Conceptual Paper

New Ways of Working in the Manufacturing Sector as COVID-19 Pandemic Learning and Its Relevance to Workforce Agility

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Abstract

The performance of manufacturing as the prominent sector decreased because of the COVID-19 pandemic. Nevertheless, it could bounce back its performance quickly right after. The question remains whether new ways of working take part in this agile behavior of manufacturing employees in adapting to such a situation. Even so, what kind of new ways of working could be implemented in manufacturing since this sector has a specific processing system from input to output? Implementing new ways of working practices in manufacturing varies since manufacturing has primary and support activities. First, this paper elaborates on the definition of new ways of working and the feasible practices that could be implemented in manufacturing. They are ICT, flexible work time, flexible workplace, and professional autonomy. Second, this paper uses the triadic reciprocal of social cognitive theory to find the relevance of new ways of working and workforce agility. Furthermore, psychological empowerment plays an important part in implementing new ways of working regarding employee sustainability as a human being who needs intrinsic motivation. The authors conclude with the proposed model that depicts the relevance between new ways of working practices, psychological empowerment, and workforce agility. This study also provides managerial implications in implementing new ways of working in the manufacturing sector.

Keywords: *New Ways of Working; Workforce Agility; Manufacturing*

INTRODUCTION

The manufacturing sector is one of the prominent sectors in the world as it can produce products in large quantities. The focus is on producing large quantities because manufacturing strives for efficiency in the production process to fulfill human needs in any situation. The manufacturing sector can survive in a devastating environment despite the complex system. This sector rebounded quickly after the pandemic of COVID-19 (UNIDO, 2021). The pandemic of COVID-19 is unique because it has caused business disruptions on an unprecedented scale (Ozdemir et al., 2022). When COVID-19 started to arise in the first-second quarter of 2020, the growth of world manufacturing output was going down compared to 2018 and 2019 (UNIDO, 2021). However, it gained back in the third quarter of 2020 and is even higher than in 2018 and 2019 (UNIDO, 2021). The manufacturing sector requires resilience to keep human supply needs even in a disruptive environment. To maintain the resilience in this sector, agility can be a critical factor for organizations not only to operate through the volatility and adapt to the current situation but to compete in the next era of enlargement technology and dynamic organizational (Alavi et al., 2014; Lee et al., 2022; Ozdemir et al., 2022).

As a critical factor, many researchers studied agility in the manufacturing sector. Agility theory in the manufacturing sector has been popular since the early 1990s in responding to dynamic, increasing change, uncertainty, and competitive environments (Devadasan et al., 2005; Sherehiy et al., 2007). Recent findings postulate that the workforce is the vital element of agility in manufacturing rather than the advance of technology (Alavi et al., 2014; Menon & Suresh, 2020; Sherehiy et al., 2007) since technology could achieve its optimum function if the worker has the agility to learn about that (Alavi et al., 2014). Agile workforces become crucial because they can grant innovations, enhance strategic capabilities, and reduce structural workforce expenses to organizations (Muduli, 2017). Azizi et al. (2021) put forward flexibility as one of the human

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resource management strategies to prevent COVID-19 with the principle of agile organizational development. Hence, many papers have studied workforce agility in many sectors during the pandemic of COVID-19 (Brack et al., 2021; Leask & Ruggunan, 2021; Menon & Suresh, 2020; Tamtam & Tourabi, 2021; Thayyib & Khan, 2021), but study about workforce agility especially in the manufacturing industry during the pandemic of COVID-19 is still scarce.

Besides workforce agility, manufacturing should know how to manage the employees to achieve an agile state even in a destructive environment like the pandemic of COVID-19. Organizations must create some innovations to get out of current practices to mitigate the destructive effect of pandemics (Ozdemir et al., 2022). In an innovative manufacturing company, the owner was more involved in developing new products, processes, and New Ways of Working (NWW) (Laforet & Tann, 2006). New products and processes are related to the primary activities in manufacturing, while NWW is a flexible form of human resources practices to enhance organizational agility in a highly unpredictable and complex environment through how, when, and where employees work. Regarding the workforce as the prominent element of agile manufacturing, NWW has become a consideration to be implemented by organizations in adapting to the dynamic environment (Aroles et al., 2021). Notably, during the COVID-19 pandemic, the situation became challenging for organizations regarding business continuity, employee motivation, distance working, or unemployment through precaution policies (Aroles et al., 2021; Azizi et al., 2021). Peters et al. (2014) posit that to enhance the sustainable success of NWW, organizations must consider the need for a supportive culture such as coaching, cooperation, and commitment. J. H. Coun et al. (2021) have studied that supporting culture can build intrinsic motivation as psychological empowerment can successfully mediate NWW to improve workplace proactivity in the financial sector. However, the organization needs the agility to mitigate the pandemic of COVID-19 and other devastating situations. Moreover, the agility aspect of the employee. So, the relevance between NWW and workforce agility for the manufacturing sector in coping with the destructive situation has not yet been clarified.

This study aims to develop a solid basis for future empirical research on NWW and workforce agility and provide some preliminary guidelines to practitioners in manufacturing on how to deal with employees even in a destructive environment. So, for the objectives, this conceptual article elucidates the relevance of NWW to workforce agility in the manufacturing sector by analyzing existing theories and concepts. First, we elaborate on the concept of NWW and particularly the possible implementation in the manufacturing sector. Second, we use a social cognitive theory perspective to see the correlation between NWW and workforce agility as a behavior. Third, we describe the mediating effect of psychological empowerment based on the synthesis of previous studies regarding the relevance between NWW and workforce agility. We conclude with the proposed model and additional research questions relevant to the study of NWW and workforce agility.

LITERATURE REVIEW

NWW Concept

NWW has become more critical since COVID-19 regulations in many countries increased the attention to the implementation and its impact (Aroles et al., 2021; Gerards et al., 2020). NWW enables organizations to sustain the business through distance collaboration even though the environment is disruptive such as the pandemic of COVID-19. Previous studies have examined the positive effect of working remotely as part of NWW on job performance and productivity during the pandemic of COVID-19 (Meilani et al., 2021; Ng et al., 2022; Parilla et al., 2022; Sirait & Murdianingrum, 2021). Specifically, based on their study, Meilani et al. (2021) recommend organizational learning with the online platform to increase performance even though the

employee cannot gather in an office or other permanent place. Therefore, NWW is essential to manufacturing as the prominent sector providing large quantities of human needs to prevent any disruptive situation. Including the pandemic of COVID-19 as disruptive conditions, Lee et al. (2022) described the disruptions in the manufacturing system can be happened from (1) Geopolitical factors, which increase the risk of disruption through its effect on the supply chain, logistics, the human capital; (2) Pandemic, which causes unstable demand changes and disruptions to the supply chain; (3) Climate changes, which will reshape the global supply chain radically in the future decades and natural disasters can seriously disrupt logistics, energy supplies, and more; and (4) Other external disturbances, like unanticipated market fluctuation, cyber-attacks, etc. Table 1 represents the various descriptive concepts of NWW.

Table 1. NWW Concept

Concept	Description	Authors
Bricks, bytes, and behavior changes	The integrated management of spatiotemporal, technological, and organizational cultural changes.	Aroles et al. (2021)
Timing, place, and new media technologies	NWW have three key characteristics: more autonomy in deciding when they work, various options for the place of work, and various options for communications.	Demerouti et al. (2014)
The wider trend of workspace differentiation and flexibilization	The flexible use of home workspaces in terms of 'teleworking', the flexibilization of office spaces under the form of 'hot desking', 'co-working', or 'nomadic working', as well as 'mobile working' between all these workspaces.	Mitev et al. (2021)
Enable organizations to respond more flexible environment	NWW is believed to enable organizations to respond more flexibly to new market requirements, improve service quality, and enhance operating efficiency.	Peters et al. (2014)
NWW will become the normal way of working	NWW is 'just' normal working but new technology and the needs of the labor market demand new forms of work. The development of technology will always adjust the way of working.	Bondarouk & de Leede (2016)

Aroles et al. (2021) refer to NWW in terms of 'bricks, bytes, and behavior changes', indicating the integrated management of spatiotemporal, technological, and organizational cultural changes. In other term, NWW has three characteristics: flexible time of work, flexible place of work, and new media technologies (Demerouti et al., 2014). Additionally, NWW can be regarded as part and parcel of the wider trend of workspace differentiation and flexibilization (Mitev et al., 2021) because Peters et al. (2014) believe that NWW enables organizations to respond more flexibly to new market requirements, improve service quality, and enhance operating efficiency. Nevertheless, the practices of NWW will become normal as people get used to them (Bondarouk & de Leede, 2016).

Nevertheless, new technology and the needs of the labor market always demand new forms of work (Bondarouk & de Leede, 2016). So, remarkably, NWW is a flexible form of Human Resource Management (HRM) practice to enhance organizational agility in a highly unpredictable and complex environment. NWW is about 'How', 'When', and 'Where' the employees can manage their work even in a devastating situation.

Workforce Agility and Psychological Empowerment

Workforce agility is not viewed as an agile personality, temperament, or trait but as an observable agile performance or behavior in the workplace (Sherehiy & Karwowski, 2014). Workforce agility is derived from agile manufacturing as the prominent factor rather than technology (Alavi et al., 2014; Menon & Suresh, 2020; Sherehiy et al., 2007). Agile manufacturing is the capacity to survive and thrive in an aggressive environment of continuous and unpredictable change by behaving quickly and electively to changing markets, driven by customer-designed products and services (Gunasekaran, 1999). Further, Sherehiy et al. (2007) posit that although computer integration can provide important competitive advantages, manufacturing flexibility still depends much more on people since human operates the technology. The dimensions of workforce agility are grouped into three: proactivity, adaptivity, and resilience (Sherehiy & Karwowski, 2014). Proactive behavior enables employees to address unanticipated issues, respond to changes or dynamic environments, and effectively solve problems (Qin & Nembhard, 2015). Proactive could bring employees to adaptive behavior (Griffin & Hesketh, 2003). Adaptive behavior pertains to the capacity of people can work in dynamic environments through regular learning, performing multiple roles, and participating within different teams (Qin & Nembhard, 2015). By adapting to significant challenges, organizations survive in their resilience state to ensure organization's sustainability (Leask & Ruggunan, 2021). Kipper et al. (2021) considered adaptability an essential soft skill for working in an innovative environment. Additionally, having a resilient workforce is vital to enhancing organizational competitiveness in this firm market competition (Cooke et al., 2019).

Adaptive performance, as one of the workforce agility dimensions, is positively affected by empowerment practices (Charbonnier-Voirin & el Akremi, 2011). It represents the motivational factors of an intrinsic task and demonstrates cognitive orientations about their job role (Spreitzer, 1995). During the pandemic of COVID-19, a study researched the effect of working from home, which increased intrinsic motivation (Parilla et al., 2022). Muduli (2017) found that psychological empowerment can support or contort agile attitudes and behavior. J. H. Coun et al. (2021) found that psychological empowerment fully mediates NWW practices and a proactivity environment. Psychological empowerment is an individual's experience of intrinsic motivation based on cognition about them their work role (Muduli, 2017). Spreitzer (1995) postulated that psychological empowerment is represented by meaning, competence, self-determination, and impact, demonstrating cognitive orientation in the workplace. Meaning is defined as the value of work purpose; competence means self-efficacy, self-determination reflects autonomy in the initiation and continuation of work behavior; and impact is the degree to which an individual can influence others in the workplace (Spreitzer, 1995). Employee empowerment could improve cooperative-supported work (Gunasekaran, 1999; Qin & Nembhard, 2015) if there is collaboration in an advanced environment regarding achieving agile nonmanufacturing. Psychological empowerment influences new capabilities, autonomy, emotional intelligence, and employee involvement directly and learning indirectly. Therefore, it becomes one of the enablers of workforce agility (Menon & Suresh, 2020; Qin & Nembhard, 2015).

Social Cognitive Theory

Social cognitive theory (SCT) mentions psychosocial functioning in triadic reciprocal causation (Wood & Bandura, 1989). Figure 1 depicts the relationship between behavior, cognitive and other personal factors, and the external environment, which influences each other bidirectionally (Wood & Bandura, 1989), regarding HRM practitioners and managerial roles who manage the employees. Wood & Bandura (1989) postulated that they do not simply react to decision environments. However, they create decision support systems to selectively process information generated by their dynamic environment. It is included how managers carefully make policies regarding devastating environments like the pandemic of COVID-19 so that the organization becomes resilient. With cognitive factors, organizations find a way to cope with the situation. Eventually, through certain ways of facing such an environment, the practices will create expected behavior that enables the employees to get used to various external disruptions.

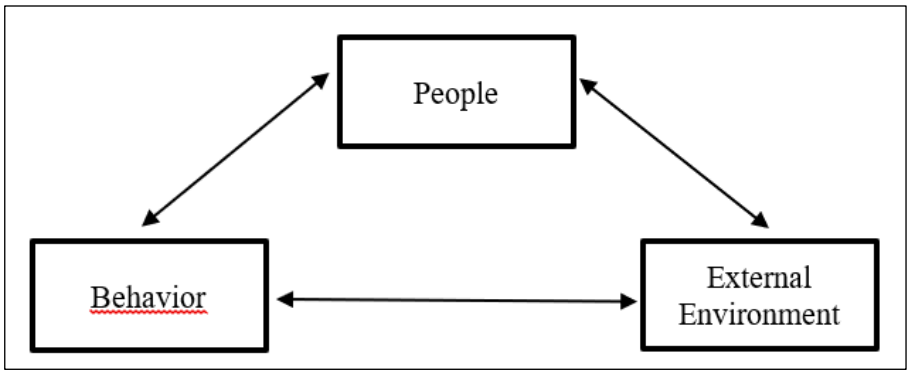

Figure 1. Social Cognitive Theory of Organizational Management (Wood & Bandura, 1989)

RESEARCH METHOD

In order to execute the research objective of finding the relationship between NWW, workforce agility, and psychological empowerment, this conceptual paper is based on literature studies cumulative critical analysis using secondary data from relevant literature. In elaborating on the relationships, this research is open to all pertinent literature as long as the scope is limited to NWW, workforce agility, psychological empowerment, and manufacturing. The conceptual paper that attempts to introduce relationships between constructs should apply any theory that enables the explanation of those relationships (Jaakkola, 2020). Consequently, this study utilizes SCT because it can describe the relevance between the people and behavior regarding the influence of external factors, such as the COVID-19 pandemic effect on employee behavior in the manufacturing sector. The authors use Scopus as the main search database, resulting in more than 70% of the research references. For the period selection, about 50% of the research references are literature from 2020 to 2023 to adjacent the research objectives to the phenomenon of the COVID-19 pandemic. The search for relevant literature is based on the critical evaluations and choices of the authors through a process of determination. Kraus et al. (2022) defined this method as a non-systematic literature review (non-SLR) when the research is conducted without any systematic procedure or protocol. Using non-SLR through a critical review of the literature by deductive reasoning approach, the authors rely on exposure, expertise, and experience to support advanced knowledge (Kraus et al. 2022).

FINDINGS AND DISCUSSION

NWW in The Manufacturing Process

After elaborating on the concept of NWW, the question remains in terms of the manufacturing process: how could manufacturing implement NWW practices while some activities are engaged in the physical workplace? NWW is reflected in different trends in work flexibility and the emergence of new spaces in the physical workplace, such as collaborative spaces or Fab Lab (Mitev et al., 2021). In addition, the fragmentation of work, the multiplication and ramification of work practices, the new form of collaboration, and the increase of production-consumption become the considerations for implementing NWW practices (Mitev et al., 2021). So, NWW could vary in manufacturing because it has a collection of activities (Porter, 1985). In general terms, a manufacturing system is some activity in which raw materials are processed from one form to another, known as a product, gaining a higher or added value (Parnaby, 1979). The collection of activities in resulting the product comprises primary and support activities (Porter, 1985). Primary activities are involved in the physical creation of the product. In contrast, support activities support the primary activities by providing purchased inputs, technology, human resource, and various firm-broad functions (Porter, 1985). If we see from the description by Porter (1985) about primary activities, the concept of flexibility in NWW to manufacturing might be limited because the primary activities should be attached to the process in the firm. However, through the rapid development of ICT, Lee et al. (2022) posit that industrial artificial intelligence (the intelligent system, the digital system, the automation system) could connect humans to machine networks and allow one person to manage a large fleet of machines. Moreover, it could transform physical manufacturing systems into cyber manufacturing systems to improve manufacturing resilience (Lee et al., 2022). So, there is also the possibility for employees who are involved in primary activities to become more flexible in the future with the high-speed development of ICT. Table 2 shows the practices of NWW and the possibility of NWW implementation within primary and support activities in manufacturing.

Compared to traditional manufacturing systems, Information and Communication Technology (ICT) has become an issue that should be addressed in the information-intensive manufacturing environment (Gunasekaran, 1999). Lee et al. (2020) posit that such an environment can deal with modern-day industries' dynamic issues, such as rising costs, performance, and reliability, safe operation, data security concerns, workforce turnover, etc. To deal with these challenges, industries are rapidly shifting from traditional manufacturing systems toward smart manufacturing systems by integrating emerging ICT (Lee et al., 2020). Laubengaier et al. (2022) put forward that industries that pursue smart manufacturing require the introduction of innovation in both technology and organization because they have mutual interaction in sequential and simultaneous ways and complement each other. Innovation in organization for smart manufacturing comprises work to design and people management (Laubengaier et al., 2022), which is essential in managing workplace dynamics. Moreover, the rapid advance of ICT has played a crucial role in workplace dynamics (Aroles et al., 2021; Mitev et al., 2021; Sirait & Murdianingrum, 2021). HRM practices associated with NWW to alter rapid advances in ICT (Gerards et al., 2018). Hence, NWW cannot be separated from the smart manufacturing concept, which describes integrating ICT to adapt to changing conditions. When working with colleagues over the NWW, ICT allows employees to have different options for communicating with colleagues, superiors, and customers (Demerouti et al., 2014), such as teleworking. Teleworking is a practice in which employees perform tasks in different locations than the primary workplace (Hoornweg et al., 2016). Still, the organization needs to consider the optimum practice of teleworking since it can sensitively affect individual performance (Hoornweg et al., 2016). Within the communication between employees, ICT enables them to share their knowledge (J. H. Coun et al., 2021). Regarding access to knowledge via ICT as part of NWW, Sherehiy & Karwowski (2014) suggested that collaborative use

of ICT applications increases employee agility. Besides, Letmathe & Rößler (2022) posit the importance of knowledge transfer through digital work instructions or any portal in manufacturing activities. By experiment, digital work instructions in manufacturing work better than paper-based instructions based on time and the number of defects (Letmathe & Rößler, 2022). The result demonstrates the potential of ICT in implementing NWW to achieve smart manufacturing environments. Another potential of ICT is industrial artificial intelligence. With industrial artificial intelligence, smart manufacturing could make timely decisions with minimal human involvement because industrial artificial intelligence allows self-adjustment, self-optimization, and self-configuration, replacing human roles (Lee et al., 2020). This term of this advanced technology will create a future of work in cyber manufacturing, from people controlling machines to machines as humans at eye level to the fusion of machines and humans or whole processes with intelligence systems (Lee et al., 2020, 2022; North & Kumta, 2018; Pedota & Piscitello, 2022). However, creative activity remains in the realm of humans (North & Kumta, 2018). Creative thinking is out of the individual when it complements ICT (Pedota & Piscitello, 2022).

Further use of ICT could dissemble work design to perform more complex activities, and work is no longer tied to a specific place or time (Aroles et al., 2021; Obermayer et al., 2022; Parilla et al., 2022). Location and time of work become independent by performing work outside the organization's physical environment and at alternate times (Duque et al., 2020). Worktime flexibility method, personnel have greater autonomy in finding out once they work (Demerouti et al., 2014). Flexibility in working hours moves from the traditional regulation of fixed working hours with clear boundaries between work and leisure to more internal and personal regulation of these boundaries (Ganegama, 2019; Mellner et al., 2016). Employees in support manufacturing activities could implement worktime flexibility as they are not engaged with the physical environment. It is hard for primary activities to have autonomy in deciding when they work. Because primary activities in manufacturing have input-output performance characteristics at a specific time and process, humans must adjust their work time with the defined process (Parnaby, 1979). Meanwhile, workplace flexibility offers employees various options for the place of work (Demerouti et al., 2014). The practices of workplace flexibility in NWW are nomadic working, hot-desking, co-working space, virtual working, or mobile working (Aroles et al., 2021). Palvalin et al. (2015) posit for physical and virtual in the NWW environment. Nomadic working, co-working space, and virtual mobile working are included in the virtual environment. While hot desking is involved in the physical environment. With place or time flexibility: employees can be reached easily and quickly, employees can collaborate with co-workers across the world, the availability of factual-time information, faster decision-making, and more flexibility in work schedules (Demerouti et al., 2014). However, if the manufacturing system is not fully cyber state, the concept of the flexible workplace cannot be applied to some activities in the primary part because the employees must have physical contact in creating the products (Porter, 1985). Employees benefit from innovation for cyber manufacturing that pursues ICT implementation in Industry 4.0, given that intelligent machines can perform risky tasks to individual health and well-being (Kipper et al., 2021). In traditional manufacturing, some primary activities involve many employees who carry out the process and interact with the physical environment (Parnaby, 1979). Despite that, the flexibility in terms of NWW could still mediate the setting of the physical environment and raise employee engagement in the workplace (Duque et al., 2020). In this dynamic era, the office in an organization and all the spaces in it should be supportive to employees both to self-concentrate and collaborate (Palvalin et al., 2015), such as hot-desking or collaborative spaces in the office.

Workplace flexibility in time and place practices requires greater autonomous and self-managed working methods (Demerouti et al., 2014; Gerdenitsch, 2017; Mitev et al., 2021; Peters et

al., 2014). Palvalin et al. (2015) posit that when employees have autonomy and can utilize NWW along with organizational habits is called a social workplace in terms of the NWW environment. So, autonomy empowers employees to implement NWW (Palvalin et al., 2015; Peters et al., 2014). J. H. Coun et al. (2021) relate workplace flexibility with professional autonomy, which allows employees to take control over 'how' to perform and do their work. Moreover, professional autonomy involves self-management as a core competence in these dynamic eras (North & Kumta, 2018). Self-management means organizing work, defining, or redefining work objectives, choosing adequate means and methods, and organizing one's competence development and work-life balance (North & Kumta, 2018). Bal & Izak (2021) and Ng et al. (2022) elaborated on work-life balance as a benefit of autonomy over flexibility where employees can manage their work and life balance. Support activities in manufacturing may gain work-life balance through professional autonomy, but it will be a different situation if autonomy is applied to primary activities. By implementing self-management in the employees in primary activities, they develop suggestions for improvement even in the physical environment (North & Kumta, 2018) rather than just the operational physical process. Using the concept of NWW, the employees from the physical workplace can have room to share their knowledge, express their ideas, share problem solutions, concentrate on themselves, and collaborate with others (Duque et al., 2020; North & Kumta, 2018; Palvalin et al., 2015). Because encouragement to the employees by letting them give their idea will create an innovative climate in the workplace (Palvalin et al., 2015).

Table 2. NWW Practices in Manufacturing Sector

Term	Practices	Authors	**Manufacturing Activities** (Porter, 1985)
HOW	**ICT:**		
	Communication tools	Demerouti et al. (2014); Hoornweg et al. (2016)	Primary and Support
	Knowledge transfer	J. H. Coun et al. (2021); Letmathe & Rößler, (2022); Sherehiy & Karwowski, (2014)	Primary and Support
	Industrial artificial intelligence	Lee et al. (2020, 2022)	Primary and Support
	Professional Autonomy	Demerouti et al. (2014); J. H. Coun et al. (2021); Mitev et al. (2021); North & Kumta (2018); Palvalin et al. (2015); Peters et al. (2014)	Primary and Support
WHEN	**Flexible worktime**	Demerouti et al. (2014); Mellner et al. (2016)	Support
WHERE	**Flexible workplace*:**		
	Virtual and nomadic working	Aroles et al. (2021); Mitev et al. (2021); Palvalin et al. (2015)	Primary and Support
	Physical working	Duque et al. (2020); Palvalin et al. (2015)	Primary and support

** For primary activities, after manufacturing successfully transforms into smart manufacturing and minimizes the involvement of humans.*

NWW, Workforce Agility, and Psychological Empowerment: Social Cognitive Perspective

Based on SCT, the pandemic of COVID-19 is defined as an external environment that affects the manufacturing management about how they can get through the complex circumstance. Lee et

al. (2022) categorized four major external disruptions: geopolitical factors, pandemics, climate changes, and other external disturbances. A recent and ongoing major external disruption is the pandemic of COVID-19. The consequences of this pandemic affect the delivery of goods and services and the maintenance of operations in manufacturing business continuity since many countries create border closures and quarantines (Lee et al., 2022; Mancl & Fraser, 2020). So, understanding this phenomenon might provide HRM practitioners with how to build more resilient manufacturing through various disruptions in the future (Ozdemir et al., 2022).

With many government policies that limited face-to-face interaction between people during the pandemic of COVID-19, HRM practitioners in many businesses area, including the manufacturing sector, embrace the way of work that can maintain business continuity and resilience of the organization. The tendency of people when attempting to adapt and develop their competencies regarding such situations is characterized by cognitive and other people factor in SCT. The cognitive determinant is listed by self-beliefs of managerial efficacy, personal goal setting, and quality of analytical thinking (Wood & Bandura, 1989). The manufacturing sector is induced to rethink resilience, robustness, and risk management differently, even though these efforts were on prior agendas before the pandemic (Ozdemir et al., 2022), including the way of work so that employees still operate the manufacturing process. For that reason, the rapid development of ICT seems to become a focal for HRM practitioners and managers in implementing NWW (Aroles et al., 2021; Mitev et al., 2021). Thus, the manufacturing business still operates even though the employee cannot see each other during the pandemic of COVID-19. The implementation of NWW is one of innovative thinking (Laforet & Tann, 2006) so that the organization can manage the people to survive in any devastating environment.

By implementing NWW, there is hope that people can result in agile behavior to become proactive, adaptive, and resilient in response to disruptive changes. In many ways, the pandemic of COVID-19 has accelerated the adoption and deployment of network-based digital collaboration tools and new practices to ensure company and especially people agility (Mancl & Fraser, 2020). Workforce agility is identified as an appropriate course of action in SCT. Because this behavior determines sustainability in different unpredictable impacts and is adaptive to disturbance and disruption (Lee et al., 2022). In addition, (Qin & Nembhard, 2015) put forward that an agile workforce continuously generates several interdependent attributes, such as responsiveness, speed, competence, adaptability, and collaboration; this is useful for organizations facing rapid, almost unpredictable change or sudden external disruptions.

Despite all the factors in triadic reciprocal causation SCT, the interaction of cognitive and motivational processes is crucial. Because it can help us understand how managerial or HRM practitioners approaches creating decisions that must be made in complex and uncertain decision environment (Wood & Bandura, 1989). Moreover, in this uncertain era, managerial and HRM practitioners should direct motivate employees to execute NWW. Therefore, employees can perform NWW to their best and result in optimum agile behavior. Perceived managerial support positively affects individual adaptive performance; it either moderates superior support or directly affects adaptive performance (Charbonnier-Voirin & el Akremi, 2011). For intrinsic motivation, NWW can shape conditions for “active work” and has the potential to reduce exhaustion to stimulate intrinsic motivation because of job autonomy (Peters et al., 2014).

NWW Impact Workforce Agility

Human resources should consider NWW practices in the future. Human resources orientation is about how the future of work will be through NWW. A human resource with a future orientation would strengthen adaptability for the dynamicity of work (Ganegama, 2019). In the

manufacturing context, the NWW practices can make the resilience of manufacturing in any disruptive environment (Cooke et al., 2019). J. H. Coun et al. (2021) found that organizations that have adopted empowering HRM practices: workplace flexibility, professional autonomy, and access to knowledge via ICT stimulate workplace proactivity. Besides, ICT-driven manufacturing put forward the importance of proactivity (Pedota & Piscitello, 2022). Meanwhile, proactivity is an element of workforce agility besides resilience and adaptability (Sherehiy et al., 2007). Sumukadas & Sawhney (2004) posit that power-sharing as a set of higher-order employee involvement is required to attain workforce agility. The term power-sharing is defined as the employee suggesting an improvement, giving and receiving feedback, and self-management (Sumukadas & Sawhney, 2004). Professional autonomy, as part of NWW, has a similar concept to power-sharing, which provides flexibility to the employee. Moreover, employee involvement or the power-sharing techniques had a strong and significant impact on workforce agility (Sherehiy & Karwowski, 2014). Further, cooperation and work teams require new forms of work organization when it comes to employee promotion and development in agile companies (Sherehiy & Karwowski, 2014). A previous study by Gerdenitsch (2017) put forward that flexible workplaces and worktime enables employees to become more adaptive. Menon & Suresh (2022) emphasized that innovative HRM practices and strategies such as NWW can catalyze agility. Thus, based on SCT (Wood & Bandura, 1989), NWW can affect workforce agility, so manufacturing can mitigate disruptive conditions and even become more innovative.

P1: NWW practices through ICT, flexible work time, flexible workplace, and professional autonomy impact workforce agility through proactivity, adaptivity, and resilience.

Psychological Empowerment Mediating Effect

Peters et al. (2014) found that the application of NWW has the potential to stimulate individual intrinsic motivation. The study by J. H. Coun et al. (2021) showed that workplace flexibility, professional autonomy, and access to knowledge via ICT significantly correlate with psychological empowerment. Specifically, Ng et al. (2022) posit that remote work in a suitable environment (part of NWW) enhances employees' motivation in competence (part of psychological empowerment) to complete any job task. Spreitzer (1995) highlighted that empowerment as a set of cognitions shaped by a work environment rather than an enduring personality trait generalizable across situations. Consequently, NWW as HRM flexible practices in the work environment enables shaping individual motivations as psychological empowerment, not vice versa. Further, psychological empowerment has been found to positively affect workforce agility dimensions (Menon & Suresh, 2020; Muduli, 2017; Qin & Nembhard, 2015). Psychological empowerment is an important element that mediates the relationship between organizational practices and workforce agility (Muduli, 2017). Organizational practice in that study means organizational learning and training, employee involvement, teamwork, and information sharing (Muduli, 2017). But in the process of globalization with rapid technological development and precautions against disruptive situations, flexibility, adaptability, and dynamism are becoming core values of new forms of work (Mitev et al., 2021). External and intrinsic motivation is important to individual adaptive behavior (Peters et al., 2014; Wood & Bandura, 1989). Additionally, psychological empowerment strengthens NWW to affect workplace proactivity (J. H. Coun et al., 2021). Whereas Sherehiy et al. (2007) posit that proactivity, adaptivity, and resilience as part of workforce agility. Muduli & Pandya (2018) posit that workforce agility is only possible if employees are intrinsically motivated; thus, psychological empowerment only affects workforce agility and is not reciprocal. Therefore, using psychological empowerment theory which comprises some motivational factors for an

individual to acknowledge intrinsic tasks (Spreitzer, 1995) and supported by the motivational factor of SCT, NWW has an effect on psychological empowerment as it affects workforce agility. In other words, psychological empowerment is mediating the relationship between NWW to workforce agility so that the organization can mitigate many disruptive conditions.

P2: Psychological empowerment through meaning, competence, self-determination, and impact mediates the relevance between NWW and workforce agility.

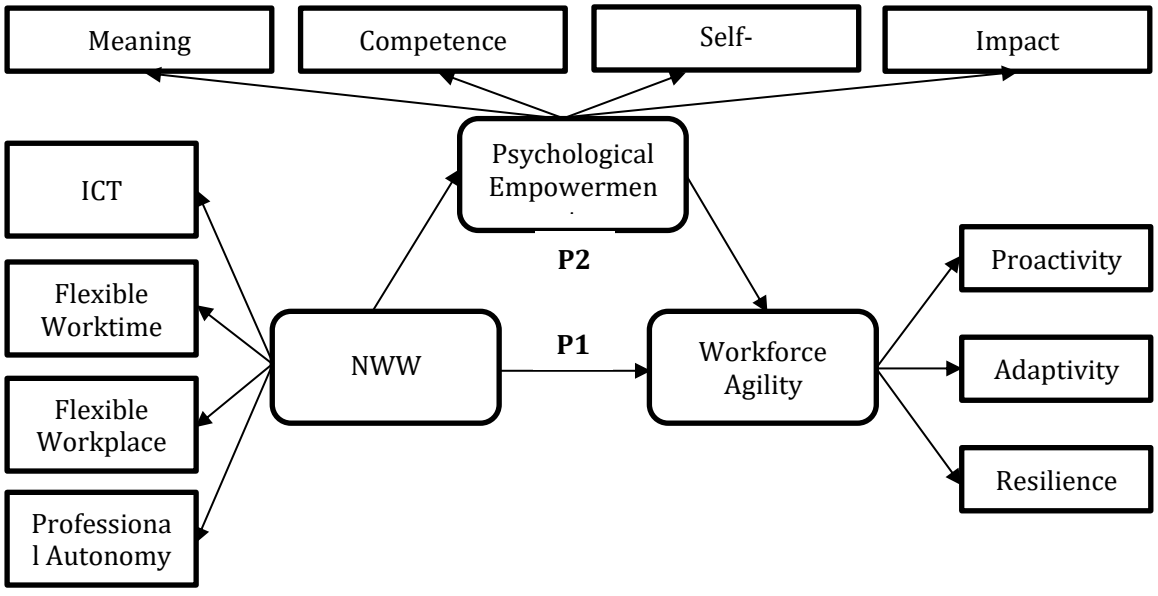

Figure 2. Conceptual Framework

CONCLUSIONS

Based on exploring relevant literature, we conclude with the proposed model and additional research questions pertinent to the study of NWW and workforce agility that NWW impacts workforce agility even in the manufacturing sector. As the prominent sector that provides many products for human needs, manufacturing must consider readiness to provide products in any situation. The first thing to emphasize is NWW in manufacturing. The implementation of its practices could vary depending on the manufacturing activities. The discrepancy in NWW execution between primary and support activities lies in flexible work time because of fixed processes from input to output in manufacturing. We determined that workplace flexibility can be applied even to primary activities. This determination supports the statement from North & Kumta (2018) that the traditional workplace will dissolve. Ganegama (2019) also posits that to navigate the next industrial revolution, regardless of the business sector and industry, they should change their practices holistically. We are coming to the digital age where there are no boundaries in our work environment (North & Kumta, 2018). Lee et al. (2022) introduced a framework for designing resilient manufacturing systems using industrial artificial intelligence, transforming physical manufacturing systems into cyber manufacturing systems. So, it is not impossible to imagine the

future of manufacturing when employees can monitor the process even as primary activities from anywhere, not only in the physical office.

Second, using SCT, we argued that the implementation of NWW positively affects workforce agility. Regardless of the variety of its activities, employees in the manufacturing sector could have agile behavior through proactivity, adaptivity, and resilience to any major turbulent environment by implementing NWW practices. It is not only about a flexible workplace and work time where managers can connect with their employees quickly but also supported by maximum utilization of ICT and autonomy. The usage of IT enables manufacturing to make more efficient processes, for example, digitization of work instructions (Letmathe & Rößler, 2022). At the same time, autonomy allows employees to shorten bureaucracy to make decisions can be made quickly, notably during urge environmental changes. Essentially, NWW activities can elaborate agile workers and emerge more manufacturing innovations. Innovations seem an effective way to mitigate the destructive effect of various changes environment; moreover, innovation in technology and business practice should be implemented in conjunction to yield smart manufacturing success (Laubengaier et al., 2022; Ozdemir et al., 2022). Because smart manufacturing is the central element of Industry 4.0, and it has been described as an integrated, flexible system which able to adapt in actual time to changing environments (Laubengaier et al., 2022). Consequently, manufacturing should consider the importance of implementing NWW nowadays as it is one of the strategies for going after smart manufacturing.

In third place, psychological empowerment mediates the relevance between NWW and workforce agility. The application of NWW practices empowers intrinsic motivation and triggers agile behavior. However, the focus of intrinsic motivational factors is not only on the sustainability of NWW but also on the human itself. The aim of human sustainability is to maintain and improve human capital in society. Human sustainability encompasses the development of skills and human capacity to support the organization's functions and sustainability and to promote communities' and society's well-being (Ganegama, 2019).

From a research perspective, the propositions put forward in this paper provide the importance of manufacturing implementing NWW in their HRM practices in this dynamic era. By implementing such practices in manufacturing primary and support activities, manufacturing could mitigate various devastating situations because it will affect workforce agility in the aspect of adaptive, resilience, and proactive. The elements of workforce agility are prominent in adjusting manufacturing ring conditions to the disastrous event, for example, the pandemic of COVID-19. Moreover, workforce agility is an important element to manufacturing to achieve an agile enterprise. Psychological empowerment also plays an important role in the success of achieving workforce agility through NWW. Motivational factors can improve the effectiveness of NWW practices so that the employees can perform better in their agile behavior.

From a practical perspective, it is unnecessary to implement all the practices in NWW because of the differentiation in the business process. There are some unique competencies for HRM practitioners in implementing NWW, such as organization sensitivity, architectural knowledge, and entrepreneurship innovation (Bondarouk & de Leede, 2016). Hence, managerial and human resources practitioners could maneuver their creativity to create an enjoyable work environment. Notably, in the manufacturing sector, which comprises primary and support activities, NWW should be combined in a certain way to impact the optimum agile behavior of the employees. Such flexible and generative learning in the work environment stimulates each employee's self-motivation. Giving employees the opportunity to set their work and life balance is also beneficial concerning human sustainability in performing to their best ability. However, it is not only about how to implement it. Supportive culture is also essential, thus enabling managerial

to monitor the NWW effectiveness:

1. Give spaces where employees can share their ideas, even for workers in the manufacturing primary activities.
2. Ready to facilitate information, communication, and technology needed to support employees in doing their work.
3. Create an efficient work instructions system by utilizing ICT.
4. Consider "on-time" and "off-time" employees who can work anytime and anywhere regarding human sustainability in work-life balance.
5. Arrange scrum meetings or another similar activity to manage the psychological engagement among members of the team.

LIMITATION & FURTHER RESEARCH

Based on the thinking and arguments underlying the conceptual model presented, this paper outlines propositions through the conceptual model and managerial actions in implementing NWW. Furthermore, NWW can affect workforce agility in manufacturing to major external disruptions. Nevertheless, this research has yet to be done empirically. Moreover, the rapid development of information, communication, and technology has become the critical element that drives the new perception of the way of work and behavior. Hence, indeed "New" in NWW will become "Normal" in some way, but the term "New" will remain. For that reason, more qualitative and quantitative exploration of manufacturing NWW is needed in various forms of the manufacturing sector in various settings and units of analysis. It will help the manufacturing industry create a flexible, collaborative environment and manage business agility to be ready to face future work.

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