GiLE Journal of Skills Development

Upskilling and Reskilling for a VUCA World: Organizational Sense-Response Framework

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Abstract

Organisations operate in a Volatile, Uncertain, Complex, and Ambiguous (VUCA) world punctuated by volatility, uncertainty, complexity, and ambiguity. Recent technological developments have given rise to new jobs, demands, products, processes, work arrangements, and methods of service delivery, thus significantly disrupting workplaces and creating a need for new workplace skills. There is a growing anticipation of "new normals" characterised by skills revolutions, among other factors. Such a context poses serious challenges to human resource management in regard to developing and maintaining a competitive advantage amidst volatility, uncertainty, complexity, and ambiguity. This theoretical study aimed to assess the need for upskilling and reskilling and propose an organisational sense-response framework for upskilling and reskilling in a VUCA business world. The findings show that for any organisation to ensure sustainability in the VUCA world, it must focus on its most valuable asset— its people. Organisations need to develop employees' skills based on organisational objectives strategically. In such a dynamic world, people require competencies in different skills, including but not limited to technological skills, self-management skills, social and cross-cultural skills, cognitive skills, entrepreneurial skills, and mastery of 21st-century inter-disciplinary themes to exhibit good performance. Therefore, the future of work will likely focus on continuous upskilling and reskilling people to thrive amidst constant disruptions. The proposed framework shows that organisations need sensing and response capabilities to thrive amidst rapid change, especially in the external environment. The sensing capability ensures that organisations continually maintain awareness of external threats or opportunities. The response capability, on the other hand, ensures that organisations can determine how best they can adapt to changes after assessing the relevance of those changes to their organisations' current situations and long-term strategic objectives, as well as the possible benefits and threats of those changes.

Keywords: upskilling, reskilling, VUCA, sense-response framework, skills

1. Introduction

Current business environments are characterised by VUCA (Volatility, Uncertainty, Complexity, and Ambiguity). This term denotes the association of the "rapidly changing environments, diverse employees' needs, and almost unpredictable customer expectations" (Hamid, 2019, p. 1). The VUCA context has unique implications for human resource management (HRM). For instance, managers must deal with the volatility related to technological advancement and customer needs, uncertainty related to the unpredictable nature of using new frameworks, complexity related to the requirement of working with diverse employees, and ambiguity related to the mandated focus on innovation (Saridakis et al., 2017). Because of this, it is difficult for human resource (HR) managers to help an organisation develop a sustainable competitive edge in a VUCA environment (Codreanu, 2016). Any company that wishes to thrive in the VUCA environment must focus on its most valuable asset— its people. Talent development – strategically developing employees' skills based on organisational objectives – is the foundation of an organisation's sustainability (Taylor, 2022).

Recent technological developments have resulted in new jobs, demands, products, processes, and methods of service delivery, thus significantly disrupting workplaces and creating a need for new workplace skills to recover from the potential obsolescence of some job tasks (Bennett, 2018). Some scholars such as Cukier, Mccallum, Egbunonu, and Bates (2021) have argued that there will be no return to normal; hence, the world should anticipate a "new normals" characterised by skills revolution (Pedron, 2018) among other factors. In addition, Frankiewicz and Chamorro-Premuzic (2020) maintain that the future of work is likely to focus on upskilling and reskilling people to thrive amidst constant disruptions.

The world of work is undergoing fundamental workforce evolution and epochal transition (Brasher, 2021; Illanes et al., 2018). A recent report by McKinsey Global Institute projects that by 2030, up to approximately 14 per cent of workers worldwide may be required to change occupational classifications because of automation, digitisation, and technology disruptions in the labour market (Manyika et al., 2017). A World Economic Forum (2017) study forecasted that by 2022, roughly 42% of the core skills needed in various occupations would revolve, and more than 133 million new jobs would emerge (Zahidi, 2020). Such technological disruptions have also led to skills mismatch (Mgiba, 2019) as demand for present-day skills relevant to thriving in new work environments increases (Chakma & Chaijinda, 2020). In order to meet the job demands of the VUCA environment and close the widening skills gap, collaborative efforts and initiatives are needed to equip current and future employees with relevant skills for the VUCA world.

This study contributes to addressing an existing research gap. The full spectrum of skills required to thrive beyond the recent disruptions remains under-explored (Cukier et al., 2021). More studies are also needed to explore adequate skill needs across different sectors (Jaiswal et al., 2021). In adopting new technologies in organisations, HR managers are required to have full commitment and adequate understanding toward providing employees with adequate training and development opportunities and support (Ng et al., 2021). Therefore, there is a need for a framework to determine the existing capabilities of professionals and the needs related to upskilling initiatives (Lacity & Willcocks, 2021). Finding out what kinds of skills and competencies will be required in the future and ways of managing and developing them in organisations sustainably are top concerns for both organisations and researchers (Hancock et

al., 2020; Schlegel & Kraus, 2023). In addition, Hirschi (2018) recommends continued conversations among researchers and practitioners regarding the implications of the increasing digitisation and automation of work in the workforce and how research and practice can address these emerging trends. Therefore, this study aimed to assess the need for upskilling and reskilling and propose a comprehensive organisational sense-response framework for upskilling and reskilling in a VUCA business world that seems to be missing in the existing literature. The study can be beneficial to HRM practitioners, policymakers, and scholars.

2. Literature Review

2.1. VUCA Business World

The United States Army coined the term VUCA to characterise the dynamic, unpredictable, and unfavourable environment following the Cold War's conclusion (Sinha & Sinha, 2020). It was thereafter embraced by leaders and organisations all across the world. The term VUCA gained traction in corporate circles in the late 1990s and became a widespread acronym in the private sector with the advent of the 2008-09 financial crisis (Clegg et al., 2019). This is a continuing phenomenon; all predictions indicate that VUCA will be with us in the future (Sinha & Sinha, 2020). This fast-paced and ever-changing business environment is the new normal. This has compelled businesses and industry sectors globally to redesign their HR strategies in order to survive the VUCA era.

VUCA, which denotes volatility, uncertainty, complexity, and ambiguity, describes how organisations perceive themselves in the present and how they can prepare for the future (Sinha & Sinha, 2020). Organisations now need to plan strategically and transform VUCA challenges into opportunities (Clegg et al., 2019). VUCA has four dimensions, according to Bennett and Lemoine (2014) and Schoemaker, Heaton, and Teece (2018):

1. **Volatility:** Volatility is defined as an unknowable shift with a generally unsteady course.

2. **Uncertainty:** Although cause and effect links may be known, uncertainty is described as the lack of predictability of occurrences, making it challenging to examine potential future consequences.

3. **Complexity:** Complexity is viewed as a phenomenon or scenario with numerous interrelated variables that overwhelm an information network.

4. **Ambiguity:** Ambiguity is a situation in which there is uncertainty regarding the nature of a relationship, particularly its cause-and-effect dynamic. The uncertainty that might arise while attempting to make judgments in a novel scenario and the novelty of the situation itself can sometimes be the reason for this ambiguity.

2.2. Fourth Industrial Revolution

The world has been undergoing industrial revolutions. We are now in the fourth industrial revolution (4IR), also referred to as Industry 4.0 (Schwab, 2016). This revolution era follows the earlier three revolutions: mechanical production in the 1800s, mass industrial production in the late 19th century, and personal computers and the Internet in the 1960s (Frey & Osborne, 2013). The 4IR is characterised by major technologies, including "genetics, artificial intelligence, cloud computing, nanotechnology, biotechnology, and 3-D printing" (Hirschi, 2018, p. 2), among many others. Although there are similarities between Industry 4.0 and earlier

revolutions, Brynjolfsson and McAfee (2014) argue that besides aiming at replacing physical work and augmenting human workers, one main difference is that the technologies in the 4IR are aimed more at replacing cognitive work and human workers as well. Ford (2015) posits that this view raises the fear that artificial intelligence (AI) will gradually take over most jobs where humans are currently needed.

The 4IR has often been referred to as comprising accelerated digitisation and automation of work (Schwab, 2016). Several scholars consider it the most significant societal and economic trend in the globe that will significantly alter work dynamics, business, and society going forward (Arntz et al., 2016; Frey & Osborne, 2013; Hirschi, 2018). Current researchers also project that the disruptions of the 4IR may result in the disappearance of several jobs and significant changes in many other current jobs (Hirschi, 2018). On the other side, scholars maintain that the 4IR is also likely to result in new jobs, industries, and work arrangements (Brynjolfsson & McAfee, 2014). Therefore, based on these projections, digitisation and automation are the forces that are likely to shape the future of work and careers.

Although some scholars project that the 4IR technologies, such as AI, will lead to mass unemployment and dehumanisation of work, some other scholars criticise this view. For instance, Autor (2015) argues that jobs entail several tasks, many of which might not be easily automated. Thus, AI does affect some tasks but is unlikely to eliminate entire jobs (Hirschi, 2018). Another key criticism is that although previous revolutions also brought fears of mass job loss, these fears have not materialised (Hirschi, 2018). Consequently, labour economists generally agree that mass job loss is a highly unlikely scenario in the coming years (Arntz et al., 2016; Autor, 2015; Furman, 2016). However, Hirschi (2018) maintains that the world of work will experience major structural changes.

Acemoglu and Restrepo (2019) argue that AI potentially creates countervailing effects. On one side, it could create a significant displacement effect by taking over human tasks, thus reducing labour demand and employment (Brynjolfsson & McAfee, 2014; Ford, 2015). On the other side, automation could expand the economy, thus increasing demand for labour and sectors (Autor, 2015). Nevertheless, Acemoglu and Restrepo (2019) also argue that a greater force that could increase the demand for labour is "the creation of new tasks, functions, and activities in which labour has a comparative advantage relative to machines" (p. 198). The two scholars posit that such a scenario would potentially create a mismatch between the emerging technological demands of emerging tasks and the skills of workers.

2.3. The Changing Skills Landscape

As the disruptions of the 4IR transform workplaces, job profiles are likely to change, thus requiring employees to be upskilled and reskilled in a variety of competencies (Chakma & Chaijinda, 2020). According to the World Economic Forum's (2020) Future of Jobs Report, approximately "50% of all employees will need reskilling by 2025, as adoption of technology increases" (para. 1). Some of the skills believed to increase in prominence include critical thinking, complex problem-solving, and self-management (such as active learning, resilience, stress tolerance, and flexibility). Moreover, "The Forum estimates that by 2025, 85 million jobs may be displaced by a shift in the division of labour between humans and machines. But even more jobs – 97 million – may emerge that are more adapted to the new division of labour

between humans, machines, and algorithms" (World Economic Forum, 2020, para. 6). Figure 1 below shows the Forum's projected *Top 10 Skills of 2025*.

FIGURE 1. TOP 10 SKILLS OF 2025
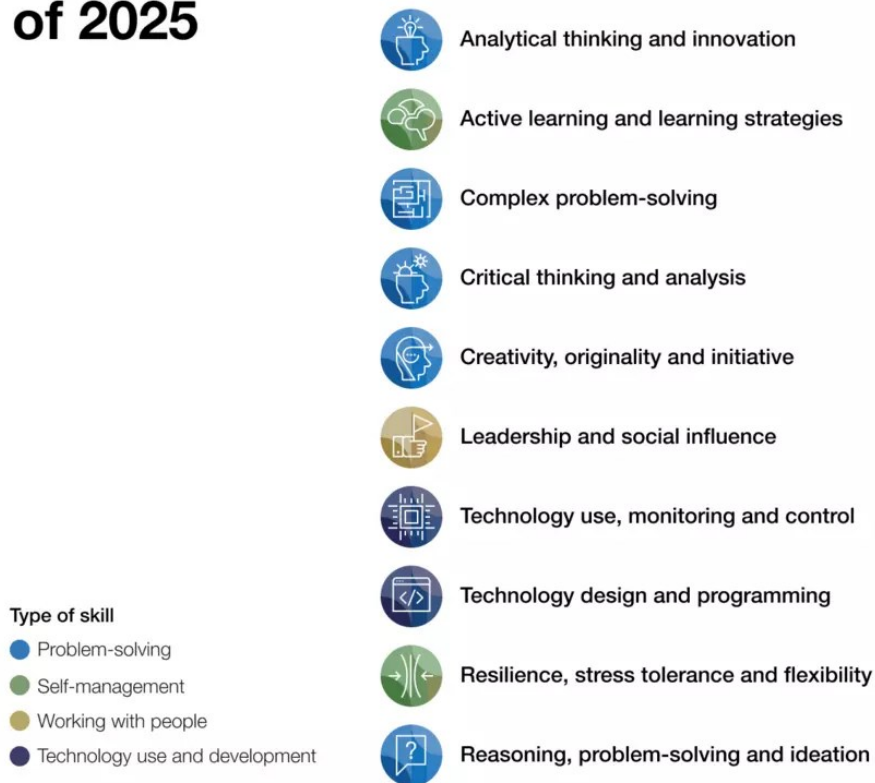
Source: Future of Jobs Report 2020, World Economic Forum, 2020.

Cukier et al. (2021) argue that innovation, adaptation, and resilience skills are increasingly becoming critical when facing challenges and change. The Future of Jobs Report 2020 by the World Economic Forum (2020) shows that the top skills required in the labour market have shifted in response to recent disruptions. A comparison of the 2020 report with the 2018 report by the same organisation showed that skills related to innovation and entrepreneurship dominate. Moreover, skills associated with technology use, technology design and programming, monitoring and control, flexibility, stress tolerance, and resilience seem to have risen on the list. This trend reflects a "rapid advancement of digitisation and the need to adapt to the changing work and a changing world" (Cukier et al., 2021, p. 19). On the other hand, skills such as attention to detail, time management, emotional intelligence, trustworthiness, and co-ordination seem to have dropped off the list.

Moreover, Kiers and Van Der Werff (2019) argue that the skills employees may need to acquire amidst digitisation, automation, and robotisation may not be limited to technological proficiency, active learning, and analytical thinking.

The two scholars maintain that employees will need other skills such as "creativity, originality and initiative, critical thinking, persuasion and negotiation, and attention to detail, resilience, flexibility, and complex problem-solving" (pp. 1-2). Chakma and Chaijinda (2020) maintain that future skills ecosystems will include "flexibility, accountability, social and cross-cultural skills" (p. 5). Brasher (2021) also suggests that enhancing employees' soft skills is as critical as technical skills. In addition, Chakma and Chaijinda (2020) posit that besides the basic subjects, continuous upskilling and reskilling also require mastery of "21st-century inter-disciplinary themes such as global awareness, financial, economic, business, and entrepreneurial literacy, civic literacy, health literacy, environmental literacy" (p. 5).

Notably, in whichever work environment, entrepreneurial skills seem to be highly valuable. Such skills include developing new ways of identifying opportunities, creating new combinations, and acquiring the necessary resources to implement the required solutions (Cukier et al., 2021). For instance, some countries such as China and Singapore have given priority to developing entrepreneurial skills in their formal education systems (United Nations Conference on Trade and Development, 2012).

The European Commission (2019) adopted a framework of eight competencies for lifelong learning. "The reference framework presents successful ways to promote competence development through innovative learning approaches, assessment methods, or support" (p. 4).

The recommended "key competencies are a combination of knowledge, skills, and attitudes" (p. 5). These competencies include digital competence, literacy competence, cultural awareness and expression competence, multilingual competence, entrepreneurship competence, mathematical competence and competence in science, technology, and engineering, citizenship competence, and personal, social, and learning competence. The European Commission (2019) maintains that these eight competencies are needed nowadays and will be needed in the future. Therefore, organisations need to continually develop these human resources competencies, especially in a volatile, uncertain, complex, and ambiguous environment.

Human resources are the most important organisational assets. Frankiewicz and Chamorro-Premuzic (2020) argue that "digital transformation is more about people rather than technology, (hence) the key technological skills are soft skills rather than hard skills" (p. 4). Moreover, the World Economic Forum (2017) has predicted that future occupations will likely focus more on human skills, enabling value-creating activities for firms.

Nevertheless, a study by Jaiswal et al. (2021) revealed that although social skills such as communication, leadership, and interpersonal are evergreen skills, they require less upskilling than technological and cognitive skills. On the other hand, routine skills, including project management and basic statistics, are likely to decline in the future and hence need no upskilling. Table 1 summarises the skills increasing and declining demand.

TABLE 1. SUMMARY OF CHANGING SKILLS LANDSCAPE

Increasing Demand	Based On	Declining Demand	Based On
Technological skills: Technology use, technology design and programming, monitoring and control, data analysis, and digital skills	Cukier et al. (2021); European Commission, (2019); Jaiswal et al. (2021); World Economic Forum (2020)	**Hard skills** in general	Brasher (2021); Frankiewicz & Chamorro-Premuzic (2020)
Soft skills: curiosity, flexibility, adaptability, stress tolerance, resilience, accountability, social and cross-cultural skills	Chakma & Chaijinda (2020); Cukier et al. (2021); European Commission, (2019); Frankiewicz & Chamorro-Premuzic (2020); World Economic Forum (2020)	**Routine skills**: project management, accounting, and basic statistics, Office administration and production, etc.	Jaiswal et al. (2021)
Cognitive skills: continuous learning, decision-making, creativity, originality and initiative, critical thinking	European Commission, (2019); Jaiswal et al. (2021); Kiers & Van Der Werff (2019)	Attention to detail, time management, emotional intelligence, trustworthiness, and co-ordination.	Cukier et al. (2021); World Economic Forum (2020)
Entrepreneurial skills andinnovation	Cukier et al. (2021); United Nations Conference on Trade and Development, 2012), World Economic Forum (2020)		
Mastery of 21st century inter-disciplinary themes: global awareness, financial, economic, business and entrepreneurial literacy, civic literacy, health literacy, environmental literacy	Chakma & Chaijinda (2020); European Commission, (2019)		

Source: Own compilation

2.4. Theoretical Frameworks

The following three theories, namely, the dynamic skill theory, neo-human capital theory (NHCT), and the theory of AI job replacement, illustrate the need for human resources development during rapid technological advancements in the VUCA world.

2.4.1. Neo-Human Capital Theory

The NHCT highlights a rising demand for technology-induced skills as well as the need to develop human capital during rapid technological change (Pereira & Malik, 2015). Bartel and Lichtenberg's (1987) posit that individuals with greater human capital competency in terms of education, training, experience, exploration, and openness to learning have a higher probability of adopting technological changes and developing new skills. Previous scholars (Jaiswal, Arun, & Varma, 2021; Pereira & Malik, 2015) have indicated that technological knowledge will not cause a decline in the need for workers' training. Therefore, the adoption of AI technologies is highly likely to increase the demand for new skill sets and higher human competencies.

2.4.2. Dynamic Skill Theory

The dynamic skill theory (Fischer & Bidell, 1998) considers skill development as web activities taking place in particular contexts. These interconnected activities are also outcome-oriented (Kunnen & Bosma, 2003). In addition to this web of skills, this theory also highlights the complexity of skills in different contexts (Fischer, Yan, & Stewart, 2003). For instance, in a dynamic world, people require competencies in different skills, including "social, emotional, technological and physical skills to exhibit good performance or demonstrate appropriate behaviour" (Jaiswal et al., p. 6) according to the relevant context. Therefore, this theory can be used to investigate the concept of the changing nature of work and skills.

2.4.3. AI Job Replacement

The unfolding of the potential of AI has also raised fears of job displacement. However, the theory of AI job replacement (Huang & Rust, 2018) narrows down displacement by AI to the task level and not the job level. In particular, the changing nature of work significantly affects easy and routine tasks that entail mechanical intelligence before it can affect tasks that require analytical intelligence (Jaiswal et al., 2021). Hence, soft skills will be critical for humans in the AI dispensation. The future workforce will require higher job complexity intelligence, such as intuitive intelligence and empathetic intelligence (Jaiswal et al., 2021). Although AI will replace some human tasks, Huang and Rust (2018) maintain that skills such as communication, empathy, problem-solving, sense-making, relationship-building, and reasoning cannot be easily displaced by AI. Therefore, in a VUCA world, current and future employees must continually upskill and reskill to remain relevant.

2.5. Upskilling and Reskilling

2.5.1. Role of Upskilling and Reskilling

Upskilling refers to augmenting existing skills with new or significantly enhanced knowledge or skills to enable individuals to continue and succeed in the same profession or field of work, whereas reskilling implies helping individuals gain new knowledge or skills to enable them to perform new jobs or enter new professions (Brinegar & Masino, 2021). The disruptions of the 4IR developments continue to reshape the type of skills required in the digital labour markets. Some scholars maintain that industries experiencing such disruptions are likely to develop skills initiatives as a classic response (Bajpai & Biberman, 2019).

Considering the need for employees to be equipped to thrive during technological disruptions (Van Deursen & Van Dijk, 2014), organisations need to invest more in training their workers to help them acquire knowledge and skills to perform new tasks with long-term career opportunities during the 4IR (Ecless & Serafein, 2017). Similarly, Mgiba (2019) highlights "a need to augment existing skills with new or significantly enhanced knowledge or skills to enable individuals to continue and succeed in the same profession or field of work or to move on to new positions" (p. 5). Therefore, upskilling and reskilling are critical initiatives for sustainability and continuity during the 4IR.

Work during the 4IR is knowledge-intensive and heavily depends on the interaction between AI-enabled technologies and employees (Bondarouk, Parry, & Furtmueller, 2017). Although technology enables organisational deliverables, Jaiswal et al. (2021) argue that employees are the key drivers of value creation and sustainable competitive advantage. The scholars thus

suggest that besides organisations developing physical and organisational capital, they should also develop human capital which is critical to success and sustainability.

Upskilling and reskilling have numerous benefits. For instance, lifelong learning can help mitigate the negative effects of the 4IR (Mokyr, 2015; Penprase, 2018). Hence, for future employees to thrive in the new normal, they will need to update and acquire new skills (Hirschi, 2018; Pedron, 2018). In addition, Brasher (2021) argues that upskilling and reskilling can help employees grow as well as have a feeling of progress and being valued in the organisation. Such a practice can thus help retain talent within the organisation by minimising the need for redundancies and outsourcing. This can help build an organisation's resiliency and agility. In this regard, Brasher (2021) recommends continuous upskilling and reskilling. Therefore, organisations should continually identify the need to upskill and reskill and encourage their employees to develop new skills.

2.5.2. *Upskilling and Reskilling in the Post-pandemic Era*

HRM transformed due to the COVID-19 pandemic. The pandemic accelerated the adoption of technology, such as artificial intelligence (AI), and caused a change in working arrangements (Mer & Virdi, 2023), such as remote working that required variant skills in employees (Durai & Jose, 2022). Mer and Virdi (2023) posit that the pandemic also "led to a paradigm shift in HRM practices. AI-enabled HRM practices are now centred around remote and contingent workforce management, mindfulness, social capital, increasing employee engagement, reskilling, and upskilling towards new competencies, etc." (p. 1). Such a paradigm shift has forced various organisations to think of new ways of organisational learning (Durai & Jose, 2022). There is a need for HR practitioners to develop employees who can adapt quickly to the world of work changes.

One challenge HR practitioners faced during and after the pandemic was upskilling and reskilling the workforce to thrive in the new context of remote working (Durai & Jose, 2022). Since the onset of the pandemic, organisations have not been able to depend on the skillset they relied on in the past years. Organisations have had to find ways of continually developing their workforce by equipping them with in-demand skills. Durai and Jose (2022) posit that the shift of learning and development in the post-pandemic era entails aspects such as a liquid workforce, optimal learning, remote working, hybrid learning, social learning, virtual learning, and life-long learning. Therefore, in the post-pandemic era, continuous upskilling and reskilling are key to surviving and thriving amidst constant and uncertain changes. Moreover, Raimi (2021) suggested that career reinvention in the post-pandemic era requires collaborative efforts from key stakeholders (such as governments, employees, and business organisations).

2.6. Collaborative Response of Governments, Educators, and Industry

The revolutionary changes of the 4IR require collaborative efforts to find both short-term and long-term solutions. Some scholars, such as Kiers and Van Der Werff (2019), have suggested that educational institutions, the industry, governments, and the wider community should collaborate to maximise the efficiency of upskilling and reskilling during the 4IR. Although organisations can carry out upskilling and reskilling independently, this may be costly and unequally implemented. However, Kiers and Van Der Werff (2019) recognise the risk of these sectors waiting upon each other to take the first initiative.

Besides impacting organisations, the 4IR technologies, such as AI, have initiated the process of developing a "learning and feeling economy" (Jaiswal et al., 2021, p. 21). A learning economy denotes a workforce that continually learns, upskills, and reskills as a result of innovation and technological advancements (Bughin et al., 2018). In a feeling economy, employment is based more on feeling tasks, including empathy and interpersonal, than mechanical and thinking tasks (Huang, Rust & Maksimovic, 2019). Therefore, managers have the task of restructuring their jobs to be "more people-oriented, feeling-conscious and emotionally intelligent" (Jaiswal et al., 2021, p. 21) by developing workforce on people skills as well as feeling intelligence.

Governments have a major role to play. Kiers and Van Der Werff (2019) suggest that governments can be instrumental in facilitating the process of upskilling and reskilling as it happens in Denmark. The Danish Government recognises the significance of world-class lifelong learning and the existence of good opportunities for the continuous upgrading of skills for the future (Danish Government, 2019). Another example is the Singapore government, which provides every employee with an amount for upskilling, hence promoting lifelong learning (Singapore Government, 2018). In addition, the Singapore government encourages employers, private training providers, higher institutions of learning, and society to support lifelong learning.

Learning institutions are also instrumental. Some scholars have suggested that education ecosystems should be designed to meet the future needs of the industry (Nordin & Norman, 2018). Nordin and Norman (2018) posit that to combat the impact of AI and robots, institutions of learning should design curriculums that integrate the 4IR technologies in teaching and learning so that learners are familiar with the potential of such technologies from early childhood. Moreover, Zahidi (2020) has proposed that higher institutions of learning can help by making skills visible and collaborating with the industry to develop a relevant taxonomy of skills.

With the prediction that AI will potentially create new tasks, functions, and activities, new skills will also be required to execute these tasks (Acemoglu & Restrepo, 2019). In cases where the workforce lacks those skills, an adjustment to new realities might be hindered. In particular, the failure of the educational systems to identify and provide these skills will be a great blow to any adjustment during the AI revolution. Considering the rising concerns of several employers being unable to find suitable employees (having the right skills) for their jobs (AfriBlocks, 2021; Deloitte and The Manufacturing Institute, 2011), educational systems need to be reviewed and revised accordingly. The European Investment Bank (as cited in Kiers & Van Der Werff, 2019), recognises the importance of a coherent and progressive strategy for human resources and skills as one of the solutions to the challenge of skills shortage.

2.7. Organisational Sense-response Framework

The sensing and response dimensions heavily affect the change process (Žitkienė & Deksnys, 2018). A driver for organisational change often occurs from the external environment. For instance, a shift in customer preferences, competitive conduct, or industry developments can impact a firm externally. To capitalise on these changes and turn them into opportunities, companies must first identify and acknowledge them. This capacity or act of recognising heavily relies on an organisation's capabilities, people skills, experience, and expertise. The sense-response framework (Figure 2), proposed by Žitkienė and Deksnys (2018), lists the

sensing ability (sub-process) as the first phase. Once external threats or opportunities have been identified, the organisation must determine how well it can adapt to these changes, including whether they are relevant to its current situation and long-term strategic objectives, whether they could be advantageous to it, and whether it is capable of taking action to address them.

A second sub-process in the sense-response framework is the capacity to use organisational resources (capabilities and enablers) from both inside and outside the organisation in response to environmental changes (Žitkienė & Deksnys, 2018). The capabilities and enablers of the organisation heavily influence its reaction or response. An organisation uses its capabilities and enablers to respond to the opportunity or threat after choosing to act in response to an external change. Based on the sense-response framework, the foundation of a successful organisation is this intricate process of evaluating and taking appropriate action in response to external changes. Although this framework has been used to study organisational agility, it can be adapted to studies on upskilling and reskilling for a VUCA world characterised by rapid, unpredictable changes in the external environment (such as technology, competition, customer needs and wants, labour market, and employee needs, etc.) that require organisations to constantly sense and keep track of changes and respond to them accordingly.

FIGURE 2. ORIGINAL SENSE-RESPONSE FRAMEWORK
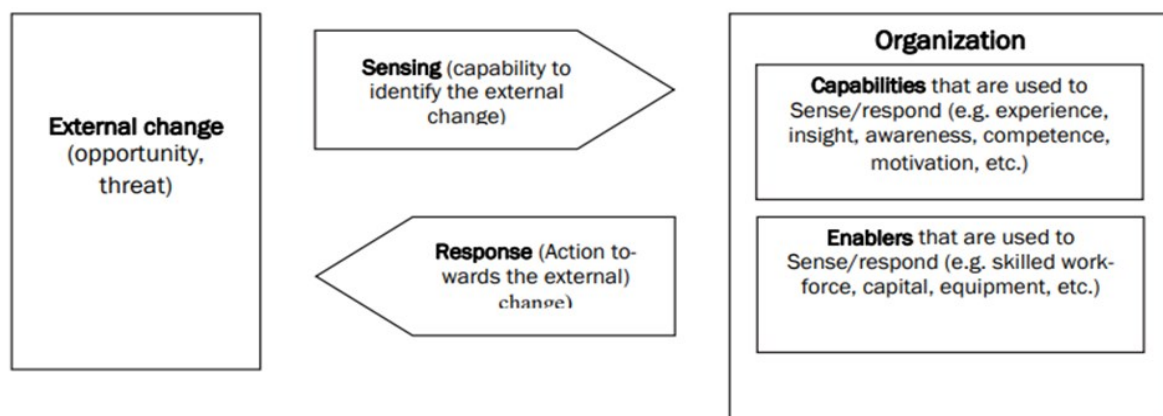
Source: Žitkienė & Deksnys, 2018, p. 122.

2.7.1. Upskilling and Reskilling Drivers

Researchers have predicted that technological advancements of the 4IR will be the key drivers of opportunities for new growth and the need for upskilling and reskilling. *The Future of Jobs Report 2018* (World Economic Forum, 2018) shows that automation, AI, ubiquitous high-speed mobile internet, cloud technology, and widespread adoption of big data analytics will dominate as positive drivers of business growth. Hall (2023) maintains that "as market circumstances, technologies, and organisational requirements evolve, in-demand skills will do the same. Throughout history, forces such as globalisation have reshaped most employees' jobs. Technology, including AI, stands to revolutionise those positions even more" (para. 1). Hall (2023) also posits that shifts in talent needs amidst rapid changes drive organisations to upskill and reskill their employees to be able to handle fast-happening developments. Moreover, the current business environment's volatility, uncertainty, complexity, and ambiguity force organisations to adopt various upskilling and reskilling strategies to survive or thrive in the present and prepare for the future (Sinha & Sinha, 2020).

2.7.2. Upskilling and Reskilling Enablers

As stated earlier, people are the most essential assets of an organisation. Hence, for any upskilling and reskilling initiative to be successful, organisations need a skilled and empowered workforce (Vroman & Danko, 2022). Low, the vice president of human resources at Cengage Group (as cited in Vroman & Danko, 2022), maintained that "employees want to understand future career opportunities, and what skills, competencies, and capabilities they need to get there" (para. 3). Therefore, empowered employees can be critical enablers of the upskilling and reskilling initiatives as they will own such programs for their career development. Besides an empowered workforce, internal networks (connections) and policies are fundamental for upskilling and reskilling (Schad, 2020).

According to a study by the Center for Creative Leadership, *The 70-20-10 Rule for Leadership Development*, "most learning happens through challenging experiences and assignments" (para. 2). Hence, ensuring a culture of learning and growth through favourable internal networks and policies can enable employees to upskill and reskill continually. Besides internal networks, strategic external partnerships with resourceful organisations are equally beneficial (Hammer, 2022). Moreover, using technology can enable stronger internal and external networks for learning and development (Hammer, 2022).

### 2.7.3. Upskilling and Reskilling Capabilities

According to Žitkienė and Deksnys (2018), organisations need sensing and response capabilities to thrive amidst rapid change, especially in the external environment. The sensing capability ensures that organisations continually maintain awareness of external threats or opportunities. Identifying these drivers is key to finding relevant ways of addressing them. The response capability, on the other hand, ensures that organisations can determine how best they can adapt to changes after assessing the relevance of those changes to their organisations' current situations and long-term strategic objectives, as well as the possible benefits and threats of those changes. Organisations can enhance these capabilities by reconfiguring talent and skills, learning, co-ordination, and cooperation of various entities within the organisation (Rogers, 2020).

2.7.4. Upskilling and Reskilling Practices

The Institute of Innovation and Professional Development (2023) suggested that some upskilling and reskilling practices include providing employee learning opportunities, creating a culture of learning within their organisation, offering incentives, and supporting career development. "This can include offering training programs, workshops, and courses related to their field or industry. Employers can also provide access to online learning platforms and educational resources to help their employees expand their skill sets" (para. 2). Organisations can also achieve this by enhancing employee empowerment through knowledge and skills sharing initiatives such as inter-departmental alliances, rotational programs, and partnering with external training providers such as universities, colleges, vocational schools, online education providers, and private trainers (Abu-Rumman, 2021, Hammer, 2022).

Organisations should also ensure continuous assessment of skills needs and solutions and continually measure the results of their upskilling and reskilling initiatives to keep improving them (Agarwal et al., 2022). Figure 3 shows the proposed organisational sense-response framework for upskilling and reskilling in a VUCA world.
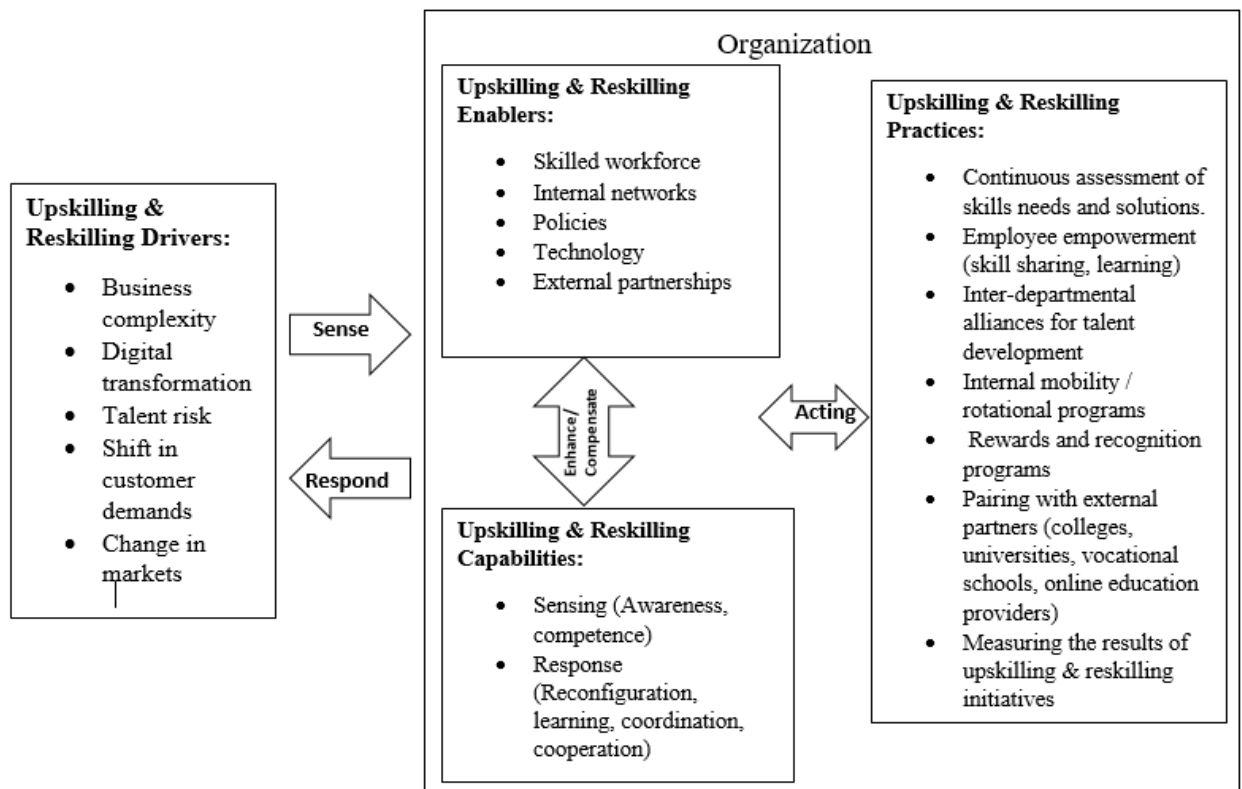
3. Conclusion

Although organisations operate in a VUCA environment characterised by volatility, uncertainty, complexity, and ambiguity, they need o plan strategically and transform VUCA challenges into opportunities. Any company that wishes to survive and/or thrive in the VUCA environment must focus on its most valuable asset— its people. Talent development – strategically developing employees' skills based on organisational objectives – is the foundation of an organisation's sustainability during the ongoing 4IR. Digital transformation is more about people rather than just technology. As disruptions of the 4IR transform workplaces, employees are to be upskilled and reskilled in various competencies. Continually developing people by combining the dual focus on the potential of soft skills and knowledge of hard skills is essential in ensuring organisations respond accordingly to the changes in the external environment. Besides organisational efforts, employees should be willing to take personal initiatives to learn new skills despite their many years in their existing roles.

The disruptive changes of the 4IR require collaborative efforts to find both short-term and long-term solutions. As various scholars have suggested, various entities such as educational institutions, industry, governments, and the wider community should collaborate to maximise the efficiency of upskilling and reskilling during the 4IR. Such collaborative efforts can help make relevant skills visible and enable the development of a relevant taxonomy of skills. This

will ensure that the skills shortage problem is addressed gradually and there is a constant supply of relevant talent to meet the labour demand. Moreover, it will ensure that employees are prepared for the unpredictable future due to their attained flexibility, agility, and resilience. With the fear that advanced technologies will take over people's jobs, thus rendering them obsolete, organisations can do well to continually upskill and reskill their employees to remain relevant despite rapid disruptions. Such efforts will ensure that employees are empowered to continue and succeed in the same professions or field of work, perform new jobs, or enter emerging professions.

Although the sense-response framework has been used to study organisational agility, in this study, I propose that it can be adapted to studies on upskilling and reskilling for a VUCA world characterised by rapid, unpredictable changes in the external environment (such as technology, competition, customer needs and wants, labour market, and employee needs, etc.) that require organisations to constantly sense and keep track of changes and respond to them accordingly. Organisations need to enhance both the sensing and response capabilities to ensure that they continually maintain awareness of their external threats or opportunities and can determine how best they can adapt to these disruptions after assessing the relevance of those changes to their organisations' current situations and long-term strategic objectives, as well as the possible benefits and threats of those changes. In the end, upskilling and reskilling will benefit both employees and, organisations and society at large.

References

Abu-Rumman, A. (2021). Effective knowledge sharing: A guide to the key enablers and inhibitors. In *Handbook of research on organisational culture strategies for effective knowledge management and performance* (pp. 133-156). IGI Global. https://doi.org/10.4018/978-1-7998-7422-5.ch008

Acemoglu, D., & Restrepo, P. (2019). *Artificial intelligence, automation, and work* (pp. 197-236). University of Chicago Press. http://www.nber.org/chapters/c14027

AfriBlocks. (2021). *Africa and the future of work report 2021*. Retrieved March 12, 2023, from https://www.afriblocks.com/africa-future-report.

Agarwal, V., Mathiyazhagan, K., Malhotra, S., & Saikouk, T. (2022). Analysis of challenges in sustainable human resource management due to disruptions by Industry 4.0: an emerging economy perspective. *International Journal of Manpower*, *43*(2), 513-541. https://doi.org/10.1108/IJM-03-2021-0192

Arntz, M. T., Gregory, T., & Zierahn, U. (2016). The risk of automation for jobs in OECD countries: A comparative analysis. *OECD Social, Employment and Migration Working Papers* (No. 189). https://doi.org/10.1787/1815199X

Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives, 29*, 3–30. http://doi.org/10.1257/jep.29.3.3

Bajpai N, & Biberman, J. (2019). *The future of work in India adapting to the fourth industrial revolution*. CSD Working Paper Series. https://doi.org/10.7916/d8-6nt2-w282

Bondarouk, T., Parry, E., & Furtmueller, E. (2017). Electronic HRM: Four decades of research on adoption and consequences. *The International Journal of Human Resource Management, 28*(1), 98–131. https://doi.org/10.1080/09585192.2016.1245672

Bartel, A. P., & Lichtenberg, F. R. (1987). The comparative advantage of educated workers in implementing new technology. *The Review of Economics and Statistics, 69*(1), 1–11. https://doi.org/10.2307/1937894

Bennett, E. E. (2018). Intranets of people, things, and services: Exploring the role of virtual human resource development. In C. A. Simmers & M. Anandarajan (Eds.). *The Internet of People, Things and Services* (pp. 166-183). New York, NY: Routledge

Bennett, N., & Lemoine, J. (2014). What VUCA really means for you. *Harvard Business Review, 92*(1/2). https://ssrn.com/abstract=2389563

Brasher, G. (2021). *Reskilling in the age of empowered employee*. Retrieved January 02, 2023, from https://www.hrreview.co.uk/analysis/george-brasher-reskilling-in-the-age-of-the-empowered-employee/132390.

Brinegar, C., & Masino, H. S. (2021). *Adapting to the new normal: Upskilling and reskilling*. Retrieved April 10, 2023, from https://trainingindustry.com/magazine/may-jun-2021/adapting-to-the-new-normal-upskilling-and-reskilling/

Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York, NY: Norton.

Bughin, J., Hazan, E., Lund, S., Dahlström, P., Wiesinger, A., & Subramaniam, A. (2018). *Skill shift: Automation and the future of the workforce*. McKinsey & Company/ McKinsey Global Institute. https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce

Caena, F., & Punie, Y. (2019). Developing a European framework for the personal, social & learning to learn key competence (LifEComp). *Literature Review & Analysis of Frameworks; Punie, Y., Ed.; Publications Office of the European Union: Luxembourg*. https://data.europa.eu/doi/10.2760/172528

Chakma, S., & Chaijinda, N. (2020). Importance of reskilling and upskilling the workforce. Interdiscplinary Sripatum Chinburi Journal, 6(2), 23-31.

Clegg, L. J., Voss, H., & Chen, L. (2019). Can VUCA help us generate new theory within international business?. In *International business in a VUCA world: The changing role of states and firms* (Vol. 14, pp. 55-66). Bingley, UK: Emerald. https://doi.org/10.1108/S1745-886220190000014005

Codreanu, A. (2016). A VUCA action framework for a VUCA environment: Leadership challenges and solutions. *Journal of Defense Resources Management, 7*(2), 31-38. https://www.ceeol.com/search/article-detail?id=472933

Cukier, W. E. N. D. Y., Mccallum, K. E., Egbunonu, P., & Bates, K. (2021). The mother of invention: Skills for innovation in the post-pandemic world. In *Public Policy Forum, Diversity Institute, Future Skills Centre.* https://www.torontomu.ca/diversity/reports/MotherOfInvention_EN.pdf

Danish Government. (February 2019). *Prepared for the future of work*. Retrieved November 23, 2022, from https://www.regeringen.dk/media/6332/regeringen_disruptionraadet_uk_web.pdf

Deloitte and The Manufacturing Institute. (2011). *Boiling point? The skills gap in U.S. manufacturing."* Report. Retrieved December 12, 2022, from https://www.purdue.edu/in-mac/assets/pdf/Deloitte_us_PIP_2011SkillsGapReport_01142011.pdf

Durai, F. A. P., & Jose, J. (2022). The shifting corporate strategy of learning and development in the post-pandemic era. *Journal of Positive School Psychology*, 7005-7010. http://mail.journalppw.com/index.php/jpsp/article/view/4915/3168

Eccles, R. G., & Serafeim, G. (2017). Corporate and integrated reporting: A functional perspective. In *Corporate stewardship* (pp. 156-171). New York, NY: Routledge.

European Commission, Directorate-General for Education, Youth, Sport and Culture, (2019). *Key competences for lifelong learning*. Publications Office. https://data.europa.eu/doi/10.2766/569540

Fischer, K., Yan, Z., & Stewart, J. (2003). Adult cognitive development: Dynamics in the developmental web. *Handbook of developmental psychology* (pp. 491–516). Newbury Park, CA: SAGE.

Fischer, K. W., & Bidell, T. R. (1998). Dynamic development of psychological structures in action and thought. In F. M. Lerncr (Ed.), *Handbook of child psychology* (pp. 467—561). New York, NY: Wiley

Ford, M. (2015). The rise of the robots: Technology and the threat of mass unemployment. *International Journal of HRD Practice Policy and Research*, *111*.

Frankiewicz, B., & Chamorro-Premuzic, T. (2020). Digital transformation is about talent, not technology. *Harvard Business Review*, *6*, 3.

Frey, C. B., & Osborne, M. A. (2013). *The future of employment: How susceptible are jobs to computerisation?* Retrieved June 02, 2022, from https://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

Furman, J. (2016). Is this time different? The opportunities and challenges of artificial intelligence. In K. Crawford & M. Whittaker (Cochairs), *AI Now: The social and economic implications of artificial intelligence technologies in the near term.* Symposium conducted at the meeting of the AI Now Institute, New York, NY.

Hall, J. (2023). *Why upskilling and reskilling are essential in 2023*. Retrieved June 02, 2022, from *https://www.forbes.com/sites/johnhall/2023/02/24/why-upskilling-and-reskilling-are-essential-in-2023/?sh=5cbaa7e84088*

Hamid, H. (2019). The strategic position of human resource management for creating sustainable competitive advantage in the VUCA world. *Journal of Human Resources Management and Labor Studies*, *7*(2), 1-4. https://doi.org/10.15640/jhrmls.v7n2a1

Hammer, M. (2022). *Ops 4.0—The human factor: The need for speed in building skills.* Retrieved May 02, 2022 from https://www.mckinsey.com/capabilities/operations/our-insights/operations-blog/the-human-factor-in-ops-4-0-the-need-for-speed-in-building-skills

Hancock, B., Lazaroff-Puck, K. & Rutherford, S., 2020. Getting practical about the future of work. *McKinsey Quarterly*, 1, pp.65-73. https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Organization/Our%20Insights/Getting%20practical%20about%20the%20future%20of%20work/Getting-practical-about-the-future-of-work-final.pdf

Hirschi, A. (2018). The fourth industrial revolution: Issues and implications for career research and practice. In *The Career Development Quarterly* 66 (3), pp. 192–204. https://doi.org/10.1002/cdq.12142

Holopainen, R. (2022). Upskilling financial management professionals in the post-pandemic era. https://aaltodoc.aalto.fi/bitstream/handle/123456789/117081/master_Holopainen_Riku_2022.pdf?sequence=1

Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research, 21*(2), 155–172. https://doi.org/10.1177/1094670517752459

Huang, M.-H., Rust, R., & Maksimovic, V. (2019). The feeling economy: Managing in the next generation of artificial intelligence (AI). *California Management Review, 61*(4), 43–65. https://doi.org/10.1177/0008125619863436

Illanes, P., Lund, S., Mourshed, M., Rutherford, S., & Tyreman, M. (2018). Retraining and reskilling workers in the age of automation. *McKinsey Global Institute*. https://www.echs-nm.com/wp-content/uploads/2019/10/retraining-and-reskilling-workers-in-the-age-of-automation-_-mckinsey-company.pdf

Institute of Innovation and Professional Development. (2023). *How employers can encourage upskilling and reskilling for their employees, and the benefits for the organisation*. Retrieved June 02, 2022, from *https://www.linkedin.com/pulse/how-employers-can-encourage-upskilling/*

Jaiswal, A., Arun, C. J., & Varma, A. (2021). Rebooting employees: Upskilling for artificial intelligence in multinational corporations. *The International Journal of Human Resource Management,* 1-30. https://doi.org/10.1080/09585192.2021.1891114

Kiers, J., & Van Der Werff, J. H. (2019). The future of work requires a future of professional learning: From stand-alone, academic moocs to programmes that are relevant for professionals. *EMOOCs-WIP*, pp. 247–253.

Kunnen, E. S., & Bosma, H. A. (2003). Fischer's skill theory applied to identity development: A response to Kroger. *Identity, 3*(3), 247–270. https://doi.org/10.1207/S1532706XID0303_05

Lacity, M. & Willcocks, L., 2021. Becoming strategic with intelligent automation. *MIS Quarterly Executive, 20*(2), pp.1-14. https://aisel.aisnet.org/misqe/misqe_forthcoming_2021.pdf

Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., ... & Sanghvi, S. (2017). Jobs lost, jobs gained: Workforce transitions in a time of automation. *McKinsey Global Institute*, 150. https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages

Mer, A., & Virdi, A. S. (2023). Navigating the paradigm shift in HRM practices through the lens of artificial intelligence: A post-pandemic perspective. *The Adoption and Effect of Artificial Intelligence on Human Resources Management, Part A*, 123-154. https://doi.org/10.1108/978-1-80382-027-920231007

Mgiba, F. (2019). Merger, upskilling, and reskilling of the sales-marketing personnel in the fourth industrial revolution environment: A conceptual paper. *Global Journal of Management and Business Research*. ISSN 2249-4588

Mokyr, J. (2015). Intellectuals and the rise of the modern economy. *Science, 349*(6244), 141-142. https://doi.org/10.1126/science.aac6520

Ng, K.K., Chen, C.H., Lee, C.K., Jiao, J.R. & Yang, Z.X., 2021. A systematic literature review on intelligent automation: Aligning concepts from theory, practice, and future perspectives. *Advanced Engineering Informatics*, 47, pp.1-36. https://doi.org/10.1016/j.aei.2021.101246

Nordin, N., & Norman, H. (2018). Mapping the fourth industrial revolution global transformations on 21st century education on the context of sustainable development. *Journal of Sustainable Development Education and Research*, 2(1), 1-7. https://doi.org/10.17509/jsder.v2i1.12265

Pedron, Z. (2018). The skills revolution of the 21st century: It's time to re-calibrate. *On Research (Journal of EU Business School)*, *1*, 20-28.

Penprase, B. E. (2018). The fourth industrial revolution and higher education. *Higher Education in the Era of the Fourth Industrial Revolution*, *10*(1), 978-981. https://doi.org/10.1007/978-981-13-0194-0

Pereira, V., & Malik, A. (2015). *Human capital in the Indian IT/BPO industry* (1st ed.). London, UK: Palgrave Macmillan. https://doi.org/10.1057/9781137481528

Raimi, L. (2021). Different models of career reinvention and retooling in the post-pandemic era. In *Scientific Conference on Economics and Entrepreneurship Proceedings* (pp. 73-81). https://doi.org/10.7250/scee.2021.0008

Rogers, M. (2020). *A better way to develop and retain top talent*. Harvard Business Review. Retrieved May 02, 2022, from *https://hbr.org/2020/01/a-better-way-to-develop-and-retain-top-talent*

Saridakis, G., Lai, Y., & Cooper, C. L. (2017). Exploring the relationship between HRM and firm performance: A meta-analysis of longitudinal studies. *Human Resource Management Review, 27*(1), 87-96. https://doi.org/10.1016/j.hrmr.2016.09.005

Schad, J. (2020). *How internal networks can help employees reskill and upskill*. Retrieved October 02, 2022, from *https://www.randstadrisesmart.com/insights/blog/how-internal-networks-can-help-employees-reskill-upskill*

Schlegel, D., & Kraus, P. (2023). Skills and competencies for digital transformation–a critical analysis in the context of robotic process automation. *International Journal of Organizational Analysis*, *31*(3), 804-822. https://doi.org/10.1108/IJOA-04-2021-2707

Schwab, K. (2016). *The fourth industrial revolution*. New York, NY: Crown Business.

Schoemaker, P. J., Heaton, S., & Teece, D. (2018). Innovation, dynamic capabilities, and leadership. *California management review*, *61*(1), 15-42. https://doi.org/10.1177/0008125618790246

Singapore Government. (March 2018). *Singapore Government aims to develop lifelong learners in preparation for dynamic future*. Retrieved February 12, 2023, from *https://www.opengovasia.com/singapore-government-aims-to-develop-lifelong-learners-in-preparation-for-dynamic-future/*

Sinha, D., & Sinha, S. (2020). Managing in a VUCA world: Possibilities and pitfalls. *Journal of Technology Management for Growing Economies*, *11*(1), 17-21. https://doi.org/10.15415/jtmge.2020.111003

Taylor, T. C. (2022). *Talent development: 8 Best practices for your organisation*. Retrieved February 12, 2023, from *https://www.aihr.com/blog/talent-development/*

United Nations Conference on Trade and Development. (2012). *Entrepreneurship policy framework and implementation guidance.* United Nations. Retrieved May 02, 2023, from https://unctad.org/system/files/official-document/diaeed2012d1_en.pdf

Van Deursen, A. J. A. M., & Van Dijk, J. A. G. M. (2014). The digital divide shifts to differences in usage. *New Media & Society, 16*(3), 507-526. https://doi.org/10.1177/1461444813487959

Vroman, S. R., & Danko, T. (2022). *How to build a successful upskilling program*. Harvard Business Review. Retrieved May 12, 2023, from *https://hbr.org/2022/01/how-to-build-a-successful-upskilling-program*

World Economic Forum. (2017). *Mapping global transformation*. Retrieved May 02, 2023, from *https://toplink.weforum.org/knowledge/insight/a1Gb0000001RIhBEAW /explore/ summary*

World Economic Forum. (2020). *The Future of Jobs report 2020*. Retrieved May 02, 2023, from *https://www.weforum.org/reports/the-future-of-jobs-report-2020/in-full*

World Economic Forum. (2020). *These are the top 10 job skills of tomorrow – and how long it takes to learn them*. Retrieved May 22, 2023, from *https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/*

Zahidi, S. (2020, January). We need a global reskilling revolution–here's why. In *World Economic Forum* (Vol. 22). Retrieved May 23, 2023, from https://www.weforum.org/agenda/2020/01/reskilling-revolution-jobs-future-skills/

Žitkienė, R., & Deksnys, M. (2018). Organisational agility conceptual model. *Montenegrin Journal of Economics. 14*. 115-129. https://10.14254/1800-5845/2018.14-2.7

Declaration Statements

Conflict of Interest
The author reports no conflict of interest.

Funding
The author received no financial support for the research, authorship, and/or publication of this article.

Ethics Statement
No dataset is associated with this article.

Open Access Agreement

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