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Recent Evidence on the Digitalization Process in Indonesia's Micro and Small Enterprises

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ABSTRACT: The digital transformation process in micro and small enterprises (MSEs) in Indonesia is still a black box, and existing findings regarding digitalization in this business group are still very limited and fragmented. Considering the above background and the important contribution that MSEs can make to the economy and employment opportunities, as well as poverty alleviation in Indonesia, this paper aims to examine the current progress in the transition process from analog/conventional technology to digital technology (DT) in Indonesian MSEs based on the latest secondary data from the Central Statistics Agency (BPS), and primary data collected from online surveys. The finding suggests that although there has been progress in recent years, as demonstrated by the increasing number of MSEs using the internet, Indonesian MSEs still lag in the adoption of digital technology.

KEYWORDS: MSEs, MSMEs, DT, digitalization

1. INTRODUCTION

Micro, small, and medium enterprises (MSMEs) dominate the Indonesian economy. These enterprises account for around 99 percent of all businesses in Indonesia and employ more than 95 percent of the total workforce across the country. They should be the primary engines of economic growth, although they generate only approximately 56 percent of the overall gross domestic product (GDP) of Indonesia. Around 80 percent of MSMEs are in the trading sector involved in buying and selling existing products/services). Within the MSME group, micro and small enterprises (MSEs), i.e. business units with up to a maximum of 500 million Indonesian rupiah (IDR), are the ones that receive the most attention from the Indonesian government because they account for almost 99 percent of total MSMEs. So, compared to medium enterprises (MEs) and large enterprises (LEs), MSEs are the largest job creators in the country. These enterprises also have high resilience in various previous crises, including the COVID-19 pandemic. Their high resilience has played a role as a cushion for the economy because of their ability to survive periods of pressure and grow back faster and higher after pressure. However, even though their strategic role in the national economy is recognized by the government, they still face various obstacles including a lack of access to formal loans especially from commercial banks, a lack of highly skilled manpower, a lack of advanced technologies, including digital technology (DT), and difficulties in marketing their products and the procurement of raw materials.

The emergence of DT, ranging from social media, mobile technology, and cloud computing, to internet-of-things (IoT), has also drastically changed business practices in Indonesia, especially since the COVID-19 pandemic crisis. As with larger companies, it cannot be denied that digital transformation in MSEs will certainly help them to have sustained and more rapid growth along with increasing their level of competitiveness which ultimately gives these enterprises the ability to survive in the long run or even increase their share in an increasingly open and competitive regional or global market. Thus, digitalization can help MSEs gain and maintain their competitive advantage by increasing the flexibility and resilience of their organizations as well as by increasing their dynamic capabilities which are now urgently needed in facing global market turmoil which is increasingly uncertain due to various serious challenges including the impact of global warming, trade wars between the US and China, the tendency in several countries to apply protectionism to foreign goods, and geopolitical changes (e.g. Sambamurthy et al., 2003; Vial, 2019; Guo et al., 2020).

From various journal articles, it can be generally defined that digitalization is a transition process from the use of analog technology to the use of DT such as information and communication technology (ICT), internet connections, and computing (see discussion, among others, in Sebastian et al., 2017; Vial, 2019; Guo et al., 2020). DT is a mixture of computerized ICT and can be classified into several types, including social media, mobile, big data, cloud computing, IoT, platform development (such as various

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markets places, and artificial intelligence (AI) technology (see for example Vial, 2019; Guo et al., 2020). et al., 2019; Guo et al., 2020)

Internet access is crucial for using DT effectively. It has been proven everywhere that the COVID-19 pandemic significantly influenced the adoption and adaptation of digital solutions in primary to higher education. Schools, universities, teachers, staff, and students transitioned to online learning, leading to the adoption of various digital tools. In other words, internet use plays a crucial role in driving the adoption of DT. Factors such as individual attitudes, economic considerations, organizational readiness, and network effects all contribute to this relationship. According to the UN (2024), around 50% of the population in developing countries now has access to DT through their internet access. But still many, especially women, the elderly, persons with disabilities, and those in poor or remote/rural areas are disconnected. The number of MSEs who have access to or use the internet, therefore, can be used as an indicator regarding the digital transformation process in this group of enterprises.

Based on the latest data from the Ministry of Cooperatives and SMEs, the process of digitalization or use of the Internet among MSEs in Indonesia is progressing relatively slowly compared to neighboring countries such as Singapore and Malaysia. According to the Ministry, quoted from a CNN Indonesia report, up to 2019, of the more than 65 million MSMEs, only 3.79 million were connected to the internet and used online platforms to market their products. The government hopes that by 2024 the number of MSMEs using digital platforms as a trading medium will increase to 30 million MSMEs (https://www. cnnindonesia.com/economic/20171115161037-78-255819/kemenkop-SMEs-379-juta-UMKM-lalu -go-online).

Meanwhile, the 2022 Digital Literacy Status survey in Indonesia conducted by the Ministry of Communication and Information as quoted from Wahyono (2024) indicates that in general the level of knowledge of MSME actors, especially those in the MSE category in Indonesia, regarding DT is relatively low. The application of digital marketing by MSMEs in Indonesia is limited to only 3 platforms: instant messaging, social media, and e-commerce. The Indonesian E-Commerce Association (idEA) noted that as many as 9.9 million MSMEs switched to digital platforms during the COVID-19 pandemic crisis from May 2020 to February 2022. According to Bima Laga, General Chairman of Idea, as of early March 2022, there were a total of 19 million MSMEs that utilize digital platforms, said (quoted from Maduwinarti, et al. (2022).

Even though the current era can be said to be the era of the digital economy, at least in Indonesia, most MSEs still reject the use of this kind of technology. They continue to use conventional methods such as using printed materials to market their products and use more traditional methods to search for information and communicate with other parties such as by telephone. Many MSEs are unlikely to adopt new technologies such as the Internet and DT if they are not familiar with more basic technologies. However, like other companies in all sectors, MSEs ultimately have no other choice but to adopt this technology if they want to survive in the market. Sooner or later, MSEs that do not adopt new digital-based technology and business practices will be pushed out of the market by their competitors and abandoned by their customers (for example Ahmada et al., 2015; Ocha, 2011; Azam and Quaddus, 2009a,b; Barry and Milner, 2002).

The Indonesian government has taken many measures to encourage or support MSEs to go online and to adopt DT in their business practices. In 2016, Indonesian President Joko Widodo launched a technology development plan to make Indonesia the largest digital economy in Asia by 2020. As part of this initiative, the Gerakan Nasional 1000 Start-up Digital Initiative was launched and has made tremendous progress. Other measures include providing training in using such as Facebook, Instagram, and other applications systems, creating their websites to promote and market their goods and services; creating a special web portal (SMESCO Trade) by the Ministry of Cooperatives and Small Medium Enterprise that all MSMEs can use it for marketing their products; and issuing various regulations to provide a sense of security for business actors in using DT such as e-commerce for marketing and internet banking for financial transactions (BI, 2022; Yuniarto, 2022).

The digital transformation process in MSEs in Indonesia is still a black box and existing findings regarding digitalization in this business group are still very limited and fragmented. Considering the above background and the important contribution that MSEs can make to the economy and employment opportunities as well as poverty alleviation in Indonesia, this paper aims to examine the current progress in the transition process from analog/conventional technology to DT in Indonesian MSEs based on the latest secondary data from Central Statistics Agency (BPS), and primary data collected from online surveys. Although the results may not be satisfactory due to limited data, this investigation helps reveal facts about the digitalization process in Indonesian MSEs as well as the factors that influence this process.

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2. LITERATURE REVIEW

This section does not review literature regarding the benefits of DT because no one doubts their benefits for business activities, but rather selected literature on key factors that influence the digitalization process in MSMEs, especially MSEs. Apart from that, this section also discusses several existing case studies regarding the use of DT by MSEs and its problems in Indonesia.

2.1 Factors Affecting Digitalization of MSMEs

In recent times, researchers have seen the value of studying digital transformation in MSMEs and have focused on investigating this topic. Even though there is an interest among scholars in understanding this topic, the extant knowledge regarding the process of digital transformation of MSMEs, especially MSEs, in developing countries remains limited and disjointed (e,g, Taiminen & Karjaluoto, 2015; Ojala, 2016; Sousa & Wilks, 2018; Riera & Iijima, 2019; Sehlin et al., 2019; Garzoni et al., 2020; Li et al., 2018; Lokuge & Duan, 2021; Lindblom et al., 2021; Argüelles et al., 2021; Kraus et al., 2021; Owoseni et al., 2022; Sastararuji et al., 2022).

Concerning the main factors that influence the decision of company owners or managers to utilize DTs or to use the Internet, many such as Blackburn and Athayde (2000), Fallon and Moran (2000), Matlay (2000), and Riquelme (2002) conclude that type of business or sector and size and characteristics of enterprises are the most decisive factors for a company to adopt DT or to use the Internet. Others such as Poon and Swatman (2005), Chong and Pervan (2007), Shih (2008), Poorangi and Khin (2013), Ahmada, et al. (2015), and Rahayu and Day (2015) mention many other factors, which include perceived relative advantage, organizational compatibility, and benefits; firm owner's or manager's strategic vision; a company's level of innovativeness; DT knowledge, expertise, experience, and willingness of company leaders or managers to use DT as well as to adjust the way they do businesses to the requirements related to the use of DT; business planning; organizational complexity; government policies; availability of skilled labor; software/hardware vendors; and pressures from trading partners, customers, and competitors.

Neale, et al. (2006), Saffu, et al. (2008), Azam and Quaddus (2009a,b), and Poorangi, et al. (2013) found that besides perceived organizational compatibility, relative advantages and organizational complexity, trialability, observability, and company's culture are also important determinant factors of adopting online marketing (e-commerce) by small businesses. Whereas, articles published by such as Herscovitch and Meyer (2002), Migiro (2006), Jones, et al. (2011), and Zaied (2012), reveal that resources, i.e. capital to finance-related costs (e.g. training of employees, organizational change, investment in tools, and others), internet security or trust to use online transactions, and human resources are the main decisive factors for MSMEs to utilize the Internet. Concerning human resources, it is not only from the point of view of technical know-how/expertise but also the solid commitment of human resources to embrace change and undergo digital transformation as a mindset binding individuals to necessary actions to implement change initiatives successfully is a critical success factor in MSME digitalization (Herscovitch and Meyer, 2002).

Several researchers such as Ghobakhloo and Iranmanesh (2021), Lokuge and Sedera (2019), and Lokuge et al. (2019), highlighted that the continuity and success of the transition to digital in MSMEs are very dependent on the ability of business owners or managers to collaborate with external partners such as large companies, universities, chambers of commerce and industry, business associations, and of course the government. These partners can also come from various aspects such as the value chain, supply network, and new partners introduced through technological advances such as consulting firm DT. This collaboration is very important for MSEs, considering their limited resources, including the skills of business owners or workers regarding ICT. In other words, engagement with various parties is very important for the growth and sustainability of MSE digital initiatives.

According to several researchers such as Sedera (2006), Nylén and Holmström (2015, 2017), Tan et al. (2015), Nair et al. (2019), Szopa and Cyplik (2020), and Lokuge and Duan (2021), the right business strategy with clear goals and objectives has a key role for MSEs in carrying out their digital transformation. Without a proper business strategy and the involvement of top leadership (e.g. owners or managers) in managing and ensuring the alignment of that business strategy, initiatives to adopt DT will have little success or may even fail. Considering the transition from analog technology to DT as an innovation process for companies, many researchers emphasize the importance of the role of top company leaders in leading the process and MSEs must fully integrate the digitalization process including adopting online marketing or the use of social media into company plans and strategies (e.g. Hoque et al., 2016; Delone & Mclean, 2003; Kohli & Melville, 2019; Lokuge et al., 2020; Garg et al., 2020). In fact, in terms of top leadership or the role of managers, it is not too much of a problem for MSEs, because this business group inherently does not have an organizational hierarchy as is generally applied in modern companies. In MSEs, the level of formalization is low and business

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owners are directly involved, in fact, in almost all areas of activity, from procurement of raw materials, and marketing to financial affairs. According to Jansen et al. (2006), these characteristics reflect factors that support innovation.

Some argue that in facing or implementing digitalization, MSMEs must implement various strategies that suit their business context and needs. These strategies include keeping the business updated with technological developments, optimizing content through search engine optimization (SEO) practices, utilizing available social media platforms, especially for marketing, digitizing human resources, using analytical tools to predict trends in market changes, utilizing financial technology (fintech) in company funding, and also ensuring the availability of quality digital infrastructure. In addition, it is important to adopt digital literacy, train employees on e-commerce, expand internet networks, increase awareness of social issues, and optimize technology that supports environmentally friendly practices. Collaboration with external parties, government support, and continuous learning are important factors in the digitalization process (see, for example, Evangeulista et al., 2023; Wahyono, 2024).

Organizational culture, which can be defined as the system of shared beliefs and values that develops within an organization or its sub-units and that guides the behavior of its members, also plays an important role in driving innovation within companies, including the shift to digital, as highlighted by various researchers, among others, Çakar and Ertürk (2010), Boudreau and Lakhani (2013), and Büschgens et al. (2013). Especially for MSEs with limited resources, ensuring that the organizational culture is very supportive of innovation is very important for the success of the digital transformation. Çakar and Ertürk, (2010) emphasize that effective management and the cultivation of an empowering corporate culture are the main drivers of the success of digital transformation efforts.

The success of MSEs in digital transformation is also determined by the appropriate utilization of ICT capabilities, namely the ability of MSEs to build and use ICT-based resources (including physical ICT resources and ICT staff within the company), which must be combined with other resources and capabilities they have. This also includes the skills of workers and owners or managers of MSEs to develop their competencies (Bharadwaj et al., 2013; Walther et al., 2013, 2018; Sunny et al., 2018; Lokuge & Sedera, 2018; Philipp, 2020). However, here actually lies the problem of MSEs, especially in developing countries, which have limited resources, including a lack of skilled ICT personnel.

Several researchers including Alashwal and Al-Sabahi (2018) and Bin-Obaidellah et al. (2023) investigated the use of DT, especially the application of marketing methods through various types of social media in Yemen, and found that in general the adoption of DT, especially marketing via social media, in this Arab country is still in its early stages due to many challenges and obstacles compared to developed countries. Some challenges include the level of ICT infrastructure development, which is an important component in DT adoption, in this country is still not very advanced. Some other researchers such as Usman and Oyefolahan (2014), Islami et al. (2020), Sarangi and Pradhan (2020), and Li et al. (2020) explained that the availability or support of DT has a significant influence on the use of web technology.

Many other studies use the concept of the “digital divide” (DD) to examine disparities between individuals, companies, regions, and countries in accessing and using DT. For instance, in Taylor's (2023) research, the DD refers to the gap between demographics and regions that have access to ICT and those that do not. Although the term now includes the technical and financial ability to utilize ICT, along with access (or lack of access) to the internet, the gaps in question continue to change as technology develops. Apart from Taylor (2023), important studies on DD include Viswanathan and Pick (2005), Arendt (2008), Fong (2009), Stiakakis et al (2009), Oliveira and Martins (2010), Srinuan and Bohlin (2011), Bach et al. (2013), Jacobs (2021), WEF (2020), and Muller and Aguiar (2022).

DD is currently developing into a digital divide, namely a socio-economic gap in the 'online population'. Jacobs (2021) explains that DD is not simply the absence of technology, but is a form of exclusion that depends on, and cannot be separated from, forms of social and economic inequality. A prime example is the so-called 'poverty premium' and how low-income or poor people pay more for data than high-income or rich people. For example, in South Africa, in practice, this ‘premium’ is charged in two ways. First, prepaid data costs much more than postpaid data or contract data per megabyte. Second, the price of low-volume, low-value packages, which are usually purchased by the poor, is more expensive than high-volume, discounted packages that are usually purchased by the rich. Further adding to this premium is the fact that, overall, South Africa is one of the countries with the most expensive data on the African continent.

As Michael Kende wrote, quoted by Muller and Aguiar (2022), DD is not binary. Many factors cause disparities in Internet access, namely (i) availability (especially infrastructure and other Internet facilities), (ii) affordability (costs that must be borne by

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users), (iii) quality of service (for example, internet speed), (iv) relevance (e.g., availability of skills, technology, mobile apps services), and (v) additional gaps (such as security, interconnectivity, digital literacy, and access to equipment). The results of a literature review conducted by Srinuan and Bohlin (2011) show that DD is a multifaceted phenomenon, due to the many dimensions of determinant factors. Some of the studies included in their review have included socio-economic, institutional, and physiological factors to gain a better understanding of the digital divide.

According to Horrigan (2019), more than 20 million households in the US do not subscribe to broadband. The analysis shows that: (i) the digital divide is caused more by consumers' unwillingness to adopt broadband than by network deployment or internet infrastructure availability; (ii) this problem is found not only in rural areas but also in urban areas, and; (iii) household economy is a greater driving factor in non-adoption decisions than geographic factors. Additionally, it was also found that network expansion was not the main reason why many households did not subscribe to broadband, but because they were unable to obtain service where they lived, or the available options did not offer service at the desired speed.

Stiakakis et al (2009) examined two main dimensions of the digital divide, namely the skills and autonomy of Internet users. The level of formal education was chosen as a variable representing the skills dimension, as well as population density in various geographic areas as a variable representing the autonomy dimension. Their research focused on European Union (EU) member states. The data provided by Eurostat includes daily computer use over the last three months and average Internet use at least once a week. Their findings show that the EU has been facing the problem of digital inequality on a large scale as there are significant gaps among member states regarding the variables mentioned above. Meanwhile, Fong (2009) analyzed the impact of DT on gross national income (GNI) per capita in developing countries using 2005 data. His regression analysis showed that there was a significant positive relationship between GNI per capita (in international PPP dollars) and the adoption of each DT is like mobile phones and personal computers, except for Internet technology.

Thus, based on this DD literature, socio-economic factors also play an important role in influencing the adoption rate of DT by MSEs, maybe not directly but through their effects on market development especially market size, structure, and level of competition.

It can thus be formulated that the willingness or ability of MSEs to adopt DT is influenced by many factors in a complex combination. These factors can be distinguished between internal factors and external factors. Internal factors can be distinguished further between company factors and owner/manager factors. The external factors include supporting, policy, and market factors (Figure 1).

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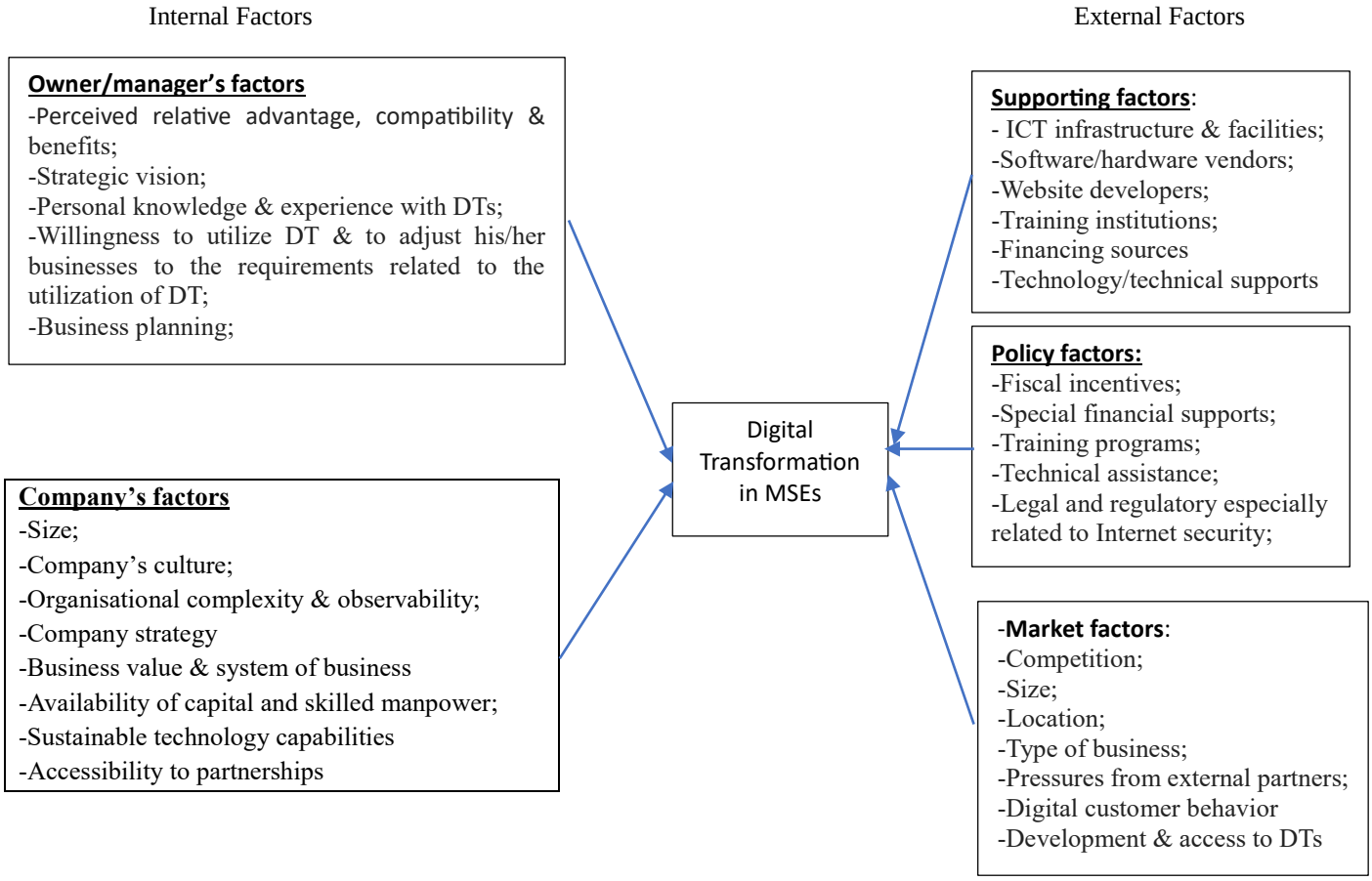
Figure 1. Main Factors Affecting Digital Transformation in MSEs



2.2 Indonesian Case

There has not been much research on the digitalization process in MSMEs, especially MSEs, in Indonesia, although in recent years there has been an increase in the number of articles on this issue. Existing studies include Rahayua and Daya (2015) who surveyed more than 200 MSME owners/managers. From their findings, it was concluded that the application of DT, especially in the form of online marketing or e-commerce, is influenced by several factors which include, among others, the benefits felt by the business owner/manager, the technological readiness of the company, the innovative spirit of the business owner, and the experience or ability of the business owner. in using DT. Because in MSEs, the owner is the company's top leader, these personal factors play an important role in the implementation of e-commerce technology in these enterprises.

Julianto (2016) in a report stated that there were various obstacles faced by the State Ministry of Cooperatives and SME in encouraging MSME owners, especially MSEs, to utilize DT. Among them are the lack of knowledge of company owners/managers in understanding the importance of DT for the interests of their business activities, their lack of desire or mindset that does not support the use of the Internet in business, and a lack of knowledge about how to operate this technology. Especially for MSEs located in relatively remote/rural areas, many of them are not yet familiar with online marketing systems. Therefore, they prefer to do marketing using conventional methods, namely by utilizing the distribution network they have used for a long time or involving many distributors or traders who have been their customers for a long time.

The Asia Pacific Foundation of Canada (APF Canada) conducted in-depth interviews with eight Indonesian MSMEs in various sectors including financial technology (fintech), food processing, manufacturing, aquaculture, logistics and warehousing, and retail. The management at these eight MSMEs answered the given questionnaires and engaged in discussions about the key digital issues impacting their businesses. The findings show that all eight companies believe they are just managing to keep up with

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digital tech, but they are lagging in key areas, particularly employee training. The majority of the respondents still need to improve their internet infrastructure, e-commerce, and digital business activities. But, they were not aware that they could get assistance from government agencies, non-government organizations, and private companies to help them. The primary technology platforms used for the companies' operations are mobile applications. The main challenges for them involve the regulatory environment and a lack of information about legal frameworks and regulations. They complain that harmonization and coordination between government agencies are lacking, and access to broadband wireless internet services is not available everywhere when it's needed (Capri, n.d.).

Rafiah and Kirana (2019) interviewed 30 MSME owners in the food and beverage industry in the Jatinangor area in West Java province and found several obstacles preventing them from utilizing various digital marketing features. Among these obstacles, limited information, including regarding how to use social media applications, is often considered the main obstacle that prevents them from adopting digital marketing via social media, especially Facebook which provides the Facebook Page feature, and Instagram which provides the Instagram for Business feature. Indeed, most of the respondents are over 40 years old, so it is relatively difficult for them to know how to use social media features, especially Instagram. Apart from that, the next obstacle is the lack of resources in managing social media, especially Instagram. They focus more on the production process and conventional product sales process.

Media Indonesia, a daily newspaper, on May 8, 2021, reviewed several research reports from various research institutions in Jakarta regarding DT penetration in MSMEs. Delloite Access Economics, among others, reported that in 2017 around 36 percent of the number of MSMEs in the country still offline, used conventional marketing methods, and only about 18% could use social media and websites to promote their products. In this group, medium enterprises (MEs) are more likely to use DT and have websites compared to small enterprises, especially microenterprises which lack resources. Low technological knowledge and unskilled labor were two main constraints according to this report. The Center for Indonesian Policy Studies (CIPS) showed that as many as 37 percent of MSMEs recorded as only being able to operate computers and the internet in simple ways. The report emphasizes that digitalization in this category of enterprises can only be accelerated if competent authorities work together to provide and ensure sustainable and affordable internet connectivity. In Indonesia, the key competent authorities are the Ministry of Cooperative and SME which is responsible for the development of MSMEs in the country, the Ministry of Communication and Information which is responsible for developing digital infrastructure, digital government, digital economy, and digital society (which has also published the 2021-2024 Digital Indonesia Roadmap), as well as all sector-based ministries such as the ministry of industry and the ministry of agriculture. Finally, the Danareksa Research Institute showed that only around 41.67 percent of the number of MSMEs in Jakarta and its surrounding areas had used social media and digital marketing in their business operations. Meanwhile, only 29.18 percent of MSMEs on Java Island and 16.16 percent of MSMEs outside Java Island have utilized digital marketing. (https://mediaindonesia.com/ekonomi/403910/literasi-digtal-umkm-jadi-kendala-dalam-transformasidigital).

In March 2023, DSInnovate (2023) released the "MSME Empowerment Report 2022", which focuses on the growth of MSME businesses in Indonesia and their ability to undergo digital transformation. The report provides a comprehensive analysis of the opportunities and obstacles of digitalization in MSMEs in Indonesia based on a survey of 1500 MSME players in the country. According to their business category, almost 65% are micro-businesses, and the second rank of the business category is a small business (25.3%). Relevant stakeholders were also interviewed to explore opportunities for digital transformation in Indonesian MSMEs. One interesting finding is regarding digital awareness among MSME business actors: 87% of respondents said they are aware of digitalization opportunities, 62.3% of surveyed companies are already using DT for business operations by implementing digital solutions, and 37.7% just started using them. Concerning obstacles they face in running a business, the problem of adopting new technology, including DT, is in fourth position (30.9%). Meanwhile, in the top position is marketing (70.2%). The report also reveals that one of the most significant challenges for MSMEs in digital adoption is access to finance. Many of the respondents struggle to secure the funding they need to invest in digital technologies and infrastructure. Another major challenge for most of the respondents is a lack of digital skills and expertise. Many of them are run by individuals who may not have the knowledge or training needed to use DT effectively. The last major challenge stated in the report is security, and it could be a big concern for MSMEs, especially MSEs, as they might not have the expertise or the budget to implement security protocols that protect their digital assets.

At the end of 2023, Indef, a research institute, surveyed 254 samples of MSMEs spread across Jakarta, Bogor, Depok, Tangerang, and Bekasi (30%), other cities in Java Island (50%), and outside Java Island (20%). This MSME sample was selected

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using a non-probability sampling method via purposive sampling techniques. The results show that 33.86% of respondents who initially only sold offline have now expanded their business online. Then 61.02% of respondents used offline and online promotional media simultaneously from the start of building their business, and 5.12% used digital channels as their only means of selling. The majority use digital applications such as social media and e-commerce as their main place to sell (34.25%). The rest still prefer to sell offline, especially in shophouses, stalls/grocery stores, shopping centers/malls, or traditional markets (Indef, 2024).

Several other studies in Indonesia such as those from Setiowati et al. (2008), Maryeni et al. (2012), Wiradinata et al. (2015), Subawa and Mimaki (2019), Effendi et al. (2020), Priyono et al. (2020), Putra and Santoso (2020), Ariyani, et al. (2021), Trinugroho et al. (2021), and Patma et al. (2021) found that company, sales, and owner characteristics play an important role in adopting new technologies including DT. Also, the intention to adopt social media to market their products is significantly influenced by the technological context (e.g. the relative advantage, perceived ease of use), organizational context (e.g. top management support, employee knowledge, business strategies), environmental context (e.g. competitive pressures), and social media awareness. Likewise, perceived benefits, ease of use, and cost are determining factors.

3. METHODOLOGY

This study adopts a descriptive analysis that analyzes secondary data and primary data. The secondary data was taken from an annual survey on MSEs in the manufacturing industry by the Indonesian National Statistics Agency (BPS). The specific manufacturing industry chosen in this research is due to the absence of annual data on MSEs in other sectors. The primary data was collected from an online survey using bit.ly, sent randomly to 200 owners of MSEs from a list provided by the Indonesian Chamber of Commerce and Industry.

The list itself exceeds 500 entrepreneurs spread across several areas outside Jakarta. However, only 200 are complete with the correct email address and/or have a WhatsApp number. These 200 respondents were spread out across several cities, including Jakarta (the majority), Serang and Tangerang in Banten Province, and Depok and Sentul in West Java Province. Other cities include Brebes in Central Java Province, Ternate in North Maluku Province, Padang in West Sumatera Province, Surabaya and Sidoarjo in East Java Province, Banjarbaru in South Kalimantan Province, and the furthest city in the easternmost part of Indonesia, namely Jayapura in Papua Province. Broadly speaking, this survey aims to find out whether they use the internet in marketing and their personal opinion regarding the importance of DTs for their business. The survey was not intended to represent a statistically significant sample, but rather to provide anecdotal evidence that supports broader trends that were identified in the literature review and findings from the annual BPS survey.

4. FINDINGS AND DISCUSSIONS

4.1 Findings from Secondary Data

Based on annual data from the Ministry of Cooperatives and SME, the number of MSMEs in Indonesia continues to increase every year. In 2019 (the latest data available), the number reached almost 65.5 million enterprises (Figure 2). Of this number, the majority are from the microenterprises (MIEs) category, which reaches around 99.99 percent of all businesses in Indonesia. For example, in 2019, of the 65,465,497 MSMEs, around 98.7 percent were MIEs. 798. Meanwhile, the number of small enterprises (SEs) is only 798.6 thousand, and medium enterprises (MEs) are almost 65.5 thousand (Figure 3).

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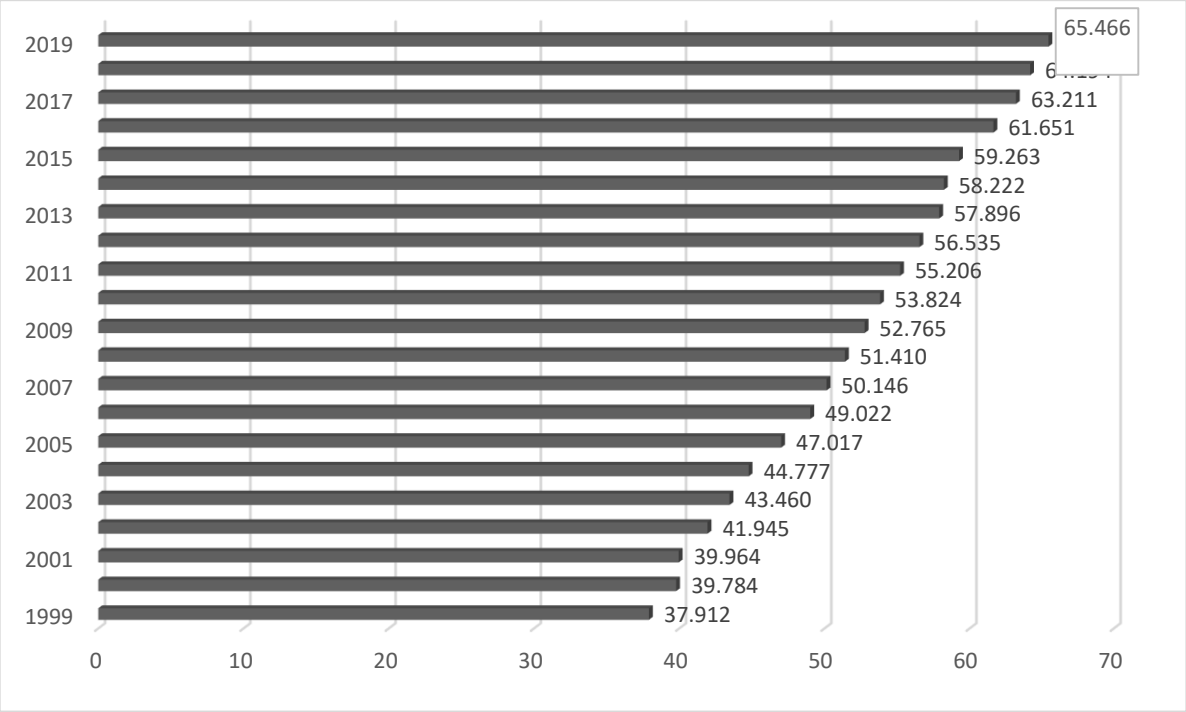
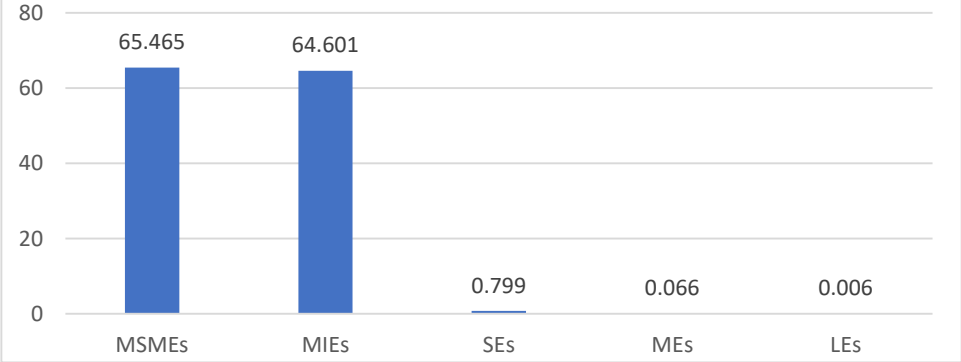
Figure 2. Total number of MSMEs in all sectors, 1999–2019 (million units).



Source: Ministry of Cooperative and SME (http://www.depkop.go.id/berita-informasi/data-informasi/data-umkm/)

Figure 3. Number of Enterprises by Size in Indonesia, 2019 (%)



Source: Ministry of Cooperative and SME (http://www.depkop.go.id/berita-informasi/data-informasi/data-umkm/)

Not all MSEs use the Internet for their business activities. Most of them are still found applying conventional systems in selling or procuring raw materials. The 2016 Economic Census shows that the types of businesses that most MSEs utilize the Internet are retail trade and car and motorcycle repair and care services with around 39.64 percent (Figure 4). Especially in the retail trade, the use of online transactions by both consumers (buying) and producers (selling) in Indonesia has grown tremendously in recent years, especially since the COVID-19 pandemic. This development is also encouraging or even forcing more and more MSEs in this sector to use the internet for marketing their products, either by utilizing existing online marketing platforms or creating their websites, or using other social media tools such as Instagram, or Facebook, or others. Other types of businesses that are also run by many MSEs by utilizing the internet are information and communication with 11.73 percent, manufacturing industry with 10.66 percent, and education with 8.09 percent.

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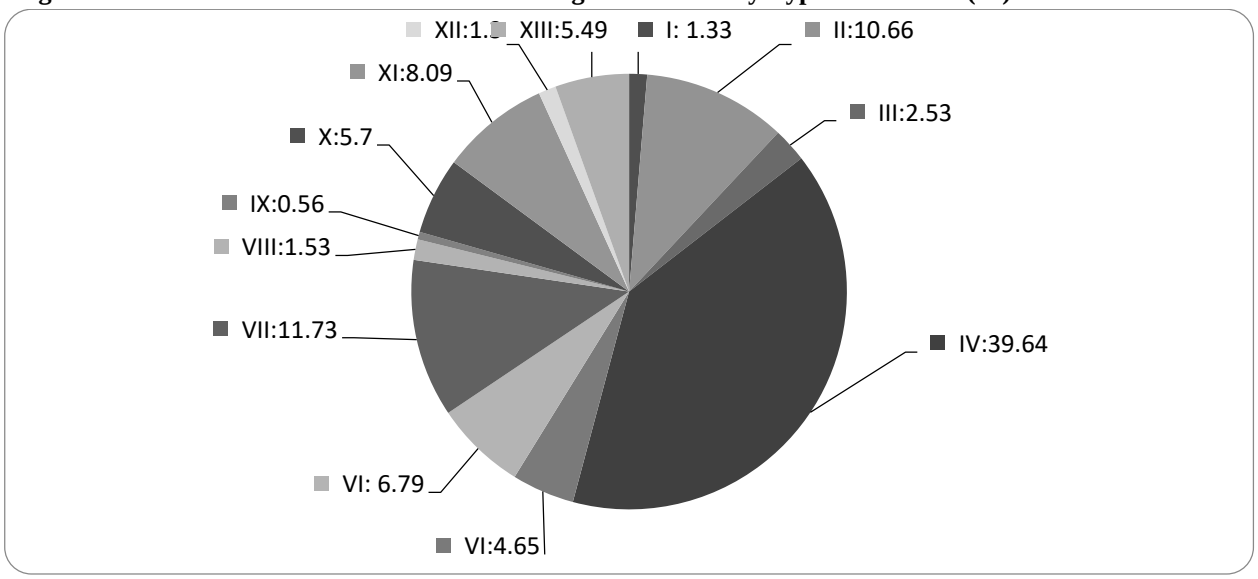
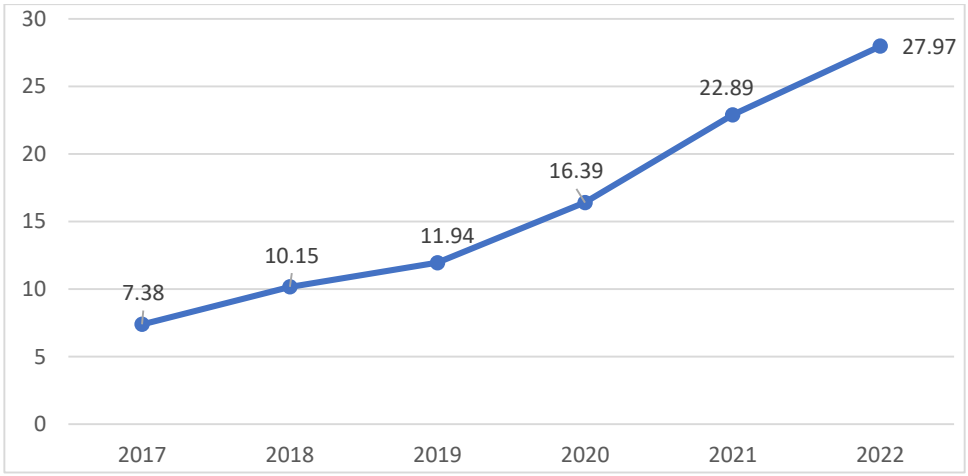
Figure 4. Distribution of MSEs in Indonesia Using the Internet by Type of Business (%)



Notes: I: Mining and quarrying; procurement of electricity, gas, and drinking water; water management, wastewater management, waste management d recycling, and remediation activities; II: manufacturing industry; III: construction; IV: retail trade, and car and motorcycle reparation and maintenance; V: transportation and warehouse; VI: accommodation and food and beverages; VII: information and communication; VIII: finance and insurance; IX: real estate; X: business services; XII: education; healthcare and social activities; XIII: other services.
Source: BPS (2017a).

Similar facts were also revealed from the national survey of MSEs in the manufacturing industry conducted by BPS every year. Even though the percentage of those who use the internet in carrying out their daily business tends to increase every year as shown in Figure 5, the majority still do not use it for various reasons. For example, based on the 2020 survey results: the majority of respondents who do not do e-commerce (73.07%) said they were more comfortable selling physically (offline). Another reason, around 17.55 percent said they lacked knowledge about the importance of this technology or did not know how to use it effectively; 33.47 percent are not interested in selling online; and the remaining 8.40 percent for various other reasons (BPS, 2021).

Figure 5. Percentage of Manufacturing MSEs using the Internet, 2017-2022.



Source: BPS ((2017b, 2018, 2019, 2020, 2021, 2022)

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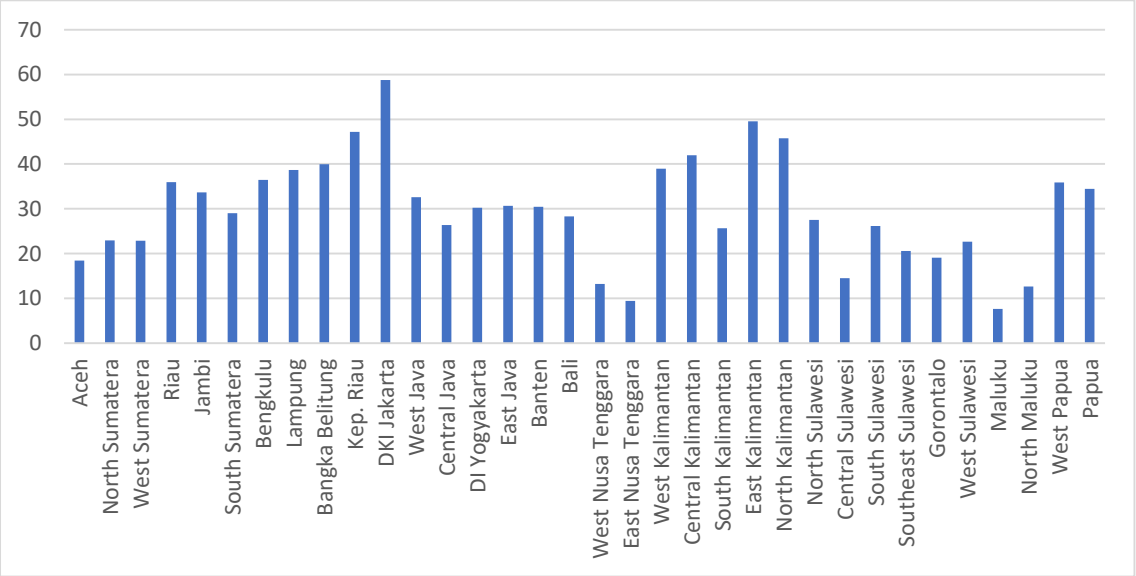
Another interesting finding from this survey is that the distribution of MSEs that utilize Internet technology varies by province. Based on the results of the 2022 survey, the majority of MSEs operating in the manufacturing industry that use the Internet are located in the western part of Indonesia, namely the islands of Sumatra, Java, and Bali, which are the most advanced regions in terms of economic development and industrialization and population. most populous in the country. Jakarta, which until early 2022 is still the center of government/capital city (before moving to East Kalimantan) is the highest province in terms of the proportion of manufacturing MSEs that use the Internet, reaching almost 60 percent of the total manufacturing MSEs in the province (Figure 6).

Figure 6. Percentage of Manufacturing MSEs using the Internet per Province, Indonesia, 2022



Source: BPS (2022).

Finally, Table 1, reveals the percentage of MSEs using the Internet varies by group of industry. The highest percentage is found in publishing, printing, and reproduction of recording media at almost 80 percent; followed by those in industries manufacturing computers, electronic and optical goods at around 73.40 percent. There are four main purposes for using the internet according to this report, namely for advertising/promotion, marketing, purchasing raw materials, and seeking information on such as government regulations, new machines and production tools, and cheaper raw materials. It reveals that most of the MSEs that use the internet use it mainly for marketing (75.0%), and the types of platforms used are dominated by instant messaging, followed by media social, marketplace, e-mail, situs web, and e-katalog. What is even more interesting from this table is that the number of MSEs using the Internet has increased every year in all industry groups. So it can be concluded that the level of digitalization of MSEs in all industrial groups continues to increase, although most are still below 50 percent. This means that the majority of MSEs in almost all industrial groups, except in the computers, electronic and optical goods industry; the motorized vehicles, trailers, and semi-trailers industry, and the publishing, printing, and reproduction of recording media industry still maintain conventional methods in marketing and procuring raw materials.

Table 1. Percentage of MSEs in the Manufacturing Industry Using the Internet by Group of Industry

ISIC	Group of industry	2017	2019	2021	2022
10	Food	4.85	9.39	21.4	27.41
11	Drinks	5.82	13.72	29.1	38.55
12	Tobacco processing	1.05	5.27	9.9	12.76
13	Textile,	6,83	9.60	15.3	15.41

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14	Apparel	12.95	20.40	32.4	38.33
15	Leather, leather goods, and footwear	15.72	18.84	33.2	38.03
16	Wood and articles of wood and cork (excluding furniture), plaited goods of rattan, bamboo, and the like	3.10	5.84	13.0	16.41
17	Paper, paper items, and the like	17.84	16.78	28.5	42.48
18	Publishing, printing, and reproduction of recording media	51.06	63.21	71.9	79.90
20	Chemicals and chemicals	4.05	4.54	10.0	16.08
21	Pharmacy, chemical drug products, and traditional medicine	8.70	18.21	38.8	38.22
22	Rubber, rubber, and plastic goods	13.0	30.08	50.0	55.50
23	Non-metal excavation	4.84	7.44	20.9	33.02
24	Base metal	9.77	4.54	9.6	7.05
25	Metal goods, not machines and equipment	16.63	27.66	39.8	49.95
26	Computers, electronic and optical goods	28.81	60.10	33.8	73.40
27	Electrical equipment	11.57	32.68	46.7	30.58
28	YTD machines and equipment (which are not included)	22.77	22.50	34.8	54.33
29	Motorized vehicles, trailers, and semi-trailers	23.07	22.73	70.4	65.22
30	Other transportation equipment	26.94	14.41	25.8	37.14
31	Furniture	13.76	23.26	40.4	49.39
32	Other processing	6.71	11.55	24.3	19.56
33	Repair and installation services for machines and equipment	6.89	29.15	41.4	44.37
	Total	7.38	11.94	22.89	27.97

Note: * Standard Classification of Indonesian Business Fields.
Source: BPS (2017b, 2019b, 2021, 2022)

4.2 Findings from a Survey

As explained, a survey was conducted online on randomly selected 200 micro and small entrepreneurs spread across several regions, including Jakarta (the majority) and many other cities in other provinces. Of the 200 respondents, only 98 filled out the survey completely, consisting of 39.8 percent women, and the remaining 60.2 percent men. Most are company owners (55.1), while the rest are company managers. Their ages varied greatly: the oldest was 60 years old (1 person) and the youngest was 16 years old (1 person). Of those who answered this, the majority, or around 63.3 percent, were from micro businesses with a maximum number of employees of 10 workers.

Meanwhile, according to sector or industry, the largest number was in the food and beverage industry which reached up to 36.7 percent of the number of respondents who answered, followed by the construction sector with 17.3 percent. The remainder comes from the agricultural and mining sectors, and several other manufacturers such as textiles and apparel, leather goods, and electrical equipment.

The first finding is about the respondents' opinions regarding the importance of DT or digitalization for their companies. They were requested to answer a given list of questions. For this reason, a Likert scale of 1-5 options was used, with gradations from Strongly Disagree (1), Disagree (2), Undecided (3), Agree (4), and Strongly Agree (5). At first glance, from the survey results shown in Table 2, there is nothing special, in the sense that in this era, especially in the business world, DT is considered important for the sustainability and growth of a business. However, the last column gives an interesting impression: it turns out that many respondents do not 'very much agree'. For example, for the first question, 26 respondents fell into the choice category (4), namely they agreed that DT is indeed important but many other factors are just as important, such as the quality of human resources, capital sources, networks, and other production resources. What is of great concern from the survey results is that many people fall into the choice category (3) for several of these questions. For example, for question 12 regarding the positive impact of using DT on reducing company costs. It turned out that 15 respondents were doubtful about the role of DT. This may be related to their lack of knowledge and awareness about DT. This of course can emerge as a stumbling block in taking the first step on their journey to

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digitalization. To many respondents, either as owners or managers of MSEs, digitalization is a buzzword and it seems too complex, expensive, and distant from their daily businesses. They are typically not very well aware of where to obtain useful information on digitalization, as the sources are usually scattered and not easily accessible. Or, reluctance to change their business practices might be their main reason for thinking that DT is not so important to be adopted. So, they tend to be resistant to adopting DT due to the perceived risks and the financial burden associated with it. Or, because of their shortage of expertise on DT, not just in programming and digital solution provision, but a good understanding of the business context and ICT environment. Of course, whatever the reason is, one thing is for sure DT is not the only thing needed for efficiency efforts or reducing production costs. Other factors are also needed such as the level of expertise and productivity of the workforce, company organizational structure, raw material prices, transportation costs, and others.

Table 2. Respondents' Opinion Regarding the Importance of DT

Questions	Response (%)		
	Very Much Disagree	Undecided	Very Much Agree
1) DT is important for the growth and sustainability of your company	1.0	9.2	56.1
2) Digitalization is an enabler of improved competitiveness for your company	2.0	11.2	52.0
3) DT is a means of achieving competitiveness for your company against its competitors	0.0	7.1	57.1
4) Digitalization is a catalyst for higher market share for the products/services of your company	2.0	9.2	46.9
5) Digitalization enables your company to achieve a higher market share for the products/services of your company	2.0	6.1	55.1
6) Digitalization is a means of achieving reliability and stability of production processes in your company's manufacturing processes	1.0	13.3	45.9
7) Digitalization is a means of achieving more efficient production management within your company's manufacturing processes	1.0	9.2	45.9
8) Digitalization is a means of achieving a higher level of efficiency in operational management within your company	1.0	12.2	45.9
9) DT is a catalyst for higher efficiency in production output for your company	1.0	14.3	43.9
10) DT is a means of waste reduction in your company's manufacturing process	5.1	18.4	36.7
11) DT is a means of reducing delays in your company's manufacturing process	3.1	18.4	34.7
12) DT helps to achieve overall cost reduction in your company's manufacturing process	3.1	15.3	40.8
13) A clearly defined digitalization strategy is important to your company	1.0	11.2	49.0
14) Your company's digitalization strategy is well aligned with its corporate and organizational strategy	0.0	20.4	35.7

Of course, as explained in the methodology, the finding of this survey of only 98 respondents cannot be considered representative of all MSEs in Indonesia. However, combined with secondary data shown in Table 1 can indicate that the level of digitalization in Indonesian MSEs is still relatively low, although there is a tendency to increase every year, and one reason is that many owners or leaders of MSEs consider DT important, but not the most important, to their business.

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So, given that the key characteristics of MSEs are relatively the same throughout Indonesia, namely that they generally operate in the informal sector, the educational level of business owners is low (on average only up to high school), they mostly use family members as unpaid workers, they only sell to the local market, and does not apply a modern organizational structure and management system, it can be expected that the results will be more or less the same if a survey like this covers all MSEs throughout Indonesia.

Of course, local factors that differ between regions, such as geographic location, regional openness, market competition, and local community behavior regarding DT greatly influence the condition of local MSEs, which can make an MSE owner's view of the role of DT in a region different from the views of his colleagues. in other regions, even in the same industrial group.

5. CONCLUSION

This article examines the digitalization process of MSEs in the manufacturing industry in Indonesia. It shows that not many MSEs are still utilizing DT, especially the Internet for marketing, although the ratio varies between industry groups. Based on the findings from the literature review, for MSEs who still do not utilize the existing internet technology, the reasons can be varied, starting from lack of insight or knowledge of company owners or managers about the importance of using DT or the internet, especially in facing competition, relatively expensive costs, limited capital, workers who are not skilled in implementing e-commerce, the nature and size of the market served, the lack of ICT infrastructure in their area, a company culture that does not support it, to business owners who feel there is no need to use the internet or e-commerce because they only sell the goods in local markets in small quantities.

Although there has been progress in recent years, demonstrated by the increasing number of MSEs using the internet. It can be said that Indonesia is still not fully successful in digitalizing MSEs. The Indonesian government still has homework to do to make this happen. From the discussion above, it seems that two factors are most important to be addressed in the short term, namely increasing MSE owners' awareness of the importance of using DT for the growth and sustainability of their business and creating market opportunities or certainty for MSEs products. The existence of market opportunities or certainty will make it easier to increase awareness of MSE owners who have not implemented DT to immediately implement them.

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