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# Productivity Insights Vol. 2-10



**Asian Productivity Organization** 

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

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# Work Design for Productivity

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## PREFACE

The P-Insights, short for "Productivity Insights," is an extension of the Productivity Talk (P-Talk) series, which is a flagship program under the APO Secretariat's digital information initiative. Born out of both necessity and creativity under the prolonged COVID-19 pandemic, the interactive, livestreamed P-Talks bring practitioners, experts, policymakers, and ordinary citizens from all walks of life with a passion for productivity to share their experience, views, and practical tips on productivity improvement.

With speakers from every corner of the world, the P-Talks effectively convey productivity information to APO member countries and beyond. However, it was recognized that many of the P-Talk speakers had much more to offer beyond the 60-minute presentations and Q&A sessions that are the hallmarks of the series. To take full advantage of their broad knowledge and expertise, some were invited to elaborate on their P-Talks, resulting in this publication. It is hoped that the P-Insights will give readers a deeper understanding of the practices and applications of productivity as they are evolving during the pandemic and being adapted to meet different needs in the anticipated new normal.

VI | WORK DESIGN FOR PRODUCTIVITY

# INTRODUCTION

There is no doubt that the world of work is changing at a rapid rate. A complex array of impressive technologies such as AI, digital records, robotics, and the Internet of Things (IoT) are transforming the ways we live and work. The conversation about the seemingly inevitable waves of technology crashing over the world is typically dominated by two topics: 1) awe about the amazing things such technologies will be able to accomplish; and 2) which jobs will be automated and which jobs will be "safe." In this report, I argue that focusing on these two points risks critically undervaluing the role of people in digitized work and the choices that are yet to be made about how to design human work.

While the automation of jobs is certainly worth considering, estimates suggest that only a small percentage of jobs will be completely automated [1]. What will be much more prevalent and has been prevalent for decades already is that jobs will be changed by technology. To put it more accurately, we will need to make decisions about how to redesign human work to optimize the benefits of both technologies and people.

This report draws from a wealth of literature from the domains of organizational psychology and organizational behavior to explain:

- Why work design matters;
- What work design is and how it contributes to well-being and productivity;
- Why bad work design prevails; and
- How to design better work.

In sharing these evidence-based insights, I hope to contribute to a deeper understanding of the psychology of employee behavior at work and the ways in which managers can proactively address many issues of productivity at their root cause: the design of jobs.

# WHY DOES WORK DESIGN MATTER?

#### The Cost of Mental Illness and Burnout

In Asia, the second-largest contributor to years lost because of disability is poor mental health [2]. In the Asia-Pacific region, while the impact of other diseases has lessened over time, the impact of mental illness has remained virtually unchanged, leading it to be an increasingly important economic and social concern [3]. More specifically, mental illness has been estimated to cost Japan USD11 billion, with USD6,912 million attributed to workplace costs [4]. In Malaysia, mental illness-related absenteeism, presenteeism, and staff turnover cost around RM14.46 (USD3.48) billion in 2018 [5]. In Singapore, the incremental costs sit at around S1.7 billion per year [6]. According to one survey conducted in 2018, presenteeism and absenteeism due to mental health issues are particularly rife in the Asia-Pacific region. In Hong Kong, where this issue was found to be the worst,<sup>1</sup> the average amount of productive time lost per year per employee was estimated at 77.4 days. This means that employees there lost more than 30% of their working time to absenteeism and presenteeism, while in the UK the figure was less than half of that.

While mental illness is not necessarily exclusive to the workplace context, chronic stress is a key factor in the emergence of mental illness [7, 8], and the workplace is one of the key causes of stress [9, 10]. Although the term "burnout" originated in the 1970s, due to its increasing prevalence, the WHO added burnout to the 11th Revision of the International Classification of Diseases in 2019. It was defined as resulting from unmanaged chronic workplace stress and as being characterized by:

- 1. Feelings of energy depletion or exhaustion;
- 2. Increased mental distance from one's job, or feelings of negativism or cynicism related to one's job; and
- 3. Reduced professional efficacy.

<sup>&</sup>lt;sup>1</sup>It is important to note that, in this survey, the Hong Kong sample included a large proportion of employees working in the construction sector. However, other sources suggest that workplace stress and mental health are a widespread issue with considerable stigma in Hong Kong (e.g., https://hrasiamedia.com/featured/time-to-tackle-the-hidden-costs-of-mental-health/).

A 2018 Gallup study confirmed that burnout is widespread, with about two-thirds of workers regularly experiencing feelings of burnout at work [11]. Burned-out employees are more likely to experience lower levels of confidence, take a sick day, and seek an alternative job. In 2020, the same survey showed record high stress figures. Employees in East Asia are some of the most stressed worldwide [11], and this is only increasing due to the lack of separation between work and home life caused by the COVID-19 pandemic [12]. In Hong Kong, work stress costs the economy between HK4.81 billion and HK7.09 billion each year [13].

#### **Benefits of Employee Well-being and Work Engagement**

Originally, well-being was conceptualized by scholars as individuals' satisfaction with their life or work (i.e., a cognitive component) and the presence of a positive mood or emotional state (i.e., an emotional component) [14, 15] which some might call happiness. Scholars have since gone above and beyond this focus on satisfaction or contentment, emphasizing the transformative potential of employees who are engaged and thriving [16–18]. Employee engagement is "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption" [19], often reflecting experiences of personal growth and connectedness to the work and colleagues [20].

In the workplace, employee well-being and job satisfaction have been consistently associated with higher employee performance, lower employee turnover, and business profitability [21, 22]. Employee engagement has been widely documented as an important determinant of task performance (standard work responsibilities) and the productivity and profitability of the organization [23]. Employee engagement is also associated with employee pro-social behaviors and innovative work behaviors [23]. These types of behaviors are increasingly important in many contemporary organizations, where environmental volatility, increased competition, and resource scarcity mean that, rather than just "doing their job," organizations are increasingly asking their employees to be proactive, adaptive, and creative [24].

# WORK DESIGN MITIGATES ILLNESS, PREVENTS HARM, AND PROMOTES THRIVING

Work design is an interdisciplinary field that entails examining the physical, biomechanical, cognitive, and psychosocial features of different jobs, involving ergonomists, physiologists, technologists, human factor specialists. interface designers, and. importantly, organizational psychologists. Organizational psychologists focus on psychosocial work characteristics and define work design as the content, structure, and organization of one's tasks and activities at work [25]. It is what makes being a pilot different to being a schoolteacher, or what makes being a schoolteacher in Australia different to being a schoolteacher in Japan. Work design is reflected in formal documents and systems, such as employment contracts and organizational charts, and in informal indicators, such as professional norms and organizational culture.

Several theoretical perspectives on work design exist. Contemporary models of work design are almost all, in some way, based on Hackman and Oldham's 1975 job characteristics model (JCM) [26]. The JCM posited that there are five critical job characteristics that facilitate important psychological states, ultimately leading to positive work outcomes (motivation, performance, etc.).

- The first three characteristics are: 1) skill variety, or the extent to which the job involves using a wide array of skills; 2) task identity, the extent to which the job involves completing a piece of work that is meaningful and "whole"; and 3) task significance, the extent to which the job has an impact on the lives of others. They shape the experienced meaningfulness of the work.
- The fourth characteristic is autonomy, or the level of freedom and independence the employees have, and shapes the extent to which employees feel responsible for their work outcomes.

• The fifth and final characteristic is feedback, or the extent to which the job provides knowledge of the results of the employees' actions and provides employees with insights into their effectiveness.

Together, these characteristics and the psychological states they foster were identified as being important determinants of employee motivation, satisfaction, and productivity.

Subsequent reports [27–29] specified that it is the balance between motivating psychosocial job characteristics, such as those specified in the JCM (termed job resources), and the volume and intensity of the work and emotional load placed on employees (termed job demands) which determines employee motivation and performance. It was proposed that the presence of job resources buffers the negative effect of job demands on work outcomes as well as fosters employee motivation and stimulates learning and development.

Consequently, negative outcomes arise when the demands placed on employees far exceed the psychosocial resources they are given (e.g., nurses with an evergrowing list of patients to take care of and very strict protocols to adhere to on how they treat those patients, resulting in low autonomy). However, negative outcomes may also arise in situations where employees are understimulated, when the level of job demand is so low that, regardless of the job resources available, employees are unable to experience a sense of achievement and progress due to, for example, the low volume of work.

Since the emergence of these two seminal theoretical perspectives, additions have been made to the list of important job characteristics to include the social, cognitive, emotional, and role-based characteristics of work [29, 30].

Now, over 100 years of work design research exists [30], clearly showing that work design matters for employees and organizations. A seminal meta-analysis [31] found that 14 work characteristics explained, on average, 43% of the variance in employees' attitudes and behaviors (a massive feat in applied psychology), including explaining 25% of the variance in subjective performance, 34% in job satisfaction, and 24% in organizational commitment. A recent review [32] documented the evidence showing how changes in work design can influence the psychological states espoused in work design theory, subsequently impacting performance.

Together, this research explains how attention to work design can mitigate illness, prevent harm, and promote thriving<sup>1</sup>:

- Mitigating illness: While appropriate treatment via the healthcare system is important for any illness, the workplace can be a vital source of relief and support for recovery for individuals with a mental or physical illness [33]. When employee illness is disclosed, adjustments can be made to work design to make the job more inclusive and accommodating of individuals' strengths and stressors [34]. This may entail reducing the volume and intensity of work demands (e.g., workload, emotional demands), thus reducing their negative effects and increasing the presence of job resources (e.g., social support, work-scheduling autonomy, stimulation via task variety).
- Preventing harm: Rather than waiting for chronic work stress to result in employee illness or burnout, work design can be a preventive and proactive strategy. This entails designing work in a way that minimizes employee exposure to psychosocial risks [35–39]. This can be done by ensuring that employees' work demands are reasonable, i.e., not so low that they would be understimulating and not so high that employees would be overworked; which includes considering whether employees have sufficient psychosocial resources to cope with these demands such as decision-making autonomy, social support, and job feedback [40, 41].
- **Promoting thriving:** Successfully mitigating illness and preventing harm only serve to remove employee stress and dissatisfaction and eliminate performance decrements; promoting thriving entails utilizing work design to maximize employees' experience at work such that they experience a sense of growth, purpose, and connection. "Thriving is being energised, feeling valued, and feeling that what you do is valued. Thriving is being productive, being open to challenges presented, and having the opportunity to continuously learn and grow [42]."

<sup>&</sup>lt;sup>1</sup>For a more detailed overview of how work design can mitigate illness, prevent harm, and promote thriving, see the Thrive at Work website, collated by academic experts in work design: https://www.thriveatwork.org.au/framework/.

This, in turn, improves employees' performance (within and outside of the bounds of their formal roles), innovation, and commitment to the organization [17]. This perspective is rooted in positive psychology [42], which tells us that this focus on maximizing well-being (rather than minimizing illness) is critical for optimizing mental health.

# WHY DOES BAD WORK DESIGN PREVAIL?

Unfortunately, despite 100 years of research documenting the importance of well-designed work for employee well-being and organizational performance, low-quality work that lacks job resources such as autonomy, variety, and social interaction and/or is excessively demanding is prevalent worldwide [43].

In addition to the rise of precarious (short-term and insecure) employment in Asia [44, 45], the psychosocial characteristics of work are also an important issue in the Asia-Pacific region. A study of work in some Australian industries (e.g., transport, hospitality, community services) identified high risks of low psychological health due to high work demands (mostly long working hours) [46]. This is also common in other countries, including Japan, the Republic of Korea, the Republic of China, and PR China, where employees are overworked and highly stressed, leading to physical and mental illness [47, 48]. These types of jobs, particularly in developing economies, are typically also low in psychosocial resources, where employees' work is monotonous and offers little opportunity for growth and development [49]. For example, one survey in Hong Kong found that nearly 40% of employees felt that they had little control over deciding what they did each day at work, indicating low levels of autonomy [50].

To address the gap between the work design literature and the quality of work design that exists in practice, researchers have sought to pinpoint the multilevel contextual and individual factors that may affect the design of work [43]. In the following, the factors that may be particularly pertinent in shaping the design of work in Asia are examined.

#### Higher-level Influences on Work Design in Asia

#### Globalization

As noted by Dollard et al. [51]: "A powerful force shaping the nature of work in the Asia Pacific is globalization" due to the neo-liberal policies that have stimulated greater connectivity between national markets and increased international competition. Much of the globalization of the world's economies is attributable to the massive transformation and industrialization that have occurred within Asian economies and systems of work [52].

The exact effects of globalization on the psychosocial characteristics of work have been understudied [43]. While this may have created new employment opportunities within Asia, it appears to have had negative effects on the psychosocial characteristics of work, specifically work demands. Due to dynamics such as increased outsourcing to Asian labor markets, the characteristics of these labor markets have changed, with increasing instability and job insecurity and the dominance of precarious work conditions [53, 54]. These types of jobs have been associated with increased volume and intensity of work and poor work–life balance [55]. In other developing economies, this has also been reflected in "dirty jobs" being shifted from richer economies to countries with cheaper labor and where employees are less protected against poor physical and psychosocial working conditions [49]. This effect may continue to spiral negatively, where the perceived threat that arises due to job insecurity may raise managers' and employees' expectations about needing to work even harder [56].

Globalization may also lead to worse work design due to the opportunities opened up for organizations to improve business profitability by using suppliers in developing Asian countries. Such a cost-minimization strategy may further force employers in these developing countries to reduce their own costs by implementing low-quality working conditions, with minimal employee training [43] and deskilled job designs [57].

#### Institutions and Institutional Regimes

Intertwined in the work design issues that are arising due to globalization is the effect of national-level institutions and institutional regimes. Institutions may influence the design of work at a national level in several ways (for a more detailed explanation, see Holman et al. [58]):

- 1. Union-based mechanisms, where unions have direct or indirect influence over decision-making related to employment conditions or work organization.
- 2. Skill-based mechanisms, where professional or government institutions either create or limit opportunities for training in specific skills, which likely affects the complexity and autonomy associated with jobs.

- 3. Cultural-intuitional mechanisms, where specific approaches to designing work that are seen to be "best practice" for successful organizations are more likely to be adopted irrespective of the quality of the work design.
- 4. Legislative mechanisms, which constrain the scope of work design decisions made in organizations.

The nature and influence of these institutions are closely tied to the institutional regimes reflected in the country. For example, more developed market economies, such as the Republic of Korea, are more likely to have strong institutions and norms that facilitate and protect higher wages and job skill levels and thus resist the potentially negative effects of globalization on the precariousness of work relative to more developing economies [59].

The varieties of capitalism theory distinguish between coordinated regimes (e.g., Denmark, Germany, France), in which firms manage activities through high-trust collaborative arrangements with a range of institutional actors, including trade unions, work councils, and banks; and liberal regimes (e.g., the UK), in which firms interact predominantly through competitive markets and formal contracting [58]. More recently, scholars have added a category for regimes in transitional or emerging market economies [58].

Holman and colleagues [58] found that job discretion/autonomy was the highest in coordinated regimes. Out of the emerging market economies studied, India was the only country to confirm the hypotheses that lower job discretion led to higher performance monitoring; while in the Republic of Korea, the levels of job discretion were like those in coordinated countries, but levels of performance monitoring reflected those found in liberal countries. Although these results require further validation and extension, Holman et al. [58] concluded that, "National institutions matter, even in a sector that has developed in an era of increased internationalization and regional integration."

#### **Government Policy**

Governments can often exert powerful influence on working conditions and the design of work through the collection of data on the labor market and employee well-being, the implementation of legislative requirements and limitations, and offering tools for best practices. Variation in these policies often reflects different levels of understanding of and emphasis on the role of employee well-being and psychosocial work characteristics in shaping productivity. However, it is important to acknowledge the privilege embedded in this perspective and to be clear that having such a focus is not always possible. As noted by Oakman et al. [60]: "...in countries with high levels of job insecurity, having a poorly designed job is better than no job. For economically advanced countries such as Australia, New Zealand, and Japan, discussion about the role of job design and the importance of reducing psychosocial hazards is made possible through the much higher levels of job security, although this is not uniform across all sectors."

For example, several years ago, a Mental Health Action Checklist was implemented in Japan to address high rates of depression and sick leave by encouraging employers to assess and adjust problematic work environments [61, 62], which includes assessing work organization and social support. In the Republic of Korea, mirroring the European Working Conditions survey, a working conditions survey was established, reflecting a transition from focusing only on the physical conditions of work to the inclusion of musculoskeletal and psychosocial characteristics [63]. PR China, on the other hand, still tends to focus on traditional occupational hazards [61]. Data collection efforts such as this are crucial inputs to subsequent government policy and support regarding psychosocial interventions.

#### Meso-level Influences on Work Design in Asia

#### Technology

Technology is dramatically and rapidly changing the world of work and it is no surprise that it thus shapes work design. However, it is important to note that technology does not directly and solely determine how work is designed [47], which is often implicit in contemporary discussions about technology and work where decisions about the organization of human work often receive little attention. While technology may automate some human work and shape the skills and competencies required by the individuals using it, there are still ample decisions to be made about how the social element of the sociotechnical system of work [64, 65] is designed. A large corpus of research exists within the domain of human factors and ergonomics on the design of work systems and the process it should entail [66, 67].

Unfortunately, these decisions are often overlooked, and there are many examples of the introduction of technologies leading to deskilled low-autonomy work [68]. Contextual factors may influence how technology shapes work design. For example, evidence shows how, when technology is implemented alongside high-skilled jobs, managers may implement more flexible methods of working to allow the professionals to use the technology most effectively; whereas the introduction of technology into low-skilled jobs often results in simplified jobs [47]. However, the exact mechanisms underlying these effects are still unclear and do not always occur, with examples existing of technology worsening work design in high-skilled jobs.

#### **Cultural Values and Norms**

The values and norms tied to specific cultures appear to bear important influences on the design of work, leading individuals (employees and managers) to prefer and adopt specific work designs over others [43, 51]. These cultural influences may appear at national, subnational, and/or occupational levels.

Several studies explored the role of cultural values on preferences for different ways of designing work, typically using Hofstede's (2005) theory of cultural values. Thus far, evidence in this area is not comprehensive, although it sheds some initial light on potential effects. For example, managers and employees living in countries where the culture reflects high uncertainty avoidance, i.e., a preference for highly structured situations and formal rules, may prefer jobs that are highly formalized [68]. Those living in cultures that have a high level of power distance, i.e., that are accepting of power inequalities between different individuals or groups, may prefer more hierarchical organizational structures [43].

Culture may also shape work design through normative mechanisms, whereby approaches that are seen as common and/or adopted by high-performing or high-status individuals or institutions are adopted by others, sometimes in the absence of evidence supporting the effectiveness or psychosocial implications of such approaches. The proliferation of workaholism in Japan is one such example of this: both individuals' and managers' expectations of employees' work hours and the intensity of their work, i.e., their work demands, increased to critical levels, eroding employees' well-being, health, and job performance [69]. While the human cost of workaholism in Japan has been severe, it serves as an example of how the visible and widespread deterioration of employee health due to poor work design can prompt change. In this case, several government-led interventions address the overwork crisis, including the role of the work environment [70].

#### Individual-level Influences on Work Design in Asia

While individuals' work design decisions and preferences are likely shaped by the contextual influences discussed above, there is also evidence that individuals bring their own unique interpretive lenses to each decision they make, based on, for example, their existing knowledge, personal values, and cognitive biases. To investigate the effects of these individual-level characteristics, researchers have conducted several experiments exploring how individuals design work for hypothetical employees.

Consistently, "naive" job designers with no explicit knowledge or training in work design theory (usually undergraduate students) tend to design simplified, homogeneous jobs within teams and organizations that had high levels of formalization, centralization, and hierarchy [71–73]. This may reflect a fundamental human orientation in nonexperts toward reducing environmental uncertainty through simplification and formalization, a proposition made elsewhere in psychology [74]. When it came to those who did have some explicit knowledge, gained through tertiary education or professional training, the findings were mixed. Sánchez-Manzanares et al. [73] found that those who had explicit work design knowledge tended to design more enriched, i.e., varied, autonomous, participative jobs and more decentralized, less formalized organizations. In contrast, Parker et al. [71] found no effect of explicit work design knowledge on work design behavior for the task allocation vignettes (knowledgeable participants were, however, less likely to choose "blame-theperson" strategies to solve organizational problems).

Parker et al. [71] found that individuals' values guided their work design behavior. Specifically, individuals higher in conservation values, i.e., those who value stability, predictability, and meeting obligations, were less likely to design an enriched job and more likely to choose blame-the-person interventions for workplace issues. However, they were no more or less likely to choose work design interventions to solve workplace issues. On the other hand, individuals high in openness values, i.e., those who value independence of thought, action, feelings, and readiness for change and adventure, were more likely to choose work design interventions for workplace issues. However, they were no more or less likely to design an enriched job.

Although this stream of experimental research is still ripe for further development, the findings support the notion that it is important to consider and address both contextual and individual factors that may affect how work is designed.

## **HOW TO DESIGN BETTER WORK**

Work design scholars and practitioners have produced a range of evidencebased resources to guide the design and redesign of work for employee wellbeing and sustainable productivity. The Centre for Transformative Work Design, within the Curtin University Future of Work Institute and led by worldleading Australian Research Council Laureate Fellow Professor Sharon Parker, has developed several evidence-based frameworks and resources.

#### **Design SMART Work**

The SMART model of work design [75, 76] provides a useful framework through which to explore ways to design work to facilitate employee thriving:

- **Stimulating:** The extent to which a job involves skill variety, task variety, and problem-solving demands and thus is stimulating for the employee.
- **Mastery:** The degree to which a job provides role clarity, feedback, and task identity and thus provides the employee with a sense of competence.
- Agency: The extent to which the job allows the employee to make decisions and control work methods and work scheduling and thus imbues the employee with a sense of control and agency.
- **Relatedness:** The extent to which an individual experiences a sense of support, purpose, and social contact in the job and thus feels connected to others and the purpose of the work.
- **Tolerable demands:** Encompasses all job demands and is thus more relevant to mitigating illness and preventing harm. However, some scholars have emphasized the importance of challenge demands, i.e., those that can have stimulating effects, such as workload and time pressure, as opposed to hindrance demands, which are typically conceived as energy-draining, e.g., role conflict, emotional labor [77].

For an example of what these characteristics may look like in a specific type of work context, see Hay et al.'s [76] application of the framework to the work of physicians diagnosing genetic diseases.

This structured approach can help employees or organizations to identify which specific job characteristics, i.e., resources or demands, may be driving the quality of the job as a whole. It also ensures that both job resources and job demands are considered, rather than focusing only on, for example, stress or workload (which risks underutilizing the benefits of good work design). Individuals or organizations could also use this framework to consider the work design strengths, or "selling points," and weaknesses, or areas for improvement, in different jobs.

The SMART work design website (https://www.smartworkdesign.com.au/) has more information on each of the components and evidence basis of the model, in addition to a wealth of resources for individuals seeking to apply it. SMART directly feeds into the "Prevent Harm" pillar of the Future of Work Institute's Thrive at Work initiative (https://www.thriveatwork.org.au/).

#### **Proactively Develop the Work Design Process**

There is more to designing good work than simply knowing which job characteristics may be contributing to low-quality work design and employee outcomes. Addressing badly designed work requires an organizational change process, a notoriously tricky endeavor that often fails. Just like any organizational change process, work redesign can be subject to the influence of biases, resistance, politics, conflict, and issues with implementation and sustainability. The failure of a work redesign intervention may have nothing to do with the intervention itself and everything to do with the redesign process [78].

Parker and Griffin's Action Principles for Work Design [79], or alternatively Safe Work Australia's "how" Principles of Good Work Design [80], offer several important principles to guide the work design process, including:

- Apply a systematic risk management approach and monitor its effects.
- Ensure the commitment of decisionmakers and leaders.

- Actively involve the people who do the work, including those in the supply chain and networks.
- Seek the best fit between the work environment, culture, systems of work, and the needs and capabilities of workers.
- Apply multidisciplinary expertise and learn from evidence and experience.

For further details, refer to the resources above or the Centre for Transformative Work Design's website.

#### **Design Human and Technological Work**

Despite the fear of robots taking over jobs, evidence suggests that this will largely not be the case. As stated by Tuck Wah [81], "Work is constantly reshaped by technological progress." The technology-centric view on what the future of work looks like, or a technology-centric view on the adoption of new technology into today's workplaces, risks overlooking the importance of proactively designing the human component of work alongside the technological component. Rather than considering the changing nature of work as being a by-product of technological innovation, consider how human work and employees' work experience can be optimized alongside technology.

When insufficient attention is paid to the social components of the work system, including the job characteristics of employees who interact with the technology, the risk of a mismatch between the technological and social subsystems and consequent inefficiency is high [65]. Further, research shows that a techno-centric view of system design can lead to the proliferation of human work that is low skilled and low in autonomy [67]. For an example of the importance of considering the social/human factors alongside the technological, see Boeing et al.'s work on a sociotechnical approach to the design of a future submarine [82].

# CONCLUSION

Most of us will spend a substantial proportion of our lives at work. Designing better work is thus critical for the health and productivity of individuals, organizations, and economies. Unfortunately, there are hurdles present on the path to better work design. Technological innovation can overshadow the importance of designing the human elements of work. These hurdles, including techno-centrism, may be addressed and overcome by utilizing the insights and resources in this report.

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