Plan encompasses the establishment and operation of an open online platform aimed at addressing social challenges and operating a 'Policy center for social problem solving through science and technology'. The open online platform is a website featuring information about living labs and R&D efforts pertaining to social problem-solving, but it lacks a mechanism for users to contribute opinions or suggest solutions. The viewership for most online content within this platform remains limited to just a few hundred. Similarly, the 'Policy Center for social problem solving by Science and Technology' faces comparable issues. Operating under the auspices of the Korea Institute of Science and Technology Evaluation and Planning (KISTEP), it operates with a modest team of nine workers and researchers. This underscores the lack of support from the central government, despite the grand vision outlined. The potential dearth of support from local governments further compounds the challenges at hand.

The government official in the Ministry of Science and ICT pointed out that the reason for people's low participation level in inclusive innovation policies can be weak support from local governments in the interview. Although local governments that face citizens need to listen to their opinions and encourage citizens to participate in inclusive policies, their interest in inclusive policies is also weak. Consequently, most people do not even know the existence of inclusive policies such as R&D for solving social problems and don't participate in these projects. Thus, an incentive system for the people or underprivileged groups, regions, and sectors to participate in inclusive policies is needed.

**Governance:** It is extremely difficult for underprivileged groups, regions, and sectors except local governments to affect the priority or agenda-setting of innovation policies in the ROK. It is mainly determined by government officials, researchers in public, or private research institutes, large

[4] An interviewee from a public research institute said it is the biggest problem for the spread of inclusive innovation.

firms, and SMEs[5]. People can voice only at lower levels of innovation policies such as individual R&D projects or one-off contact such as surveys.

The main problem seems to be that underprivileged groups are not considered as a "group" that has a voice. For example, a lack of cultural space for rural households is one of 40 social problems in the second comprehensive plan for solving social problems based on science and technology (2018–2022). However, the Second Plan does not reflect the voice of a group of rural households. It similarly considers discrimination of labor as one of the 40 social problems, but there is no voice of discriminated workers or labor unions. It seems to come from a centralized tradition in the ROK, that is, governments define problems and find solutions by themselves without the participation of other stakeholder groups.

Inclusive innovation requires researchers to listen to consumers' or citizens' opinions carefully and communicate with each other, reflecting their opinions in research, and proceeding with research tasks. To accomplish this, researchers need to dedicate more time and effort compared to when working on other R&D projects. However, if the evaluation system is the same with other projects using several papers or patents, researchers who participated in inclusive innovation projects can be disadvantaged in the evaluation. It can discourage the participation of researchers in inclusive R&D projects, especially junior researchers who are at stake for promotions and appointments. Kim and Bak (2020) introduced the case of a researcher who participated in a living lab project [5]. He said, "If I only do this kind of research, I won't be promoted". Therefore, a new evaluation system for researchers that provides more weight on inclusive innovation is needed to increase the participation of researchers. That may be an evaluation system that includes the social impact of research or the impact on underprivileged groups, regions, and sectors.

### Policy Recommendations

- Prioritize inclusive innovation and enhance the allocation of R&D funds toward science and technology-driven solutions for social problems.

- Promote the development of systems that involve underprivileged groups, rather than solely individuals or the broader public, in the policymaking process. This initiative should commence right from the initial policymaking stages to foster greater inclusivity in governance.

- Broaden the assessment framework for researchers to encompass their engagement in inclusive innovation initiatives.

- Enhance the presence and accessibility of online platforms to facilitate meaningful engagement.

- Create an incentive structure that encompasses both financial and non-financial rewards, aimed at fostering more intentional involvement of underrepresented demographic groups, industries, and regions in the realm of innovation.

[5] An interviewee highlighted that government officials have the greatest influence on innovation policy while another interviewee said researchers have the greatest influence in the ROK.

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## List of Interviews

| Job Title | Organization | Date of Interview |
|---|---|---|
| Government Officer | Ministry of Science and ICT | 2 Nov 2022 |
| Researcher | Science and Technology Policy Institute (STEPI) | 14 Oct 2022 |
| Researcher | Korea Institute of S&T Evaluation and Planning (KISTEP) | 18 Oct 2022 |

# Appendix

## Inclusive Innovation Policy Analysis of the ROK

**TABLE 1**

### 4TH BASIC SCIENCE AND TECHNOLOGY PLAN (2018–2022).

| Dimension of Inclusion | Social Groups Inclusion | | | | Region/Spatial Inclusion | Industry/ Sectoral Inclusion | General Social Problems |
|---|---|---|---|---|---|---|---|
| | Women | Elderly | PWD | Youth, Low Income, Working Individuals | | | |
| **Direction of innovation** | X | R&D project to develop auxiliary engineering equipment related to life assistance. | Technology development of community-based rehabilitation movement service for the disabled. | X | X | R&D projects for SMEs and Service sectors. | Startups use public data to alleviate social problems and help find solutions. |
| **Participation in innovation** | Increases women's employment in public research institutes and supports for career-interrupted female scientists to return to R&D works. | X | X | X | Increases the R&D budget of local government and ensures the autonomy of local governments as much as possible in the planning of state-funded R&D projects. | Tax cut for SMEs' R&D and supports SMEs to employ young researchers by using public R&D and introducing a pension system for young researchers employed by SMEs. | X |
| **Governance of innovation** | * Citizen participation in R&D planning and innovation policies by gathering public opinions on national and social issues and idea contests. Introduction of an open employment system to science and technology-related government committees.<br>* Public participation throughout the R&D process, such as problem selection, demonstration, and evaluation.<br>* "Living Lab" type R&D in the area closely related to public life such as security, safety, and environment. | | | | | | |

**TABLE 2**

**2ND COMPREHENSIVE PLAN FOR SOLVING SOCIAL PROBLEMS BASED ON SCIENCE AND TECHNOLOGY (2018–2022).**

| Dimension of Inclusion | Social Groups Inclusion | | | | Region/Spatial Inclusion | Industry/ Sectoral Inclusion | General Social Problems |
|---|---|---|---|---|---|---|---|
| | Women | Elderly | PWD | Youth, Low Income, Working Individuals | | | |
| **Direction of innovation** | Small-scale field farming machines are suitable for the elderly and women and small multi-purpose machines with workability and convenience. | Technology for easily screening olfactory disorders, which are precursor symptoms of dementia, with scent. | Remote language rehabilitation system for children with disabilities. | X | Establishment of a cargo delivery system using drones and logistics platforms for islands and backwoods. | X | Fine Dust Reduction Technology in Road. |
| **Participation in innovation** | Focusing on users' participation in R&D. In the type of living lab, residents, civic society organizations (CSOs), and experts participate in the process of solving local problems. Their main participation is the demonstration of technology in the living environment. | | | | | | |
| **Governance of innovation** | Researchers, residents, and local governments form a Living Lab. Residents and local governments can select researchers and operate them autonomously. Problem-solving plans are conceived under consultation. A Living Lab is an open lab type that allows other researchers and stakeholders to participate freely. | | | | | | |

**TABLE 3**

**MATERIAL, PARTS, AND EQUIPMENT INDUSTRIES PROMOTION POLICY.**

| Dimension of Inclusion | Social Groups Inclusion | Region/Spatial Inclusion | Industry/Sectoral Inclusion |
|---|---|---|---|
| **Direction of innovation** | X | X | Support for low-productivity sectors (material, parts, and equipment industries). |
| **Participation in innovation** | | X | |
| **Governance of innovation** | | X | |

**TABLE 4**

**SEMICONDUCTOR INDUSTRIES PROMOTION POLICY.**

| Dimension of Inclusion | Social Groups Inclusion | Region/Spatial Inclusion | Industry/Sectoral Inclusion |
|---|---|---|---|
| **Direction of innovation** | | X | |
| **Participation in innovation** | No consideration for the participation of underprivileged groups/regions/sectors in innovation activities. In contrast, there are some aspects in which inclusive innovation reverses in terms of balanced development across regions, environment, and workers' health. | | |
| **Governance of innovation** | | X | |

**TABLE 5**

**DIGITAL STRATEGY KOREA.**

| Dimension of Inclusion | Social Groups Inclusion | | | | Region/Spatial Inclusion | Industry/Sectoral Inclusion |
|---|---|---|---|---|---|---|
| | Women, Youth, Low Income | Elderly | PWD | Working Individuals | | |
| **Direction of innovation** | X | Smart care systems are provided to protect the spirit and safety of the elderly living alone. | Easy kiosk UI will be developed and distributed. | Installation or distribution of digital safety equipment or smart safety equipment in dangerous areas in the workplace. | Establishment of a high-speed maritime communication network will be established to bridge the gap in communication welfare between land and sea. | Support projects to increase digital utilization in low-productivity sectors such as small business owners and traditional markets. |
| **Participation in innovation** | X | X | X | X | Digital innovation bases will be designated and created in each region (non-capital area). | Project to support digital innovation of SMEs and venture companies by providing computing resources such as data and AI. |
| **Governance of innovation** | Plan to enact "Digital Inclusion Act" that deals with the implementation system of digital inclusion policies, guaranteeing digital use by underprivileged people, and developing inclusive technologies and services. | | | | | |

# MALAYSIA

## Inclusive Innovation Challenges in Malaysia

Malaysia has set its sights on becoming a high-income nation by 2025 and is cognizant that to maintain its competitiveness, it must increase the quality, inclusiveness, and sustainability of its economic growth. Thus, it has outlined multiple strategies, driven by elements of innovation, transformation, and digital and technology adoption, at a national level. Amongst the challenges faced, in 2020, 8.4% of Malaysian households were living below the national poverty line [1], an increase from only 5.6% in 2019 [2]. This increase is driven partly by the COVID-19 pandemic and has affected the states of Sabah and Kelantan in particular, where an estimated 25% and 21% of the population, respectively, are below the poverty level [3].

A contributing factor to this is the access to internet connectivity. While the recent launch of the MEASAT-3d aims for 100% coverage by 2025 [4], the World Bank reported that Malaysia's average broadband fees, at an average of USD26.58 per month, are considerably more expensive compared to other countries [5]. The percentage of broadband users among the bottom 40% income group (B40) is only 49.3%, with many having access to only 2G phones, resulting in a significant digital divide due to an inability to actively participate in e-commerce activities. In addition to the affordability, many of those within the underprivileged segment do not see the necessity for such services [6]. Rural entrepreneurs have also faced unstable connectivity in their villages [7].

In 2018, it was reported that half of the Malaysian working-age population were women. They, however, constituted only two-fifths of the labor force. Women's average earnings were also significantly lower than men's for almost all major occupational and educational groups. Housework has been cited as the main constraint preventing women from participating in the labor force. Thus, ensuring equal access to economic opportunities for women could unlock their potential. This is substantiated by data that shows that on average, women in the labor force are better educated and outperform men in standardized assessments [8].

Marginalization of PWDs, is another challenge. While the latest figure of 1.8% [9], in 2021 was deemed understated, they formed 11.8% [10], of the adult Malaysian population in 2015. A key factor why they have been unable to participate in society is the lack of accessibility to the workplace. Many of these people do not have a fixed income and receive a subsidy of MYR400 per month if they are working, or MYR300 a month if they're bedridden. In 2018, there were only 4,500 PWD workers in the public and private sectors [11].

SMEs in Malaysia were also found to be struggling in their readiness for IR 4.0 [12], based on the Industry4WRD Readiness Assessment, a comprehensive program to help firms assess their capabilities and readiness to adopt Industry 4.0 technologies and processes. While most organizations were motivated to play their role in Industry 4.0, many did not face high market pressure to adopt IR 4.0 technologies [13]. This lack of readiness was particularly evident among the laggard industries like agriculture, wood-based products, textile, and construction.

## Existing Innovation Policies in Malaysia

In the last four years, Malaysia had launched several innovation policies to further steer the country in talent development and enculturation of STI, embedding it within all levels and pockets of society. Three comprehensive and interconnected policies were launched, including the Twelfth Malaysia Plan (12MP), the National Fourth Industrial Revolution (4IR) Policy, and the Malaysian Digital Economy Blueprint (MDEB). These policies focused on a national recovery plan to restore and reinvigorate economic stability while planning for the country to become the regional leader in the digital economy, aiming toward an inclusive digital society. The main enabler, as mentioned in the MDEB, is the country's ability to leverage the growth potential presented by the fourth industrial revolution (4IR). The MDEB additionally aimed to provide an enabling environment for the digital economy and put forward strategies to embed digitalization, for all sectors to keep up with the pace of change, especially in technological advancement, labor market requirements, business model innovation, and changing public expectations. The various policies also touched on strategies to provide citizens with the skills and knowledge around digital and IR.

Complementing these main policies were other more specific policies around STIs. These included the National Policy on Science, Technology and Innovation (NPSTI); the 10-10 Malaysian Science, Technology, Innovation and Economy (10-10 MySTIE); policies on spurring specific emerging technology, namely the National Blockchain Roadmap (2021–2025), Malaysia National Artificial Intelligence Roadmap 2021–2025, and National Robotics Roadmap (NRR); and along with policies to spur the electrical and electronic, advanced material and manufacturing sectors.

When examined, the three comprehensive policies face three key hurdles of connectivity, which encompasses physical infrastructure like roads, transport, and access to buildings; broadband availability; and capability of the people. The scarcity of these elements was manifested as poverty within various underserved communities that restricted access to information and income opportunities, and led to alienation from the e-commerce ecosystem, thereby creating a vicious cycle. Thus, one of the specific targets for the 12MP is to eliminate hardcore poverty by 2025.

**Direction:** An analysis of the various policies highlighted that inclusive elements are present largely within the three comprehensive policies, spelling out specific strategies to address many of the marginalized groups such as women, gig workers, the bottom 40 (B40) of the population, particularly the urban poor, PWDs, indigenous populations, and those living in rural areas. The policies also aspire to improve and enhance internet connectivity by enabling access to more affordable and quality digital services. At the same time, upgrading of basic amenities and infrastructure was also planned particularly in remote areas to ensure equitable access to opportunities for all Malaysians. The Short-Term Economic Recovery Plan (PENJANA) had also addressed the plight of single mothers and the disabled, apart from the unemployed [14]. In addition, the government has also been encouraging and supporting social entrepreneurship and social innovation, as a way towards inclusivity, as these initiatives frequently target niche communities that may be overlooked.

Initiatives focusing on talent development have also been widespread within the various policy documents. These have included steps to encourage the digitalization of education as well as the identification and development of appropriate digital solutions to fit the level of industry and graduate readiness, in addition to programs to reskill and upskill the existing STI workforce. The policies also aim to address the challenge of transforming Malaysia's traditional manufacturing-based economy into an innovation-led economy. This is guided by the 10-10 MySTIE that underpins growth in all sectors through sectoral initiatives and socioeconomic drivers. Within the 10–10

MySTIE, a 6-step implementation mechanism is spelt out, to enable the deployment of high-impact projects to address the needs of communities as well as the quality of life at specific localities across Malaysia. The policy also highlights ten emerging global technologies and their possible intersections in enhancing ten key socio-economic areas.

**Participation:** Seeing that the advancement of connectivity infrastructure was fundamental to the progress of the nation, *Jalinan Digital Negara* (JENDELA) was introduced in August 2020 as a digital infrastructure organization to meet digital connectivity needs and to prepare the nation for a gradual transition into 5G technology [15]. By March 2022, 4G coverage had reached 95% of the country, with over seven million premises having fiber connectivity. The young users also benefitted from the launch of a new prepaid package *Pakej Remaja Keluarga Malaysia* that aimed to assist teenagers and students in gaining internet access for online learning from home without any data restrictions. Overall there were 149,935 subscribers as of 31 December 2021.

Alongside improvements in internet connectivity, the MDEB detailed strategies to enable access to more affordable and quality digital services. Two of its six key thrust areas are particularly relevant to inclusivity. The thrust to 'Build agile and competent digital talent' is aimed at building future-ready digital talents who are well-equipped with the skills required to thrive in an evolving job market. Amongst this are programs like CERDIK where students from lower-income families are given access to devices (laptops or tablets) and data plans. CERDIK is an initiative spearheaded by the Ministry of Finance (MOF) and the Ministry of Education (MOE). It is supported strongly by Government Linked Companies (GLC) and Government Linked Investment Companies (GLIC) as part of their Corporate Social Responsibility. The initiative is targeted to involve contributions worth MYR150 million from 13 GLCs/GLICs. It is overseen by Yayasan Hasanah, a foundation of *Khazanah Nasional Berhad*, one of Malaysia's largest sovereign wealth funds, and plans to look into 'digital learning' for the underprivileged rather than being a one-off device donation drive [16]. Overall, CERDIK has enabled access to digital learning for 150,000 students.

Efforts to bridge the capability gap within the different groups were also seen in programs like GigUp which equipped gig workers with versatile skills, to ensure they remain relevant in the digital economy. This is done in collaboration with companies that employ gig workers, including technology companies, startups, and even larger companies. A year after the launch, 28,477 Gig workers had been upskilled through the PENJANA HRD Corp programs. On a more holistic note, as part of efforts to boost long-term social protection and increase outcomes for the gig economy, workers were provided with enhanced social protection under three separate schemes of PENJANAGig, SPS Lindung, and SPS Prihatin Wanita, that gave benefits like medical and disability coverage [17].

The availability of skilled technical workers is also seen as essential for the successful adoption of Industry 4.0. As such it was important to improve the existing Technical and Vocational Education and Training (TVET) ecosystem. The attractiveness and the quality of delivery and training of TVET were enhanced through improvements in accreditation, recognition, and certification. Going ahead, a ranking system for TVET institutions is planned, comprising components such as employability, wage levels of graduates, industrial engagement, and implementation of social initiatives in rural areas [18].

Another area of focus under the 4IR policy is upskilling of PWDs, the Orang Asli (a group of indigenous people), people living in remote and underserved areas, and housewives. The familiarity with 4IR knowledge and skill sets aims to ensure that they can adopt and use technology wherever applicable, thereby enabling them to be part of the digital economy [19].

Many other programs featured public-private collaborations. Industry players participated in many ways, ranging from financing, co-development of concepts, and training. An example of this is the 42KL program [17]. Aimed to provide computer science education for all, it is led by the Sunway Education Group and provides free industry-level skills for those above 18 years in areas such as Blockchain, AI, ML, and cybersecurity. Designed to learn without teachers or formal classes, the year-long course already has 120 students, 40% of whom are from the B40 population.

The other thrust under the MDEB is to 'Create an inclusive digital society'. Here, the focus is to narrow the digital divide and ensure every individual can participate and reap the benefits of the digital economy. Amongst the programs executed was *My Ikrar* a program that aimed to assist vulnerable groups within the society (such as the B40, women, and people with disabilities) to adopt digital technologies. This was executed in collaboration with the private sector, academia, and CSOs, through volunteerism, to create a positive social impact.

One of the intentions for creating an inclusive digital society was to encourage entrepreneurship, leveraging digital technology. Familiarity with digital skills is facilitated through 883 Digital Economy Centers or *Pusat Ekonomi Digital Keluarga Malaysia* (PEDi), set up to provide internet access, as well as entrepreneurship and advocacy programs to local communities. The project aimed to increase the number of PEDi to 1,084 by the end of 2022. MSME companies that have a sales turnover of less than MYR300,000 or less than five full-time employees, were also prioritized as they were identified to be a powerful game changer for the economy. The MSMEs were equipped with the skills to enable them to digitalize their business processes and enhance competitiveness through products and services which are on par with international standards. Some of the PEDi act as a One Stop Center (OSC) for MSMEs, offering support through jointly organized programs from government agencies, the private sector, and telecommunications companies, helping local MSMEs adapt to digital technology to expand their businesses. This is done through the Small Entrepreneur Digitization Empowerment Program or *Program Pemerkasaan Pendigitalan Usahawan Kecil* (PUPUK). As of 31 December 2021, a total of 60,632 entrepreneurs have benefited from the programs organized under PUPUK. This initiative, led by the Ministry of Entrepreneur Development and Cooperatives (MEDAC) has onboarded 725,285 of the targeted 875,000 MSMEs, to adopt e-commerce by 2025. Testament to the impact created, at the end of 2021, the 725,285 MSMEs had generated a revenue of MYR1.1 trillion [17].

PWDs were also included in the equation. The 12MP stated a target of having more economic opportunities for PWDs and for them to make up 1% of the public service by 2025 [6]. To support this, Disability Equality Training Programs and community-based rehabilitation or *Pemulihan Dalam Komuniti* (PDK) programs have been providing rehabilitation, training, education, opportunity equalization, and social integration of PWDs so that they can enjoy greater self-reliance and financial independence. Of the 560 PDK centers, 240 got their ICT facilities renovated and were rebranded as PDKNet. This has provided PWDs greater access to information due to the use of the internet [6]. A total of 1,397 PWDs have been trained and assisted in getting employment through the Job Coach Service program. As of 2020, 4,488 PWDs, or 0.33% of the targeted quota are working in the public service. To encourage the hiring of PWDs in the public sector, one representative from PWDs was appointed as a member of the Public Services Commission in 2019. One PWD representative is still a member of the House of Senators [6]. Complementing initiatives for PWDs, the *Santuni OKU* campaign was introduced, to increase the number of PWDs registered in the Disability Information System (SMOKU). This will hopefully better document the needs of PWD so that more tailored aid can be delivered.

Physical infrastructure was also identified as one of the barriers to inclusivity. The physical infrastructure, particularly on land, was recognized to be crucial to enable access to rural communities and in providing access for products or services to emerge from rural communities. Similarly, this also proved to be a barrier for PWDs due to the restriction in mobility. Thus, the Disability Accessibility Action Plan, endorsed in 2019, was reinforced in the 12MP. This guide was subsequently used by local governments to enhance accessibility to public facilities.

To address issues of gender disparity, particularly to elevate women's participation in the STI economy and the workforce, policies have included many women-related initiatives. The Go-e-commerce Onboarding and Shop Malaysia Online campaigns provided incentives, and programs to empower women towards adoption of digital technology and participation in e-commerce. Within a year, 178,000 women entrepreneurs benefited from the program [17]. In addressing women, the NRR also outlined measures to empower women towards the adoption of robotics for the improvement of quality of life and career development. This is achieved by offering programs to improve workforce skills and by promoting upskilling and reskilling programs specifically for the robotics sector taking into account future employment for women.

For several policy initiatives, implementation plans are proposed by the related CSOs or NGOs. These are communicated upwards to the implementation agency, to support the initiative and include it in the overall plan. This ensures that the programs delivered are applicable and impactful, with an experienced implementation partner.

**Governance:** Across the various policies, extensive stakeholder engagements were held during the design phase. As the scope of the policy was far-reaching and comprehensive, almost all communities, ministries, and industries were included either directly or indirectly through representative organizations. For example, many of the engagements with SMEs in manufacturing occurred through the Federation of Malaysian Manufacturers, SME Association of Malaysia, or SME International Trade Association of Malaysia which is an NGO that facilitates and nurtures SMEs to tap into the global arena by providing training and support. CSOs were always included and almost all mention actively engaging stakeholders from the quadruple helix (public and private sector, academia, and society). Formulation of the MDEB, for example, was done following a comprehensive study and active involvement of various stakeholders including the ministries and their agencies, the private sector, and CSOs. Multiple stakeholder engagements with industry players were conducted, including nearly 500 companies and over 50 industry associations and technology providers. For the IR 4.0 policy, the stakeholders represented 25 ministries, 51 agencies, seven state governments, 460 companies, 22 industry associations, and 33 technology providers. The committee that overlooked the formulation of the policy included representatives from 22 ministries and agencies.

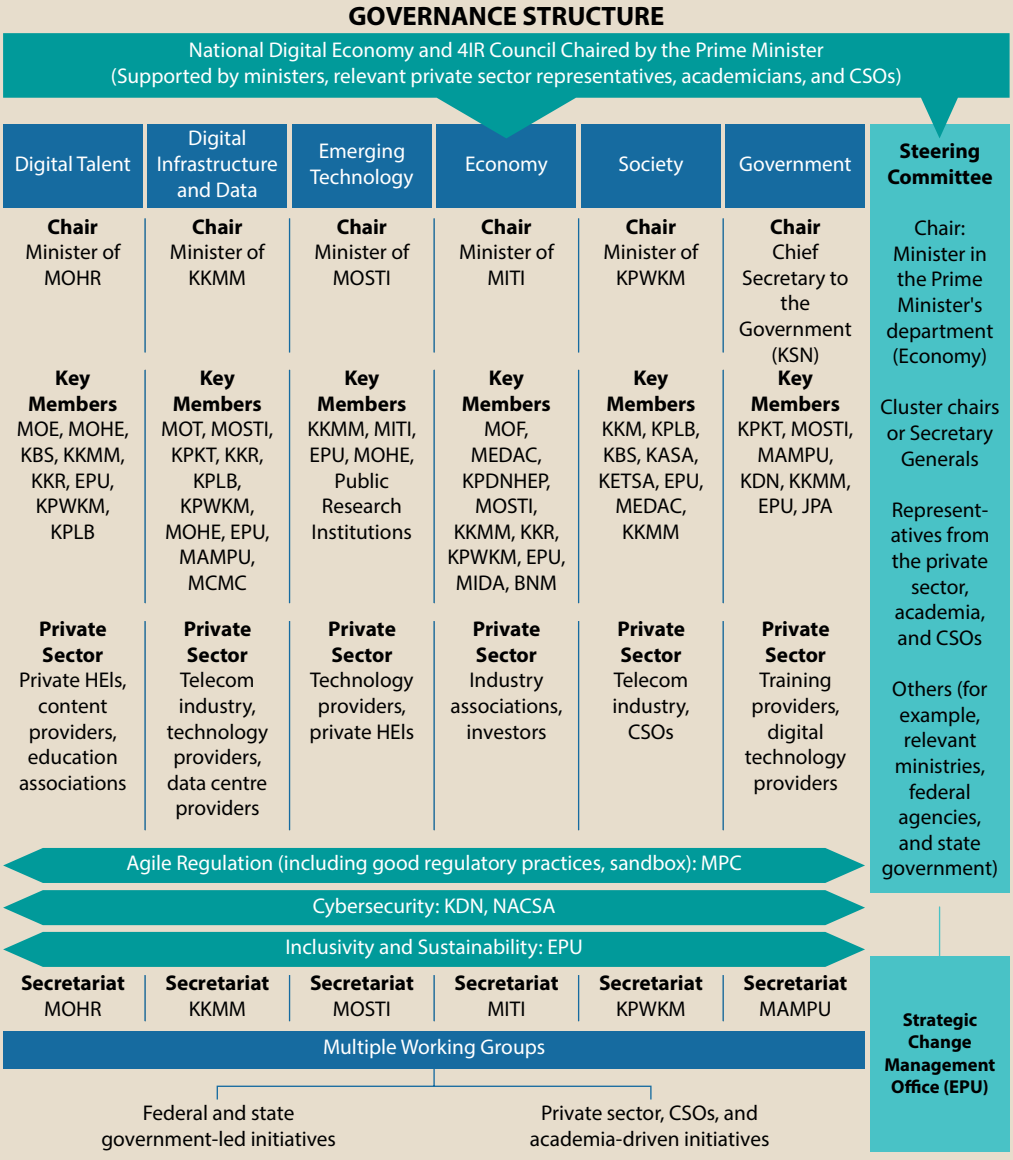
Engagements are further enhanced through digital platforms, called Unified Public Consultation (UPC) Portal which facilitates stakeholder engagements. This digital platform, which was developed together with the World Bank, is open to the public, providing easy access to regulatory consultations through a single website. The use of the platform enables the engagement of a diverse cohort of respondents, in addition to engaging those who are already on UPC's database. In designing the policies, grassroots organizations were also frequently roped in to include their members or target group. Specific clusters of the population were also included to get a feel of the situation without designing specific solutions for them. For example, in Dungun, fishermen from the fishing villages were part of the focus groups to understand the challenges faced in trying to elevate the quality of life.

The 12MP also states that to develop a robust approach towards developing new and reviewing existing policies, government agencies will be required to adopt Good Regulatory Practices to increase transparency, especially in disseminating information related to changes in law and regulations. This will enable the industry to stay updated with laws and ensure compliance while fostering modernization and increased employment and growth [6].

In addition to these, a clear oversight and reporting structure ensures that policies are measurable and collaboration across implementing entities is happening. An example of this is seen in the structure for monitoring initiatives for MDEB and the 4IR Policy, as shown in Figure 1, where a National Digital Economy and 4IR Council was formed, and chaired by the Prime Minister. This subsequently had six different focus areas which were chaired by different ministries; however, the members were made up of various ministries and agencies, including the corporate sector, industry associations, and others.

**FIGURE 1**

**NATIONAL DIGITAL ECONOMY AND 4IR COUNCIL GOVERNANCE STRUCTURE.**



## Recommendations for Policymakers

Several recommendations have emerged from the study. They are aggregated and listed under different categories.

**Direction**

1. Ownership of innovation policies should not rest solely with a single ministry or entity, as this approach could diminish the sense of urgency and engagement from other ministries. It is imperative to establish a clear mandate regarding which entity holds the authority and responsibility for driving the implementation and impact of these initiatives.

2. The involvement of diverse ministries or agencies during the policy design stage is crucial to ensure that all stakeholders understand their respective roles in the implementation process. This approach ensures that, upon policy launch, everyone has a clear understanding of the policy and its applicability.

**Participation**

1. Given that inclusive innovation is a relatively emerging domain, expertise in this field may not be predominantly concentrated within the public sector but rather dispersed across the broader ecosystem. Adopting a shared resource or on-demand mindset and approach, for expertise, personnel or even physical assets would allow governments to avoid undue burdens while still attaining substantial and meaningful outcomes.

2. Incorporating digital tools as enabling technologies would allow for creating a balance of oversight, empowerment, and independence.

3. Intensifying public-private initiatives when rolling out plans is a great strategy to share the responsibility of policy implementation. The corporate sector is open to assist, particularly when it comes to marginalized or underprivileged communities. This can be part of their CSR initiatives. Public-private partnerships can also be helpful when it relates to the dispersion of knowledge, or the adoption of digital, as these form the areas where corporates frequently have an upper hand.

**Governance**

1. Adopting a digital dashboard to monitor and track outcomes and the impact of the initiatives, would be beneficial. This may further highlight elements of inclusivity and identify which target group's needs are being addressed. This approach reduces the resource needed to manage and minimizes human error in reporting by assigning the team responsible to input their updates. Furthermore, the platform's visibility acts as a gentle pressure for each initiative, often originating from different ministries or departments, to integrate inclusive components.

2. Instituting a mindset for prototyping while implementing strategies in new areas, such as inclusivity, are beneficial as plans can be tested and subsequently tweaked for optimized outcomes and results.

3. Having a clear framework and approach which can be referred to by all parties involved is important. This should include a mechanism for reviewing policy implementation plans,

to ensure applicability and flexibility to embrace emerging needs. This agile approach is important for facilitating adjustments to implementation strategies and resource reallocation, where necessary.

4. A distinct strategy for planning and collaboration proves invaluable in directing diverse stakeholder organizations to identify and carry out relevant activities or initiatives. This expedites the effective implementation of initiatives on the ground.

5. Data sharing or privacy policies should be spelt out clearly to ensure a seamless collaboration process among all the involved stakeholders. Implementation plans are likely to generate new data, which can be cross-analyzed with data from other initiatives to yield a more comprehensive and insightful understanding of the ecosystem. This approach facilitates the development of data-driven strategies. Consequently, transparent data sharing policies should encompass procedures for data cleansing and anonymization as needed. Such transparency is crucial, as it has often proven to be a stumbling block, even within a single organization. When addressing minority or marginalized groups, data can occasionally be treated as particularly sensitive, whether due to political, social, or macroeconomic considerations, in contrast to 'standard' data. Thus, clear guidelines become even more crucial in such contexts.

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| Job Title | Organization | Date of Interview |
|---|---|---|
| Senior Vice President | MIGHT | 25 Oct 2022 |
| Principal Analyst | MIGHT | 25 Oct 2022 |
| Chief Strategy Officer | Academy of Sciences Malaysia | 28 Oct 2022 |
| Deputy Director | Research Management Unit, Economic Planning Unit | 4 Nov 2022 |
| Assistant Manager | Research Management Unit, Economic Planning Unit | 4 Nov 2022 |
| Partner, Economics and Policy | PwC Malaysia | 7 Nov 2022 |
| Advisor | Strategic Change Management Office, Economic Planning Unit | 9 Nov 2022 |

# Appendix

## Inclusive Innovation Policy Analysis of Malaysia

**TABLE 1**

**MYDIGITAL ECONOMIC BLUEPRINT.**

| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis: MyDigital |
|---|---|---|
| **1. Overall objectives**<br><br>Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | This Blueprint envisions Malaysia becoming the regional leader in the digital economy and achieving inclusive, responsible, and sustainable socio-economic development. It focuses on three-phase implementation, with the second phase planned from 2023 to 2025, towards an equitable digital transformation. |
| **2. Direction of innovation**<br><br>Whose needs are being met? | 2.1. Support for innovation addressing societal challenges and needs. | The Blueprint advocates for co-solution approaches with businesses and society to tackle economic, social, and environmental challenges via innovative people-private-public partnerships.<br><br>• The need to have a digital-first mindset and higher digital technology adoption across the public sector.<br><br>• The digital divide among income and age groups, and between gender need to be narrowed.<br><br>• The need to build a more supportive ecosystem for local enterprises to digitalize.<br><br>• The need to nurture a future-ready workforce.<br><br>• The need for better deployment of quality broadband and digital technologies infrastructure.<br><br>• The need to build trust and ethics in using data and technology as well as increasing awareness of cyber security. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | |

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| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis: MyDigital |
|---|---|---|
| **3. Participation in innovation**<br><br>Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | **Women**<br>MyDigital has put forth several initiatives for women, including providing support to enhance sales capability in e-commerce and help boost business under Go-e-commerce Onboarding and Shop Malaysia Online campaigns. This has subsequently, resulted in up to 178,000 Women entrepreneurs benefiting from the e-marketplaces and e-payment gateways provided under these campaigns.<br><br>**Youth**<br>At the same time, Pakej Remaja Keluarga Malaysia was also introduced as a new prepaid package specifically to help teenagers and students gain Internet access for online learning from home without any data constraints while increasing productivity. A total of 149,935 Pakej Remaja have been subscribed as of 31 December 2021.<br><br>**B40**<br>Providing an online platform to facilitate better access for vulnerable groups; women and B40. Free science education program that aims to gain essential industry-level skills in subjects like AI, Blockchain, cybersecurity, data analytics, ML, and more for the B40 group in Malaysia.<br><br>**Working Individuals**<br>Over 28,477 Gig workers upgraded their skills through the PENJANA HRD Corp programs, equipping them with enhanced skills and improving their employability as part of the ongoing initiative to ensure all gig workers remain relevant in the digital economy. 248,225 Gig workers with enhanced social protection under PenjanaGIG, SPS Lindung, and SPS Prihatin Wanita that provide benefits such as medical and disability coverage, as part of efforts to offer support of long-term social protection and improve outcomes for the gig economy. |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | Build enabling digital infrastructure in rural areas. This initiative aims to enhance efforts to increase digital literacy and skills among rural residents. |
| | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | One of the framework's main intended outcomes is to achieve business growth in all sectors, including 28 sectoral initiatives and 10 Socio-economic drivers. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | Enhancing participation of the private sector, academia, and CSOs in assisting society to adopt digital technologies. |

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| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis: MyDigital |
|---|---|---|
| **4. Governance of innovation**<br><br>Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | Malaysia Digital Economy Blueprint is formulated through a comprehensive study with the active involvement of various stakeholders including ministries and their agencies, private sector, and CSOs. Several stakeholder engagements with industry players were conducted, including nearly 500 companies and over 50 industry associations and technology providers. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | Minority groups were actively included in the policy strategies. |
| | 4.3. Measures to mitigate the risks of innovation. | Agile regulations to put in place for the gig economy while ensuring unhindered business innovation. KPIs on the policy deliverables, one year down the line, are made public. |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | A wide range of stakeholder engagements were done in the early stages and during the implementation phase. There is also extensive involvement of CSOs. |

**TABLE 2**

## THE NATIONAL 4IR POLICY.

| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis: 4IR |
|---|---|---|
| **1. Overall objectives**<br><br>Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | The goal of the policy is to take advantage of the growth potential presented by 4IR, aiming to provide citizens with the skills and knowledge around it, additionally, build a conducive ecosystem for IR to thrive and build trust for an inclusive digital society. There is also an emphasis on improving the ecological integrity of the country and the role technology can play to improve the well-being of the people. |
| **2. Direction of innovation**<br><br>Whose needs are being met? | 2.1. Support for innovation addressing societal challenges and needs. | This policy aims to resolve issues of insufficient innovation-led mindset, inadequate 4IR-ready talent, and lack of quality basic infrastructure. It provides solutions to address critical social and environmental challenges, related to, among others, good health, affordable and clean energy, and sustainable communities. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | Many of the strategies apply to all layers of society. There are, however, specific strategies addressing women, PWDs, and the Orang Asli (indigenous group). |
| **3. Participation in innovation**<br><br>Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | **Women**<br>The policy ensures housewives have equitable access to 4IR learning opportunities.<br><br>**PWDs**<br>Equip the PWDs with 4IR knowledge and skill sets.<br><br>**Working Individuals**<br>Transform 20% of semi- and low-skilled labor to highly skilled labor. All teachers are trained to use 4IR technology. Enhance formal social protection mechanisms for gig workers. |

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| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis: 4IR |
|---|---|---|
| **3. Participation in innovation**<br><br>Who participates in innovation? | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | 4IR knowledge upskilling is targeted to Orang Asli (indigenous community) and people living in remote and underserved areas to equip themselves with the necessary knowledge and skill sets.<br><br>Invest in basic infrastructure in rural areas to enable the adoption of 4IR technologies. |
| | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | National 4IR Policy outlines sectoral-specific initiatives to capture opportunities that emerge from global and regional trends. Deployment of this policy will be focused on 10 key sectors as underlined by the 10-10 MySTIE, along with six supporting sectors. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | Implementation of this policy will be done through people-private-public partnerships, including academicians and CSOs. The 4IR also offers a huge opportunity for CSOs to take advantage of cutting-edge technology to increase influence and complete vital objectives. |
| **4. Governance of innovation**<br><br>Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | Extensive engagements were held with 25 ministries, 51 agencies, state governments, and the private sector, including 460 companies, 22 industry associations, and 33 technology providers. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | Implementation of the policy cuts across multiple ministries and agencies, allowing for a wide breadth of participation. |
| | 4.3. Measures to mitigate the risks of innovation. | Malaysia has implemented several measures to mitigate some of the societal impacts of 4IR.<br><br>• Coverage of cross-border data transactions in the current Personal Data Protection Act.<br><br>• Coverage of 4IR-related education and relevant upskilling programs.<br><br>• Equal access to technologies that widen urban-rural, gender, income, and generation gaps.<br><br>• Adequate social safety nets to mitigate job displacements due to 4IR technology adoption.<br><br>• Increase potential for online transactions due to low trust.<br><br>• Adequate awareness in society to protect against cybercrimes. |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | |

**TABLE 3**

**TWELFTH MALAYSIA PLAN (12MP).**

| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis: 12MP |
|---|---|---|
| **1. Overall objectives**<br>Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | The 12MP is a medium-term plan to restart and rejuvenate Malaysia's socioeconomic development for long-term sustainability and prosperity. It is anchored on three key themes, namely resetting the economy, strengthening security, well-being, and inclusivity as well as advancing sustainability. |
| **2. Direction of innovation**<br>Whose needs are being met? | 2.1. Support for innovation addressing societal challenges and needs. | The goal of 12MP is to address issues relating to the slow expansion of the digital economy, the alarming rate of the digital divide, the lack of funding for R&D, innovation, and commercialization, as well as the difficulties in implementing the technologies of the fourth industrial revolution. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | To reduce the disparity within the income groups, ethnicities, and geographic regions. |
| **3. Participation in innovation**<br>Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | **Youth**<br>Promoting innovation-driven entrepreneurs among youth.<br><br>**PWDs**<br>More economic opportunities will be made available for PWDs through various platforms, including the sharing and digital economies to achieve the participation rate of PWDs in Public Service up to 1% by 2025. The Disability Accessibility Action Plan endorsed in 2019 serves as a guideline for local authorities to improve accessibility to public facilities.<br><br>**B40**<br>A minimum enrolment quota of 60% for B40 students for public matriculation and TVET program is encouraged. Digitalizing MSMEs to broaden market access for the B40 group.<br><br>**Working Individuals**<br>Access to entrepreneurship training and microfinancing will be expanded to increase and diversify the income of the urban poor. the urban poor will be exposed to job opportunities in the gig economy. |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | Capitalizing cooperatives, agriculture-based associations, and social enterprises in developing entrepreneurs among the B40 and rural communities |
| | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | Address the problem of industries outside selected industrial zones that do not have access to gigabit-speed broadband connectivity to adopt emerging and 4IR technologies. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | A special program to improve TVET Education of Orang Asli will be introduced through collaboration between the government, universities, and CSOs. |

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| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis: 12MP |
|---|---|---|
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | The Twelfth Plan has been drawn up based on extensive engagements with various stakeholders, including ministries, state governments, the private sector, and CSOs, as well as online engagements with the public. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | The ecosystems that support private sector participation in development will continue to be improved such as facilitating regulation as well as increasing engagement and consultation with the private sector in policy formulation. |
| | 4.3. Measures to mitigate the risks of innovation. | A digital monitoring platform is planned to monitor the progress and outcomes of projects. |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | Digital platforms similarly would allow a higher degree of transparency towards the distribution of activities and resource allocation. |

# TURKIYE

## Inclusive Innovation Challenges in Turkiye

In Turkiye, some applications can be defined as inclusive innovation. However, since there is no definition for inclusive innovation, the content and contribution of these practices cannot be clearly understood.

However, the gender distribution of the personnel employed in the public authority, which is expected to lead innovation and create policies, has an active role in determining the direction of policies. For example, the number of women working in the public sector in Turkiye is considerably less than the number of men. The gender imbalance that occurs here creates a compelling and obstructive situation in creating an innovation policy for women.

With the Five-Year Development Plans it has been implementing since 1963, Turkiye determines and implements the principles and targets that will enable Turkish society to change from an agricultural society to an industrial society, from an industrial society to an information society. There is a clear difference between the east and west of Turkiye in terms of income distribution, industrialization, participation in innovation, and education rate. This difference has a significant impact on internal migration and increases migration from east to west. The Government of Turkiye applies a regional incentive system to reduce the inequality between regions and aims that the people of the region benefit from the developments resulting from innovation through development agencies. However, these applications, which cannot provide sufficient coverage, need to be developed.

The Government of Turkiye supports several priority sectors in the manufacturing industry, which is considered a dynamic of stable growth, to accelerate technological innovation. These sectors are chemistry, pharmaceutical-medical equipment, machinery-electrical equipment, automotive, electronics, and rail system vehicles. AI, IoT, AR, Big Data, cybersecurity, energy storage, advanced materials, robotics, micro- and nano-electromechanical systems (MEMS/NEMS), biotechnology, quantum technologies, sensors, and additive manufacturing technologies are determined as critical technologies. In addition to the priority sectors, agriculture, tourism, and defense have been determined as priority development areas. Apart from these, there is no direct application to support innovation in sectors such as textiles, metal, cement, and services.

Turkiye has faced a very serious influx of refugees due to the civil war in Syria since 2011. When refugees from other countries are included, the number of refugees in the country has exceeded 3.5 million. Ensuring the participation of refugees, who make up more than 4% of the country's population, in social life, business life, and innovation process in the upcoming period is seen as an important challenge for Turkiye.

Municipalities are the closest public actors to society in terms of social aspects. The role of municipalities within the scope of inclusive innovation is important. However, municipalities in Turkiye commonly face debt and and financing issues, which curtails their capacity to support innovation.

Educational institutions play a pivotal role in facilitating the development of students' innovative capabilities within the inclusive innovation process. Hence, it is essential to assess these environments to drive creativity and innovation.

For example, it can be ensured that young people develop innovative inclusive projects where they can see themselves as a part of the problem and design solutions. In this direction, with the inclusion of inclusive innovation and practice examples in the curriculum, more young people will be able to integrate into society as active individuals.

## Existing Innovation Policies in Turkiye

To understand the development of innovation in Turkiye, the policies within the scope of R&D and innovation in the Development Plans should be evaluated first. Ten different five-year Development Plans have been implemented in Turkiye since 1963. Currently, the Eleventh Development Plan, covering the years 2019-2023, is in effect.

### Eleventh Development Plan

The main objectives of innovation policies in Turkiye's Development Plans have been listed.

1. Enhancing technology development and innovation activities with a focus on the private sector, and converting them into added value.

2. Commercialising innovative ideas by creating an innovation-based ecosystem.

3. Increasing Turkiye's competitiveness with technology-intensive products and services.

The 11th Development Plan includes policy steps for disadvantaged regions, sectors, groups, and actions for the development of the R&D and innovation ecosystem.

In this sense, the Plan aims to benefit all segments of society from the welfare created by development, and therefore to reduce poverty. Steps are taken to improve income distribution to protect disadvantaged groups and to expand social assistance and services.

Training is provided to make innovative and high-value-added production attractive among young people living in rural areas, and by organizing grant programs, equality of opportunity is provided to all institutions, organizations, and researchers.

The establishment of a strong society is linked to the empowerment of women. In this framework, studies are continuing to increase the access of girls and women to education and training and their participation in social and economic life, to facilitate their access to resources, to raise public awareness, and to improve the status of women in society. In this context, the Women's Empowerment Strategy Document and Action Plan was put into practice by the Ministry of Family and Social Services.

In terms of participation in the innovation process, the Plan prioritizes the participation of young people and people with low incomes. In this direction, innovative and sustainable projects that will reveal the potential in the provinces to increase the employment of young people are supported by the Scientific and Technological Research Council of Turkiye (TUBITAK) and Small and Medium Enterprises Development Organization of Turkiye (KOSGEB). In particular, TUBITAK's innovation

policies aim at greater participation of women and youth in recent years, as well as mainstream supported actors such as academia, private sector firms, and research centers. An agreement was inked with the European Commission in May 2022 to implement TUBITAK's Gender Equality Plan. The plan aimed to ensure the representation of women in the evaluation mechanisms of TUBITAK's support programs as well as various other support programs. This agreement has now been put into effect. Details of these supports are given in the section below [1, 2].

Moreover, an environmentally-friendly urbanization approach maintains its importance. On the other hand, policies are being developed to ensure that the efficiency gains and value-added created by urbanization inclusively integrate different social sectors into the development process.

Social entrepreneurship and social responsibility activities are encouraged to ensure more active participation of the disadvantaged segments of society in economic, technological, and social life, and to support productivity and talent development.

Regarding R&D and innovation, the priority objectives include boosting R&D and innovation capacity, augmenting the proportion of value-added production and high-technology sectors within both the manufacturing industry and exports, and establishing a conducive environment for fostering innovation. To achieve this goal, comprehensive R&D and innovation support systems will be seamlessly integrated at every phase of the R&D and innovation process, spanning from fundamental research to successful commercialization.

One of the prominent areas in the plan is regional development, and it is aimed to increase the participation of underdeveloped regions in innovation by eliminating interregional inequalities. In this direction, the regional supports previously created by taking into account the development level of the provinces will be revised according to the development level of the districts. The establishment of broadband infrastructures, which have critical importance in terms of information and communication technologies, is encouraged by taking into account regional differences. More focused and effective support is provided by the Development Agencies with innovative support mechanisms specific to the region.

From the perspective of the governance of innovation, it is seen that the Plan has been prepared with an inclusive approach, with the participation of public institutions and organizations, academia, the private sector, and CSOs. Seventy five specialized commissions and working groups were formed on macroeconomic, sectoral, and regional issues, and more than 12,000 academics, public employees, the private sector, and CSO representatives participated and contributed to these committees through 267 workshops. While all ministries, public institutions, and CSOs contributed to the preparation of the five-year plan, opinions were collected through a survey conducted online with the participation of over 19,000 people in terms of public participation. In this sense, it can be evaluated that public participation is weak. However, in the next Plan period, there are also measures to increase the participation of the public and NGOs in the priority-setting process.

The Eleventh Development Plan is shaped around the concepts of society and social and includes policies aimed at meeting the needs of people on low incomes and increasing their income levels. In addition, steps such as increasing women's participation in the workforce, reducing social inequality by ensuring that children and young people benefit from education conditions equally, and implementing practices that facilitate the lives of people with disabilities are aimed at meeting the needs of all segments [3].

### 2023 Industry and Technology Strategy

Another document that includes policies aiming to develop the innovation ecosystem is the 2023 Industry and Technology Strategy. High Technology and Innovation constitutes one of the five principal components of this strategy.

The Industry and Technology Strategy, which was prepared to increase high technology and added value in Turkiye, includes policy steps for lagging regions and some disadvantaged groups.

To increase women's participation in business life, entrepreneurship-oriented training is provided, and the number of nurseries is increased in industrial and technology regions. In addition, priority will be given to investments and policies to be developed by expanding flexible working conditions in software and informatics fields that stand out with digitalization.

Youth camps focused on science and technology is organized with the Ministry of Youth and Sports of the Republic of Turkiye. The camps provide youngsters with the opportunity to learn innovation and entrepreneurship skills, carry out teamwork where different disciplines come together, and develop problem-solving skills.

Programs that support the arrival of leading researchers to Turkiye and reverse brain drain continue. In addition, new support programs are being designed to support young researchers. For example, the government continues to organize the International Teknofest, an aviation and technology festival, every year to encourage young people to focus on inventions and working in new technology areas.

Mechanisms for teaching and applying the open innovation approach are being developed in schools, workplaces, and Technology Development Zones for the formation and maturation of entrepreneurial ideas. In addition, qualified human resources are encouraged to work on priority investment issues.

The investment incentive system has been designed to increase the participation of disadvantaged regions and to allow the added value to spread throughout the country, thus creating cities with high competitiveness in multiple sub-sectors. Clustering and branding supports are provided in sub-sectors suitable for the structure and potential of each region, and the infrastructure investments of the region are shaped accordingly.

The strategy particularly promotes technology and innovation in the manufacturing industry and has identified the chemistry and pharmaceuticals, motor vehicles, watercraft, rail systems, machinery, semiconductors, electrical-electronics, defense, aviation, and space sectors as Turkiye's focus sectors.

In addition, CSOs take an active role in the process of creating roadmaps for the focus sectors mentioned above.

From the perspective of the governance of innovation, it is seen that the Strategy has been prepared with an inclusive approach, with the participation of public institutions and organizations, academia, the private sector, and CSO. However, there are no measures or actions to increase participation in the innovation policy-making process, especially to involve the public in the process [4].

### Mobility Vehicles and Technologies Roadmap

Another document that aims to improve the R&D and innovation process in Turkiye and was prepared based on the 2023 Industry and Technology Strategy is the Mobility Vehicles and

Technologies Roadmap. The Roadmap, which was prepared by taking into account the effects of socio-economic, demographic, and technological changes taking place in the world on the mobility sector, includes programs to increase Turkiye's competitiveness in this field.

When the roadmap is evaluated in terms of direction, it cannot be said that it takes inclusive innovation into account. However, it includes some measures aimed at young people from among the disadvantaged groups. For example, acceleration programs will be organized to direct young people to new technologies in the field of mobility.

In terms of participation, there is no target to increase the participation of disadvantaged regions or groups in innovation activities. Similarly, there is no action to increase innovation activities in underdeveloped regions. However, there is no obstacle for anyone who wishes to benefit from the support programs to be implemented within the scope of the Roadmap.

In addition, the Roadmap promotes technology and innovation in the mobility sectors, including automotive, rail systems, watercraft, and unmanned aerial vehicles. In this context, ecosystem supports will be defined for manufacturers to extract by-products from new technologies.

The Roadmap was prepared with the participation of public institutions and organizations, academics, the private sector, and CSO representatives. There was no direct participation of the public and there is no approach to be included in the priority-setting process in the future.

In summary, as it can be understood from the three different policy documents explained above, the inclusiveness of the documents and the opportunities for joint governance and participation decrease as one moves from the general to the specific. Since Turkiye is a developing country, it has focused on strengthening its industrial competitiveness and becoming an important industrial country rather than spreading innovation-based developments to disadvantaged groups [5].

In addition to the policies specified in the Eleventh Development Plan and 2023 Industry and Technology Strategy, the amount and method of support given by public institutions to R&D and innovation activities in Turkiye and the number of supporting institutions have been increasing significantly over the years.

For example, Technology Development Zones aim to bring the industry together with researchers and universities to develop innovative products and production methods for technological production. Currently, there are 96 Technology Development Regions in Turkiye [6].

There is a technology development zone in almost every city in Turkiye, and companies operating in these regions are exempt from income and corporate tax revenues from software, design, and R&D activities. To ensure that the support is more inclusive, attention has been paid to regional distribution while establishing technology zones.

There is an insufficient definition of an inclusive innovation concept that will enable and sustain systematic change in Turkiye. The disadvantaged socioeconomic regions are supported under several national and regional practices and steps have been taken to pave the way for inclusive innovation practices. The regional support given through Development Agencies is an example of one of these applications. The regional venture capital application and crowdfunding mechanism realized by the agencies can be shown as innovative application tools for entrepreneurs [7].

The investment incentive system implemented in Turkiye has been designed to support investments with high and medium-high technology that can ensure technological transformation, increase investment support provided to the least developed regions, and reduce regional development disparities. This regional incentive system implemented aims to reduce the development gap between the provinces and to increase the production and export potentials of the provinces.

When the policies and practices mentioned in this section are examined, it can be said that primarily young people, women, and people with low incomes are encouraged to participate in innovation. 99.8% of enterprises in Turkiye are SMEs and sectoral policies frequently address SMEs. However, there are also many actions to promote innovation in the traditional manufacturing industry. Turkiye's policies aim primarily to provide more equal opportunities for innovation and competition, rather than guaranteeing a more equitable sharing of the benefits of innovation [8].

Social entrepreneurship is gaining momentum in Turkiye and is considered a promising avenue for addressing key social and economic problems including refugee integration, unemployment, and economic downturns.

The applied regional incentive system plays an important role in increasing the participation of underdeveloped regions in the innovation process. In this way, investment in deprived regions increases and interregional inequalities are tried to be reduced.

## Recommendations for Policymakers

With innovation policies, the capacities and opportunities of disadvantaged or less-represented individuals to participate in innovation activities, including research and entrepreneurship, can be increased. Moreover, these policies can also support the development of new products and services that address the challenges faced by socially disadvantaged people.

Upon examining the objectives of inclusive innovation policies, it becomes evident that their aim is to ensure equitable opportunities for all societal segments to actively engage in the innovation process and reap its benefits. Hence, it is important for nations to formulate policies focused on eliminating barriers hindering the involvement of underrepresented individuals, social groups, companies, sectors, and regions in innovation endeavors.

In this context, while Turkey may lack a dedicated innovation policy document, several policies and initiatives underscore and endorse innovation across numerous strategic documents, as elucidated earlier. Upon closer examination of these policies and practices, it becomes evident that a foundational framework exists to foster inclusive innovation endeavors. However, the degree of inclusiveness noticeably diminishes as these measures transition from general to specific domains. Hence, it is imperative to formulate a comprehensive national innovation strategy or a policy document tailored explicitly to innovation pursuits.

**Direction:** In terms of the direction of innovation, a method such as an inclusive innovation indicator can be developed to measure how inclusive the current innovation policies are and to determine who benefits from innovation.

The approach to R&D studies should change, and besides technology-based entrepreneurship, need-based entrepreneurship that takes care of the needs of excluded groups should also be

supported. To understand the importance of inclusive innovation in Turkiye, it is of great importance to reveal the effect of inclusive innovation on the socioeconomic welfare level of countries. In this context, methods should be developed to analyze the inclusive potential of policies and social benefit-cost analysis models should be developed.

**Participation:** Demographic characteristics need to be taken into account in the design and implementation of innovation policies.

Another important issue is that participation in the innovation process should be on equal terms to share the benefits of innovation equally. However, the analysis shows that the policy documents in Turkiye do not focus much on this area. In this context, demographic-oriented policies should be developed to ensure the participation of under-represented disadvantaged groups as innovation producers according to their characteristics such as gender, age, ethnicity, and disability.

**Governance:** Efforts should be made to include underrepresented groups in the governance of innovation policy.

As it can be understood from the analysis, there are quite a few shortcomings, especially in terms of public participation in the innovation process and governance. In this context, intermediate forms such as online idea platforms, digital tools, inclusive innovation awards, innovation camps, and idea workshops can be created to strengthen the inclusive innovation ecosystem in Turkiye and to increase public participation in the development of science and innovation policies. Especially disadvantaged groups should be included in these processes and policies should be formed from the outside in.

Municipalities, as public entities, hold a unique position as they are closest to society. Their role in fostering inclusive innovation is of utmost significance. It is crucial for local governments to actively seek and consider the opinions of citizens, encouraging their active participation in the inclusive innovation process. However, policymakers must also prioritize transparently communicating how the information gathered from consultation and participation activities will be utilized. This transparency ensures accountability and strengthens the trust between policymakers and citizens.

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## List of Interviews

| Job Title | Organization | Date of Interview |
|---|---|---|
| Innovation Orchestrator | Kastomonu Entegre A.Ş., METU | 13 Nov 2022 |
| Head, R&D Centers Department | Ministry of Industry and Technology | 1 Nov 2022 |
| Head, Technology and Innovation Support Programs Presidency | The Scientific and Technological Research Council of Turkiye | 25 Oct 2022 |
| Academician, Department of Economics | Middle East Technical University | 18 Oct 2022 |
| Head, Technology, Innovation, and Localization Department | Small and Medium Enterprises Development Organization of Turkiye | 17 Oct 2022 |
| Industry and Technology Expert | Ministry of Industry and Technology | 12 Oct 2022 |

# Appendix

## Inclusive Innovation Policy Analysis of Turkiye

**TABLE 1**

### ANALYSIS OF THE 11TH DEVELOPMENT PLAN OF TURKIYE.

| Dimension | Indicator of an Inclusive Approach | Analysis of the 11th Development Plan of Turkiye |
|---|---|---|
| **1. Overall objectives** Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | The plan includes social objectives as well as economic objectives. The goals and policies of the plan were determined under the following five main headings:<br>1. Stable and Strong Economy<br>2. Competitive Production and Efficiency<br>3. Qualified People, Strong Society<br>4. Liveable Cities, Sustainable Environment<br>5. Rule of Law, Democratization, and Good Governance |
| **2. Direction of innovation** Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs. | In addition to reducing poverty, the Plan aims to benefit all segments of society from the prosperity created by development. It includes priority policies regarding the improvement of income distribution, protection of disadvantaged groups, social assistance, and dissemination of social services. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | The plan defines targets for some disadvantaged groups:<br>- Directing young people living in rural areas to innovative and high-value-added production.<br>- Increasing girls' and women's access to education and training and their participation in social and economic life.<br>- Production of 250 thousand social housing for low-income and disadvantaged groups during the plan period. |
| **3. Participation in innovation** Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | The plan particularly encourages the participation of young people and low-income people:<br>- Supporting innovative and sustainable projects to increase youth employment.<br>- Enabling young people to take an active role in social life and decision-making mechanisms.<br>- Expanding and diversifying mobility programs in line with the demands of especially disadvantaged youth.<br>- Encouraging social entrepreneurship and social responsibility activities to enable the disadvantaged segments of society to participate more actively in economic, technological, and social life and to support productivity and talent development. |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | Regional development is one of the prominent areas in the plan, and eliminating inequalities between regions is among the targets.<br>- Establishing regional supports by taking into account the development levels of the district.<br>- Encouraging the establishment of infrastructure in regions where broadband infrastructures are difficult to develop, taking into account regional differences.<br>- Providing more focused and effective support with result-oriented programs and region-specific innovative support mechanisms by Development Agencies.<br>- Supporting the development of urban and industrial infrastructures in underdeveloped regions. |

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| Dimension | Indicator of an Inclusive Approach | Analysis of the 11th Development Plan of Turkiye |
|---|---|---|
| **3. Participation in innovation** Who participates in innovation? | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | The plan promotes technology and innovation in the manufacturing industry. It includes policies that will encourage innovation and productivity, especially for SMEs. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | The plan includes policies to encourage innovation among CSOs and involve them in the digital transformation process. |
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | The plan includes measures to increase the participation of the public and CSOs in the priority-setting process. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | There is no specific action on this issue in the plan. |
| | 4.3. Measures to mitigate the risks of innovation. | There is no specific action on this issue in the plan. |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | The plan includes steps to ensure that the benefits of innovation and technological developments are felt equally in all regions. |

**TABLE 2**

## ANALYSIS OF THE 2023 INDUSTRY AND TECHNOLOGY STRATEGY OF TURKIYE.

| Dimension | Indicators of Inclusive Approach | Analysis of the 2023 Industry and Technology Strategy of Turkiye |
|---|---|---|
| **1. Overall objectives** Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | The strategy includes areas such as human resources and entrepreneurship as well as economic targets. The objectives and policies of the strategy have been determined under the following five main components:<br>1. High Technology and Innovation<br>2. Digital Transformation and Industry Move<br>3. Entrepreneurship<br>4. Human Capital<br>5. Infrastructure |
| **2. Direction of innovation** Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs. | The strategy includes policies to support innovation processes in lagging regions. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | The strategy defines targets for some disadvantaged groups:<br>- Providing entrepreneurship training to increase women's participation in business life.<br>- Enabling young people to acquire innovation and entrepreneurship skills. |
| **3. Participation in innovation** Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | The strategy encourages the participation of all segments of society through relevant CSOs. |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | Regional development is one of the prominent areas in the strategy.<br>- Determination of investment incentives taking into account the impact on regional development.<br>- Managing regional development with the active participation of local stakeholders in decision-making processes. |

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| Dimension | Indicators of Inclusive Approach | Analysis of the 2023 Industry and Technology Strategy of Turkiye |
|---|---|---|
| **3. Participation in innovation** Who participates in innovation? | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | The strategy promotes technology and innovation in the manufacturing industry. Businesses in low-tech industries are encouraged to develop new products. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | The strategy includes policies to involve CSOs in the process of creating action plans. |
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | The strategy includes measures to increase the participation of CSOs in the priority-setting process. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | There is no specific action on this issue in the strategy. |
| | 4.3. Measures to mitigate the risks of innovation. | There is no specific action on this issue in the strategy. |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | The strategy includes steps to ensure that the benefits of innovation and technological developments are felt equally in all regions. |

**TABLE 3**

## ANALYSIS OF THE MOBILITY VEHICLES AND TECHNOLOGIES ROADMAP OF TURKIYE.

| Dimension | Indicator of an Inclusive Approach | Analysis of the Mobility Vehicles and Technologies Roadmap of Turkiye |
|---|---|---|
| **1. Overall objectives** Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | The Roadmap includes areas such as human capital and entrepreneurship, as well as economic targets. |
| **2. Direction of innovation** Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs. | There is no specific action on this issue in the roadmap. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | The roadmap defines targets for young people:<br>- Organizing an acceleration program to orient young people to new technologies in the field of mobility. |
| **3. Participation in innovation** Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | There is no specific action on this issue in the roadmap. |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | There is no specific action on this issue in the roadmap. |

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| Dimension | Indicator of an Inclusive Approach | Analysis of the Mobility Vehicles and Technologies Roadmap of Turkiye |
|---|---|---|
| **3. Participation in innovation** Who participates in innovation? | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | The roadmap promotes technology and innovation in the mobility sectors.<br>- Identification of ecosystem supports for producers to extract spinoffs in new technologies. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | There is no specific action on this issue in the roadmap. |
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | The roadmap includes actions to increase the participation of CSOs in the priority-setting process. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | There is no specific action on this issue in the roadmap. |
| | 4.3. Measures to mitigate the risks of innovation. | There is no specific action on this issue in the roadmap. |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | There is no specific action on this issue in the roadmap. |

**TABLE 4**

**PARTICIPATION IN INNOVATION.**

| Policies | Social Groups Inclusivity | | | | Region/ Spatial Inclusivity | Industry/ Sectoral Inclusivity | CSOs |
|---|---|---|---|---|---|---|---|
| | Women | Youth | PWD | Working Individuals | Rural | | |
| **11th Development Plan** | To increase the access of girls and women to education and training and their participation in social and economic life. | To support innovative and sustainable projects to increase youth employment. | To implement policies aimed at providing decent job opportunities to all segments of society. | To develop the digital skills of employees in the manufacturing industry. | To make innovative and high value-added production attractive among young people living in rural areas. | 11th development plan has identified the following priority sectors: Chemical, Pharmaceutical and Medical Devices, Machine, Electrical Equipment, Automotive, Electronics, Rail System Vehicles. | To create a digital transformation ecosystem by developing cooperation between the public, private sector, universities, and CSOs. |

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| Policies | Social Groups Inclusivity | | | | Region/ Spatial Inclusivity | Industry/ Sectoral Inclusivity | CSOs |
|---|---|---|---|---|---|---|---|
| | Women | Youth | PWD | Working Individuals | Rural | | |
| **2023 Industry and Technology Strategy** | To provide training for entrepreneurship to increase the participation of women in business life with talent capacity, and to expand flexible working conditions in software and informatics fields that stand out with digitalization. | To support young people to gain innovation and entrepreneurship skills, to work in teams where different disciplines come together, and to develop their problem-solving skills. | – | To prepare corporate entrepreneurship training and support mechanisms for employees. | – | The following sectors have been identified as Turkiye's focus sectors: chemistry and pharmaceuticals, motor land vehicles, watercraft, rail systems, machinery, semiconductors, electricity-electronics, defense, aviation, and space. | – |
| **Mobility Vehicles and Technologies Strategy Road Map** | – | To organize an accelerator program every year with international companies and CSOs to guide young people to new technologies in the field of mobility. | – | To give additional points to companies that increase the competencies of their workers in incentive and support applications. | – | – | To design life-long hybrid education models with the sector and CSOs to transform the existing workforce and gain new practical competencies. |

# VIETNAM

## Inclusive Innovation Challenges in Vietnam

Vietnam demonstrates a successful development story that began more than 35 years ago with economic reform policies [1]. Since the *doi moi* (renovation) reforms were implemented in 1986, Vietnam's average economic growth rate is 7%, but it has only slowed to 2.6% in 2021 due to the COVID-19 pandemic, and it is expected to recover to 7.2% in 2022 and 6.7% in 2023. Poverty has decreased from 16.8% in 2010 to 5% in 2020. The Gini Index 2018 is the same as it was in 1992 (35.7), showing the continued equity in society and the opportunity to benefit from growth is preserved for a long time even as economic growth accelerates. Vietnam has pursued both rapid economic growth and social and equitable sustainability [2].

Vietnam has recently begun to move in the direction of inclusive innovation. The Vietnamese government places a high priority on science, technology, and innovation policies to foster an environment favorable to the growth of new businesses by enacting supportive policies and providing educational and training opportunities.

Innovation policy in Vietnam has witnessed a major shift in its strategic direction. Notably, innovation has been incorporated into the 2021–2030 socio-economic development strategy, for the first time. It is also the first time that the name "The strategy for scientific-technological development and innovation" has been used instead of the previous nomenclature "The strategy for science and technology development".

Vietnam's ranking in innovation index has also increased rapidly, from 76th position in 2013 to 42nd position in 2019 [3]. However, it subsequently declined to the 48th position in 2022. In recent years, Vietnam's ranking on the innovation index has remained stable, showing that Vietnam's innovation environment has significantly improved, encouraging innovative startups. Changes in innovation policy have yielded encouraging results in Vietnam, trying to explain the economic development in recent years.

Despite positive outcomes, there are still numerous issues that need to be addressed in the country's innovation policies. Vietnam continues to invest less in innovation than other countries in the region. Science and technology spending accounts for only approximately 0.44% of GDP, trailing Singapore (2.22%), Malaysia (1.44%), and Thailand (0.78%) [4].

An assessment of key innovation policies, including the STI policy, SME development and startup policy, and entrepreneurship education policy, indicates some interesting facts.

First and foremost, there is a call to take effective action on the STI front. The present moment is seen as conducive to the nation's development through an innovation-driven approach. However, shortcomings in STI capacity and the national innovation system are evident, with certain aspects receiving disproportionate attention while others are overlooked. The examination of the strategy for scientific-technological development and innovation until 2030 underscores prospects for inclusive innovation in Vietnam.

Moving forward, in the context of SME and Startup Development, the business environment has shown improvement over recent years, accompanied by heightened focus and investment in startup activities. Yet, a disconnect persists between startup policies and their practical implementation. This report also delves into the 2017 Law on Supporting SMEs, believed to be a comprehensive policy aimed at assisting SMEs and startups.

Another topic worth mentioning is entrepreneurship education. Entrepreneurship education policies are widely used and mentioned across a majority of STI policies, promoting Vietnam's innovation capacity. For instance, Decision No. 1665/QD-TTg emphasizes "supporting students to initiate businesses until 2025." However, entrepreneurship and innovation education in Vietnam are still in their infancy in general education.

It has been discovered that Vietnam's inclusive innovation policies suffer from a few flaws; nonetheless, this presents a chance to make inclusive innovation even more robust in the years to come.

## Existing Innovation Policies in Vietnam

This chapter examines three inclusive innovation policies through the lens of the NESTA framework for inclusive innovation, including direction of innovation, participation of innovation, and governance of innovation. The selected inclusive innovation policies are (1) The Strategy for Development of Science and Technology and Innovation until 2030; (2) Inclusive innovation in SMEs, Entrepreneurship, and Startup development policies; and (3) Inclusive innovation in Entrepreneurship Education and Training in Vietnam.

### Strategy for Development of Science and Technology and Innovation until 2030

**Direction:** For the first time, innovation is included in the 2021–2030 socio-economic development strategy and concretized in the "Strategy for Development of Science and Technology and Innovation until 2030" according to Decision No. 569/QD-TTg of the Prime Minister dated 11/5/2022. Innovation is also a key strategy of the S&T policy for the period 2021–2030, beginning with the use of the name "The strategy for scientific-technological development and innovation" rather than the previous "The strategy for science and technology development".

In the Strategy for Science, Technology, and Innovation Development to 2030, the goal of long-term STI development is to develop culture, society, and people as a whole, protect the environment, and turn Vietnam into a middle-income country. The outline consists of nine groups of tasks and solutions to determine the role of science, technology, and innovation in the country and how they can be used to their fullest potential. These task and solution groups will assist Vietnam in developing its STI sector over the next ten years. The following are the primary directions for the advancement of STI:

- Aligning science, technology, and innovation with inclusive and sustainable socio-economic development
- Attempting to improve the institutional environment for STI activities, as well as the state's organization and management of STIs.
- Field activity orientation, key technologies, and activity orientation for innovation, in which innovation activities are concentrated in specific industries like agriculture, industry, construction, transportation, and services, as well as in the regions.

It is expected that the tasks and strategic goals outlined will result in the establishment of a strong and effective national innovation system in Vietnam. This is consistent with the policy framework for science, technology, and innovation, which aims to transition to a growth model that is centered on productivity and innovation [5]. The key policies for the 10 years 2021–2030 focus on the main objectives of the national innovation system, such as science, technology, and innovation public organizations, school organizations, and research institutes, as well as creating an institutional environment to promote science, technology, and innovation activities.

STI policies must also take into account the specific needs of excluded groups. Scientists have traditionally been regarded as both the creators of scientific knowledge and the subjects involved in the implementation of novel activities. However, the commercialization of S&T products from academia to practice continues to be hampered by the legal framework [6]. In the Strategy for Science, Technology, and Innovation Development to 2030, there is talk of looking into a way for researchers and professors to participate in the establishment of startups based on their research.

**Participation:** Table 1 shows what parts of the innovation system the Strategy for Science, Technology, and Innovation Development to 2030 is trying to improve. Although the Strategy for Science, Technology, and Innovation Development to 2030 shows that innovation is at the center of the long-term strategy for the development of the national innovation system, the content of the strategy is still biased towards innovation based on traditional actors such as policy agencies public and research institutes (see appendix). The Vietnam 2035 report Emphasizes that to achieve a growth model based on innovation and productivity, enterprises must be placed at the center of innovation policies as the main actors rather than only focusing on the academic sector to carry out R&D activities. Although an innovation strategy focused on R&D activities is correct in the long run, in the current setting, spending too much on this policy can limit access to new, suitable technology from outside, which comes at a cost. Imitation or copying of foreign innovations is another sort of innovation that is vital for productivity and growth [5].

The innovation policy is still focused on the top, but not on the people and resources required for innovation activities. University students are the focus of research and innovation efforts, but pupils of general education are not yet the target of sufficient policy attention. The innovative efforts are limited to higher education institutions, with no mention of general education.

Innovation policy tools are still narrow, and their implementation is still limited, which has not had the effect of promoting technology applications [7]. Donations and tax incentives are the most common tools of policy. While many innovation policies in practice face barriers from an inappropriate legal system. Specifically, the activities of the National Fund for Technological Innovation after more than 10 years have only stopped at non-refundable granting activities and have not been able to implement preferential lending activities.

Gender considerations in the context of science, technology, and innovation policy were raised. The rationale is that in the Vietnamese context, there are diminished opportunities and choices for women participating in and benefiting from this field. There are, on the other hand, examples of Vietnamese female scientists making important achievements in STI. For example, a group of female scientists in the Influenza Laboratory, Virology Department, and the Central Institute of Hygiene and Epidemiology, isolated a new strain of coronavirus (SARS-CoV-2). Promoting more female participation in the STI field was identified as an objective to reduce gender disparities and boost the potential for future contributions by such female-led teams.

Policies on STIs should be geographically inclusive as well. On the one hand, focusing resources on STIs can help economic growth. Firms, research institutes, universities, and markets, which are critical components of a national innovation system, are concentrated in one region, providing significant benefits. However, when economic activity becomes disproportionately concentrated in certain geographical areas like cities and industrial centers, other areas, such as rural and mountainous areas, are frequently overlooked, which can result in accentuating regional inequality. Regional inequalities can be ameliorated by putting together a network of local STI support centers that give innovators outside of the country's major economic hubs access to knowledge, services, and funding.

In addition, the government can also help private research institutions improve their ability to support innovations that meet the needs of excluded groups. For example, providing access to public funding for non-state research institutes.

**Governance:** When steps are taken to increase participation in setting priorities and monitoring the outcomes of innovation, STI policies can become more inclusive. In Vietnam, provinces also play an important role in implementing government STI policy. Because the provincial government does not directly implement national decisions and decrees, but rather through a local policy mapped from government policy. Some localities are still confused about how to concretize policies and solutions to support businesses in their area to local conditions and characteristics. Therefore, more work is needed with local and provincial governments to promote inclusive innovation across the country. In addition, participation in STI policy proposals can be expanded to include STI experts and organizations instead of being consulted only, as at present.

To mitigate the risks of inclusive innovation, state agencies need to work together. There is not a clear division in Vietnam between the agencies that are responsible for putting the policy into action and those that are responsible for deciding how much money should be spent on putting the policy into action. Innovation inclusion policies administered by various ministries, including the Ministry of Science and Technology, the Ministry of Industry and Trade, the Ministry of Agriculture and Regional Development, the Ministry of Planning and Investment, and the Ministry of Natural Resources and Environment, shape the scene for innovation inclusion.

The next step, which entails the organization and monitoring of policy implementation, is of critical significance. It is even more significant than the stage at which policy is formulated. The Ministry of Science and Technology issued a decision in 2013 (Decision 3243/QD-BKHCN) that assigned the task of calculating indicators and evaluating strategy implementation to agencies under the Ministry of Science and Technology. Additionally, the Ministry of Science and Technology issued a decision in 2015 (Decision 1318/QD-BKHCN) that approved the 5-year plan on the main directions and tasks for S&T development from 2016 to 2020. These decisions were issued to implement the STI. Nevertheless, there has not been a documented organizational plan developed to turn the STI strategy into reality.

In general, Vietnam already possesses a foundation of policies that support inclusive innovation, even though these policies are not expressly couched in terms of inclusive innovation. It seems as though the present main goal is to work toward the comprehensive development of the national innovation system. However, it is vital to put businesses at the core of the national innovation system to ensure that the implementation is successful. Even though there is significant participation from government agencies, non-profit organizations, and academic institutions in the formulation

of science, technology, and innovation policies, the level of involvement from businesses remains low. This circumstance is mirrored in the quality of management, which in turn restricts the capacity for innovation that is present in businesses.

### SMEs and Startup Development Policy

**Direction:** In recent years, Vietnam has made strides to improve its business environment, as well as its competitiveness and innovative capacity. These efforts have been recognized; according to the most recent ranking of the World Bank, Vietnam's business environment in 2020 was ranked 70 out of 190, which is an increase of 30 places compared to 2014 [8].

The legislation governing startup businesses has been actively revised, supplemented, and developed by the government to promote startup activities in general and innovative startup businesses in particular. The Vietnamese government's commitment and efforts toward new businesses are demonstrated by the legalization of legal regulations by the Law on Supporting SMEs in 2017 [9]. This law, which was passed in 2017, replaced the legal documents that were previously required by the law.

The Law on Supporting SMEs in 2017 has solved the important issue of policy beneficiaries, distinguishing between SMEs and startups. The legalization of the concept of innovative startups, which differentiates them from small and medium-sized businesses, ensures consistency in documents and legislation across the country. Whereas in the past, policymakers and academics did not agree on the concept, they now do so because of its legalization. As a result, the mechanisms, policies, and regulations in this area that support startups are easier to implement. The government of Vietnam has developed its action programs to concretize policies to support startups and small and medium enterprises to bring the policy to life and make it effective.

If in the past, small and medium-sized enterprises that were transitioning from business households and micro enterprises were not the specific targets of policies, then now this group is one of the groups that is being prioritized. In addition, this target group is further defined in Decree 80/2021/ND-CP, which details and guides the implementation of several articles of the Law on Supporting SMEs.

The policy that is designed to assist small and medium-sized businesses also gives priority to those SMEs that are owned by women or that employ a significant number of women in their workforce. According to the provisions of the law, a Woman-owned small- or medium-sized enterprise means a small- or medium-sized enterprise having one or more than one woman holding 51% or more of its charter capital and at least one of whom is its manager [9].

Over the course of the past few years, Vietnam's startup policy has made a significant impact on the country's business environment and innovation index, resulting in the creation of an ecosystem that is more conducive to the success of startups. However, the policies that are intended to assist small and medium-sized businesses as well as startups appear to be focused on quantity rather than quality. This may give rise to issues in the future that will require attention and a solution.

**Participation:** The majority of domestic enterprises in Vietnam are SMEs, accounting for 98% of the total number of enterprises and providing half of the workforce. Small and medium-sized businesses or SMEs are typically concentrated in areas that offer many benefits in terms of labor, are located close to suppliers, or have a large market. As a result, the highest population densities in SEM are specifically found in large cities, in the geographic centers of provinces and cities.

Similar are startups, particularly technology-based startups, in that they frequently require high-technology infrastructure and high-quality human resources. As a result, the majority of these businesses are located in major cities like Hanoi, Ho Chi Minh City, and Da Nang. This situation shows an imbalance in the distribution of enterprises or, conversely, the concentration of all beneficial resources in places where enterprises have many favorable conditions. Measures should be designed to increase the participation of underprivileged or underdeveloped regions.

Inadequate land, logistics, and transportation infrastructure can make it difficult for SMEs, particularly those located in rural areas, to deliver goods to their dispersed customers. Even though communities have a significant amount of untapped potential to foster the formation and growth of innovative businesses in the fields of agriculture and handicrafts.

The enabling tools are not particularly diverse, and they have not yet produced the desired effect of encouraging innovation-related activities in businesses. To be more specific, grants and tax incentives are the most common forms of financial assistance, accounting for more than 50% of the value of support programs in 2017. To get into the depth of the policy, it is necessary to promote spillover effects and develop the technological capacity of potential domestic suppliers. Also, the policy needs to encourage multinational corporations to share their knowledge with domestic businesses. In addition, policies are to build the requisite skills, establish high-quality technical facilities with incentives to commercialize and undertake contract research or collaborative R&D programs with several multinational companies. Promoting market access and entrepreneurship, the main priorities of the Government of Vietnam has also not been fully reflected in the policies.

Although business regulations have been simplified, state-owned enterprises still account for a large share of the economy [8]. This group of businesses, along with large enterprises, are in fact the beneficiaries of the support programs. Even though government policies still give a lot of money and incentives to high-tech businesses, they haven't yet focused on how to make the most of the positive effects that these larger businesses have on smaller domestic businesses.

The venture capital channel is important for startups. The current situation shows that the policy group for venture capital funds is still incomplete, leading to problems in policy implementation. Recently, provisions related to the Innovative Startup Investment Fund were added to the Law Support to SMEs (2017), and Decree No. 38/2018/ND-CP, which guides the implementation of the Law and contains detailed regulations on investment for innovative startup SMEs, was recently published. However, although the regulations are very detailed, from the charter to the management organization, establishment, dissolution, profit distribution, etc., it is affirmed that the innovative startup investment fund has no legal status. (Article 5, Decree No. 38/2018/ND-CP). In addition, the current startup law in Vietnam does not include any regulations for individual investors in startup activities, which are also referred to as angel investors.

**Governance:** As steps are taken to include more people in keeping an eye on innovation policy, policies to help SMEs and new businesses are becoming more inclusive, and to promote the implementation of the law supporting SMEs in practice. According to a survey by the VCCI in 2021, about 51.3% of businesses do not know about The Law Supporting SMEs. Among enterprises aware of this law, only 36.8% have benefited from at least one support measure. Also, the role of women in running a business has grown in Vietnam, which has been very good for society and the economy [10]. So, it's important to get them involved in making and implementing policies for SMEs that encourage innovation.

The Law Support to SMEs (2017) outlines the provision of "exemption and reduction of corporate income tax for a definite time on income from investments in innovative small and medium-sized enterprises" (No.18). However, the enforcement basis is "according to the provisions of the law on corporate income tax", implying that the policy is applicable solely to investors operating within the framework of the enterprise law. The practice requires a policy aimed at investors and innovative startups, particularly for individuals or entities that have not yet operated under corporate law, such as angel investors, etc.

Initiatives to provide financial assistance to SMEs are beneficial but are rarely put to direct use. To gain access to this capital, businesses typically have to go through banks, which requires the businesses to have reciprocal capital. However, because the interest rates offered by this loan source are frequently lower than those offered by the market, participation from banks is discouraged. In a similar vein, SMEs hardly ever make use of credit guarantee funds.

To date, efforts to support SMEs and startups have often been too focused on technological innovation, thereby limiting the number of businesses that need support. For example, the Law on Supporting SMEs gives these firms that are part of value chains and clusters incentives to support innovation. However, SMEs that do not meet this requirement are not eligible for these incentives.

The policy on inclusive innovation has a broader scope than the policy on scientific and technological innovation, particularly for micro, small, and medium-sized enterprises and startups. Activities relating to innovation do not fall outside of the social practices and methods of social management employed by the Vietnamese government. For inclusive innovation policy to be effective, policy actors must be diverse and fully engaged. Additionally, the more disadvantaged groups of policy beneficiaries need additional support for the policy to be effective.

### Entrepreneurship Education and Training for Higher Education

**Direction:** The primary mission of Entrepreneurship Education and Training (EET) is to foster the development of aspiring business owners through curricula on entrepreneurship awareness and principles, financial skills, and social-emotional entrepreneurial skills. EET also assists potential entrepreneurs to become real entrepreneurs, as well as existing entrepreneurs to become more high-performing entrepreneurs. On 30 October 2017, the Prime Minister gave his approval to Project 1665, which was described in Decision No. 1665/QD-TTg as "supporting students to start a business until 2025" (Project 1665). The goal of Project 1665 is to promote the spirit of entrepreneurship among students and equip them with knowledge and skills about entrepreneurship during their study time at school, from general education to university. Create a favorable environment to support students in forming and realizing their ideas and startup projects, contributing to the creation of jobs for students after graduation.

As a result of what has been discussed thus far, it is abundantly clear that academic organizations play a significant role in the ecosystem for inclusive innovation. They serve both as producers and providers of knowledge and technology. In the realm of either education or investigation, academic institutions such as universities and research and development institutes are capable of fostering an inclusive environment for their innovation activities. EET represents academic education or formal training interventions that share the broad objective of providing individuals with entrepreneurial mindsets and skills to support participation and performance in a range of entrepreneurial activities [11]. Academic organizations play an important role as knowledge producers and technology providers in the environment for inclusive innovation. Whether it be a research and development

institute or a university, academic institutions have the potential to be inclusive in the innovation activities that they undertake, whether it be in the field of education or research.

Policies that encourage innovative entrepreneurship have a responsibility to also take into account the particular requirements of underserved communities. The policy to help innovative startups did not apply to students pursuing general education in the past. This gap has been filled by setting goals for education that are meant to help students develop an entrepreneurial mindset that fits with their studies.

**Participation:** EET policy requires the participation of many different actors in policy formulation and implementation. According to the Ministry of Education and Training, entrepreneurship and innovation activities at universities are still limited in terms of organization, awareness of students, lecturers, and schools is not high; startup support is not good, especially the coordination between businesses and schools; and there is a lack of information and mechanisms. Therefore, in addition to professional policymakers and startup experts involved in EET policy formulation and implementation, it is necessary to mobilize the participation of teachers and university lecturers.

Along with other policies to promote the development of the startup ecosystem, Project 1665 has brought positive results. A lot of universities and colleges have created courses on entrepreneurship and put them into their curriculums. Currently, more than 40 education and training institutions in Vietnam have formed clubs and centers to support creative startups [12]. Several universities in Vietnam have integrated content on "starting a business" into their curricula as modules, seminars, and skill-based courses. This approach is evident at institutions like Foreign Trade University, Vietnam National University, Vietnam National University, Ho Chi Minh City University of Technology and Education, and the University of Economics, among others. The percentage of schools with subjects on innovation skills accounts for about 7–8%. In addition, some provinces offer their very own startup education and training programs for school children, college students, private individuals, and business owners in the area. Even though the scope of influence is substantial, the participation of policy actors is still restricted and has not yet reached any significant level of depth.

If education and training in entrepreneurship are offered at the university level, along with skills training for business owners, then the area of general education that is lacking the most in Vietnam is the area of entrepreneurship education. Students have very limited access to educational programs that focus on entrepreneurship. Commentary on entrepreneurship education in general: the lack of entrepreneurship education in Vietnam continues to be a roadblock to the growth of the country's startup ecosystem [13].

**Governance:** Policies for the advancement of entrepreneurship education and training will be more inclusive if entrepreneurship teachers and lecturers participate actively. In many different contexts, the participation of instructors and lecturers is taken into account. First and foremost, there should be teacher-training programs available to give teachers the knowledge and skills they need to teach entrepreneurship. The subsequent step is to offer assistance in the process of compiling instructional materials that are appropriate for a variety of students.

Policies for EET that are inclusive include steps to make sure that the benefits of the policy are shared fairly. To do this, it is necessary to aim for the possibility that the subject of entrepreneurship can be considered to become compulsory at all levels of training, from general education to university education.

## Recommendations for Policymakers

Since the early years of the new millennium, the Government of Vietnam has positioned STI at the epicenter of its deliberations regarding economic policy [14]. To this day, STI has been an important contributor to the continued expansion of Vietnam's economy, and it will continue to play this role in the years to come. The scope of inclusive innovation policy is wider than that of STI policy. It includes social issues and some groups that are usually left out of or marginalized in mainstream development processes. Therefore, the STI strategy needs to be considered from the perspective of an inclusive innovation policy.

**Direction:** STI development needs to be promoted in a way that strives to ensure that policies are available to everyone who needs it. Geographical characteristics and local roles in concretizing government policies led to the participation of many ministries in the development and implementation of STI policies, as analyzed above.

From an industrial inclusion perspective, more can be done to encourage innovative practices in agricultural production and environmentally friendly energy sources, the government needs to take into consideration developing distinct innovation policies tailored to remote and isolated areas. The government may choose to implement this policy through the use of intermediary institutions such as universities and research institutes, for example, to support the implementation of technology and technology transfer programs. In addition, the government also needs to guide localities in developing SME support programs. Since the introduction of the SME support law, only about 20 provincial SME support centers have been effectively managed by the provincial People's Committee or the Department of Planning and Investment, while many of the 63 provinces do not have a budget dedicated to SME development policy [8].

In addition, Vietnam's policy-making tradition includes sub-law documents to concretize regulations for specific groups of policy beneficiaries. To help SMEs and startups that are geographically far from national and local economic hubs, it is important to propose detailed rules that address these geographically distant populations.

**Participation:** A thoroughly inclusive innovation policy should Emphasize innovative thinking and culture. A society that encourages innovation will be the driving force for economic growth and social development. Potential entrepreneurs who are provided with knowledge and skills about entrepreneurship and innovation will quickly move into the role of startup founders; human resources who are fully educated and trained in innovation will be the source of necessary human resources for future innovation activities. The final recommendation is for entrepreneurship education and training. While entrepreneurship education and training programs exist for different audiences at the university level, entrepreneurship education in General education is still inadequate. To have a long-term foundation and implement an inclusive innovation policy, more targeted support for startup education activities for this group of people is needed. This could include building a network of teachers.

**Governance:** It is necessary to coordinate STI activities synchronously and create a wide network. The recommendation here is to make use of existing mechanisms to make the process of implementing STI policy at localities more comprehensive. For example, develop networks of innovation support centers in the provinces and connect with existing networks of technology application centers, information centers, and technology exchanges. In addition, the STI policy needs to come from the very people covered by the policy. This effort can be made possible through

the establishment of an independent working group consisting of representatives of elements of the national innovation system, such as enterprises, institutes, universities, NGOs, etc. for policy-making dialogue and listening to policy proposals.

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## List of Interviews

| Job Title | Organization | Date of Interview |
|---|---|---|
| Independent Expert | Dai Nam University | 19 Oct 2022 |
| Acting Director | Nistpass, Visti | 19 Oct 2022 |
| Deputy Head | Nistpass, Visti | 10 Nov 2022 |
| Vice Manager | Training Department, IP Vietnam-MOST | 10 Nov 2022 |
| Deputy Head | Legislation Department, IP Vietnam-MOST | 24 Nov 2022 |

# Appendix

## Inclusive Innovation Policy Analysis of Vietnam

**TABLE 1**

**INCLUSIVE INNOVATION POLICY FRAMEWORK ON STI OF VIETNAM.**

| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis |
|---|---|---|
| **1. Overall objectives** Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | To prioritize long-term goals such as developing culture, society, and people in general, protecting the environment, and becoming a middle-income country. |
| **2. Direction of innovation** Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs. | Connect science, technology, and innovation to comprehensive and sustainable socio-economic development and poverty alleviation. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | N/A |
| **3. Participation in innovation** Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | Gender considerations are both appropriate and economically sound in science, technology, and innovation policy. |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | Policies on STIs should be geographically inclusive as well. |
| | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | Attention to the innovation policy for the target general education. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | To support private research institutions to improve innovation capacity. |
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | To promote the participation of provincial governments in setting up and monitoring innovation activities. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | To promote participation in STI policy proposals can be expanded to include STI experts and organizations. |

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| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis |
|---|---|---|
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.3. Measures to mitigate the risks of innovation. | State agencies must cooperate, and policies need to be synchronously integrated among ministries. |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | To put enterprises at the core of the national innovation system. |

**TABLE 2**

**INCLUSIVE INNOVATION POLICY FRAMEWORK ON SMEs AND STARTUPS.**

| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis |
|---|---|---|
| **1. Overall objectives** Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | To create social justice in policy support, it is important to know what the policy goals are. |
| **2. Direction of innovation** Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs. | To clearly distinguish SMEs from startups is an important basis for having appropriate promotion policies for each policy object, creating social equality. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | Previously excluded groups such as micro-enterprises, SMEs converted from household businesses, and women-owned SMEs. |
| **3. Participation in innovation** Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | To increase the participation of underprivileged or underdeveloped regions. |
| **3. Participation in innovation** Who participates in innovation? | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | To increase the participation of underprivileged or underdeveloped regions. |
| | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | To foster the formation and growth of innovative businesses in the fields of agriculture and handicrafts. |
| | 3.4. Measures to involve civil society and social economy organizations in innovation. | To promote the venture capital channel and attract the participation of angel investors. |

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| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis |
|---|---|---|
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | To get women involved in making and implementing policies for SMEs that encourage innovation. |
| | 4.2. Measures to broaden participation in the regulation of innovation. | Legalize the concept of objectives involved in supporting SMEs and startups as angel investors. |
| | 4.3. Measures to mitigate the risks of innovation. | NA |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | Distinguish between innovative and non-innovative SMEs to have appropriate support policies. Should be a separate form of support for disadvantaged groups. |

**TABLE 3**

**INCLUSIVE INNOVATION POLICY FRAMEWORK ON EET.**

| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis |
|---|---|---|
| **1. Overall objectives** Do the overall aims of innovation policy involve more than economic growth? | 1.1. Objectives are not exclusively related to economic growth but take account of a wider range of socially desirable outcomes, such as sustainability, equality, health, and well-being. | To improve the capacity of business owners and foster innovation in educational environments, from general education to university. |
| **2. Direction of innovation** Whose needs are being met? | 2.1. Support for innovation addressing 'societal' challenges and needs. | To promote entrepreneurship and equip students with knowledge and skills from elementary school through college. |
| | 2.2. Support for innovation addressing the particular needs of excluded groups. | To help startups that are innovative to students of general education. |
| **3. Participation in innovation** Who participates in innovation? | 3.1. Measures to increase the participation of underrepresented and excluded social groups in innovation and innovative sectors of the economy. | Mobilize the participation of teachers and university lecturers. |
| | 3.2. Measures to increase the participation of disadvantaged or lagging regions or districts. | NA |
| | 3.3. Measures to promote innovation in low-productivity or low-innovation sectors. | NA |

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| Dimension | Indicator of an Inclusive Approach | Policy-specific Analysis |
|---|---|---|
| **3. Participation in innovation** Who participates in innovation? | 3.4. Measures to involve civil society and social economy organizations in innovation. | NA |
| **4. Governance of innovation** Who sets priorities, and how are the outcomes of innovation managed? | 4.1. Measures to broaden participation in innovation priority-setting. | NA |
| | 4.2. Measures to broaden participation in the regulation of innovation. | Provide priority support for the creation of entrepreneurship teaching materials compiled by teachers. |
| | 4.3. Measures to mitigate the risks of innovation. | NA |
| | 4.4. Measures to promote fair distribution of the benefits of innovation. | There should be teacher-training programs available to give teachers the knowledge and skills they need to teach entrepreneurship. |

**TABLE 4**

**SUMMARY OF POLICY OBJECTS ACCORDING TO STRATEGIC TASKS IN VIETNAM.**

| Major Tasks, Solutions for STI Development | Components of the NIC | | | | |
|---|---|---|---|---|---|
| | Public Policy Agencies | Universities and Research Institutes | Enterprises | Financial Institutions | Building Institutional Environment |
| 1. Renovate the mechanism for science, technology, and innovation; improve the capacity for state management of science, technology, and innovation. | | | | | |
| 2. Build a national innovation system. | | | | | |
| 3. Attracting and effectively using all investment resources for science, technology, and innovation. | | | | | |
| 4. Develop research institutes, universities, and other science and technology institutions into capable research institutes. | | | | | |

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| Major Tasks, Solutions for STI Development | Components of the NIC | | | | |
|---|---|---|---|---|---|
| | Public Policy Agencies | Universities and Research Institutes | Enterprises | Financial Institutions | Building Institutional Environment |
| 5. Develop human resources for science, technology, and innovation with high qualifications and creative capacity. | | | | | |
| 6. Effectively develop and extract infrastructure of science, technology, and innovation. | | | | | |
| 7. Promote science, technology, and innovation activities in enterprises. | | | | | |
| 8. Actively promote international cooperation and integration in science, technology, and innovation. | | | | | |
| 9. Strengthen activities to honor, communicate and raise awareness of science, technology, and innovation. | | | | | |

**Source:** Operational model and mechanism of Science and Technology Incubation Center in Vietnamese Universities and Research Institutes, 2020.

# INSIGHTS AND RECOMMENDATIONS

## Insights

**Direction:** Inclusive innovation as a concept is not yet widely used in policy contexts across the countries considered for this report. The desktop research and interviews carried out by the country teams led to a reasonably well-held consensus that the language of inclusion and innovation is not often used together. Instead, the flagship innovation policies studied tended to focus on fostering capabilities at the technological frontier (e.g., semiconductors), with little attention given to distributional considerations. In policies at the intersection of innovation and social policy areas, such as digital education, however, there was a greater acknowledgment of disparate access and the need for directing resources towards underrepresented demographic groups and disadvantaged regions.

The division that often occurs between (social) inclusion and innovation is not unique to this study, but it is an issue at the core of the challenges in how innovation is conceived. Science, technology, and innovation policies are often identified in relatively narrow terms, in the context of advanced technologies such as semiconductors as in the case of the ROK. With that said, national findings did reveal some growing alignment between innovation policies and societal challenges. In the Japanese context, for instance, demographic shifts and regional inequalities were identified as grand, or societal, challenges motivating the formulation of innovation policy.

**Participation:** Participation constitutes the need for greater and purposeful inclusion in terms of several typologies. This includes consideration of participants in terms of target consumers or producers of innovation, and who shares in the gains made from producing innovation and/or consuming it. Inclusion is also understood in terms of demographic groups, industrial sectors, and geographies. This is to say that inclusion is multi-faceted, both in terms of the types of activities like consumption or production, and the attributes of whom, or what is targeted such as demographic, industrial, or spatial.

The six national research teams most often found evidence of particular demographic groups, most often in gender, persons with disabilities, and youth terms, as the target participants in policies. National policies identify gaps in gender participation and in some cases, specify intentions for increasing representation in innovation activities. In several cases, however, the flagship national innovation policies analyzed seem to operate on an "open" basis, in which no specific underrepresented groups or distributional concerns are targeted. Regional disparities, in terms of access to support centers, as in the Vietnamese case, or participation in innovation and as places suffering from two-speed productivity as well as de-population, were identified in several country studies, including India and Japan. Innovation policies, including those aimed at building ecosystem capacity and boosting R&D, in countries like the ROK and Vietnam, were found to strive to allocate resources to small firms (e.g., SMEs) operating in rural and disadvantaged regions. There was also some evidence of wholly intersectional policy aims, striving to address the underrepresentation of particular demographic groups in low-productivity industrial and territorial parameters.

**Governance:** The six countries studied in this report found varying, but broadly low, degrees of inclusion in the context of the innovation policymaking process. Overall, findings suggest that

innovation policymaking could be more inclusive, from a governance perspective, if target beneficiaries were included in the full policy-making cycle, from agenda setting, through to policy design, implementation, and evaluation. As it stands, policy processes are described as expert-led, with insufficient systematic processes for involving wider society, as well as target beneficiaries, in designing, implementing, and drawing policy lessons.

Findings suggest that further data collection is needed so that the scale of the challenges can be better measured. As it stands, policymakers are not able to systematically see who or what is excluded and therefore have insufficient information available to inform their policy priorities and actions. There are, however, existing best practices, such as Malaysia's digital dashboard that tracks initiatives about Science, Technology, Innovation, and Economy performance. Related to challenges, and emerging best practices, national reports revealed that it proved difficult to see the portion of national innovation policy budgets dedicated to societal challenge, or inclusion, goals.

## Recommendations

Adopting a shared language that speaks to the contextual challenges in each country is crucial. Given the thrust of the Asian Productivity Organization's remit, we acknowledge that inclusion is an essential driver of greater productivity; bringing more of society's resources into the production of innovation, and directing innovation towards challenges affecting more of society, can boost society-wide productivity. In this sense, work can be done to ensure that inclusive innovation is better motivated in terms of economic productivity, rather than only in more socially good terms. Based on this research, we propose several recommendations for consideration, both for the APO and its member economies.

### For the APO Member Economies

- Make an extra effort to acknowledge that innovation has a direction and mainstream directionality in public policymaking. This means that even pure science and innovation policies can be better framed in terms of differential access and capabilities.

- Strive for higher specificity in policy writing in terms of the attributes of target beneficiaries; provide clearer delineation of the traits of target groups and activities, and as a result, how proposed policies are addressing inclusion challenges for target populations.

- Invest in furthering transparency around the level of budgetary resources allocated towards inclusive innovation.

- Facilitate cross-agency collaboration to ensure that inclusive innovation is more collaborative in its design and implementation, and not owned by a particular ministry or agency (e.g., science and technology).

### For the Asian Productivity Organization

- Continue to organize international dialogues to elevate the concept of inclusive innovation and underscore its significance to broader audiences.

- Act as a forum for member economies to compare and contrast the target groups for inclusive innovation in their national domains; although the inclusion challenges vary in different country contexts, sharing national conceptualizations of inclusive innovation

target beneficiaries can help foment a comprehensive understanding of the concept and best practices across the region.

- Support the development of an ’index for inclusive innovation’ across APO member economies to enable better measurement and evaluation.

- Foster the sharing of inclusive innovation initiatives and policies (e.g., Malaysia’s dashboard) across national borders.

# Appendix

## Interview Protocol Template

The following interview protocol was shared as a base for each country's interview questionnaire and then adapted as needed for different country contexts.

**I. Direction of innovation policy**

- In which ways are inclusion, in terms of bringing in underrepresented social groups, geographic regions, and low-productivity industries, included in the innovation policy?

**II. Participation in innovation**

- Do your innovation policies target greater participation by any specific social groups (e.g., women, minority groups, etc.)?
- Do your innovation policies target greater distribution to any specific regions or areas?
- Do your innovation policies target productivity enhancements for specific industries or sectors?

**III. Governance of innovation policy**

- What is your government's process for developing innovation policies and strategies?
- Who is involved in this policymaking process (e.g., government officials, other ministries, experts, researchers/academics, international organizations, civil society groups, labor organizations, citizens, etc.), and in what ways are they involved (e.g., consultations, working groups, citizen engagement, etc.)?

**IV. General questions**

- Are you aware of interesting initiatives or best practices relating to the promotion of more inclusive forms of innovation in your own country, either within the government or at the grassroots level?
- What are the biggest opportunities for your innovation policies to promote inclusion?
- What are the key challenges within government relating to promoting inclusion in innovation?

# LIST OF ABBREVIATIONS

| | |
|---|---|
| 10-10 MySTIE | 10-10 Malaysian Science, Technology, Innovation and Economy |
| 12MP | Twelfth Malaysia Plan |
| 4IR | National Fourth Industrial Revolution |
| AI | Artificial Intelligence |
| AIC | Atal Incubation Centers |
| AR | Augmented Reality |
| ATL | Atal Tinkering Laboratories |
| B40 | Bottom 40% Income Group |
| BOP | Base of the Pyramid |
| BPL | Below Poverty Line |
| CDMA | Code Division Multiple Access |
| CPHC | Comprehensive Primary Health Care |
| CSC | Common Service Center |
| CSIR | Council of Scientific and Industrial Research |
| CSTI | Council for Science, Technology, and Innovation |
| DBT | Direct Benefit Transfer |
| DGCN | Digital Garden City Nation |
| DIKSHA | Digital Infrastructure for Knowledge Sharing |
| DRAM | Dynamic Random Access Memory |
| DST | Department of Science and Technology |
| E&I | Equity and Inclusion |
| ECCE | Early Childhood Care and Education |
| EET | Entrepreneurship Education and Training |
| EPU | Economic Planning Unit |
| GATI | Gender Advancement for Transforming Institutions |
| GEM | Government eMarketplace |
| GER | Gross Enrolment Ratio |
| GII | Global Innovation Index |
| GLC | Government Linked Companies |
| GLIC | Government Linked Investment Companies |
| GRP | Good Regulatory Practices |
| HEI | Higher Education Institutions |

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| | |
|---|---|
| HiAP | Health in All Policies |
| HWC | Health and Wellness Centers |
| IIS | Integrated Innovation Strategy |
| IoT | Internet of Things |
| JENDELA | Jalinan Digital Negara |
| KIRAN | Knowledge Involvement in Research Advancement through Nurturing |
| KISTEP | Korea Institute of S&T Evaluation and Planning |
| KOSGEB | Small and Medium Enterprises Development Organization of Turkiye |
| LGBTQ | Lesbian, Gay, Bisexual, Transgender, and Queer |
| MDEB | Malaysian Digital Economy Blueprint |
| MEDAC | Ministry of Entrepreneur Development and Cooperatives |
| MeitY | Minister of Electronics and IT |
| MEMS | Micro Electromechanical Systems |
| MEXT | Ministry of Education, Science, Technology and Culture |
| ML | Machine Learning |
| MMP | Mission Mode Projects |
| MMU | Mobile Medical Units |
| MOE | Ministry of Education |
| MOF | Ministry of Finance |
| MOOC | Massive Online Open Courses |
| MSME | Micro, Small, and Medium Enterprises |
| NeGD | National e-Governance Division |
| NeGP | National e-Governance Plan |
| NEMS | Nano Electromechanical Systems |
| NEP | National Education Policy |
| NHP | National Health Policy |
| NIDHI | National Initiative for Developing and Harnessing Innovations |
| NIOS | National Institute of Open Schooling |
| NIS | National Innovation System |
| NISP | National Innovation and Startup Policy |
| NISTEP | National Institute of Science and Technology Policy |
| NPCSCB | National Programme for Civil Services Capacity Building |
| NPSTI | National Policy on Science, Technology and Innovation |
| NRF | National Research Foundation |
| NRR | National Robotics Roadmap |

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| | |
|---|---|
| OBC | Other Backward Classes |
| OSC | One Stop Center |
| PDK | Pemulihan Dalam Komuniti (community-based rehabilitation) |
| PEDi | Pusat Ekonomi Digital Keluarga Malaysia (Digital Economy Centers) |
| PENJANA | Short-Term Economic Recovery Plan |
| PHC | Primary Health Centers |
| PMGDISHA | Pradhan Mantri Gramin Digital Saksharta Abhiyan |
| PM-JAY | Pradhan Mantri Jan Arogya Yojana |
| PUPUK | Program Pemerkasaan Pendigitalan Usahawan Kecil (Small Entrepreneur Digitization Empowerment Program) |
| PWD | Persons with Disability |
| R&D | Research and Development |
| RI | Research Infrastructure |
| SBIR | Small Business Innovation Research |
| SC | Scheduled Castes |
| SDG | Sustainable Development Goals |
| SEDG | Socio-Economically Disadvantaged Groups |
| SMOKU | Disability Information System |
| SRIMAN | Scientific Research Infrastructure Sharing Maintenance and Networks |
| SSR | Scientific Social Responsibility |
| ST | Scheduled Tribes |
| STEAM | Science, Technology, Engineering, Arts, and Mathematics |
| STEM | Science, Technology, Engineering, and Mathematics |
| STI | Science, Technology, and Innovation |
| STIP | Science, Technology, and Innovation Policy |
| TBI | Technology Business Incubators |
| TOBB | Union of Chambers and Commodity Exchanges of Turkiye |
| TUBITAK | Scientific and Technological Research Council of Turkiye |
| TVET | Technical and Vocational Education and Training |
| UHC | Universal Health Coverage |
| UID | Unique Identification |
| UPC | Unified Public Consultation |
| UPI | Unified Payment Interface |
| VR | Virtual Reality |

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