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Developing Innovation Ecosystem between Cross-Sector Industry Players through Human Resource Quality Improvement

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Abstract

Research Aims: This study aimed to analyse the effect of workforce agility on innovative behaviour, the effect of digital literacy and psychological conditions on workforce agility, and the role of digital literacy and psychological conditions as moderating variables on the relationship between workforce agility and innovative behaviour.

Design/methodology/approach: The type of data collected was primary data using an online questionnaire. The sampling method was purposive sampling. The collected data were then processed and analysed using SEM-PLS.

Research Findings: The results of this study indicated that workforce agility has a positive effect on innovative behaviour. Digital literacy and psychological conditions also has a positive effect on workforce agility. However, only psychological conditions has a moderating effect on the relationship between workforce agility and innovative behaviour.

Theoretical Contribution/Originality: The results of this study illustrates how workforce agility affects innovative behaviour. The use of digital technology through good digital literacy will further encourage the creation of industrial innovations.

Managerial Implication in the South East Asian context: Organisations should build massive collaboration among various industry players in all sectors by encouraging workforce agility to create industrial innovations.

Research limitation & implications: This study has an uneven number of samples in each industry. Future studies can consider sampling in which each industrial sector can have sufficient sample similarity, so comparisons can be made.

Keywords: Workforce Agility, Digital Literacy, Psychological Conditions, Innovative Behaviour, Industrial Revolution

INTRODUCTION

The fourth industrial revolution (or Industry 4.0) is closely related to the development of massive technology that brings changes to business models in many industries (Sherehiy & Karwowski, 2014; Swafford *et al*., 2006). The emergence of Artificial Intelligent (AI), Big Data Analytics, Cloud, IoT, and Data Science has concerned Industry 4.0 players. Increasingly dynamic consumer preferences and adjusting technological developments require industry players to be more innovative in this era. Innovative behaviour is considered as an important asset that leads to organizational success in a dynamic business environment (Kanter, 1983; West & Farr, 1990 as cited in (Yuan & Woodman, 2010). Innovative behaviour is characterized by the ability to develop, adapt, and implement new ideas, for products, processes, and work methods (Yuan & Woodman, 2010).

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Much of the literature has examined various antecedents of innovative behaviour, including culture and organizational climate (e.g., Scott, & Bruce, 1994), relationships with supervisors (e.g., Janssen & Van Yperen, 2004), job characteristics (e.g., Oldham & Cummings, 2007), social/group context (for example, Munton & West, 1995), and individual differences (e.g., Bunce & West, 1995). The emergence of the concept of workforce agility is also thought to be another important factor that impacts innovative behaviour. This is reinforced by the opinion of Plonka (1997) that innovative behaviour is understood as a positive attitude possessed by an agile workforce (Muduli & Pandya, 2018).

The concept of agility itself becomes very important because it is related to how a person can adapt to uncertain environmental changes (Sherehiy & Karwowski, 2014). This concept refers to a person's ability to react and adapt to changes appropriately and to take benefit from these changes (Cai *et al*., 2018). Therefore, agility is one of the important abilities that must be possessed by someone today (Alavi *et al*., 2014; Breu *et al*., 2002; Cai *et al*., 2018; Sherehiy *et al*., 2007). In the world of work, agility is a factor that also determines the success of an organisation. An agile workforce will influence how organisations adapt to changing dynamic business environments (organisation agility) (Bala *et al*., 2019; Sherehiy & Karwowski, 2014). This has been *stated* consistently by many researchers.

Agile workforces can provide benefits, including improving quality, improving customer service, and accelerating learning (Fink, 2007; Hopp & Oyen, 2004; Sherehiy & Karwowski, 2014). Even so, it turns out that not too many studies have focused on this thing. In addition, various definitions emerge and no agreement regarding definitions is deemed appropriate, including those (e.g., Bala *et al.*, 2019; Muduli, 2017; Qin & Nembhard, 2010) try to re-conceptualize the definition of agility as the ability of the workforce to respond to uncertainty and capture new opportunities, characterized by speed, flexibility, proactive innovation, quality, and profitability.

In addition to workforce agility and innovative behaviour, one of the skills that must be possessed in the current era to survive is digital skills or digital literacy (Indonesia, 2019). Digital literacy not only includes the ability to search for information effectively but also checks and integrates that information for a learning purpose (Bråten *et al*., 2011 as cited in Greene *et al.*, 2014). In addition, psychological factors, in this case, psychological security, are also an important factor to be considered by the organisation to enable each workforce to take risks in the work environment. This is related to how organisations create work environments that can facilitate workforce innovations (Indonesia, 2019).

Deloit and MIT added, there must be changes in three areas in order to be successful in this digital age, namely ways of thinking (cognitive transformation), ways of acting (behavioural transformation), and ways of reacting (emotional transformation) (Indonesia, 2019). The three areas are formulated in the framework of thinking built in this study, namely the relationship between workforce agility, innovative behaviour, psychological conditions, and digital literacy. This formulation serves as an interesting novelty in this study. An agile workforce is a prerequisite for those

who want to survive in today's dynamic environment. Demands to be able to react and adapt through the creation of innovative ideas are the focus of today's industry. This, in fact, also needs to be supported not only through an adequate set of skills but also through organisational support in facilitating psychological security in developing new ideas.

LITERATURE REVIEW

Workforce Agility

Agility is not a new concept in many previous studies (Bala *et al.*, 2019). However, an accurate definition can be said to have not been fully developed, given the various definitions used by researchers (Muduli & Pandya, 2018). However, the importance of the concept of agility for workers in this increasingly dynamic era has led some researchers to try to re-conceptualize it by providing two keywords as an important element in understanding the concept of agility (Alavi *et al*., 2014; Cai *et al.*, 2018; Muduli & Pandya, 2018). These keywords are (1) responding to changes in the right way and time; (2) taking advantage of changes as an opportunity to take advantage. It can be concluded that workforce agility is the ability to respond and adapt to changes quickly and appropriately, learn from them, and take advantage of opportunities from these conditions.

A highly agile workforce has a strong commitment to continuing to learn and explore (Cai *et al.*, 2018; Plonka, 1997;). Being used to changes, new ideas, new technologies, and other forms of changes makes it easier for these workers to adapt. This strengthens the understanding related to three dimensions in the concept of workforce agility, namely proactivity, adaptability, and resilience (Sherehiy, 2008 as cited in Cai *et al.*, 2018; Patil & Suresh, 2019).

First, proactivity is defined as an individual initiative to carry out an activity that can have a positive impact or result on the environment. Among those included in the proactive category is the ability to anticipate problems and find solutions to existing problems. Second, adaptability is defined as the ability to adapt behaviour to new conditions or environments. Among those included in the adaptive category are good interpersonal skills for those with different backgrounds, willingness to learn many new things, the ability to carry out multiple roles or easy transition from one role to another, and the ability to multitask in multi teams. Third, resilience is the ability to work well even under pressure, control, and overcome ambiguity, and easily rise from failure. Individuals with high resilience have a good ability to cope with stress and a high tolerance for uncertainty (Patil & Suresh, 2019).

The concept of agility is related to how the workforce responds and adapts to not only technological changes but also changes in work requirements, working conditions, and work processes (Sherehiy & Karwowski, 2014), which can occur due to massive changes in the industry. An agile workforce can find and use resources related to their work, including IT resources and non-IT resources, to solve existing tasks or problems quickly and precisely (Bala *et al.*, 2019). Therefore, agility is

positioned not as a stable characteristic, but as a temporary state or behaviour that depends on the situation (Bala *et al.*, 2019).

Digital Literacy

In the current era of Industry 4.0, all information and knowledge can be easily accessed (de Fátima Goulão & Fombona, 2012), so digital literacy can be said to be a key competency in this era (Zhang & Zhu, 2016). Digital literacy is defined as the awareness, attitude, and ability of individuals to use digital tools and facilities to identify, access, manage, integrate, evaluate and synthesize digital sources, communicate with others, and build new knowledge (Martin, 2006 as cited in Prior *et al.*, 2016).

Zhang & Zhu (2016) revealed that there are four dimensions in digital literacy, namely technical skills, critical understanding, creation and communication, and citizenship participation. The technical skill dimension is related to the ability to use digital media and technology. Technical skills are considered a prerequisite for the other three dimensions. The critical understanding dimension is related to the use of a critical approach to analyse and assess the quality and accuracy of content in digital media (Koltay, 2011; Zhang & Zhu, 2016). The creation and communication dimension is related to the ability to produce writing using digital media, as well as the ability to interact with others through digital media (Buckingham, 2007; Zhang & Zhu, 2016). The citizenship participation dimension is related to the ability to participate socially and access various opinions in digital media responsibly (Park & Park, 2012; Zhang & Zhu, 2016).

Psychological Condition

The psychological condition referred to in this study is a psychological experience felt by individuals in the context of work. Psychological conditions are described through interactions between individuals and the environment in which they work (Cai *et al.*, 2018). Hackman & Oldham's (1980) as cited in Kahn (1990) state that a person's psychological condition can affect his/her work motivation. Psychological conditions, in this case, consist of three conditions that together can shape how individuals carry out their roles or tasks in the workplace, namely psychological meaningfulness, psychological safety, and psychological availability (Kahn, 1990).

Psychological meaningfulness is defined as an individual's perception of how important and meaningful the work is. Individuals who feel that the work is important and meaningful will provide more involvement in their work (Cai *et al.*, 2018; Kahn, 1990; Li & Tan, 2012). Psychological safety is defined as a feeling to be able to work without fear of things that are detrimental and have a negative impact on self-image, status, or future careers (Cai *et al.*, 2018; Kahn, 1990). Individuals who feel safe are more likely to deal with worries or stress at work so they will be more open and able to express themselves (Zhang *et al*., 2010 as cited in Cai *et al.*, 2018). Psychological availability is defined as an individual's perception of the availability of resources at work, be it physical, emotional, or intellectual resources (Cai *et al.*, 2018). Individuals with psychological availability will be more

prepared and more confident in completing their work (Danner-Vlaardingerbroek *et al*., 2013 as cited in Cai *et al*., 2018).

If organisations want to retain their best workforce, the psychological condition of their workforce needs serious attention (Indonesia, 2019). Especially in the current dynamic work environment, threats to the physical and mental health of workers can arise if they are unsafe psychologically (Indonesia, 2019). Organisational attention to the psychological condition of their workforce is a form of organisational support in creating experiences to develop in the workplace (Riaz *et al.*, 2018), such as producing innovative behaviour.

Innovative Behaviour

Innovative behaviour is considered as the basis of an organisation's success (Hülsheger *et al*., 2009; Korzilius *et al*., 2017; Oldham & Cummings, 2007; Riaz *et al*., 2018). As an intangible asset, innovative behaviour can increase the competitiveness of an organisation, especially in the era of Industry revolution 4.0 which is closely related to technology. For example, innovative behaviour can be realized through the concept of "doing more with less", namely the use of new technology that allows businesses or work processes to be more effective, efficient, and productive (Carmeli, 2005; Crossan & Apaydin, 2010; Riaz *et al., 2018*).

Innovative behaviour can be interpreted as the ability of individuals to generate and implement new ideas, new processes, and new procedures in their work (Bala *et al*., 2019). New things do not always have to come from ourselves, but they can also be adopted or developed from others (Yuan & Woodman, 2010 as cited in Soetantyo & Ardiyanti, 2018). In simple terms, innovative behaviour consists of three activities, namely generating, introducing, and realizing these new ideas (Yuan & Woodman, 2010).

First, generating new ideas is understood as an activity to generate new ideas or modify previous ideas. Generating new ideas can be driven by several things, including problems in the workplace, inconsistencies, emerging trends, and mismatches between expectations and reality. Second, promoting ideas is understood as an activity to introduce new ideas that have been found to get support, be it the provision of resources to the required authority. Third, realizing an idea is understood as making a prototype or realizing an idea that has been found so it can be used or felt by other parties.

Several previous studies have focused on the importance of innovative behaviour in the workplace (Riaz *et al., 2018*). For example, by examining the determinants of innovative behaviour in the workplace, including leadership, organisational climate *(*Podsakoff *et al*., 2003; Scott & Bruce, 1994 in Soetantyo & Ardiyanti, 2018), LMX and work engagement (Agarwal *et al*, 2012 in Soetantyo & Ardiyanti, 2018). Even so, there are not many studies that focus on processes that lead to innovative behaviour (Riaz *et al., 2018*). Therefore, this research will also fill that gap.

Hypothesis Development

Agile workforces can overcome uncertainty in the work environment by using relevant resources (Bala *et al*., 2019). This ability leads them to innovative behaviour that makes it easy to produce appropriate solutions to existing problems (Bala *et al*., 2019; Muduli & Pandya, 2018). Employees with high work agility are likely to generate more ideas because they possess a better ability to gather relevant resources to which they can refer. They are also likely to find an appropriate solution since they have access to more information and are better at ruling out inadequate options.

H1: Workforce agility has a positive effect on innovative behaviour.

The widespread use of technology media in various activities in this era can further encourage the exchange of information and collaboration between parties (Bala *et al*., 2019). This can strengthen the ability of workers in various industries to create new things to meet the existing challenges of work. Thus, it is true that good digital literacy is needed in this era to support it all.

H2: Digital literacy has a positive effect on workforce agility.

Organisational support is an important factor in ensuring the development of a good psychological condition of the workforce (Indonesia, 2019). This is because the psychological condition of the workforce has a significant role in the work process (Cai *et al*., 2018). Sherehiy and Karwowski (2014) discussed autonomy and collaboration as strategies that encourage employees to be agile. Psychology is an important role in improving performance, such as self-awareness, self-control, and self-motivation. The agile performance of employees who are psychologically motivated has been proved to be enhanced, thus, investigating the role of employees' psychological conditions is significant in this stream of research.

H3: Psychological conditions have a positive effect on workforce agility.

As some previous studies have implied, the use of technology can promote employee agility by fostering knowledge exchange and collaboration. With superior features over the existing collaboration tools, technology use will encourage employee agility, thus leading to better performance and contributing to organisational agility ultimately (Bala *et al*., 2019).

H4: Digital literacy has a moderating effect on the relationship between workforce agility and innovative behaviour.

To be able to respond to the uncertainty of the business environment, agile workforces must be able to produce innovative behaviour without fear of risks that could occur. Therefore, the organisation also needs to create a work environment that facilitates the emergence of innovative behaviour through its attention to the psychological condition of its workforce. Organisational support may be an important factor that explains how a thriving workforce can be more encouraged to exhibit innovative behaviour (Riaz *et al., 2018*). Organisational support for innovation would play a critical role between employees' experience of thriving at work and the display of innovative behaviour (Riaz *et al., 2018*).

H5: Psychological conditions have a moderating effect on the relationship between workforce agility and innovative behaviour.

RESEARCH METHOD

Sample

Population is the number of elements expected to make conclusions (Cooper & Schindler, 2011). The population in this study was the workforce in various cross-sector industries in Indonesia. This study used purposive sampling techniques, where the sample selection was based on certain criteria required (Cooper & Schindler, 2011). The criteria used in this study were employees who had worked for at least two years. According to Robinson *et al*. (1994), employees' perceptions of their obligations to the organisation change within two years.

Data Collection and Measurement

In this study, the primary data was collected using an online questionnaire. The questionnaire material contained statements regarding 12 items for workforce agility (Alavi & Wahab, 2013), four items for innovative behaviour (Scott & Bruce, 1994), seven items for digital literacy (Ng, 2012), and 11 items for psychological conditions (May *et al*., 2004) (see table 1). The score of each questionnaire item was determined using a Likert scale from 1 to 5, where the scale of 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Then, the data collected were analysed using SEM-PLS.

RESULTS AND DISCUSSIONS

Descriptive Statistics

Overall, there were a total of 255 questionnaires data obtained. However, only 253 data could be processed because two data were considered not to meet the required criteria. The respondents were dominated by female respondents (60.8%), while the male respondents were only around 39.13%. Most of the respondents were millennials or those aged between 25-38 years (77.47%). Today, millennials have begun to enliven the world of work. In line with that, their work experience was still relatively new, ranging from 2-5 years (45.85%). In addition, to meet the focus of

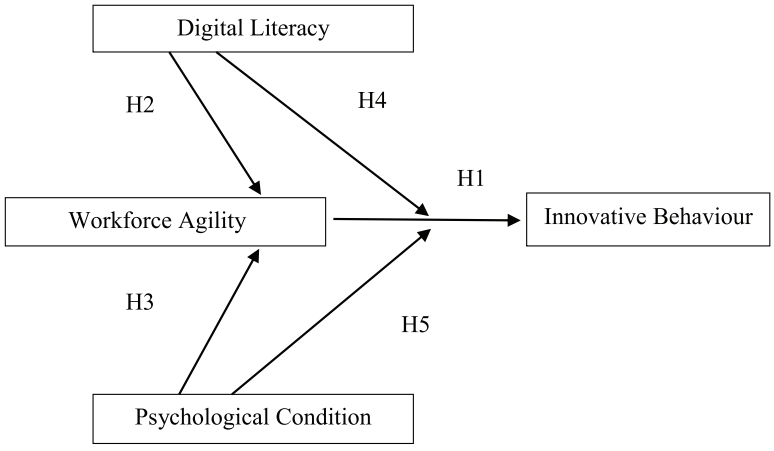

Figure 1
Research Framework

the research on innovation across sectors, the company sector used varied. Among them were the education sector (32.81%), banking/financial institutions (15.02%), creative economy (9.88%), and other sectors. The details can be seen in Table 2 in the following.

Measurement Model

In this study, there were two stages carried out in the PLS analysis, namely the evaluation of measurement models (external models) and evaluation of structural models (inner models) which were then used for hypothesis testing. The evaluation results of the measurement model can be seen in Table 3, where all the question items for all the variables were declared valid and reliable because they fulfilled the criteria for the validity test, namely the AVE value > 0.5, and the reliability test,

Table 1
The Measurement

Instruments	Constructs
	Agility Workforce
AW1	I look for the opportunities to make improvements at work.
AW2	I am trying to find more effective ways to perform my job.
AW3	At work, I stick to what I am told or required to do.
AW4	I find new ways to obtain or utilize resources when resources are insufficient to do my job.
AW5	In my work, I can change my behaviour to work more effectively with other people.
AW6	In my work, I can accept critical feedback.
AW7	In my work, I can adjust to new work procedures.
AW8	I can quickly adapt to switch from one project to another.
AW9	I am able to perform my job efficiently in difficult or stressful situations.
AW10	I am able to work well when faced with a demanding workload or schedule.
AW11	When a different situation occurs, I react by trying to manage the problem.
AW12	I drop everything and take an alternate course of action to deal with an urgent problem.
	Digital Literacy
DL1	I can learn new technologies easily.
DL2	I keep up with important new technologies.
DL3	I know about a lot of different technologies.
DL4	I have good ICT skills.
DL5	I am familiar with issues related to web-based activities e.g. cyber safety, search issues, plagiarism.
DL6	I frequently obtain help with my university work from my friends over the Internet e.g. through Skype, Facebook, Blogs.
DL7	ICT enables me to collaborate better with my peers on project work and other learning activities.
	Psychological Condition
PC1	My job activities are personally meaningful to me.
PC2	The work I do is very important to me.
PC3	I feel that the work I do on the job is valuable.
PC4	I am confident in my ability to deal with problems that come up at work.
PC5	I am confident in my ability to think clearly at work.
PC6	I am confident in my ability to display the appropriate emotions at work.
PC7	I am confident that I can handle the physical demands at work.
PC8	I' am not afraid to express my opinions at work.
PC9	I am not afraid to be myself at work.
PC10	I accept each other's differences.
PC11	Working in this team, my unique skills and talents are valued and utilized.
	Innovative Behaviour
IB1	Generates creative ideas.
IB2	Investigates and secures funds needed to implement new ideas.
IB3	Develops adequate plans and schedules for the implementation of new ideas.
IB4	Is innovative.

namely the composite reliability value > 0.7 and Cronbach's alpha > 0.6 (Hair *et al*., 2011).

Furthermore, an evaluation of the structural model can be carried out with a number of model fit indicators, including the coefficient of determination (R^2) and Godness of Fit (GoF). In this study, the value of R^2 was 0.564 (moderate), which means that the innovative behaviour variable in the structural model can be explained moderately by the workforce agility variable. While the value of GoF was 0.634 (large), it means that the model can be said to have a good ability to explain empirical data.

Hypothesis Testing

Table 4 presents the results of the hypothesis testing conducted on five hypotheses. Based on the results of the data processing, all the hypotheses were supported (H1, H2, H3, H5; p-value <0.05), except for H4. The hypothesis built on H4 stated that the digital literacy variable has a positive moderating effect on the relationship between workforce agility and innovative behaviour. However, the value of the path coefficient of digital literacy was negative (-0.31), it means that the digital literacy variable weakened (negatively moderated) the effect of workforce agility on innovative behaviour, so H4 was rejected.

	N	(%)
Gender		
Male	99	39.13
Female	154	60.87
Age		
≤ 24 years old	15	5.93
25 - 38 years old	196	77.47
39 - 54 years old	26	10.28
≥ 55 years old	16	6.32
Work Experience		
< 2 years	51	20.16
2 - 5 years	116	45.85
6 - 10 years	39	15.42
> 10 years	47	18.58
Company Sector		
Creative Economy	25	9.88
Agriculture	1	0.40
Mining	7	2.77
Manufactur	14	5.53
Chemistry/Pharmacy	5	1.98
Food and Beverage	18	7.11
Properties/Construction	6	2.37
IT	9	3.56
Insurance Services	3	1.19
Health Services	5	1.98
Consulting Services	2	0.79
Transportation Services	13	5.14
Banking/Financial Institutions	38	15.02
Hospitality	2	0.79
Tourism	2	0.79
Education	83	32.81
Government Institution	20	7.91

Source: Primary Data (2020)

Table 2
Demographic Data of Respondents

Discussion

Based on the results of the data processing, workforce agility was proven to have a positive effect on innovative behaviour, so H1 was supported. This is in line with research by Bala *et al.* (2019). Workforce agility is reflected in two constructs, namely agile in work (work agility) and agile in communication (communication agility) (Bala *et al.*, 2019).

In other words, agile workers are those who are agile in working as well as in communicating with others. People who are agile at work can obtain the resources needed to work quickly and precisely, for example, resources in the form of information from the media or opinions from co-workers. Meanwhile, people who are agile in communicating can communicate effectively with others. It means they not only can convey messages/information to others but also can understand what is conveyed by others.

Besides, H1, H2 and H3 were also proven. Digital literacy and psychological conditions have been proven to have a positive effect on workforce agility. A person's

Table 3
The Result of Validity and Reliability Testing

Variable	Loadings	AVE	Composite Reliability	Cronbach's Alpha
Agility Workforce (AW)		0.513	0.920	0.904
AW1	0.746			
AW2	0.662			
AW3	0.604			
AW4	0.764			
AW5	0.707			
AW6	0.751			
AW7	0.607			
AW8	0.721			
AW9	0.771			
AW10	0.778			
AW11	0.744			
Digital Literacy (DL)		0.640	0.914	0.887
DL1	0.831			
DL2	0.829			
DL3	0.856			
DL4	0.806			
DL5	0.773			
DL6	0.697			
Psychological Condition (PC)		0.523	0.923	0.907
PC1	0.763			
PC2	0.750			
PC3	0.790			
PC4	0.813			
PC5	0.760			
PC6	0.612			
PC7	0.802			
PC8	0.605			
PC9	0.745			
PC10	0.613			
PC11	0.656			
Innovative Behaviour (IB)		0.786	0.936	0.909
IB1	0.895			
IB2	0.898			
IB3	0.901			
IB4	0.851			

Source: Primary Data (2020)

behaviour is highly dependent on several factors, including his/her ability and environment (Mete *et al*., 2016 as cited in Santoso *et al*., 2019). In this study digital literacy was considered as an ability factor, whereas psychological conditions as an environmental factor.

Digital literacy not only emphasizes the skills of using digital tools, more than that, but it also emphasises how a person can evaluate all information obtained through digital media (Zhang & Zhu, 2016). People with high digital literacy can be said to be cognitively high and have good problem-solving abilities (Zhang & Zhu, 2016). This encourages them to be more initiative in finding solutions, proactive and adaptive to existing problems, and highly resilient. Psychological conditions at work also influence how a person deals with workplace problems. People with good psychological conditions can minimize stresses at work (Cai *et al*., 2018), thus making them more prepared and more confident in work or in facing the possibilities that could have occurred in the workplace (Cai *et al*., 2018).

There were two moderating variables in this study, namely digital literacy (on H4) and psychological conditions (on H5). Psychological conditions were proven to positively moderate the effect of workforce agility on innovative behaviour. It means that an agile workforce will be more innovative if the work environment provides a sense of security, both physically and psychologically. In the theory of organisational innovation, it is stated that a person's innovative behaviour is the result of an interaction between an individual and the situation at hand (Chang *et al*., 2013; Rogers, 1954). It reinforces the importance of one's psychological condition at work because a person's psychological condition is a psychological experience that is felt in the workplace and the results from how a person responds to his work

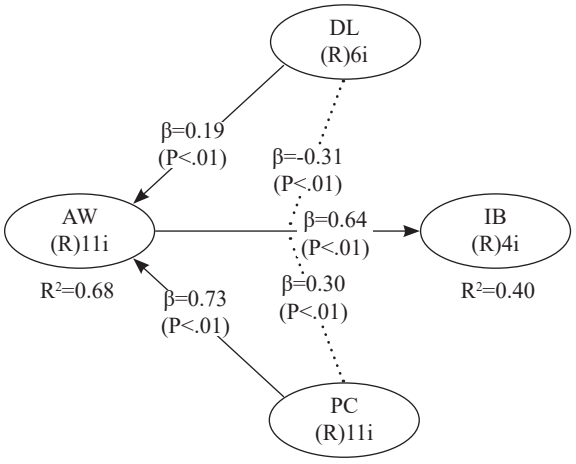

Figure 2
The Result of Hypothesis Testing

Hypothesis	Path Coefficient	Conclusion
H1 (AW→IB)	0.64**	Supported
H2 (DL→AW)	0.19**	Supported
H3 (PC→AW)	0.73**	Supported
H4 (DL*AW→IB)	-0.31**	Rejected
H5 (PC*AW→IB)	0.30**	Supported

**p-value < 0,05
Source: Primary Data (2020)

Table 4
The Result of Hypothesis Testing

environment (Cai *et al*., 2018). The better the psychological condition of a person at work, the more possible the person to be more innovative (e.g., Chang *et al*., 2013; Martín, Salanova, & Peiró, 2007; Rogers, 1954; Scott & Bruce, 1994).

In contrast, how the psychological condition variable moderated the effect of workforce agility on innovative behaviour, apparently did not apply to the digital literacy variable. Based on the results of the data processing, digital literacy had a negative path coefficient (-0.31). It means that digital literacy weakened the effect of workforce agility on innovative behaviour. The availability of sufficient information and ease of access through digital media do not necessarily guarantee or make it easier for a person to get what he needs at work (Bala *et al.*, 2019). Regarding the fact that not all available information is accurate, the ability to criticize and sort out information becomes very important (Mohammadyari & Singh, 2015; Santoso *et al*., 2019). In other words, being able to get information but not being able to analyse and evaluate the information will make it more difficult for someone to innovate.

According to Martin (2006) in Knutsson *et al*. (2012), digital literacy has three stages. The first stage is the use of digital tools to complete tasks; the second stage is the use of digital tools to become more expert in a field, and the third stage is the use of digital tools to be creative and innovative (digital transformation). Low digital literacy shows that someone has not reached the highest stage of digital literacy, namely digital transformation. In addition, now most people only use digital tools to get the job done, instead of using existing information to be more innovative at work. It can be seen from the average score of the question items on the cognitive and social-emotional dimensions in the digital literacy variable which was quite low (mean = 3.7) compared to the score of the question items on the technical dimension (skills using digital tools).

MANAGERIAL IMPLICATIONS IN THE SOUTH EAST ASIAN CONTEXT

Organisations should understand the importance of horizontal and massive collaboration from various groups, including collaboration between industry players in all sectors. To encourage workforces to be able to create innovations, agility is needed to develop many things through the use of increasingly massive technology. Because the use of digital technology can sustain innovation to increase efficiency and productivity, and be able to manage production scalability to achieve operational agility. In addition, managers need to pay attention to the psychological condition of employees which can encourage better and more innovative work experiences. This regards the fact that adequate facilities and technology will be maximized in producing good performance if employees feel good and safe psychologically. For example, managers give autonomy to employees to complete work in their own way, reduce excessive workload so as not to give excessive stress, appreciate employee performance to increase job satisfaction, and provide career path opportunities to increase motivation.

THEORETICAL IMPLICATIONS

This study reinforces the importance of having an agile workforce in the current

era. This study adds to the evidence that workforce agility can produce innovative behaviour as one of the key competencies to increase the competitiveness of industry players, especially in Industry 4.0. This study also explains the factors that can affect workforce agility, including having good digital literacy, having access to use resources, and feeling psychologically secure to further support encouraging innovation.

This study has an uneven number of samples in each industry. Future studies can consider sampling where each industrial sector can have sufficient sample similarity so comparisons can be made. This can help find out which industry sector is ready and not ready to face Industry 4.0 through indicators of labour agility, the level of digital literacy, even the level of innovative behaviour of its workforce. In addition, there is a significant gap in the number of female and male respondents and the millennial age range is also quite dominant compared to other age ranges, making the comparison less comprehensive. This was, however, beyond the control of the researcher, but these still become other limitations in this study. In addition, further research can also be done at the organisational level to determine overall organisational agility.

CONCLUSION

The results of this study illustrate how workforce agility affects innovative behaviour. The use of digital technology through good digital literacy will further encourage the creation of industrial innovations. The government has also focused on strengthening industrial human resources and establishing the Digital Capability Center (center of innovation and industrial development 4.0) as a strategic step. The support of the government must be understood by industry players, so it is hoped that massive collaboration will occur to better prepare Indonesia to face industrial revolution 4.0.

REFERENCES

Alavi, S., & Wahab, D. A. (2013). A review on workforce agility. *Research Journal of Applied Sciences, Engineering and Technology*, *5*(16), 4195-4199.

Alavi, S., Wahab, D.A, Muhamad, N., & Shirani, B.A. (2014). Organic structure and organisational learning as the main antecedents of workforce agility. *International Journal of Production Research*, *52*(21), 6273-6295.

Bala, H., Massey, A., & Seol, S. (2019, January). Social media in the workplace: Influence on employee agility and innovative behavior. In *Proceedings of the 52nd Hawaii International Conference on System Sciences*.

Breu, K., Hemingway, C. J., Strathern, M., & Bridger, D. (2002). Workforce agility: The new employee strategy for the knowledge economy. *Journal of Information Technology*, *17*(1), 21-31.

Buckingham, D. (2007). Digital media literacies: Rethinking media education in the age of the Internet. *Research in Comparative and International Education*, *2*(1), 43-55.

Bunce, D., & West, M. A. (1995). Self perceptions and perceptions of group climate as predictors of individual innovation at work. *Applied Psychology*, *44*(3), 199-

215.

Cai, Z., Huang, Q., Liu, H., & Wang, X. (2018). Improving the agility of employees through enterprise social media: The mediating role of psychological conditions. *International Journal of Information Management*, *38*(1), 52-63.

Carmeli, A. (2005). Organization perceived external prestige, affective commitment, and citizenship behaviors studies. *Organization Studies*, *26*(3), 443–464.

Chang, H. T., Hsu, H. M., Liou, J. W., & Tsai, C. T. (2013). Psychological contracts and innovative behavior: A moderated path analysis of work engagement and job resources. *Journal of Applied Social Psychology*, *43*(10), 2120–2135.

Cooper, D., & Schindler, P. (2011). *Business Research Methods* (11th ed.). Boston: McGraw Hill.

Crossan, M. M., & Apaydin, M. (2010). A Multi-dimensional framework of organizational innovation : A Systematic review of the literature. *Journal of Management Studies*, *47*(6), 1154–1191.

de Fátima Goulão, M., & Fombona, J. (2012). Digital literacy and adults learners' perception: The case of a second chance to university. *Procedia-Social and Behavioral Sciences*, *46*, 350-355.

Fink, L. (2007). Gaining agility through IT personnel capabilities : The mediating role of IT infrastructure capabilities. *Journal of The Association for Information Systems*, *8*(8), 440–462.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *The Journal of Marketing Theory and Practice*, *19*(2), 139–152.

Hopp, W. J., & Oyen, M. P. Van. (2004). Agile workforce evaluation : A framework for cross-training and coordination. *IIE Transactions*, *36*, 1–32.

Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: a comprehensive meta-analysis spanning three decades of research. *Journal of Applied psychology*, *94*(5), 1128.

Indonesia, S. (2019). *Human capital 4.0*. Jakarta: PT. SSCX International.

Janssen, O., & Van Yperen, N. W. (2004). Employees' goal orientations, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction. *Academy of Management Journal*, *47*(3), 368-384.

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, *33*(4), 692-724.

Knutsson, O., Blåsjö, M., Hållsten, S., & Karlström, P. (2012). Identifying different registers of digital literacy in virtual learning environments. *Internet and Higher Education*, *15*(4), 237–246.

Koltay, T. (2011). The media and the literacies: Media literacy, information literacy, digital literacy. *Media, Culture and Society*, *33*(2), 211–221.

Korzilius, H., Bücker, J. J., & Beerlage, S. (2017). Multiculturalism and innovative work behavior: The mediating role of cultural intelligence. *International Journal of Intercultural Relations*, *56*, 13-24.

Li, A. N., & Tan, H. H. (2012). What happens when you trust your supervisor ? Mediators of individual performance in trust relationships. *Journal of Organizational Behavior*, *34*(3), 407–425.

Martín, P., Salanova, M., & Peiró, J. M. (2007). Job demands, job resources and individual innovation at work: Going beyond Karasek's model? *Psicothema*, *19*(4), 621–626.

May, D. R., Gilson, R. L., & Harter, L. M. (2004). The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *Journal of Occupational and Organizational Psychology*, *77*(1), 11-37.

Mohammadyari, S., & Singh, H. (2015). Understanding the effect of e-learning on individual performance: The role of digital literacy. *Computers and Education*, *82*, 11–25.

Muduli, A. (2017). Workforce agility: Examining the role of organizational practices and psychological empowerment. *Global Business and Organizational Excellence*, *36*(5), 46-56.

Muduli, A., & Pandya, G. M. (2018). Psychological Empowerment and Workforce Agility. *Psychological Studies*, *63*(21), 1–10.

Munton, A. G., & West, M. A. (1995). Innovations and personal change: Patterns of adjustment to relocation. *Journal of Organizational Behavior*, *16*(4), 363-375.

Ng, W. (2012). Can we teach digital natives digital literacy?. *Computers and Education*, *59*(3), 1065–1078.

Oldham, G. R., & Cummings, A. (2007). Employee creativity : Personal and contextual factors at work. *The Academy of Management Journal*, *39*(3), 607–634.

Park, S., & Park, S. (2019). Employee adaptive performance and its antecedents: Review and synthesis. *Human Resource Development Review*, *18*(3), 294-324.

Patil, M., & Suresh, M. (2019). Modelling the enablers of workforce agility in IoT projects: a TISM approach. *Global Journal of Flexible Systems Management*, *20*(2), 157-175.

Plonka, F. E. (1997). Developing a lean and agile work force. *Human Factors and Ergonomics in Manufacturing*, *7*(1), 11–20.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879-903.

Prior, D. D., Mazanov, J., Meacheam, D., Heaslip, G., & Hanson, J. (2016). Attitude, digital literacy and self efficacy: Flow-on effects for online learning behavior. *Internet and Higher Education*, *29*, 91–97.

Qin, R., & Nembhard, D. A. (2010). Workforce agility for stochastically diffused conditions—A real options perspective. *International Journal of Production Economics*, *125*(2), 324-334.

Riaz, S., Xu, Y., & Hussain, S. (2018). Understanding employee innovative behavior and thriving at work: A Chinese perspective. *Administrative Sciences*, *8*(3), 46.

Robinson, S. L., Kraatz, M. S., & Rousseau, D. M. (1994). Changing obligations and the psychological contract: A longitudinal study. *Academy of Management Journal*, *37*(1), 137–152.

Rogers, C. R. (1954). Toward a theory of creativity. *ETC: A Review of General Semantics*, *11*(2), 249–260.

Santoso, H., Abdinagoro, S. B., & Arief, M. (2019). The role of digital literacy in supporting performance through innovative work behavior: The case of Indonesia's telecommunications industry. *International Journal of Technology*, *10*(8), 1558-1566.

Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management*

Journal, *37*(3), 580-607.
Sherehiy, B., Karwowski, W., & Layer, J. K. (2007). A review of enterprise agility: Concepts, frameworks, and attributes. *International Journal of Industrial Ergonomics*, *37*(5), 445-460.
Sherehiy, B., & Karwowski, W. (2014). The relationship between work organization and workforce agility in small manufacturing enterprises. *International Journal of Industrial Ergonomics*, *44*(3), 466–473.
Soetantyo, T. I., & Ardiyanti, N. (2018). Innovative behavior, learning organization, and the mediating role of work engagement in IT sector. *Asia Pacific Institute of Advanced Research (APIAR)*, 1-12.
Swafford, P. M., Ghosh, S., & Murthy, N. (2006). The antecedents of supply chain agility of a firm: Scale development and model testing. *Journal of Operations management*, *24*(2), 170-188.
Yuan, F., & Woodman, R. W. (2010). Innovative behavior in the workplace: The role of performance and image outcome expectations. *Academy of Management Journal*, *53*(2), 323-342.
Yusuf, Y. Y., Sarhadi, M., & Gunasekaran, A. (1999). Agile manufacturing:: The drivers, concepts and attributes. *International Journal of Production Economics*, *62*(1-2), 33-43.
Zhang, H., & Zhu, C. (2016). A study of digital media literacy of the 5th and 6th grade primary students in Beijing. *Asia-Pacific Education Researcher*, *25*(4), 579–592.

APPENDIX

Workforce Agility

Proactivity

1. I look for the opportunities to make improvements at work.
2. I am trying to find more effective ways to perform my job.
3. I let time take care of things that I have to do.

Adaptability

1. In my work, I can change my behaviour to work more effectively with other people.
2. In my work, I can accept critical feedback.
3. In my work, I can adjust to new work procedures.
4. I can quickly adapt to switch from one project to another.

Resilience

1. I am able to perform my job efficiently in difficult or stressful situations.
2. I am able to work well when faced with a demanding workload or schedule.
3. When a different situation occurs, I react by trying to manage the problem.
4. I drop everything and take an alternate course of action to deal with an urgent problem.

Digital literacy

Technical Dimension

1. I can learn new technologies easily.

2. I keep up with important new technologies.
3. I know about a lot of different technologies.
4. I have good ICT skills.

Cognitive Dimension

1. I am familiar with issues related to web-based activities e.g. cyber safety, search issues, plagiarism.

Social-Emotional Dimension

1. I frequently obtain help with my university work from my friends over the Internet e.g. through Skype, Facebook, Blogs.
2. ICT enables me to collaborate better with my peers on project work and other learning activities.

Psychological Condition

Psychological meaningfulness

1. My job activities are personally meaningful to me.
2. The work I do on this job is meaningful to me.
3. My job activities are significant to me.

Psychological availability

1. I am confident in my ability to deal with problems that come up at work.
2. I am confident in my ability to think clearly at work.
3. I am confident in my ability to display the appropriate emotions at work.
4. I am confident that I can handle the physical demands at work.

Psychological safety

1. I am not afraid to express my opinions at work.
2. I am not afraid to be myself at work.
3. I accept each other's differences.
4. Working in this team, my unique skills and talents are valued and utilized

Innovative Behaviour

1. Generates creative ideas.
2. Investigates and secures funds needed to implement new ideas.
3. Develops adequate plans and schedules for the implementation of new ideas.
4. Is innovative.