ISSN 1816-6075 (Print), 1818-0523 (Online)
Journal of System and Management Sciences
Vol. 14 (2024) No. 10, pp. 78-93
DOI:10.33168/JSMS.2024.1005

Examining the Role of Open Innovation in Enhancing Sustainability and Reputation of Indonesian SMEs

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Abstract. This study analyzed the role of open innovation in improving sustainability and reputation of small and medium enterprises (SMEs) in Indonesia. In this study, we use Partial Least Square with Structural Equation Modeling (PLS-SEM) to analyze survey data from 360 SME owners in Indonesia chosen using purposive sampling. The samples are chosen through certain characteristics that they have been running the business for at least 3 years to ensure they have experienced the dynamics within the business environment. Results showed technology opportunities and network resources positively influenced sustainability, which in turn enhanced reputation. Additionally, open innovation positively moderated the relationship between technology opportunities and network resources. Despite limitations in sampling and methods, the findings provide useful implications for SMEs to leverage open innovation capabilities and external collaborations to drive their sustainability and build reputation in order to win competition in the industry. Further research incorporating additional individual and organizational factors is warranted.

Keywords: MSMEs reputation, MSMEs sustainability, MSMEs technology opportunities, network resources, open innovation

1. Introduction

As start-up businesses grow and information technology develops rapidly, scholars have attempted to explore factors that affect performance especially in the context of micro, small, and medium-sized enterprises (MSMEs) (Lim, 2019; Parola et al., 2021; Snihur et al., 2021). In addition, the increasing attention towards environmental issues and sustainability from various parties has led MSMEs to consider economic, social, and environmental factors that can affect their performance and reputation (Khin & Lim, 2018; Papastathopoulos et al., 2019). Consumers are becoming increasingly conscious of environmental and social issues, thus adopting sustainable practices can enhance MSMEs competitiveness as it attracts environmentally-conscious consumers (Preghenella & Battistella, 2021; Asim et al., 2019). In addition, MSMEs with strong sustainability practices may find it easier to obtain investment and secure financing, as it aligns with the growing demand for responsible and ethical business practices. This response towards the needs for sustainability can bring up positive reputations which then set MSMEs apart from their competitors, allowing MSMEs to have unique selling proposition in the industry (Soeling et al., 2022; Singh & Mishra, 2021). This response matters more as the sustainability and performance of MSMEs lies in its ability to respond to environmental issues (Clauß et al., 2022).

Organizations that pursue business sustainability tend to be committed to expand their networks and open to innovation (Preghenella & Battistella, 2021). Sustainability, organizational capabilities, and performance are closely linked with innovation capability, yet its implementation and exploration in MSMEs are still rare and worthy needs for attention (Asim et al., 2019). On their study, Hervas-Oliver et al. (2021) defined innovation as the ability to introduce new processes, products or ideas, measuring the effect of enterprise capabilities such as market orientation and organizational learning on business performance. However, many scholars have argued that the MSMEs sector is difficult to innovate due to the expensive cost and lack of knowledge for the practice (Asim et al., 2019; Criado-Gomis et al., 2018; Voola et al., 2012). In this regard, prior research have empirically proved that innovation capability can influence business sustainability in B2B companies (Du et al., 2022), manufacturing (Boutaba et al, 2018), and service firms (Fan et al., 2021). Despite earlier research from Boutaba et al. (2018) who confirmed the link between open innovation and business sustainability, there is still a need to understand it contextually, as only a few studies have examined open innovation for enhancing sustainability and reputation in the specific context of MSMEs.

Aside from that, Criado-Gomis et al. (2018) mentioned that the difficulty to innovate for MSMEs occurs due to their inability to respond to technological opportunity and development. Technology opportunities has become a factor that has an impact on business sustainability. Fan et al. (2021) stated that the tangible benefits of responding to technological development can create opportunities and spark potential for organizations. Skills for communicating in the digital world as well as the ability to know, understand, and use social media become the most important aspect in capturing technology opportunities (Hernández-Linares et al., 2021). Regarding this, Asim et al. (2019) stated that industrial development in several countries such as India, Pakistan, and Indonesia, has not matched by the comprehensive application of technology. Hence, innovation process and technological advancement has been associated more with a large corporate scale rather than in the context of MSMEs in developing countries.

In order to have sustainable performance, organizations can built relationships through networks and connections to be able to survive and compete in dynamic situations (Amofah & Saladrigues, 2022; Esty & Winston, 2006). To maintain their position in the market, organizations also need a good reputation which has many strategic benefits, as it can help the organization to distinguish itself from competitors and improve overall image. Boyd et al. (2010) stated that reputation is the key to understand why a particular organization can outperform another. In creating a good reputation, organization must

engage in all kinds of relationships in exchange with others (Soeling et al., 2022). As stated by Lange et al. (2011), gaining good reputation can be done by being a good, well-known, and profitable organization. Both reputation and competitive advantages are closely linked, as a strong reputation can contribute to the competitive edge, while competitive excellence can enhance an organization's reputation, and this also applies for MSMEs.

Based on the findings from existing literatures, it can be known that there is still a gap that must be addressed in the topic. Lack of research on open innovation and technological opportunities in the context of MSMEs (Asim et al., 2019; Criado-Gomis et al., 2018) as well as the increasing attention for sustainability practices in business (Khin & Lim, 2018; Papastathopoulos et al., 2019) have led this study to be carried out. Specifically, this study aims to understand the interaction between MSMEs technology opportunities, network resources, and open innovation in enhancing business sustainability and reputation within the context of MSMEs in emerging markets in Indonesia.

2. Literature Review and Hypotheses Development

2.1. MSMEs Technology Opportunities and Network Resources

Technology opportunities (TO) is defined as a system, process, ability, or strategy associated with the discovery, threat, and creation or use of technology (Asim et al., 2019). Lim & Lee (2019) and Parola et al. (2021) added that technology opportunities can also be understood as organization's ability to acquire knowledge and understand new technological developments. Currently, online sales transactions with various platforms have experienced a significant rate of growth, thus many MSMEs business actors are adopting e-commerce with different platforms to support their business activities (Parola et al., 2021). According to Papastathopoulos et al. (2019), technology opportunity is the activity of creating products or introducing products and services to the market through technology. Skills and knowledge on technology are an important asset for organizations to establish sustainable business (Asim et al., 2019). Within the current condition, technological opportunities should be adapted to the internal capabilities that exist in the organization (Ren & Zhao, 2021; Verdolini et al., 2018), as it can lead organizations to have better network resources through the utilization of technology itself.

Network resources refers to the strategic resources of network that can support organizations in achieving superior performance (Liu & Yang, 2019). This study predicts that there is a correlation between the opportunities acquired from technology with network resources (Annett, 2020). Previous studies have also confirmed that there is a correlation between technological opportunities and networks operated by organizations (Boutaba et al., 2018; Davis et al., 2020). According to Khin & Lim (2018), a business can survive economic, social, and environmental challenges when it can respond and accept opportunities from available external environments as well as combine knowledge and environments that can create technological opportunities for survival. The study from Lim (2019) on founders of small technological firms in Malaysia have highlighted that network resources that is come through the utilization of technological opportunities by MSMEs can provide new knowledge that has not been acquired before. Technological opportunities allow MSMEs to access network resources through cloud services and maintain collaboration through improved communication without geographical constraints (Shaytan & Laptev, 2018; Abbas et al., 2019). In addition, Li et al. (2019) and Jiang et al. (2020) in their study also underlines how data analytics and digital marketing can help firms, including MSMEs, to access and obtain network resources by seizing the opportunity from technology. Based on this explanation, the first hypothesis proposed is as follows:

H1. MSMEs technology opportunities has a positive impact on network resources

2.2. Network Resources and MSMEs Sustainability

Network resource is conceptualized as the organization's ability to develop and leverage external inter-organizational relationships (Johan et al., 2022; Acosta et al., 2018). Li et al. (2019) stated that the

network resources developed from strong relationships can provide benefits to MSMEs especially in developing a more sustainable and agile business compared to its competitors (Abbas et al., 2019), as well as gaining competitive advantage and sustainable performance (Shi et al., 2020; Liu et al., 2020). According to Majid et al. (2019), network resource is defined as the resource owned by organizations to acquire knowledge from the environment through the creation of alliances and social bonds in business operations (Reyna-Castillo et al., 2023; Tjahjadi et al., 2023).

Jiang et al. (2020) argued that building network resources has a correlation with achieving sustainable business. Network resources are crucial to organizations, including MSMEs, as it provides substantial assistance in building a new business process or developing an existing business (Cenamor et al., 2019). Effective network resources enable business to engage with customers through various channels, thus ensuring customer satisfaction. Sustainable business is often linked to an organization's ability to adapt to evolving challenges and opportunities, and a well-equipped network resource can support this adaptability. Business sustainability itself is organization's tendency to continue thinking for what needs to be develop (He et al., 2020), and it is a critical factor for gaining a competitive advantage (Barrutia & Echebarria, 2015). However, this cannot occur if the organization does not have strong networking resources and capability. According to Abbas et al. (2019), in his study on small firms in Pakistan, network resources in the form of business relationship and firm aggregations can lead firms to gain sustainability and higher performance. In addition, Farida (2021) also stressed the importance of network capability and relational capability for MSMEs to have business sustainability by providing access to opportunities. Based on this explanation, the hypothesis proposed is as follows:
H2. Network resources has a positive impact on MSMEs sustainability

2.3. MSMEs Sustainability and MSMEs Reputation

Entrepreneurs believe that integrating sustainability to their business is vital for meeting consumer needs as well as reducing negative environmental impacts (Tjahjadi et al., 2023; Yanto et al., 2022). Regarding this, Singh & Roy (2019) stated that sustainable business can transform a competitive environment and encourage organizations to change the way they think about products, processes, and business models thus it can improve their reputation. Firm reputation is deemed as one of the most valuable resources and is regarded as the intangible asset that distinguishes one organization from the other. Boyd et al. (2010) defined reputation as the assessment of a business organization by stakeholders in terms of performance. Besides, Singh & Mishra (2021) stated that reputation can be strengthened when an organization has sustainable business performance. Sustainability and reputation are important factors for MSMEs in today's business landscape (Yadiati, 2019). This is because sustainability can strengthen the business reputation for all organizations regardless of size and type (Murphy et al., 2015; Tikkanen & Jaakkola, 2019; Toussaint et al., 2021).

Höflinger et al. (2018) mentioned that reputation can be a competitive advantage that affects business performance. Reputation is seen as one of the most valued assets of an organization and is classified as the most relevant intangible asset. This study predicts that there is a positive correlation between business sustainability and an organization's reputation. A few studies have proven that business engaged in social and environmental activities can improve its image and reputation (Mokrova et al., 2020). If compared to organizations with low performance, such organizations generally have a low reputation as well (Rustamova, 2020). Positive perception of consumers and sustainable business partners brings firm performance and reputation to a higher level (De Castro et al., 2006; Mokrova et al., 2020). Therefore, in a global and competitive market, adopting and implementing the concept of sustainability as a business strategy can result in a higher level of reputation (Jones, 2005). Therefore, the fourth hypothesis proposed is as follows:
H3. There is a positive correlation between MSMEs sustainability and MSMEs reputation

2.4. Open Innovation as Moderator

Many organizations realize that they cannot rely solely on their ability to respond to the opportunities present in the face of today's competition. Tobiassen & Pettersen (2018) stated that organizations must seek open innovation practices so that they do not have interdependence. Open innovation refers to activities that complement internal skills and knowledge with external knowledge sources and collaboration to facilitate business activities (Du et al., 2022). Through open innovation, organizations can gain access to external knowledge and expertise, including from customers, suppliers, and technologies, to improve business performance (Du et al., 2022). Although most of the open innovation practice has been widely used in the context of large corporations, it has also been recognized in MSMEs industries as they can be more adaptable and flexible to the practice compared to large enterprises (Jing & Qu, 2023; Tobiassen & Pettersen, 2018). Open innovation represents dynamic input-based competence (Bogers et al., 2019), a desire to respond to opportunities in the environment in which operate, as well as providing organizations with diverse knowledge of markets and environmental and social issues from external sources (Hervas-Oliver et al., 2021).

Since the opportunity to adopt technology for organizations is wide open, the role of the company to innovate is opened up as well (Bogers et al., 2018; Yun et al., 2020). Moreover, a business network cannot be developed further when an organization is not heavily involved in the open innovation process. Hence, this study predicts that open innovation has great potential to strengthen the influence of technology opportunities on network resources. Similarly, taking advantage of technological opportunities and integrating them towards organizational network resources is crucial to business success. Small and medium-sized organizations benefit greatly from strengthening their external relationships to respond to the opportunities of the external environment. This is because open innovation is very much opposed to closed innovation, where organizations rely solely on their internal resources to create new products (Tobiassen & Pettersen, 2018). The degree of openness of innovation within an organization can be determined by the extent to which an organization uses external resources including their network in carrying out its own innovation process. SMEs enterprise industries tend to be less open than larger enterprises, but they can enhance its open innovation process when it has connections with various business networks built (Höflinger et al., 2018). Thus, the opportunities present in the external environment will lead to the network resources, but it will strengthen or weaken depending on the innovation practices carried out by the organization (Dencik et al., 2023). Thus, then the final hypothesis is submitted as follows:

H4. Open innovation moderates the relationship between MSMEs technology opportunities and network resources.

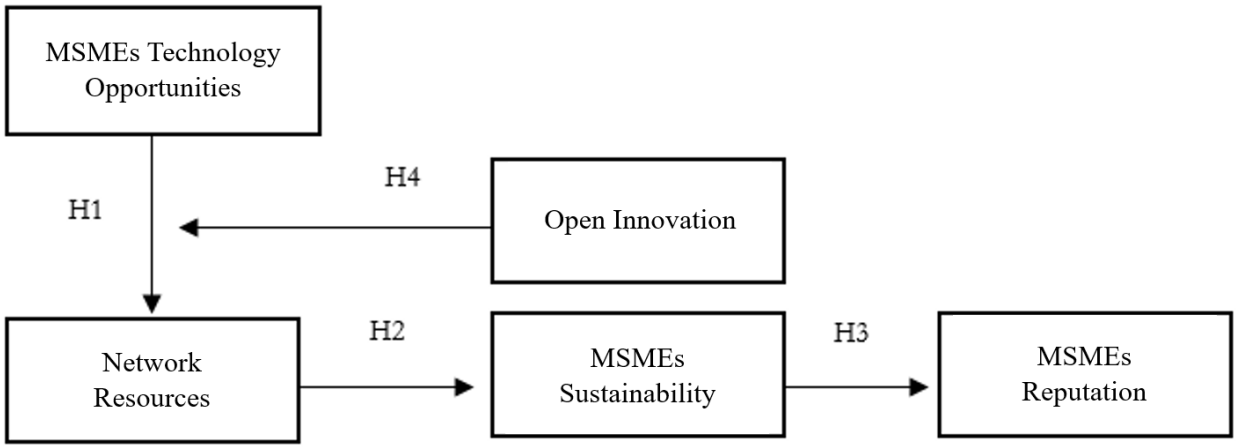

Fig. 1: Conceptual Framework

3. Research Method

3.1. Research Design

This study is carried out with qualitative approach through survey-based study in which questionnaires are used for data collection purposes. We aim to gather information from a large sample of small and medium-sized entrepreneurs in West Java and DKI Jakarta Province, Indonesia. The study is limited on two provinces on the grounds that these have the most MSMEs contributions compared to the other provinces in Indonesia. The sample is determined using purposive sampling techniques, with the criterion that MSMEs have been running their business for at least 3 years to ensure that the MSMEs have experienced the dynamics of change in the organization, so that they can know how the organization perceives changes in the business environment as well as technological developments. The final number of respondents in this study is 360 MSMEs owners, which mostly worked in food, electronics, fashion, and craft industries. According to Hair et al. (2019), the minimum number of respondents for a study using Structural Equation Modeling with Partial Least Square (SEM-PLS) is 100 respondents, thus the sample size in this study (360 respondents) have met the criteria.

The questionnaires are distributed over three weeks through online platforms. Each questionnaire is accompanied by a letter explaining the importance of the study and its confidentiality. We assessed the characteristics of respondents that include gender, age, education, and period of business establishment. Most of the sample respondents are male (78%), with the age ranging from 25 to 35 years, with college experience and had been running a business for 5 to 10 years. (Table 1). Further, the data analysis process is performed using the Structural Equation Modeling method with Partial Least Squares. According to Hair et al. (2019), SEM can simultaneously estimate all effects in the model, thus enabling scholars to set up and reliably test hypothetical relationships among theoretical constructs. More specifically, SEM-PLS is chosen as it is considered appropriate to be used when complex models are analyzed, and it can deal with non-normal, categorical or ordinal data, and smaller sample size (Hair et al., 2019).

3.2. Measurement

Technology opportunities arise from the factors of sensing, responding, having ability, and adaptive. In this study, technology opportunities are measured by eight items adopted from Asim et al. (2019). Network resources is measured by three items adopted from Pettersen et al. (2015; Zhang & Du, 2019) which includes sources of financial, technological, and marketing resources. Furthermore, in general, the view of the concept of sustainability starts from the view that someone wants the next generation to be able to enjoy the same things as what they are currently experiencing. Singh & Roy (2019) stated that the concept of sustainability is defined as the ability of an organization to respond to current needs without sacrificing other parties in meeting their needs. In this study, MSMEs sustainability is measured by three items adopted from Alonso-Martinez et al. (2021) which covers environmental, social, and economic performance. Du et al. (2022) mentioned that open innovation is the ability of an organization to respond to opportunities present in the environment in which the organization operates. Open innovation is measured with the items adopted from Bogers et al. (2018) which includes collaboration, internal capability, organizational culture, and technology empowerment. Höflinger et al. (2018) stated that reputation is the most crucial intangible asset. MSME reputation is measured by four items adopted from Yadiati (2019) which includes perception, performance, communication, and relationships with stakeholders. All items are tested for validity and reliability, and the results have shown that all items used in the questionnaires are valid.

Table 1. Respondents' Profile

Respondent profile		Total
Gender	Male	248
	Female	112
Age	25-35 years old	195
	35-45 years old	98
	> 45 years old	67
Education	Senior High School	101
	Bachelor	130
	Master	94
	Doctoral	35
Length of Business	5-10 years	217
	10-15 years	143

Source: Data Processed (2023)

4. Results and Discussion

4.1. Measurement Model Evaluation

Factor analysis is performed to determine the validity of the construction on the measurement scale. The tests were conducted using Kaiser Meyer Olkin (KMO) with a score of 0.896 (> 0.50) and Bartlett's Test with a significance of 0,000 (< 0.05). Both values indicate that factor analysis already meets the criteria. Other criteria for factor analysis are eigen values > 1, Measures of Sampling Adequacy (MSA) values shown on Anti Image Correlation values must have values greater than 0.5 and the Determinant of Correlations Matrix values should be close to 0. From the test results, the own values are obtained on the entire variable > 1 with the value range of 1.047 – 8.606, the anti-image correlation value on the whole measurement item > 0.5 with the range of values 0.751 – 0.927, and the determinant of correlations matrix value is close to 0 with a value of 0.0000001864. Table 2 presents the results of factor analysis for each measurement item. Cronbach's Alpha value for the whole variable is >0.700 with a value range of 0.769 – 0.945 which indicates that the overall variable has good reliability.

Table 2. Results of Validity and Reliability Test

Performance Factor	Factor Loading	Eigen Value	Anti Image Correlation	Cronbach's Alpha	Mean	Median	Std Deviation
Technology Opportunities		8.606		0.859	4.18	4.00	0.88
TO1	0.710		0.751				
TO2	0.711		0.778				
TO3	0.705		0.771				
TO4	0.703		0.869				
TO5	0.810		0.863				
TO6	0.811		0.889				
TO7	0.805		0.59				
TO8	0.796		0.878				
Network Resources		3.657		0.756	4.32	4.00	0.79
NR1	0.818		0.861				
NR2	0.803		0.900				
NR3	0.833		0.905				
MSME Sustainability		1.773		0.769	4.11	4.00	0.95
MS1	0.766		0.927				
MS2	0.855		0.892				
MS3	0.858		0.862				

Open Innovation	1.164		0.781	4.14	4.00	0.87
OI1	0.703	0.871				
OI2	0.816	0.875				
OI3	0.772	0.854				
OI4	0.733	0.902				
MSME Reputation	1.047		0.945	3.56	4.00	1.17
MR1	0.917	0.869				
MR2	0.923	0.879				
MR3	0.933	0.863				
MR4	0.934	0.882				
Determinant of Correlation Matrix = 0.00000001864						

Source: Data Processed (2023)

4.2. Descriptive Statistics

To understand the nature of the data distribution, a univariate analysis is performed and the results are presented in table 2. It appears that there is a small difference between the average value and the median, which indicates that the distributed data is close to the normal distribution. The average value obtained ranges between 3.56 – 4.32 whereas the medium value is 4.00. The standard deviation ranges from 0.79 – 1.17.

4.3. Results of Correlation Analysis

To test the degree of relationship between five variables or constructs, a Pearson correlation coefficient test is performed. Table 3 shows that MSME technology opportunities have a correlation to network resources of 0.740, network resource has a corelation to MSMEs sustainability of 0. 714, MSMEs sustainability has a correlation towards open innovation of 0. 581, while open innovations has a correlation towards MSMEs reputation of 0.565.

Table 3. Results of Correlation Analysis

	MSMEs Technology Opportunities	**Network Resources**	**MSMEs Sustainability**	**Open Innovation**	**MSMEs Reputation**
MSMEs Technology Opportunities	1	0.740**	0.650**	0.604**	0.297**
Network Resources		1	0.714**	0.530**	0.248**
MSMEs Sustainability			1	0.581**	0.327**
Open Innovation				1	0.565**
MSMEs Reputation					1

**Correlation is significant at the 0.01 level

Source: Data Processed (2023)

4.4. Structural Model Evaluation

The Pearson correlation coefficient helps to identify the relationship between two variables, but cannot be used to check the relationship of predictor criteria between dependent variables versus independent. The double regression analysis results in four regression models and a summary of the regression model presented in table 4. The summary results of the model of regression show that MSMEs technology opportunities is a significant predictor for network resources (hypothesis 1 accepted). Network

resources are a significant predictor of MSMEs sustainability (hypothetic 2 accepted), MSMES sustainability is a significant predictor for MSMEs reputation (hypothesis 3 accepted), open innovation can moderate the relationship between MSMEs technology opportunities and network resources (hypothesis 4 accepted).

Table 4. Multiple Regression Analysis

IV	DV	R-Square	Beta	Sig. Value	Conclusion
MSME Technology Opportunities	Network Resources	0.634	0.801	0.000	Accepted
Network Resources	MSME Sustainability	0.540	0.735	0.000	Accepted
MSME Sustainability	MSME Reputation	0.405	0.323	0.000	Accepted
MSME Technology Opportunities x Open Innovation	Network Resources	-	0.484	0.000	Accepted

Source: Data Processed (2023)

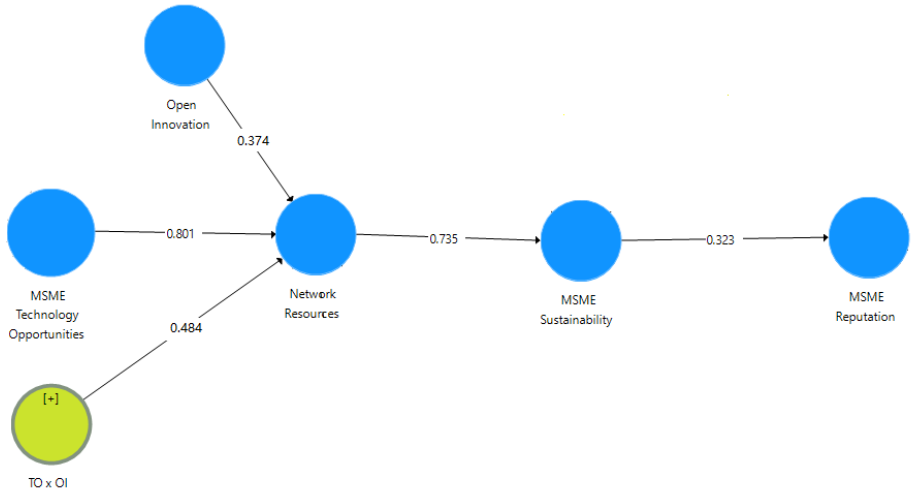

Fig. 2: Performance Model

4.5. Discussion

The study aims to identify factors that can enhance MSME reputation by looking at the role of technological opportunities, network resources, and sustainability, while also considers open innovation as mediators. The findings of this study emphasize that MSMEs reputation is a result of its own ability to capture opportunities and acquire networks. This combination can strengthen business sustainability especially in the context of MSMEs as it allows MSMEs to combine measures related to customer feedback, relationships, and added value to generate a good reputation. It aligns with the RBV theory which emphasizes how organizations can build excellence by developing resources and capabilities in responding to external opportunities (Cui et al., 2019; Kaukab et al., 2020).

The network resources present in the external environment are exploitable when MSMEs has a technological opportunity that includes knowledge, skills, and ability to utilize technology. This opportunities lead MSMEs to form a network resources (for example, the ability to understand the market) that allows the organization to explore existing networks (Asim et al., 2019; Srinivasan et al., 2002). The findings of the study also found that technological opportunities require organizations to

build relationships with various stakeholders as well as to establish partners. This findings support the results from Asim et al. (2019) that the component of technological opportunity itself can enhance the organizational capabilities and networks built.

Second, this study also found that network resource have a relationship with the sustainability of MSMEs. These results are in accordance with Stevenson's theory regarding RBV which states that network resources built in a business can lead to the sustainability of the business itself (Pettersen et al., 2015: Davis & DeWitt, 2021). Li et al. (2019) states that an organization's ability to build networks is a resource or asset that can improve business performance and sustainability and this has been proven in developing countries. From a digital perspective, the RBV concept can be used to support organizations in achieving sustainable performance by establishing business partners and capturing existing opportunities (Elia et al., 2021). The results of this study provide a good understanding of network resources for the sustainability of MSME businesses in the current modern situation based on the ability to adapt and take advantage of new technological opportunities. This supports the arguments from Davis & DeWitt (2021) that organizations generally have made various efforts in forming business strategies. In this matter, building network resources can be a business strategy to face dynamic market competition. This finding also indicates the network resources owned by MSMEs can have an impact towards their performance. Thus, the better the network resources that are built can increase the sustainability of the business.

In addition, every organization makes open innovation an important component to generate profits. This study proves that MSMEs actors today have made innovation an important way to gain competitive advantage and business development by building networks. Apart from that, open innovation is also an important factor in encouraging organizations to seize technological opportunities and build network resources. In fact, innovation in business processes has required organizations to build relationships with business partners. Therefore, digital transformation has led every organization to innovate so that it can obtain optimal business performance, supporting the results from previous studies (Hervas-Oliver et al., 2021; Jing & Qu, 2023). Furthermore, the present study also proves that the sustainability of MSME businesses can improve reputation. Bearing in mind that every organization is concerned with social responsibility, MSMEs players must direct every business practice towards sustainability as it can also affect their positive image. MSME is part of a large business environment and when the current business paradigm embraces the concept of sustainability, there will always be opportunities for MSMEs to embrace the concept of sustainability, thus it leads to the reputation of the business itself.

It has been mentioned by previous scholars (Asim et al., 2019; Abbas et al., 2019) that organizations have a need to prioritize sustainability. This sustainability concept consists of three main pillars (economic, social, and environmental) where these three pillars depend on and strengthen each other. The results of Abbas et al. (2019) study prove that for some organizations business sustainability can lead to reputation and increase competitive advantage. In accordance with Höflinger et al. (2018) research, organizational reputation is a key strategy obtained from a combination of internal and external assessments. This study also defines reputation as an attribute whose value comes from the relationship of factors that lead to competitive advantage and ultimately to performance. Making reputation an organizational resource is very important for generating value for the organization. Thus, the use of technology, network resources and business continuity can lead to an organization's reputation.

5. Conclusion

This study fills the literature gap with a theoretically developed and empirically tested model based on previous studies. Empirical testing of this model shows the strong influence of technological opportunities, network resources, sustainability, and organizational reputation in the context of MSMEs in Indonesia. All hypotheses proposed in this research are accepted and can be predictors of improving

the reputation of business organizations in the MSME sector in Indonesia. Adopting new technology and changing technology over time is an effective way to create business performance, thereby leading to sustainability and organizational reputation. Overall, the findings of this study indicate that technological opportunities and the network resources contribute to assist MSMEs in achieving the environmental, social, and economic performance and subsequently improve the reputation of the MSMEs itself. This study shows that utilization of technology opportunities which include the adoption and effective exploitation of technology, as well as network resources are critical for increasing the environmental, social and economic performance of SMEs.

5.1. Implications

This study suggests that technology opportunities, network resources, and open innovation can play an important role in achieving business sustainability and reputation for MSMEs. Theoretically, this study aligns and provides empirical support for the RBV theory, emphasizing that organizations, particularly MSMEs, can build excellence by developing and leveraging internal resources and capabilities to respond to external opportunities. In addition, the present stduy reinforces the significance of open innovation in contemporary business strategies by validating the idea that MSMEs can leverage open innovation to gain competitive advantage, seize technological opportunities, and build network resources. Practically, this study suggests that MSMEs can strategically embrace open innovation as a means to gain a competitive advantage and drive business development. In addition, MSMEs should recognize the critical role of building and maintaining network resources for long-term sustainability. Effective management of relationships with various stakeholders and partners can lead to improved business performance and longevity in dynamic market. Furthermore, given the positive influence of technological opportunities on sustainability and reputation, MSMEs should actively seek and capitalize on emerging technologies, while also invest in digital transformation and innovative practices.

5.2. Limitations and Future Research Directions

This study still has several limitations that needs to be addressed by future scholars. First, the scope of this study is carried out in the context of MSMEs in Indonesia by looking at their ability to capture technological opportunities and build network resources for increasing business sustainability. Further research can be carried out in other industrial contexts by looking at other determinants for business sustainability. Second, this study is based on samples and characteristics of respondents in certain industrial sectors in three provinces in Indonesia by selecting samples randomly. Future research can expand the sample with different criteria so that maximum results can be obtained.

Despite its limitations, our study highlights potentially useful opportunities for future research. First, it is expected that our reanalysis can encourage additional investigation into the processes that influence how organizational reputations are formed. Reputation has been conceptualized as a firm- and industry-level factor so potential interactive effects between resources need to be examined. For example, if a company has a strong reputation and culture, then the performance advantages obtained from these two resources create positive effects for the organization. Additional insights into the durability of performance advantages, such as those derived from reputation, are also needed. Apart from that, various types of innovation are also considered as factors that can strengthen an organization's reputation. The MSME players in this research also proved that to be able to have sustainable performance and have a good reputation, thus examining the ability to adapt to the environment is required. For MSME players who do not have the ability to capture technological opportunities and develop resource capabilities, it will be difficult to develop a reputation. Finally, this study also opens up opportunities for further research in the field of organizational reputation by investigating how non-innovative organizational performance can produce a good reputation by looking at factors such as green business or CSR implementation**.**

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