DIGITAL READINESS OF SMES: AN INSIGHT FROM INDONESIA

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Abstract

In the era of industrial revolution 4.0, digital technology is constantly improving in many areas of industry, particularly in business. It forces every business, whether large corporations or small businesses, to make various adjustments in order to keep up with the advancement of digital technology. They should be aware of how far their improvement and readiness have advanced in the digital era. This paper measures the digital readiness of SMEs and categorizes them into the level of digital readiness. The research examined the level of digital readiness among businesses, particularly small and medium-sized enterprises (SMEs) in West Java. A survey of 113 SMEs in West Java was conducted to assess their digital readiness. This research used a descriptive survey research approach. The research method itself is carried out by using a cross sectional survey method. Five variables used in this research include people, process, strategy, technology, and integration. Findings indicated that SMEs in Indonesia show a low level of readiness in relation to Industry 4.0. The majority of the respondents are aware about the phenomenon of digitalization, but they are currently not ready to adapt or use various innovations in their businesses. People, process, strategy, technology, and integration are the five variables analyzed, and the variable showing the best readiness to face digitization is people. SMEs business owners are still taking initial steps to identify the most appropriate strategy to approach industrial revolution 4.0. SMEs must take advantage of existing opportunities, especially with the availability of various information and data to develop business and make decisions. In general, the majority of businesses in Indonesia are small and medium-sized enterprises (SMEs) that are aware of the development of digitalization but are hesitant to implement it and require extensive assistance from various parties to understand and implement digitalization in their business.

Keywords: Digital Readiness Index, SMEs, Industry 4.0, Digitalization

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INTRODUCTION

The Fourth Industrial Revolution (Industrial Revolution 4.0) brought fundamental changes to many aspects in global life, characterized by the increasing development of creativity and innovation through the use of information technology, disrupting various aspects of global life, including competition in the economic field. Rapid changes triggered by the use of human-machine interfaces, artificial intelligence (AI), the internet of things (IoT), and the proliferation of the shared economy phenomenon characterize this revolution, making creativity and innovation crucial factors in winning global economic competition. This rapid change is a challenge for business people, both in large corporations and SMEs. The transition to Industry 4.0 requires an appropriate strategy and organizational model, as it necessitates significant changes around the entire organization in terms of physical infrastructure, manufacturing processes and technology, as well as human resources and process management [26].

Indonesia is one of the countries that relies on the industrial sector as one of the largest contributors to its economy [41]. However, according to measurements carried out by CISCO, namely Digital Maturity Index 2019, Indonesia is not included in the world's community of developed industrial countries. This is caused by various issues that arise in the growth of the national industrial sector. One of them is the lack of readiness among entrepreneurs in the development of the industrial sector. These measurements show that nine of the 14 countries in Asia Pacific are at the digital observer level, while the other five, including Indonesia, are only at the digital indifferent level. The digital indifferent level shows that the company is reactive to market changes, but there is no digital effort, no automation (the majority of manual processes), no use of digital technology, and no use of cloud services. In fact, technology adoption is one of the implementations of industrial revolution 4.0, and according to research conducted by McKinsey, technology adoption also has a large potential to increase industrial growth [15]. Various limitations of the development and implementation of digital technology have triggered Indonesia's government to seriously prepare in adapting and implementing digital technology in various aspects for any industrial sectors. It is shown by the efforts made by the Indonesian Ministry of Industry through the launch of Making Indonesia 4.0.

Making Indonesia 4.0. is an integrated roadmap and strategy as an effort to accelerate the implementation of Industry 4.0. in order to increase the competitiveness of the national industry through the use of the latest technology and innovation. One of the strategic steps in Making Indonesia 4.0 is the empowerment of SMEs to optimize the use of digital technology to optimize productivity which can be able to penetrate the global market [42]. SMEs must be able to use technological advancements in the era of the Industrial Revolution 4.0 as an opportunity to optimize the operating system within the company by integrating various processes, resulting in more effective and efficient processes [14]. Since SMEs are one of the aspects that drive growth and development of the economy in a country [14] including Indonesia, the development of SMEs is a concern for various parties, including the government, companies, related business owners, experts and so forth.

In addition to optimizing the implementation of Industrial Revolution 4.0, SMEs' participation in Making Indonesia 4.0 also aims to strengthen the national economy and increase annual economic growth. SMEs have an influence on Indonesia's economic sectors, which account for 99% of the total number of enterprises, can absorb 97% of the labor force, and contribute 57% of Indonesia's annual GDP [42]. The number of SMEs increased by 7.3% in 2015 compared to 2012, which undoubtedly supports the influence of SMEs [11]. The rapid growth of SMEs and the strategic role of SMEs in Indonesia do not necessarily enable SMEs to optimize in all aspects in order to continue to grow. Most SMEs run their business in the traditional way, including in production and marketing, even though the use of various technologies allows SMEs to develop businesses globally [53] and can continue to grow so that they are able to continue increasing their business scale.

One of the most important aspects in the development of SMEs is the readiness of SMEs to face various challenges, especially those related to digital transformation, where SMEs are required to quickly adapt to digital developments in today's business world. Westermann, Bonnet, & McAfee prove the success of companies that have good digital readiness in creating much higher revenue and profitability than companies with lower levels of digital readiness [49]. Digital readiness itself has various meanings in various literatures. Digital readiness can be interpreted as the readiness of individuals, institutions, industries or even countries in adopting and utilizing digital technology to obtain maximum benefits from the technology. As Quaicoe and Pata define digital readiness, namely the readiness of teachers' skills, knowledge, and confidence to adopt digital learning in the primary school education system in Ghana [50]. Punchihewa uses the term digital readiness in a study of institutional readiness in Sri Lanka to implement e-government [51]. Hamzah and Mustafa (2014) used digital readiness in a study on the digital readiness of journalists in Malaysia. Meanwhile, the Queensland Department of Trade and Industry uses digital readiness to refer to the state's industry readiness to describe the opportunities of the digital economy.

In addition, there are also differences in terminology in addressing digital readiness. Some scholars discuss and associate digital readiness with e-readiness, e-business readiness, e-government readiness, digital readiness, mobile readiness, network readiness and generally as technology readiness. The differences in terminology create many challenges in the development of digital readiness constructs which in the end cause no general definition of digital readiness that may be universally accepted. The inconsistent use of digital readiness

concepts and models cause research findings to be in-comparable and cannot be used to form the same perspective or knowledge about digital readiness. [12]. For example, Hanafizadeh, Hanafizadeh, Khodabakhshi [27] propose e-readiness assessment model which consist of 6 dimensions (e.g., e-business, e-government, e-education, infrastructure and access, access to use of ICT, and basic enabling indicator). Yet, our study particularly prioritizes digital readiness of SMEs which have been developed by Pirola et al., [36]. Pirola et al [36] see the digital readiness of SMES based on five criteria e.g., people, strategy, technology, integration and process which focus on micro level (internal aspect). Thus, we focus on Pirola's model due to the fact that we would like to focus on how SMEs transform to industry 4.0 internally rather than readiness at macro/general level.

This study used the definition of digital readiness as a metric that can be used to assess the readiness of entrepreneurs towards digital transformation. Digital readiness measures how well the technology is managed within an organization or company, as well as how well the organization or business can adjust to change and take advantage of new opportunities in the digital business era. Digital readiness is defined as the tendency and willingness to switch and adopt digital technology and the readiness to create new innovative opportunities by using this technology to bring individuals, organizations, industries and countries to achieve their goals faster with great results.

Due to the exploratory intent of this research, we do this research with qualitative method that aims to answer the research question:

RQ: What is the current level of digital readiness in SMEs? How can this impact the digital transformation?

This research replicates the research which has been done by Pirola,et.al., about the digital readiness of Italian SMEs. The previous research used the empirical method of multiple case studies. The research was conducted through a literature review of the industry 4.0 maturity and readiness evaluation model, and then the research model was developed and validated through two pilot case studies, and tested to measure digital readiness in a sample of 20 SMEs in Italy [36]. Meanwhile, this research uses descriptive and quantitative methods to measure the level of digital readiness of SMEs in Indonesia, especially West Java. Thus, we contribute to generalizing Pirola's model in different settings e.g., South East Asia Country. West Java is one of the provinces with the percentage of SMEs reaching 98.84 percent of the total number of non-agricultural businesses in West Java (jabar.bps.go.id., 2020). In addition, the West Java government is also very massive in supporting the digitization of SMEs in West Java. This research aims to allow SMEs to evaluate their digital readiness level by answering the questions in the questionnaire, and then calculated using a formula that has been formulated in previous research so that the results of the digital readiness level of the SMEs concerned are obtained. These results can be used as a reference to determine the best strategy for the business concerned in competing in the era of the Industrial Revolution 4.0. The five variables used in the current study consist of people, process, strategy, technology and integration.

This paper consists of four parts, the first part is introduction. After the introduction, there is a literature study section that explains about SMEs in Indonesia, the Industrial Revolution 4.0 in SMEs, and digital readiness. Next, the third section discusses the findings and results. At the end there are conclusions and suggestions for further research.

LITERATURE STUDY

SMEs in Indonesia

The industry 4.0 era expanded the competitive market in every industry, making technological advancement critical and occurring at a rapid pace. SMEs are required to demonstrate technological sophistication in competitive markets [18]. Industry 4.0 ap-plies to the most recent technological developments, with the internet as the supporting infrastructure, and it requires guidance and assistance to align business strategies and operations [1]. Industry 4.0 focuses on human integration resulting in continuous improvement [47]. Industry 4.0 is a term that was first coined in Germany in 2011, characterized by the digital revolution. This is a digitally connected industrial process that involves various types of technology, such as 3D printing and robotics that are thought to improve productivity. Industry 4.0 focuses on the end-to-end digitization of all physical assets in order to optimize the use of technology for integration into the eco-system [31]. This entails an effective and efficient use of technology to create products and services [13; 43]. The synergy of various technologies in creating products and ser-vices has been seen through various emerging technologies such as augmented reality, artificial intelligence (AI), autonomous robotics, Big Data analytics, cloud systems and IoT which have the potential for integration in value chains for various industries [48; 29].

According to a McKinsey survey in 2017 towards 300 leading company leaders in Southeast Asia, as many as 9 out of 10 respondents believe in the effectiveness of Industry 4.0. and almost no one has any concern about it. When asked whether they were prepared for the transition, only 48 percent said they were. In fact, the private sector would benefit from this move toward Industry 4.0. The supply chains of large integrated manufacturers would be able to be optimized and simplified. Meanwhile, a digitally-controlled manufacturing system would create new market opportunities for SMEs that include sensors, robotics, 3D printing, or inter-

machine communication technology.

Industry 4.0 can be a way to regain infrastructure competitiveness for developing countries. Industry 4.0 can also assist in the simplification of the manufacturing supply chain, which is crucial in light of rising labor costs [42]. The global development of Industry 4.0 has an impact on Indonesia, leading the Ministry of Industry to launch the "Making Indonesia 4.0" strategy as a road map for Indonesia's strategy in implementing Industry 4.0 so that Indonesia can compete with other countries. One of the national priority strategies of "Making Indonesia 4.0" is the empowerment of Micro, Small and Medium Enterprises [28].

Referring to a brief study by Venti Eka Santya, Expertise Researcher Agency of the People's Representative Council of Indonesia on "Indonesia's Strategy for Facing Industry 4.0", Industry 4.0 can help developing countries recover infrastructure competitiveness. Industry 4.0, on the other hand, can help developing countries simplify their production supply chain, which is crucia in light of increasing labor costs. As a result, as the Industrial Revolution 4.0 unfolds, SMEs would need to develop their skills and technological mastery in order to remain competitive in this era.

The most common obstacles cited by SMEs in Industry 4.0 were a lack of digital strategy, vision, and action plan, suggesting that top management should embrace Industry 4.0 initiatives and provide the necessary resources and support in all implementation phases [36]. Furthermore, difficulties of SMEs in applying industrial technology 4.0 are caused by a lack of manpower, as well as a barrier to entry into new product and development areas, as well as refusal to allow new technology investments [41]. The findings from case studies – along with these Industry 4.0 principles and technology trends, such as horizontal and vertical integration – indicate that information technology (IT) plays an important role in the digital transformation, which must be characterized by precise definitions of requirements, objectives, to-be situations and activity planning [36]. Therefore, considering the readiness of a business for Industry 4.0 is a good way to find ways to develop a particular area of the business. Small and medium-sized enterprises (SMEs) are steadily driving global economic recovery [5]. It provides great opportunities for the development of SMEs in various countries around the world, including Indonesia. SMEs are one of the types of businesses that the Indonesian people are most interested in. SMEs are constantly forming and expanding in order to participate in various industrial sectors. SMEs use existing technologies in addition to production and promotion as it evolves. SMEs have grown to be an important pillar of national economic development in a number of countries, including those in the ASEAN region. SMEs are a significant driver of economic development and technological changes in the United States, as well as other developed industrial countries that are members of the OECD [46].

The Law of the Republic of Indonesia No. 20 of 2008 concerning Micro, Small and Medium Enterprises stated that small businesses are productive economic enterprises that are independent, carried out by individuals or business entities that are not subsidiaries or branches of companies that are owned, regulated, or become part of medium or large businesses either directly or indirectly. Meanwhile, several criteria that must be fulfilled by small businesses based on the law is that the business must own a net asset of more than USD 3.500 up to a maximum of USD 350.000 excluding land and buildings for business premises; or obtain an annual sales revenue of more than USD 20.000 up to a maximum of USD 175.000.

Another explanation can be found in the Law of the Republic of Indonesia No. 20 of 2008, which relates to medium enterprises. It stated that medium enterprises are characterized as independent economic enterprises that are run by individuals or business entities that are not subsidiaries or branches of companies that are owned, regulated, or directly or indirectly part of small or large businesses. The company must either have a net asset of more than USD 3.500 up to a maximum of USD 700.000 excluding land and buildings for business premises; or annual sales revenue of more than USD 175.000 up to a maximum of USD 3.500.000.

In terms of the growth of SMEs in Indonesia, SMEs have a competitive advantage based on innovation and creativity, but these need more focus in terms of durability and business sustainability. SMEs, as part of the economy, must strive to boost their competitiveness by conducting business innovations [16]. Furthermore, statistics from BPS - Statistics Indonesia show that the number of SMEs in Indonesia has grown steadily from 1997 to 2013, indicating an upward trend in the development of SMEs in Indonesia.

This research focuses on the readiness of SMEs for the Industrial 4.0 era. The development of SMEs cannot be separated from the role and use of technology in this digital transformation era. Digital readiness refers to the abilities of SMEs to adapt to digital transformation. Measuring and analyzing digital readiness is carried out to determine how SMEs in various sub sectors are prepared to face digital transformation and continue to thrive in the era of the industrial revolution 4.0. This research aims to ad-dress the issue of how SMEs in the creative industry of Indonesia will continue to develop and maintain their business.

Digital Readiness

We now live in a digital world. Digital innovations are rapidly advancing, bringing people from all over the world together and generating exciting new opportunities. As a result of technological developments, people today have more access to information, facilities and resources than at any other time in human history. Automation, artificial intelligence, and Internet of Things (IoT) have an effect on almost everywhere in every country, industry, and everyday life [15]. However, while digitization has a wide-ranging effect, the benefits it creates are unevenly

distributed. It is crucial to evaluate the digital readiness of a country, organization, or individual to help build a more inclusive future for everyone.

The terms of digital readiness are made up of two syllables, namely digital and readiness. According to oxfordlearnersdictionaries.com, readiness is a state of being fully prepared for something, as well as willingness to do something. According to dictionary.cambridge.org, digital refers to a system that can be used by a computer and other electronic equipment, as well as computer technology in general, including the internet.

Thus, digital readiness is characterized as inclination and willingness to turn to and adopt digital technology, as well as the willingness to use this technology to create new creative opportunities in order to help a person, organization, industry, and country achieve their goals faster with greater results, or in this case, people and agencies/organizations are prepared to embrace digital technology and can make the best use of this it [12]. Based on the above definition, a tool is developed to measure the level of digital readiness based on predetermined parameters. The tool is then referred to as the Digital Readiness Level (DRL). Digital Readiness Level is based on pre-existing readiness level models, such as the Technology Readiness Level, which is used to assess the readiness level of certain technologies [36; 32], the Design Readiness Level, the Software Readiness Level, and several other models [44]. The Readiness Level Model is a method for assessing the respondent's level of readiness for the best possible implementation of the research product.

There are some research models that assess digital readiness such as research by Lichtblau,et.al., with title Industry 4.0 Readiness Online Self-Check for Business (IMPULS). The research developed a digital readiness measurement and classified digital readiness into 6 levels. They specifically examine companies in the engineering sector. The dimensions of the research are strategy and organization, smart factory, smart operations, smart products, data-driven services, employees [53]. Other research by Pirola, et.al with title digital readiness assessment of Italian SMEs: case study research proposes a comprehensive assessment model suitable for evaluating small- and medium-size enterprises' (SMEs) digital readiness levels. They compare and identify some model and dimension of digitalization measurement from any previous research, then formulate the dimension to five dimensions that are strategy, people, process, technology, and integration [36]. Research about digital readiness itself in Indonesia focuses more on big companies and other specific to identify digital maturity index than measure the digital readiness level specially for SMEs. It causes researcher interest to do research about digital readiness especially for SMEs.

According to literature review which has been done by researchers, the Digital Readiness Level Model which is proposed by Pirola, et.al., has relevant dimensions which can be used to address the level of digital readiness especially for SMEs. Digital Readiness Level Model was used in this research to determine the readiness level of SMEs in West Java to adapt digital technologies such as cloud, IT tools, robotics, and so forth. Several variables are required to calculate the DRL which refer to the Dimensions of Digital Readiness Index. Beside the Dimensions of Digital Readiness Index, to draw conclusions about the position of a digital readiness of SMEs, this research also calculates the digital readiness level. The description about dimension of Digital Readiness Index can be found at Table 1 and the description about the level of Digital Readiness can be found at Table 2.

Digital Readiness Assessment Model

A digital and Industry 4.0 index has proven to be successful at the macro level [35]. This index is used or applied to measure and compare the digital performance of various countries, for example, Industry 4.0 Readiness Index from a consultancy company called Roland Berger (2020), Networked Readiness Index (NRI) from the World Economic Forum (2016), CISCO Digital Readiness Index (2019), Digitization Index (DiGiX) from BBVA Research. Some aspects have become very important over time, namely the in-creasing number of digital readiness indexes and Industry 4.0, as well as the maturity model that has been developed over the past few years to analyze and measure digital performance and the readiness of Industry 4.0 on micro-level companies. Digital and Industry 4.0 readiness index assessment and maturity models can assist management in making comparisons, and planning a road map for their company's digital transformation by auditing the current digitization status of a benchmarked firm [38].

In this case, the digital readiness index is a crucial metric to assess the success of small and medium-sized enterprises (SMEs) in the digital domain. It is a tool that assists SMEs in recognizing gaps when using digital technology. It is determined by taking into account the degree of:

- The digital divide between one to another small and medium-sized enterprises;
- The potential for ICT development and the degree to which small and medium-sized enterprises can make use of it;
- Availability of the digital technologies required to make the small and medium-sized enterprises 'digitally ready'.

People	Analyses the strengths of individuals and how the know-how is handled inside the people/culture market
Strategy	Analyzes the company's digitalization plan and implementation of the industry 4.0 concepts
Process	Analyses how internal processes are handled from the point of view of digitalization and how data is processed, exchanged and managed within the business
Technology	Analyses the latest adoption of the technology supporting Industry 4.0
Integration	Analyses the degree of digitalization and convergence with other value chain actors

Table 1.
Dimension of
Digital Readiness
Index

Source: Pirola, et.al.,2019

Readiness evaluation methods offer structured mechanisms for benchmarking and enhancement of outcomes, and they generally provide a set of explanations for the business performance of distinct organizational elements. Descriptions are sorted into power groups, from "digital novice" to "digital master". The majority of tools have five levels, but other models with three and nine levels are also available [36]. The frame-work of each level involves a set of objectives that must be addressed in order to achieve maturity at that specific level, as well as supporting sub-goals that define the scope, limitations, and actions required for a specific level, as well as activities and tasks that must be completed to achieve the objectives of each level [45]. A company (or a business unit within it) must pursue improvement measures in order to advance from one stage to the next. Readiness and Maturity evaluation models are formulated using a tacit logical step-by-step progression, with maturity increasing from the lowest to the highest levels [17]. Determining the current level of a company may provide a variety of benefits to an organization. First, a situational analysis of its capabilities is required, as well as a starting point and a behavior-prioritizing framework. The determined readiness or maturity can then be used as a benchmark to better illustrate and promote continuous improvement by understanding the needs of the organization.

RESEARCH METHODOLOGY

This research used a descriptive survey research approach. Descriptive research provides a description of the situation as clearly as possible without any treatment of the object under study. A descriptive survey used to identify and describe the digital readiness level of SMEs in Indonesia, particularly West Java. The research method itself is carried out by using a cross sectional survey method. The cross-sectional survey method was carried out because the object of this research involved various SME sectors without limiting one or two types of SMEs, but any type of SME can measure their digital readiness. In principle, cross-sectional research is a type of research methodology with an extensive dataset to look at many cases and the relationship between variables. This number of cases and variables makes it possible to conduct inter-sectional analysis between many cases and many variables. In addition, there are five variables involved which consist of strategy, people, process, technology, and integration.

Data was collected through a survey using a questionnaire which was distributed to various SMEs in West Java. Researchers made adjustments to the questions on the questionnaire so it can be used to generally measure the digital readiness of SMEs in Indonesia especially West Java with various characteristics and types. The questionnaire is then filled out by the one who has authority and capacity as well as a good under-standing of the business processes of the SMEs, such as owners or managers. Questionnaire is structured in such a way that it is suitable to be filled out by various types of companies in various industrial sectors. The unit of analysis of this research itself is the organization or company.

The questionnaire consists of 46 questions. In the first part of the questionnaire, there are 12 closed questions regarding the company's vital statistics aimed at identifying company size in terms of employment and turnover, industry and general features of the production process. The second part includes 24 five-point Likert scale questions about the implementation of Industry 4.0 technology within the company, covering five different dimensions (described in Table 1). These questions are a core contribution to the DRL assessment. The final section includes ten single choice questions about the short-term investments of each company.

Considering the question in the second section, the respondent should answer $a_j \in \{1,\ldots,5\}$ (five-point Likert scale) with score $S_i \in [1,5]$ which define for each dimension I as follows:

$$S_i = (\sum\nolimits_{j \in Q_i} b_j)/m_i \cdots\cdots (1)$$

Where Q_i is the subset questions referring to the dimension i, and b_j is a parameter calculated as follows:

b_j = 0 if the technology/feature j is deemed not applicable;

b_j = a_j if the technology/feature is applicable, and the company is not planning to invest in it (or the investment already has been carried out and completed); and

bj   = min (aj + 1;5) if the technology/feature is applicable, and the company cur-rently is investing in it.
and mi is defined as:

mi = card ({j: j € Qi ∧ bj > 0}) …………………………………………………………………………… (2)

From these scores, a single index I is calculated:

$$I = (\sum_{(i=1)}^n S_i)/n$$ …………………………………………………………………………... (3)

where n = 5 is the total number of dimensions.

The final score I defines the company's digital readiness level according to the rules presented in Table 2, which also provide the definition of digital readiness level.

Table 2.
Digital Readiness Level

Digital Outsider (1 < l ≤ 1.8)	Identify which businesses are not interested in participating in Industry 4.0 pilot projects. Only a few processes are compatible with information technology (IT) systems (processes are either partially or fully not digitized, and the existing architecture prevents process integration). Data collection from the area is not carried out. The skills required to extend Industry 4.0 are only found in a few areas of the enterprise. Horizontal integration and internal exchange of knowledge are minimal, although no convergence with other value chain actors is foreseen. The company does not follow service-oriented and cloud-based strategies.
Digital Novice (1.8 < l ≤ 2.6)	Determine which companies at the intermediate level are integrating Industry 4.0 into their strategic plans. Some pilot projects are being designed by the company. Information technology (IT) systems support routine operations (processes are highly digitized) and the current infrastructure allows for some process convergence. Only certain performance data is obtained automatically and in real-time, and it is only used to a minimal extent. Horizontal integration and internal exchange of information are restricted to some areas and the first steps toward integrating data with supply chain participants are being taken. Only in some areas do workers possess requisite skills with respect to Industry 4.0.
Digital Adopter (2.6 < l ≤ 3.4)	Identify the business that has created a plan for Industry 4.0 and is investing in supporting the implementation of smart development. Most processes are supported by information technology (IT) systems, and process integration is facilitated by the existing infrastructure. Data is automatically collected in real-time in key areas of development. Information exchange is partially incorporated into the system, both internally and with external actors. At this stage, the company produces goods fitted with IT-based features, allowing the company to provide the first data-driven services, which still account for a small proportion of revenue. Employee capabilities expansion efforts are currently underway.
Digital Experienc ed (3. 4 < l ≤ 4.2)	Identify the business that has already implemented an Industry 4.0 strategy and keep track of its progress using appropriate indicators. The business is interconnected horizontally and vertically, and within the sector, Industry 4.0 standards have been introduced, automating knowledge flows. Investments span almost all relevant areas, and the mechanism is assisted by inter-departmental innovation management. Information on production processes is collected and used for optimization. The exchange of knowledge is largely incorporated, both internally and with value chain partners into the system. IT-based features are included in the products, allowing data collection during the use process, enabling and promoting data-driven services. Services are available ubiquitously within the company and can be accessed anywhere, allowing staff to retrieve data through mobile devices. The company has the necessary expertise in most of the relevant fields.
Digital Master (4.2 < l ≤ 5)	Identify the company that has already implemented and actively tracks the execution of its Industry 4.0 strategy. The company is fully digitized and integrated with the supply chain, both within and outside corporate boundaries. Investments are made in the whole sector. Significant volumes of production process data are obtained and used for the optimization of processes. Some manufacturing areas currently use autonomously driven work lines and processes that can respond on their own. The information obtained during the process of the product is used significantly for functions such as product creation and remote maintenance. Data-driven services for consumers account for a significant share of revenues, and the producer is fully integrated with the customer. In all critical areas, the organization has the internal human skills required.

Source: Pirola, et.al.,2019

RESULT AND DISCUSSION

The results of processing and analysis of data collected from 113 SMEs in West Java is discussed within this section. We collect data from various sectors of SMEs in Indonesia which are listed in table 1. From the data collected, we found that most of the samples are from the culinary and fashion industry. It was in line with the research by BPS (Badan Pusat Statistik) and BEKRAF (Badan Ekonomi Kreatif) Indonesia which found that culinary and fashion were the most contributed sectors in creative industries Indonesia [11]. Also, supported by the statement of the Minister of Cooperatives and SMEs which stated that two industries that continue to grow and increase from year to year are Culinary and Fashion. The samples from the culinary industry are 42 (37.2%), fashion 34 (30.1%), and the other from architecture, interior design, farm, movies, etc.

In addition to grouping into sub-sectors, we also recorded a sample based on assets and monthly turnover which can be seen in Table 3. There are three groups of samples which are listed based on The Law of the Republic of Indonesia No. 20 of 2008 concerning Micro, Small and Medium Enterprises

Table 3.
List of Sample per Sub-Sector

No	Sub-sector	Number of Sample	Percentage
1	Advertising	2	1.8%
2	Agriculture	2	1.8%
3	Architecture	7	6.2%
4	Art	1	0.9%
5	Craft	3	2.7%
6	Culinary	42	37.2%
7	Interior design	4	3.5%
8	Farm	4	3.5%
9	Fashion	34	30.1%
10	Movies, Animation and Videos	4	3.5%
11	Product Design	3	2.7%
12	Publishing	1	0.9%
13	Visual communication design	2	1.8%
14	Others	4	3.5%
	Total	**113**	**100.0%**

Source: researcher data

Based on Figure 1, the majority of the data samples are small enterprises with total assets between USD 3.500-350.000 (80 %) and monthly turnover between USD 14.000-270.000 (52 %).

Figure 1.
Total Asset and Monthly turnover of sample SMEs
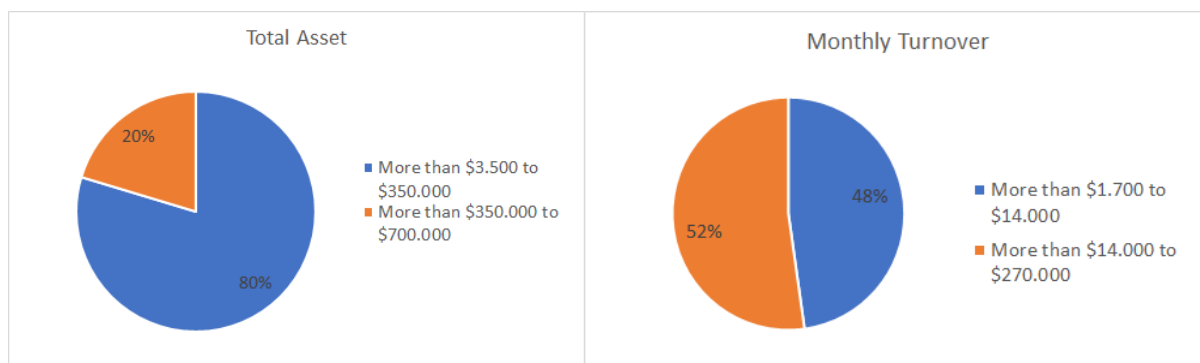
Source: researcher data

From the data which has been collected, researchers conducted a quantitative method of data processing using the formula described in the section of research methods in order to obtain results as in the following pictures.

In figure 2 we can see that the majority of these sample's SMEs were found to be at level 2 or "digital novice" category. The level of readiness is represented by 43.86 % of the 113 respondents, and then 31.58% of the respondents are in the level 1 "digital novice". It shows that digital readiness in Indonesia, especially in West Java, is still quite low. Although, there are some SMEs which are in the three top levels.
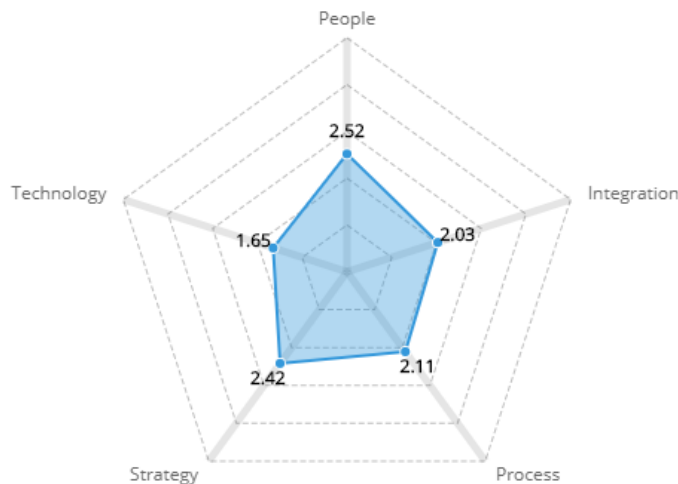
Source: researcher data
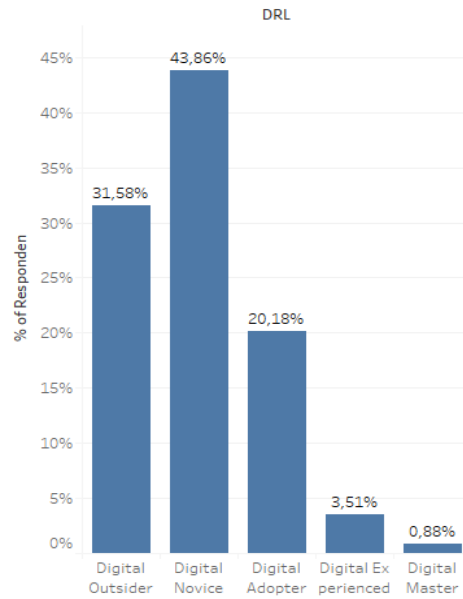
Figure 2.
Digital Readiness
Level

After calculating the respondent's digital readiness level. we analyzed the 5-dimensional digital readiness index which then obtained the results as shown in Figure 3. We found that from five dimensions, people are the first dimension which has been the strength of SMEs in Indonesia. This proves that in fact human resources or people in SMEs in Indonesia are quite ready to accept the development of digital technology in their business, however, other supporting things such as the willingness of the technology itself are not sufficiently supportive.

Figure 3.
Digital Readiness
Index

Source: researcher data
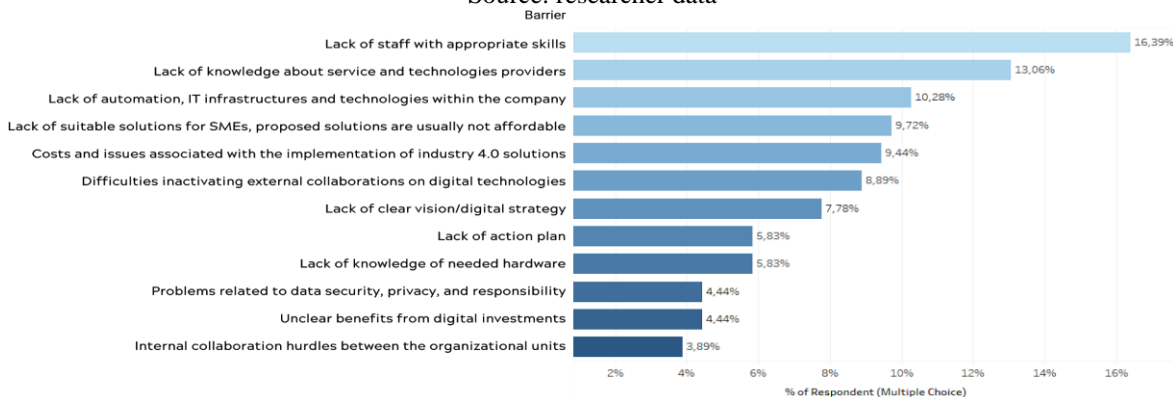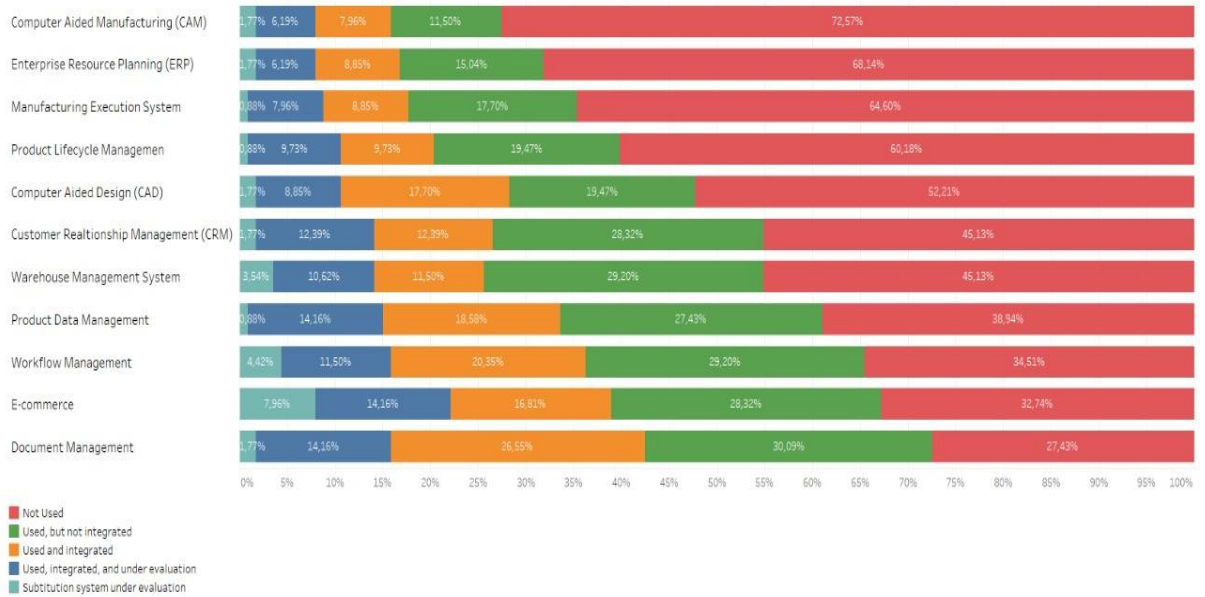
Figure 4.
Barriers

Source: researcher data

Figure 5.
Use of IT Tools

Of the five conditions for using IT instruments, the majority of answers from the 113 responded is dominated by the red one (not using IT instruments). 72.57 % and 68.14 % of the total respondents have also responded that they have not used Computer-Aided Manufacturing (CAM) and Enterprise Resource Planning (ERP), respectively. According to the average 'not using IT instruments' category, more than 49 % of the 113 SMEs did not use IT Tools for their business. The current figure indicates that the vast majority of SMEs have not accepted or used these IT methods. This can be related to the barrier chart in Figure 2, in which many SME actors lack knowledge of service providers and technologies
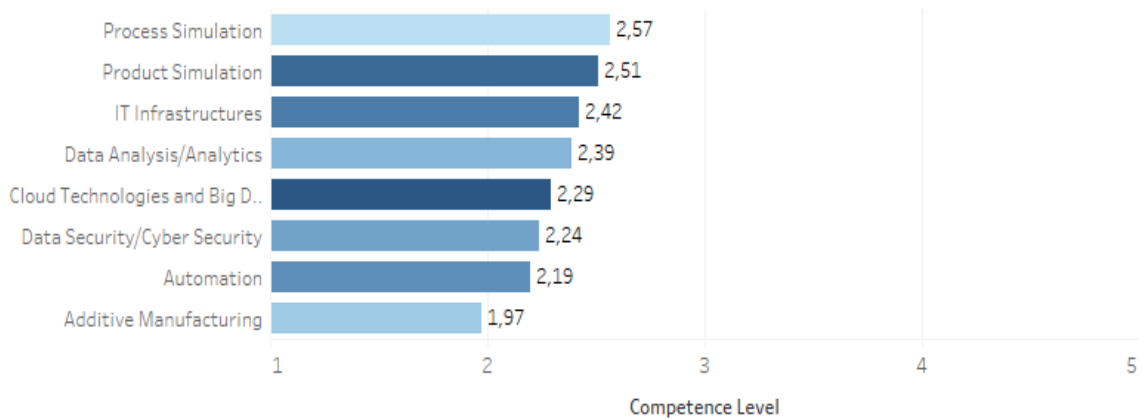
Figure 6.
Technology-related
Competency

Figure 3 shows the overall average smart technology-related competency, with an assessment ranging from 1 (no competence at all) to number 5 (high competence), and the result shows the value of 2.31. This figure shows that small and medium-sized enterprises also lack adequate smart technology-related competence; only a few small and medium-sized enterprises have adopted smart technology, such as process automation. For this purpose, upskilling and reskilling actions should be developed to encourage workers to leverage the potential of new technology. In particular, lifelong learning and preparation are important
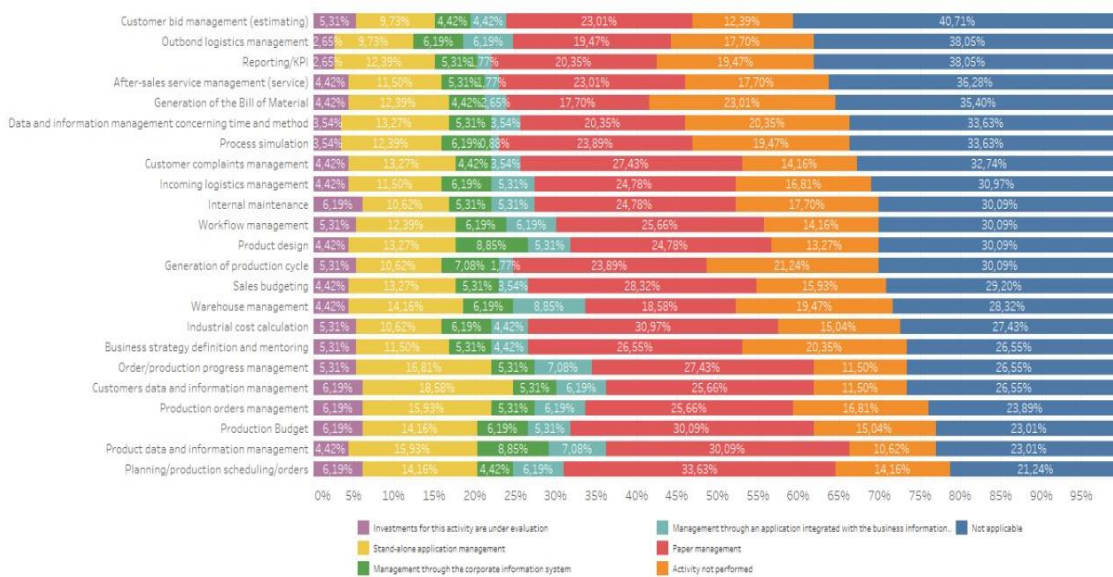
Figure 7.
Types of Support System

Source: researcher data

In this figure, there are different types of support systems for every method. Content management, integrated business information systems for applications, and stand-alone applications are some of the examples. It can be seen that the majority of SMEs do not use the support system in each process. It is worth mentioning that most planning/scheduling methods for the production/ordering of SMEs provide a support mechanism in the form of document management. It can be seen that, in the context of record management, many regular or repetitive tasks use a support system.

This research was found that 43.86 % of the 113 respondents are at level 2 or "digital novice" category. It means that the level of readiness of SMEs in West Java is still quite low in particular.

There are numerous obstacles that make digitization difficult for SMEs in Indonesia. From the five dimensions studied, it is known that the weakness or unpreparedness of SMEs in West Java lies in technological advancement. Since there are so many SME in Indonesia that are personal businesses and home goods, they seem to be cautious about incorporating new technology into their operations. The findings of the research were also affected by the types of businesses examined. The majority of the 113 SMEs surveyed were not technology-based businesses, such as those in the fashion and food and beverage industries, which continued to only use basic digitization for marketing purposes using different online media. The vast geographical position of Indonesia, with gaps in the distribution of information and technology, is one of the obstacles in digitizing SMEs in the region. There is a digitalization gap among SMEs in cities and villages, and IT technology is unevenly distributed. The index of information and communication technology development is still not equally distributed in Indonesia, according to the BPS - Statistics Indonesia.

People are the most mature dimension, despite the fact that the average figure is not particularly large. This demonstrates that the majority of Indonesians are aware of and concerned about the value of digitalization, despite the fact that the capabilities and various supporting factors for digitalization are still missing. SMEs are still unsure about the benefits of digitalization, identifying the most appropriate strategy for the Industrial Revolution 4.0, and identifying what investments are needed for a successful transition to digitalization.

Integrity between large-level companies and SMEs is almost limited to CSR (Company Social Responsibility) which is regulated by the Indonesian government in the Law no. 40 of 2007 about the Company. The Indonesian government itself strongly encourages partnership programs between large companies and SMEs that aim to help the development of SMEs in Indonesia. The government monitors and determines the CSR criteria that companies must carry out, this shows that CSR is very important and can affect the relationship between companies and stakeholders [3]. However, research conducted by Ghassani & Wardiyanto [24] states that the implementation of SME partnerships often fails. Partnership failures are generally caused by the weak foundation of partnership relationships and differences in organizational culture in partnerships and various other factors [24]. While implementing 4.0 requires a strong foundation of partnership and higher level of integrity in order to get more effective and efficient results. Large companies should be able to collaborate more intensively with SMEs to improve the efficacy and quality of their operations through the use of digital technologies.

Despite the real conditions in the field, there are several significant barriers to digital readiness, especially for SMEs in the culinary and fashion sectors in West Java. Every company, organization and business must be able to commit and have corporate goals and strategies that are aligned with the use of digital technology [20; 21; 25]. Strategy is one of the most critical aspects of business planning for both large corporations and SMEs. The most frequently cited constraints are the lack of a digital strategy, vision and action plan. Business owners must support Industry 4.0 initiatives and provide the necessary resources and support during all phases of implementing digitization. Using digital technologies to execute a business strategy involves collaboration from all parties in the organization, including top management and business owners, as well as all staff and employees [22]. Industry 4.0 strategy must include all facets of business activities from upstream to downstream, starting from product manufacturing, product offerings to customer relationships. The more software and knowledge incorporated in a product during strategy 4.0 implementation, the more data relevant to all phases of the life cycle is available, assisting companies in developing new businesses. Predictive technology, combined with intelligent algorithms, may allow product performance degradation to be predicted, as well as the ability to independently manage and optimize product and service requirements [30]. This assists manufacturers in transitioning to service transformation particularly in offering services enabled by digital technology and connectivity, such as remote monitoring and predictive maintenance [4], and shifting the manufacturing paradigm away from product-to-product usage [8].

Apart from technology, automation, processes and strategies, human resource is one of the most important considerations for companies, especially SMEs, when implementing digitization in their businesses. People who are knowledgeable and willing to adapt and operate efficiently using different digital technology are needed by businesses of all sizes. Human resources must also possess problem-solving, optimization, and analytics skills, as well as big data and cognitive abilities [37]. Furthermore, Industry 4.0 would necessitate a wider work climate.

CONCLUSION

It is critical to note that SMEs must establish a long-term plan for coping with the fourth industrial revolution. Until developing a plan and defining the investments that SMEs will need for the industrial revolution 4.0, SMEs must first consider and assess their current business' digital readiness.

The main objective of this study is to assess the level of digital readiness of SMEs in Indonesia, especially in West Java, in light of the industrial revolution 4.0's progress. This research is intended to assess SMEs' level of digital readiness in order to determine what needs to be improved and/or retained.

With relation to the five key dimensions, namely individuals, process, strategy, technology, and honesty, we were able to recognize the current conditions of digitalization readiness of 113 SMEs and identify many items that need to be prioritized in the transition to industry 4.0.

Other factors that could have a major effect on the transformation of SMEs in the face of the Industrial Revolution 4.0, such as Indonesian government regulatory factors, should be considered in future research. Further study is also needed to enrich sample grouping so that the characteristics of each SMEs can be defined in greater detail and accuracy.

In terms of limitations, this review acknowledges that it only looked at a few variables that could be expanded in future research as technology advances. The drawback of this research is the number of samples that are not uniformly distributed around each sector. Further research can be carried out by increasing the sample size and taking into account other variables such as governance. As we all know, the development of SMEs in Indonesia is also influenced by government support and regulations.

The government should take into consideration that given our results find that the digital readiness level is 2 (e.g., digital novice), thus technology infrastructure should be strengthened while the capability of the management (owner/senior manager) of a SMEs should be trained to adopt current digital technology to level up their digital competence. Also, integrity between large-level companies and SMEs is not only limited to CSR (Corporate Social Responsibility). Meanwhile, implementing 4.0 requires a higher level of integrity in order to be effective and efficient. Large companies should be able to collaborate with SMEs to improve the efficacy and quality of their operations through the use of digital technologies.

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