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Organizational Readiness and Innovation Capabilities in a Context of Manufacturing Company: Will Leadership Skills Mediates?

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Abstract

This study aimed to see the link between organizational readiness, leadership skills, and innovation capabilities. The context of this study is in manufacturing because the urgency in the manufacturing industry drives it to have the readiness to face business challenges, then understood as the term organizational readiness. The manufacturing ability to find new ways of doing business processes and researchers suspect these two things requires contributions from individuals in leadership skills. The method used in this research is a quantitative approach. These research samples are 105 respondents from manufacturing. We collect the data by distributing questionnaires with online forms. All process results obtained using SmartPLS to see the reliability value through composite reliability and average variance values explained, validity through discriminant validity, and the bootstrapping process to see whether the proposed hypothesis is supported or not. The results indicated that leadership skills do not contribute either as a moderator or mediating role.

Keywords: Organizational Readiness, Innovation Capabilities, Leaderships Skills, Manufacturing

1. Introduction

Creating a sense of urgency in the company should be the starting point for every change initiative. The relationship between individuals, procedures, structures, and performance evaluation refers to organizational readiness (Greeff and Ghoshal, 2004). Understanding an organization's willingness to solve the root causes of issues entails learning about its cultural patterns in problem-solving in general (Sebastian-Coleman, 2013). Many factors are affecting organizational readiness, one of that many factors related to technology. Many companies experience change due to the introduction of new technologies, and while this change can be disruptive at first, it eventually leads to increased efficiency and operation. Technology has also changed the way people in organizations interact. To understand the effect of technology within the business, we use the term innovation capabilities. When companies implement innovation activities, it will affect the future performance of organizations (Aas & Breunig, 2017). Firms use their expertise and skills to create new goods, services, or processes (Hill, Brandeau, Truelove & Lineback, 2015).

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On the other hand, all industries face a challenge, called industrial 4.0 may be another obstacle for the company, as the technique is well-established in developed countries but still in its infancy in developing countries due to the governments of the countries planning the infrastructure's readiness. From the organization's perspective, the readiness to embrace industrial 4.0 would be determined by the organization's readiness, as incorporating developments in an organization is a complex and ongoing operation. Research about organization readiness in manufacturing companies only focuses on the literature on European Union (Castelo-Branco et al., 2019). Complete comprehensive research of literature exploring enablers of transformation in industry 4.0 has already published this study compared to which country is including an early adopter of industry 4.0 (Basl, 2018). Many countries build a road map to Industry 4.0 and evaluate the current status or mention the readiness assessment published already (Sony and Naik, 2019). But the lack of Industry 4.0 readiness assessment in the nontechnical aspect was also a challenge for future research, especially even though implementation already been review so manufacturing companies have realization model targeting, but it will be different for Indonesia (Schummacher et al., 2019)

There are four pillars of organization readiness, as follows 1) leadership, 2) governance, 3) competencies, and 4) technology (Hartman et al., 2000). These four pillars can enhance the innovation capabilities in the company so that it can raise the opportunity for successful innovation implementation. Leadership is one of the pillars of organizational readiness. When an organization has a strong leader who can set goals, vision, and objectives strategically using the technology, the whole organization can change more effectively. It can build a solid organizational culture. Strong leaders also can be change agents that will engage and empower the organization; without outstanding Leadership, the other pillars of organizational readiness are most likely not enough to execute well. (Lalic, 2010). However, the link between how crucial the role of Leadership determines the innovation capabilities of one organization has not been studied yet (Anderson et al. l, 2014). There are seven aspects of an organization's readiness for change: perception toward change efforts, vision for change, mutual trust and respect, change initiative, management support, acceptance, and managing change. Excellent and effective Leadership in one organization is a necessary foundation to ensure a successful change program because leaders are critical to inspiring the employee to participate and support the change initiatives, according to a study on organization readiness in manufacturing companies in Indonesia (Susanto, 2008). This paper aims to better understand the relationship between the readiness level of manufacturing organizations in Indonesia, especially in food manufacturing, to adopt industrial 4.0 with the leadership roles in the company and how the leadership skills of the leaders can affect the innovation capabilities in the company. This paper expects to give a perspective from the employee perspective on how company leadership styles can support the innovation capabilities, so the organization is ready to implement Industry 4.0. However, this paper did not explain how the other dimensions like 1) enabling environment, 2) human resources, infrastructure, 3) ecological sustainability, all of these are on the top of all dimensions in the organization readiness assessment models (Tripathi, 2021).

2. Literature Review

Innovation Capabilities

Technology innovation is always a critical factor that keeps changing the industry. Nowadays, development and innovation in the production sector have gained significant momentum. Industry 4.0, which we know as the fourth industrial revolution, was the newest trend in the industry that revolved in completely automated. Human-independent machines and self-managing processes can make the manufacturing process more straightforward. The communication between the process is more accessible to increase quality and productivity, reduce the operation cost, and ensure that operations

and processes are gaining momentum. Many studies respond to phenomena of a company's transition to Industry 4.0. However, due to a lack of relevant guiding research or applications, Industry 4.0 remains a fresh notion that many factories and specialists throughout the world are unable to appreciate fully. Businesses that cannot keep up with Industry 4.0's massive changes and transformations will unavoidably suffer negative consequences such as lower value-added output, ineffective working conditions, considerable market losses, and a decline in competition (Kiraz et al.,.2020). This shift in the industry will impact many aspects of human existence, including work and interaction. The way human work is structured and executed has changed dramatically as a result of these innovations. Mobile devices to supplement processes and help workers, such as maintenance or order picking, are two prominent examples.

Organization Readiness

The concept of readiness coin originated from Jacobson (1957). Organizational readiness indicates the relationship between systems, processes, people, and performance measurement. Coordination and synchronization between system, process, and people will determine where the implementation will be successful. Therefore, organizations must have processes and people to communicate changes, so the people and management are ready to accept or embrace the changes. Changes in the organization sometimes are urgently needed. The implementation must undergo rapidly. In order to ensure successful implementation, there is a need to create a proper definition of roles, responsibilities and define the relationship of the function. The proper definition can minimize the confusion or resistance for the people because the people need to be involved in the change process to create a mindset and commitment for the organization's transformation (Greeff and Ghoshal, 2004). Organization readiness is when an organization can optimize its required vital attributes to successfully enable business strategies or initiatives (Hartman, 2000). However, it can also define as the state of an organization's preparedness to commencing their activity (Helfrich et al., 2011). Because of industry 4.0, the manufacturing company challenges the necessity to implement changes in process, culture, strategy, and structure; the most important factor for applying these changes is the readiness for change. We learn from Lewin (1951) that readiness is a concept of unfreezing that shows the organizational member's attitude, belief, and intentions regarding the needed changes and the organization's capabilities to implement those changes successfully.

Leadership Skills

Organizational changes will require changing the member or individual inside the organization. Leaders will become integral in the organization's pattern of behavior where the leaders will be the change agent that will create ripple effects to the employees. However, not many leaders thought about the readiness of their employees. So, Leadership carried out by a leader also describes the direction and goals to be achieved from an organization (Thoha, 2010). Leadership focuses on how a person's skills and abilities make an achievement done in a collective way (Hannay, 2013). Leadership itself comes naturally to people who are responsible for their Leadership. Nature skills cannot be learned, unlike approach skills learned. (Bass, 200). Leadership is a process or relationship that causes interactions that result in the characteristics of the leader or often called leadership skills. Leadership is a process that can influence a group of people, so they are inspired to achieve one goal is virtually the dominant theory about leadership skills (Charry, 2012).

Innovation Capabilities

Literature on innovation claims that the most fundamental source of company success and survival is innovation capability, identifying potential customer needs and expectations, and

responding appropriately (Abbing, 2010). Innovation is the company's capabilities in creating a new product, work process, and services to gain competitive organizational advantages. (Drucker, 2004). Innovation Capabilities are the firm's capacity to have continuous innovation in which the application of knowledge or skills embedded in the routines or the processes within the company that made it can perform innovation activities of technical and nontechnical innovation. Because this capability has a tangible nature, it is assessing through indirect measures that can be objective or subjective (Mendoza-Silva, 2020). There are four complementary capabilities involved within innovation capability —first, technology development capability. Second is operation capability, management capability, and transaction capability. The third is the coordination between these capabilities that will define the ability to absorb; and four is about how to adapt and transform a given technology into specific operational, managerial, and transaction routines that can lead to Schumpeterian profits in innovation (Zawislak, 2012).

Innovation capabilities lead the organization to develop innovation continuously to respond. The rapid demand of the market that's why there is enormous attention to innovation inclines companies to differentiate the value of existing products and services (Nybakk & Jenssen, 2012). As a result, knowing the innovative competencies for integrated services is critical, and it is becoming increasingly relevant as a source of economic growth as the world changes (Ko & Lu, 2010). Innovation capabilities are among the competencies that a firm or company must have to increase their organization's readiness for changes.

H1: Innovation capabilities affect organizational readiness

The relevance of aligning the skills of innovation leaders to the specific duties and roles they would encounter in specific situations must be well understood by top management (Deschamps, 2005). On the other hand, innovation capabilities are concerned with change and support the creation of competitive advantage based on their innovative nature (Helfat et al., 2007); these capabilities are concerned with change and support creating competitive advantage based on their innovative nature. Leadership provides the context for and affects the development of capabilities within the alliance (Schweitzer, 2014).

H2: Innovation capabilities affect leadership skills

Most successful organizations have a strong leader that sets a vision, objectives, and goals that can drive the organizations; therefore, Leadership is one of the pillars of organization readiness in implementing changes. Because solid leaders typically promote changes in their organization, they will engage and empower the organization, so continuous improvement is a success. Without Leadership, the three other pillars of Organization Readiness implement successfully. (Lalic, 2010). The most sophisticated but essential industry 4.0 in manufacturing was in EDI (Electronic Data Interchange). However, there is research that one of the obstacles to EDI implementation is in Managerial Leadership and Human resources management issues since the effectiveness of the technology will depend on time and effort to use it. An insufficient leader that can lead the implementation will be a critical barrier (Jun, 2003). Thus, we developed a hypothesis as follows.

H3: Leadership skills affect organizational readiness
H4: Leadership skills moderates effect of innovation capabilities to organizational readiness

These studies aim to investigate the impact of leadership skills and how the company's innovation capabilities will affect the states of organizational readiness to implement changes, especially in Industry 4.0.

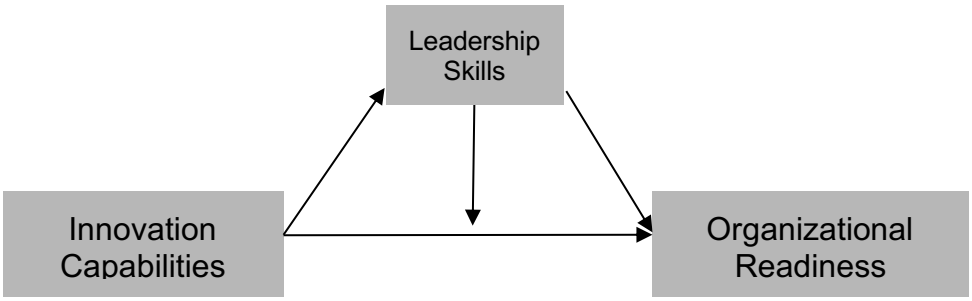

Figure 1. Conceptual Model

3. Methods

As mentioned above about the objective of this research, the variables that want to be measured are leadership skills, innovation capabilities, and the overall organizational readiness for implementing Industrial 4.0. There are several questions asked to get a response that can explain the variable condition in the population. For organization readiness, there are nine questions taken from Readiness for Organizational Change: The systematic development of a scale (Holt, 2007), for Leadership there are 12 questions taken from the perceived leadership communication questionnaire (Scheider, 2015) also from a study about the relationship between leadership style, organization culture and change readiness (Seipp, 2019) and eight questions for Innovation capabilities taken from the journal of innovation management about innovative capability (Akman, 2008), to maintain uniformity, subjects rate each parameter on a 5-point Likert scale (5 point scale, 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree), we also add for three open questions in order to collect respondent insight whether they fully understand the questionnaire's question or not. The open questions: do they feel the company invests large enough for technology, the degree of involvement that the employee feels during the new technology implementation, and Leadership at their workplace. The sampling method used in this study is non-random sampling, purposive sampling. The unit of analysis of this study is the employee at two food manufacturing companies since we want to capture the phenomenon during Industry 4.0 in these companies. Because the number of the population is undefined, we follow a reference by Hair et al. (2014), which said that the minimum requirement needed for samples is five times the amount of indicators in the population research (5:1). For this study, we use 29 indicators that explain why we spread the questionnaire to 145 people.

4. Results and Discussion

We spread the questionnaire with a collection period that started from March 23th to April 24th. From a total of 145 respondents targeted in this research, we receive responses from 105 respondents. All respondents complete the survey fill, and we could use the data to further steps. We believe we have enough data to be included in the final analysis, with an average time to fill the questionnaire is 15 minutes. We could describe our respondent's profile as follow.

Table 1. Respondents Profile

Characteristics		**Numbers of respondents**
Job Position	Production	41
	Engineering	12
	Quality control	7
	Warehouse	2
	Sales and Marketing	6
	Supporting (PPIC, Purchasing, et cetera)	37
Gender	Male	81
	Female	24
Age	<= 25	12
	26-30	18
	31-35	13
	36-40	29
	41-45	26
	>=46	7
Years of working experience	< 5	
	5-10	
	10-15	
	> 15	

First, we run for reliability and validity testing. We utilize SMART PLS and run the PLS Algorithm procedure, resulting in outer loadings, reliability results, validity, and R-Square.

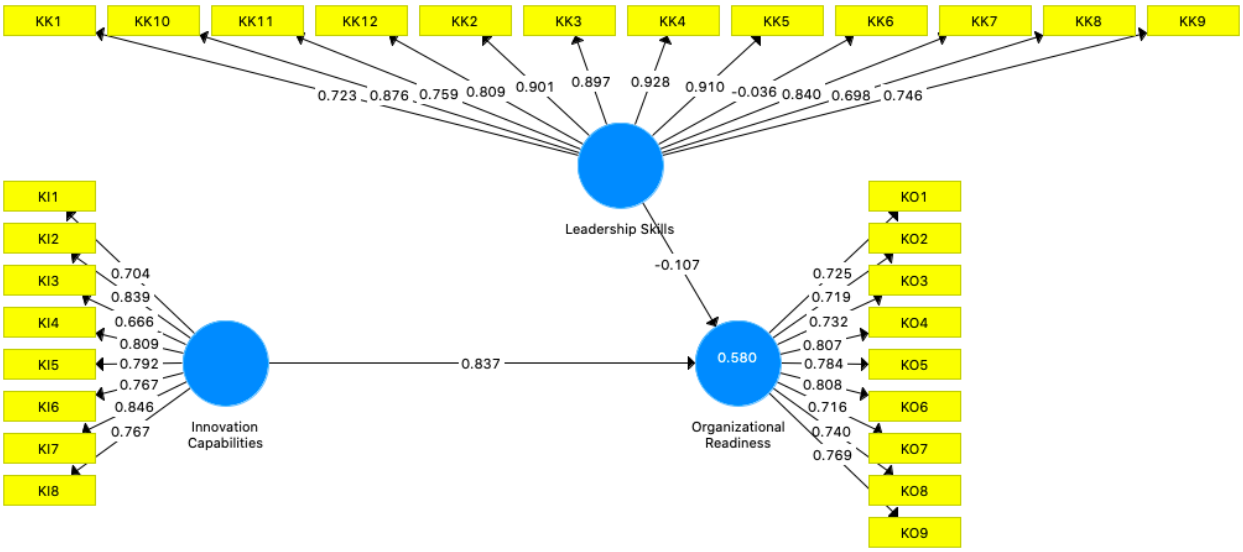

Figure 2. Structural Model Assessment (1)

At first, we found from the construct reliability and validity table that it seems all appropriate to measure in this research, as table 2. below,

Table 2. Construct Reliability (1)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Innovation Capabilities	0,905	0,909	0,923	0,602
Leadership Skills	0,934	0,967	0,949	0,631
Organizational Readiness	0,907	0,913	0,923	0,572

With maximum iterations of as much as 300, we are wandering the quality of each item. Therefore, we look at the outer loadings and find that one item cannot proceed to be an indicator, KK6 (-0,036) (Table 3).

Table 3. Outer Loadings (1)

	Innovation Capabilities	Leadership Skills	Organizational Readiness
KI1	0,704		
KI2	0,839		
KI3	0,666		
KI4	0,809		
KI5	0,792		
KI6	0,767		
KI7	0,846		
KI8	0,767		

KK1	0,723	
KK10	0,876	
KK11	0,759	
KK12	0,809	
KK2	0,901	
KK3	0,897	
KK4	0,928	
KK5	0,910	
KK6	-0,036	
KK7	0,840	
KK8	0,698	
KK9	0,746	
KO1		0,725
KO2		0,719
KO3		0,732
KO4		0,807
KO5		0,784
KO6		0,808
KO7		0,716
KO8		0,740
KO9		0,769

We have some items that need to reverse; therefore, we avoid the fallacy in understanding. We have conduct reverse scoring, and we found a similar result. Therefore, we decided to exclude the item, proceed on others, then run for PLS Algorithm, as its results are as follows.

Table 4. Construct Reliability (2)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Innovation Capabilities	0,905	0,909	0,923	0,602
Leadership Skills	0,954	0,968	0,960	0,689
Organizational Readiness	0,907	0,913	0,923	0,572

If we want to see the difference between table 1. and table 2., we found that after KK6 did not include, Leadership Skills result in a Composite Reliability increase from 0,949 to 0,960. However, its average

variance extracted (AVE) decreased from 0,631 to 0,689. It indicates that KK6 does mess with Leadership Skills. However, the outer loading post excluding KK6 is as follows.

Table 5. Outer Loadings (2)

	Innovation Capabilities	Leadership Skills	Organizational Readiness
KI1	0,704		
KI2	0,839		
KI13	0,666		
KI4	0,809		
KI5	0,792		
KI6	0,767		
KI7	0,846		
KI8	0,767		
KK1		0,723	
KK10		0,876	
KK11		0,757	
KK12		0,809	
KK2		0,901	
KK3		0,898	
KK4		0,929	
KK5		0,909	
KK7		0,841	
KK8		0,696	
KK9		0,745	
KO1			0,725
KO2			0,719
KO3			0,732
KO4			0,807
KO5			0,784
KO6			0,808
KO7			0,716
KO8			0,740
KO9			0,769

After this we also found that the result of model is as follow:

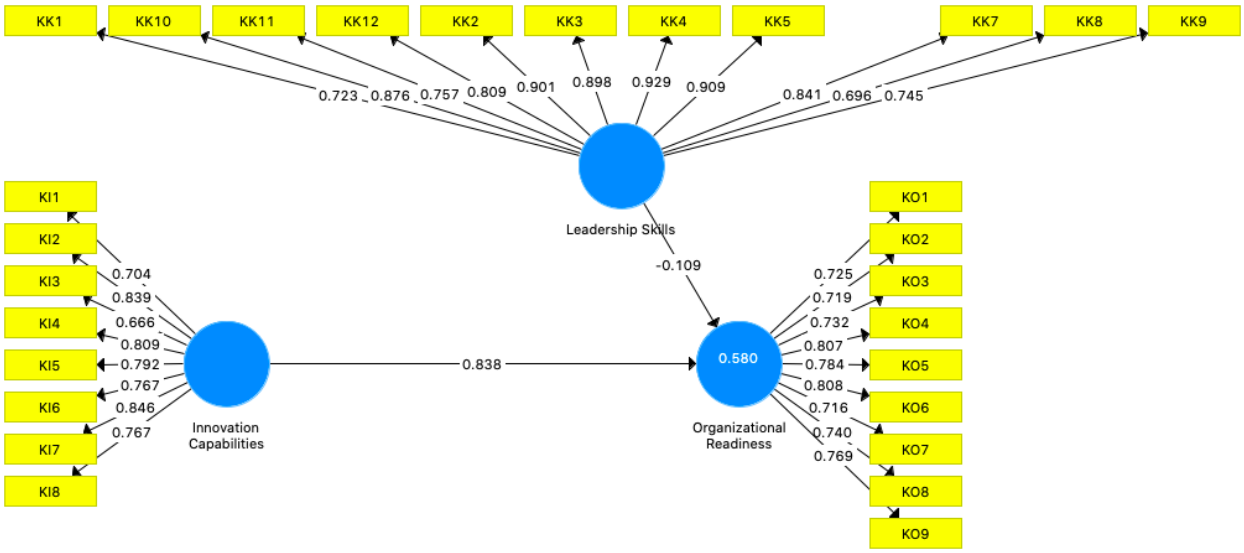

Figure 3. Structural Model Assessment (2)

After reliability testing, we then checking discriminant validity

Table 5. Discriminat Validity

	Innovation Capabilities	Leadership Skills	Organizational Readiness
Innovation Capabilities	0,776		
Leadership Skills	0,735	0,830	
Organizational Readiness	0,758	0,507	0,757

From table 5. above, Fornell-Larcker Criterion shows that all items are valid, and we may proceed to check their RSquare, as follows.

Table 6. Quality Criteria

	R Square	R Square Adjusted
Organizational Readiness	0,580	0,572

Based on table 6, we now have confidence that our organizational readiness model can explain 58 % of phenomena. After we succeed with all of the criteria, we then proceed to bootstrap (n = 5000), which aims to measure whether our model is supported or not.

Table 7. Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	
Innovation Capabilities -> Leadership Skills	0,749	0,755	0,038	19,570	0,000	Supported
Innovation Capabilities -> Organizational Readiness	0,841	0,855	0,082	10,290	0,000	Supported
Leadership Skills -> Organizational Readiness	-0,060	-0,072	0,102	0,587	0,557	Not Supported
Moderating Effect 1 -> Organizational Readiness	0,119	0,102	0,099	1,202	0,229	Not Supported
Innovation Capabilities -> Leadership Skills -> Organizational Readiness	-0,045	-0,055	0,078	0,574	0,566	Not Supported

According to table 7, we may conclude that only two out of five hypotheses are supported. The supported hypotheses are, innovation capabilities affect leadership skills or H2, and innovation capabilities affect organizational readiness or H1. Also, we succeed in collecting open question responses, as follows. Based on the open question about new technology and implementation that company did in the past two years. Eighteen respondents are not sure that the company was seriously investing in new technology implementation. In contrast, 82% of the respondents are sure that the company has a significant investment in new technology implementation even if they can mention an example, like a new ERP, new production machine. However, 18 respondents say the company did not invest in a considerable portion because they feel they did not participate in the implementation or did not significantly impact them, like the new attendance system for Quality Control's staff.

In an open question about Leadership, 15% of the respondents feel that they did not have guidance from their leader when the company tries to implement new technology. In comparison, 5% feel that the leader cannot continuously guide them. 80 % of respondents feel that their leader helpful and continuously guide them in the new technology implementation with Standard Operating Procedure, WI, Briefing, and some say their leader even had time for sharing knowledge.

The organization's innovation capabilities drive it to produce new ideas regularly in order to respond. The market's increasing demand, which is why there is such a focus on innovation, encourages businesses to differentiate the value of existing products and services (Nybakk & Jenssen, 2012). As a result, knowing the innovative competencies for integrated services is critical, and it is becoming increasingly relevant as a source of economic growth as the world changes (Ko & Lu, 2010). Innovation capabilities are one of the skills that a firm or company must possess to improve their organization's change readiness.

The relevance of aligning the capabilities of innovation leaders to the specific duties and duties they would encounter in unique situations must be well understood by top management (Deschamps, 2005). On the other hand, innovation capabilities refer to actively building, extending, or modifying an existing resource base (Helfat et al., 2007). These qualities are focused on change and, as a result of their inventive nature, aid in building competitive advantage. The environment for and influence on the development of capabilities within the alliance provide by Leadership (Schweitzer, 2014).

5. Conclusion

There are three primary latent constructs used in this study, namely "leadership skill," "organization readiness," "innovation capabilities." the study revealed that innovation capabilities have

a significant positive impact on organization readiness, whereas manufacturing companies were aware of the demand of rates of innovation to transform the company toward factory of the future (Pessot et al., 2020), but there is no significant effect of the leadership skill towards the organization readiness because transformational Leadership has proven to be positively related to organizational commitment in service company but not for a manufacturing company, Leadership skills that were needed in manufacturing company slightly difference maybe because it will be more effective when combined with a directive leader decision style.

6. Limitation and directions for future research

The finding in this study should view in light of the following limitations. First, this study used 105 respondents from the target 145 respondents taken from two companies based on Business to Consumers and Business to Business company. We suggest that future studies should concentrate on a larger sample size that can conduct a sectoral analysis or a comparative analysis in a different manufacturing company.

Second, this study using a quantitative method with only a few open questions to get an insight into how the implementation of leadership skills and innovation capability for a better organization readiness in the company, but a further interview on some of the respondents can give a better and deeper explanation about how that leadership skills do not contribute to the organization readiness in industry 4.0 implementation especially about what kind of leadership style or decision style that was applied more effective in manufacturing company

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APPENDIX

Questionnaire in Bahasa

Category	#	Question
Kesiapan Organisasi	*1*	*Perusahaan tempat saya bekerja berkomitmen untuk selalu berusaha mengadopsi teknologi terbaru*
	2	*Perusahaan tempat saya bekerja berkomitmen dan memiliki kultur dalam inovasi yang berkelanjutan*
	3	*Dalam penerapan suatu perubahan, manajer atau leader selalu menjelaskan rencana perubahan dan hal apa saja yang perlu diperhatikan oleh pekerja*
	4	*Integrasi rencana kerja antara departemen di organisasi tersusun dengan baik*
	5	*Ada komunikasi antar fungsi atau antar departemen yang terjalin secara kontinu*
	6	*Pekerja mengerti dampak dari perubahan teknologi yang dilakukan dengan baik*

	7	*Ada penerapan teknologi baru yang dilakukan perusahaan untuk menciptakan produk baru*
	8	*Proses produk baru tersusun dan terencana dengan baik di dalam departemen masing masing*
	9	*Teknologi baru yang diterapkan sudah terintegrasi dengan proses atau sistem yang sudah ada di perusahaan*
Kapabilitas Inovasi	1	*Pekerja didukung untuk ikut terlibat aktif dalam penerapan inovasi dalam perusahaan*
	2	*Inovasi yang diterapkan selalu berguna untuk menghasilkan produk*
	3	*Manajemen perusahaan selalu menekankan pentingnya untuk selalu berinovasi*
	4	*Manajemen perusahaan selalu mempertimbangkan kemampuan pekerja berinovasi dalam hal apapun*
	5	*Manajer/leader berperan penting dalam penerapan inovasi yang berkaitan dengan teknologi baru*
	6	*Ketika ada masalah dalam penerapan inovasi, manajer atau leader terbuka untuk diskusi dan membantu mencari solusi*
	7	*Manajer/leader memiliki pengertian yang sama dengan saya mengenai cara untuk menerapkan sesuatu secara efektif*
	8	*Seluruh orang yang bekerja akan mengikuti segala penerapan inovasi di perusahaan*
Keahlian Kepemimpinan	1	*Banyak sosok manager/leader di area kerja yang merupakan sosok yang berpengaruh dalam penerapan teknologi baru*
	2	*Leader saya memimpin group secara efektif*
	3	*Leader saya memotivasi saya untuk bekerja dengan lebih baik*
	4	*Leader saya memberikan masukan dan saran bagaimana agar tugas bisa selesai dengan lebih baik*
	5	*Leader saya membantu saya untuk berkembang dalam organisasi*
	6	*Leader saya selalu menunda keputusan yang penting*
	7	*Leader saya selalu menekankan pentingnya bekerja dalam team*
	8	*Leader saya memuji jika saya melakukan sesuatu dengan baik*
	9	*Leader saya mewakili saya secara efektif pada saat meeting*
	10	*Leader saya membuat saya mau bekerja lebih daripada yang diharapkan*
	11	*Leader saya menerapakan sistem hukuman dan penghargaan yang adil*
	12	*Secara keseluruhan, Leader saya memiliki kualitas kepemimpinan yang memuaskan*