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The Influence of Innovation Strategy on Sustainable Competitive Advantage

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Abstract

This study examines the influence of innovation strategy on sustainable competitive advantage through a functional innovation approach, innovation process, and innovation system. This research utilized survey data conducted on MSMEs in Yogyakarta with a total sample of 95 respondents. In order to answer the research hypothesis, this study employed the Partial Least Square Structural Equation Modeling (PLS-SEM) analysis tool using SmartPLS tools. The results of the study indicate that there is an influence of innovation strategy on the innovation process and system, as well as the influence of the innovation process and system on sustainable competitive advantage. This research has contributed to the development of innovation strategies in building sustainable competitive advantage in MSMEs.

Keywords: innovation strategy, innovation process, innovation system, sustainability competitive advantage.

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1. Introduction

Innovation is a strategic practice which a company develops products, services, processes, or systems to fulfill market demands and requirements (Hanaysha *et al.*, 2022). Innovation is also a significant driver of many types of organizational performance (Abubakar et al., 2019; Olan et al., 2022; Schuldt & Gomes, 2020). Innovation is considered as the main source for companies to keep relevant in the market, create sustainable competitive advantages, support economic development, and respond to changes in society (Akpa et al., 2021; Kurniawati & Raharja, 2023; Singh & Misra, 2021). Companies do not just maintain sustainable competitive advantage through one innovation, but through a series of innovations over time. In this context, it is important to group aspects of innovation, both as products and processes because this relates to the strategies taken by companies to meet market demands and opportunities by utilizing the company's capacity and competence (Thi *et al.*, 2023). Innovation management plays an important role in company growth and controlling competition. Good innovation management with the strategies that have been created will produce products or services that can develop and compete in the market.

Innovation strategy is the practice of innovation at a strategic level and includes innovation in identifying, predicting, and adapting to a changing environment with innovation in products and services to create sustainable competitive advantage in the marketplace (Kim, 2023; Onufrey & Bergek, 2021; Pihlajamaa, 2023). Among the types of innovation, process innovation is considered an important element for the economic success of a company because it is closely related to the company's productivity and competitive advantage (Chen et al., 2018; Müller et al., 2021; Zhang et al., 2022). The innovation process changes production or service methods in a positive way. In addition, companies can make changes in the entire value chain through the innovation process, such as improving supply logistics, improving manufacturing processes, advances in media planning, and reducing delivery times. Most previous research examining innovation tends to focus on businesses that are already established or have been operating for a long time (Thi *et al.*, 2023). Previous research has several gaps regarding the influence of innovation on sustainable competitive advantage applied to micro, small, and medium enterprises (MSMEs). This starts from the assumption that large and long-standing businesses have more resources and capacity so they can create a good foundation for exploiting innovation projects, technology utilization, and the use of economies of scale and diversity

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of resources.

Sustainable competitive advantage in an organization can be considered as the ability gained through resources and attributes to perform at a higher level than competitors in the same market. Companies can rely on different strategies to engage in the innovation process. However, in particular, no author has explored approaches to assessing innovation from the strategic level to the functional level based on a strategic implementation perspective. Therefore, the author is interested in researching the influence of innovation on sustainable competitive advantage in MSMEs, which aims to determine the influence of innovation strategies on innovation processes and systems as a form of functional innovation, as well as the influence of innovation processes and systems on sustainable competitive advantage. This research was conducted in Indonesia as one of the countries with the fastest economic growth among Asian countries.

2. Research Method and Materials

This research used quantitative methods on data collected based on questionnaires. Besides general questions that collect demographic characteristics, this questionnaire used a Likert scale. This research was conducted in the Special Region of Yogyakarta (DIY), which has carried out innovation. The location above was chosen due to the high development of micro, small and medium enterprises (MSMEs) in that area. Population on this research covers all MSMEs domiciled in the Special Region of Yogyakarta. The amount of sample in this study was 95 respondents, but the number of respondents collected was 120 respondents to avoid errors. In this research, the data collection technique utilized a questionnaire via Google Form. Quantitative data analysis used statistical analysis. This research employed a partial structural-squares model (PLS-SEM) and Smart-PLS to assess the research model and test hypotheses. There were two steps in using the PLS-SEM method, namely the measurement model and structural model assessment (Thi *et al.*, 2023). The sample size of 95 is sufficient to carry out the analytical task.

3. Results and Discussion

The questionnaire was distributed to MSME products, services and so on in the Special Region of Yogyakarta with a sample of 95 respondents. Respondents consisted of business actors (managers/owners/supervisors).

Table 1 Respondent Demographics

Type of Business	**Frequency**	**Percentage (**%)
Food and Beverage	42	44,21
Service	9	9,47
Accessories	6	6,32
Craft	12	12,63
Convection	26	27,37
Position	**Frequency**	**Percentage (**%)
Owner	63	50,77
Manager	28	43,08
Supervisors	4	6,15
Capital	**Frequency**	**Percentage (**%)
350.000-50.000.000	91	95,79
51.000.000-300.000.000	4	4,21

Respondent demographics can be found from several pieces of information, namely type of business, how many workers and amount of capital.

3.1. Variable Statistics

Descriptive statistics were used to present data statistically. In the context of this research, descriptive statistics refer to the average (mean) and standard deviation values as well as the minimum and maximum values of all variables, namely innovation strategy (STR), innovation process (PRO), innovation system (SIS), and sustainable competitive advantage (CBC). A smaller standard deviation value indicates that there is no data deviation in the variable. Hypothesis testing in this research utilized Partial Least Square (PLS) software. PLS is an alternative method of analysis using a component or variance-based Structural Equation Model (SEM).

3.1.1. Innovation Strategy

The innovation strategy variable of the first item of STR1 has a mean value of 3.032 and a standard deviation of 1.061. This shows that the average value is much higher than the standard deviation, which means it shows quite good results. In the second item of STR2, the mean is 3.042 with a standard deviation of 1.015. The mean of the three STR3 items is 3.116 and the standard deviation is 1.004. The fourth item is STR4 with an average value of 3.011 with a standard deviation of 1.091. Then, the last item STR5 has a mean value of 3.179, standard deviation of 1.036. This shows that the innovation strategy variable has quite good results with a minimum value of 1.000 and a maximum of 4.000.

Table 2 Descriptive Analysis of Innovation Strategy

Variables	Items	Mean	Median	Scale min	Scale max	Std deviation
Innovation Strategy	STR1	3.032	3.000	1.000	4.000	1.061
	STR2	3.042	3.000	1.000	4.000	1.015
	STR3	3.116	3.000	1.000	4.000	1.004
	STR4	3.011	3.000	1.000	4.000	1.091
	STR5	3.179	3.000	1.000	4.000	1.036

3.1.2. Innovation Process

The second variable is the innovation process consisting of 5 items. The first item is PRO1 with a mean of 3.305 and a standard deviation of 0.834. PRO2 as the second item has a mean value of 3.358 with a standard deviation of 0.780. The third item is PRO3 with a mean of 3.316 and a standard deviation of 0.932. The fourth item PRO4 has a mean of 3.168 and a standard deviation of 0.890. The last item is PRO5, the mean value is 3.379 with a standard deviation of 0.848. The results of this variable show that the innovation process has satisfactory results with a minimum of 1.000 and a maximum of 4.000.

Table 3 Descriptive Analysis of the Innovation Process

Variables	Items	Mean	Median	Scale min	Scale max	Std deviation
Innovation Process	PRO1	3.305	3.000	1.000	4.000	0.834
	PRO2	3.358	3.000	1.000	4.000	0.780
	PRO3	3.316	3.000	1.000	4.000	0.932
	PRO4	3.168	3.000	1.000	4.000	0.890
	PRO5	3.379	3.000	1.000	4.000	0.848

3.1.3. Innovation System

The innovation system is the third variable of this research. There are 4 (four) items from this innovation system, the first item is SIS1 with a mean value of 3.442 with a standard deviation showing 0.750. The second SIS2 item has a mean value of 3.368, the standard deviation is 0.795. Then for the third item, the SIS3 mean is 3.326 and the standard deviation value is 0.876. The last item of the innovation system is SIS4, which has a mean value of 3.221 and a standard deviation of 0.920. The innovation system variable shows quite good results. The minimum value of this variable is 1.000 and the maximum is 4.000.

Table 4 Descriptive Analysis of Innovation Systems

Variables	Items	Mean	Median	Scale min	Scale max	Std deviation
Innovation System	SIS1	3.442	3.000	1.000	4.000	0.750
	SIS2	3.368	3.000	1.000	4.000	0.795
	SIS3	3.326	3.000	1.000	4.000	0.876
	SIS4	3.221	3.000	1.000	4.000	0.920

3.1.4. Sustainable Competitive Advantage

The last variable is sustainable competitive advantage consisting of 4 (four) items. The first item is KKB1 with a mean value of 3.432 and a standard deviation of 0.878. The second item of KKB2 has a mean value of 3.347, standard deviation 0.949. Then, the third item KKB3 has a mean value of 3.326 with a standard deviation of 0.989. Last, the

KKB4 mean value is 3.295 and has a standard deviation value of 0.950. For this variable, the minimum value is 1.000 and the maximum is 4.000. Thus, this result is considered quite good.

Table 5 Descriptive Analysis of Sustainable Competitive Advantage

Variables	Items	*Mean*	*Median*	*Scale min*	*Scale max*	*Std deviation*
Sustainable	KKB1	3.432	3.000	1.000	4.000	0.878
Competitive	KKB2	3.347	3.000	1.000	4.000	0.949
Advantage	KKB3	3.326	3.000	1.000	4.000	0.989
	KKB4	3.295	3.000	1.000	4.000	0.950

3.2. Data Analysis Results

3.2.1. Instrument Measurement Model Test (Outer Model)

a. Validity Test

Analysis of the measurement model or what is called the outer model used validity and reliability testing methods. The validity test includes convergent validity and discriminant validity. In addition, the reliability test was analyzed by calculating composite reliability and Cronbach's alpha values.

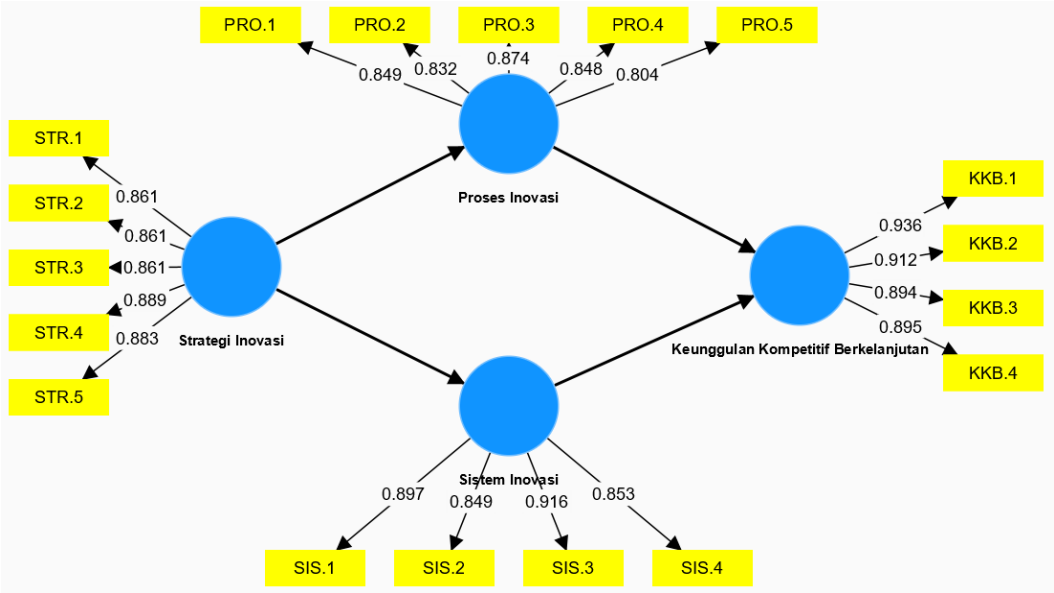

Figure 1 Loading Factor

In Figure 1, the results of the loading factor calculation show that the value has exceeded 0,70, which means that the indicator has reached the necessary convergent validity requirements. According to Ringle et al. (2019), a value of >0,7 indicates that the data used is valid. To make it clearer, the author explains the results data in tabular form in table 6.

Table 6 shows the results of the outer loading calculation with the results showing greater than 0,70 so that this indicator meets the convergent validity criteria. Discriminant validity is a test, which aims to ensure that a measuring instrument accurately measures the construct being measured. To test discriminant validity, it can be seen from the cross loading and average variance extracted (AVE) values of each construct.

An alternative method that can be used to assess discriminant validity is to use the Fornell-Larcker criteria and cross loading indicator values. Fornell Larcker is calculated by comparing the AVE of each construct with the correlation between other constructs in the research hypothesis model. If the root AVE value of each construct exceeds the correlation between that construct and other constructs, then discriminant validity can be considered good based on the Fornell -Larcker criteria.

Table 6 Outer Loading (convergent validity)

Variables	Items	Outer Loading
Sustainable Competitive Advantage	KKB1	0.936
	KKB2	0.912
	KKB3	0.894
	KKB4	0.895
Innovation Process	PRO1	0.849
	PRO2	0.832
	PRO3	0.874
	PRO4	0.848
	PRO5	0.804
Innovation System	SIS1	0.897
	SIS2	0.849
	SIS3	0.916
	SIS4	0.853
Innovation Strategy	STR1	0.861
	STR2	0.861
	STR3	0.861
	STR4	0.889
	STR5	0.883

Table 7 Fornell-Larcker Criteria Test Results (discriminant validity)

	Sustainable Competitive Advantage	Innovation Process	Innovation System	Innovation Strategy
KKB	0.909			
PRO	0.802	0.842		
SIS	0.791	0.794	0.879	
STR	0.720	0.732	0.654	0.871

According to Sarstedt et al., (2017), the AVE value with a variable value >0.5, it means that the convergent validity requirements have been fulfilled properly. Meanwhile, in the Fornell-Larcker test, a is the value in the diagonal axis, which is the root of AVE. Cross loading is an evaluation of discriminant validity at the level of indicators or measurement items. Cross loading is fulfilled for each item that has a higher correlation with the variable it measures.

b. Reliability Test

The next analysis after the validity test is reliability testing. This test was carried out to assess the consistency of the measurement results of an instrument even though conducted in a different times, locations, and populations. Construct reliability was measured by two different criteria, namely composite reliability, and Cronbach's alpha. A construct is considered reliable if the composite reliability value exceeds 0.7. According to Ghozali, (2015), a good value Cronbach's alpha is a value that exceeds 0.7. Reliability results on composite reliability and Cronbach's alpha shows on Table 8.

Table 8 Cronbach's Alpha and Composite Reliability Test Results

Variables	Cronbach's Alpha	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
KKB	0.930	0.950	0.827
PRO	0.897	0.924	0.708
SIS	0.902	0.931	0.773
STR	0.921	0.940	0.759

The composite reliability and Cronbach's Alpha tests in table 8 show that all Composite Reliability criteria variables have values above 0.7 and variables for the Cronbach's alpha criteria have values above 0.7. Thus, these results are declared valid and reliable.

3.2.2. Structural Model Test (Inner Model)

After measuring the outer model, which consists of convergent validity, discriminant validity, Cronbach's alpha reliability, and composite reliability, the next step is testing using a structural model or inner model including testing the path coefficient and R^2. Path coefficients are a depiction of the direction of the relationship between variables, which indicates whether the hypothesized relationship is positive or negative. When the path coefficient value is 0 and 1, it indicates a positive relationship, while if the value is between -1 and 0, it indicates a negative relationship.

Table 9 Path Coefficients Test Results

Connection	*Path Coefficients*
STR →PRO	0.732
STR →SIS	0.654
PRO →KKB	0.471
SIS →KKB	0.418

The structural model was evaluated using R-square for the dependent variable. R^2 is used to evaluate the extent to which certain endogenous variables and exogenous variables have a significant influence. The magnitude of the influence of innovation processes and systems on sustainable competitive advantage is included in the moderate category at 0.708. Adjusted R-square has a lower value than R-square because this data is a multiple variable.

Table 10R-square test results

Variables	*R-square*	*R-square adjusted*
KKB	0.708	0.702
PRO	0.536	0.531
SIS	0.428	0.422

Path coefficients test results shows positive results because it is still at 0-1, which means that the strategy influences the innovation process and system positively, then the innovation process and system influences sustainable competitive advantage positively. The R-square test in this study has a moderate category, which identifies that the strength between variables is not too strong and not too low, but is moderate.

3.2.3. Hypothesis Test

To determine the structural relationship between latent variables, it is necessary to carry out hypothesis analysis on the path coefficients between variables by comparing p-values < 0.005 or t-statistic values that exceed > 1.96. This testing process aims to test the four hypotheses that have been formulated.

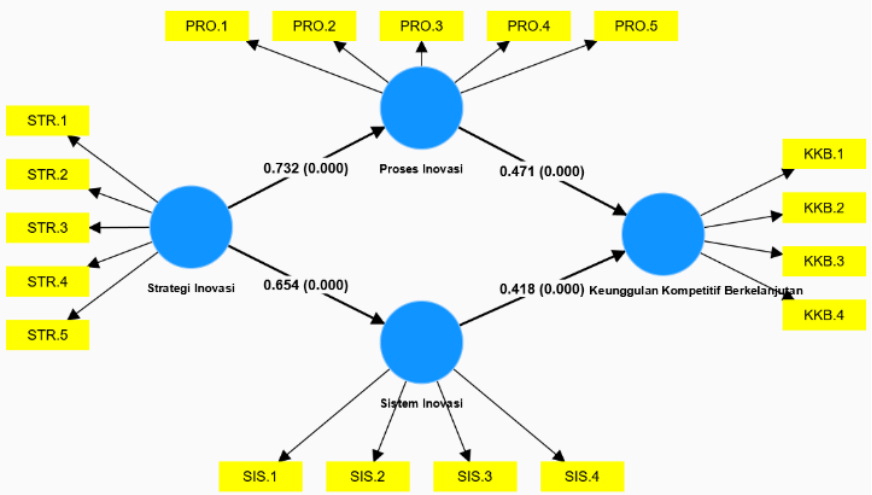

Figure 2 Path Coefficients

Table 11 Hypothesis Test Results

Hypothesis	Correlation	Original Sample	P-values	T-statistics	Results

		(o)			
H1	STR →PRO	0.732	0,000	12,663	Positive
H2	STR →SIS	0.654	0,000	9,483	Positive
H3	PRO →KKB	0.471	0,000	4,417	Positive
H4	SIS →KKB	0.418	0,000	3,854	Positive

The results of the hypothesis test show that all variables are positively related. The most influencing variable is the innovation process with P-values <0.005 and T-statistics >1.96.

a. The Influence of Innovation Strategy on the Innovation Process

An innovation strategy is the beginning of the sustainability of a production process or service that is quality and competitive in the market. By continuing to innovate, companies are able to continually update their products or services, maintain a competitive advantage, and meet the evolving needs and expectations of consumers. Innovation is also the key to increasing operational efficiency, reducing production costs, and expanding market share. As a result, an innovation strategy is not only important to start a process, but also to ensure business sustainability and growth in the long term.

The results of this research show that there is a direct influence of innovation strategy on the innovation process positively with path coefficients of 0.732 then P-values of 0.000 and T-statistics of 12.663. This figure shows that with a carefully planned innovation strategy, MSMEs will create a structured production or service process according to the strategy that has been created. Thus, innovation strategy has a significant influence on the innovation process.

b. The Influence of Innovation Strategy on the Innovation System

Rapid developments in the digital world increasingly encourage the need for an effective innovation system. In facing this challenge, companies need to strengthen their innovation strategy, especially in utilizing technology and adapting to dynamic market changes. With a strong innovation system, MSMEs can ensure that they can be competitive and ready to face various changes that occur in the surrounding environment. Not only is technology structured, but the production or service process also has a structured innovation system.

The research that has been carried out shows that innovation strategies have a positive effect on innovation systems with path coefficients of 0.654, then P-values of 0.000, and a T-statistic value of 9.483. This proves that Yogyakarta MSMEs utilize an innovation system, one of which is using technology as the main support in increasing their competitiveness and operational efficiency. Technology has opened up new opportunities for MSMEs to expand markets, increase production efficiency, and improve the quality of the products and services they offer. By utilizing technology wisely, MSMEs can become more resilient in facing increasingly complex market challenges.

c. The Influence of the Innovation Process on Sustainable Competitive Advantage

The innovation process aims to reduce valueless activities, and this is expected to make the process more efficient and effective. Moreover, a good innovation process can influence competitive advantage in the market by improving product or service quality, reducing production costs, speeding up *time-to-market*, and creating significant differentiation from competitors. Thus, MSMEs can achieve a larger market share and have a sustainable competitive advantage in the market.

The results of this research show that the innovation process has a positive effect on sustainable competitive advantage with path coefficients of 0.471, P-values of 0.000, and T-statistics of 4.417. This means that an innovation process that includes product differentiation, operational efficiency, and new creation can create a sustainable competitive advantage in the market. The existence of an innovation process will naturally encourage the development of MSMEs' internal strengths, such as HR skills and can achieve sustainable competitive advantage.

d. The Influence of Innovation Systems on Sustainable Competitive Advantage

Innovation systems in the business world, especially in Micro, Small and Medium Enterprises (MSMEs), are important for the growth and sustainability of MSMEs. It involves a set of processes, methods, tools designed to manage and optimize innovation in all aspects of business. The existence of an innovation system is able to maintain sustainable competitive advantage by ensuring that MSMEs can continue to adapt to market and technological changes. An effective innovation system makes MSMEs ready to face market competition or existing business players.

The research results show that the innovation system has a positive effect on sustainable competitive advantage with

the path coefficients test of 0.418, then the P-values of 0.000, and the T-statistics of 3.854. This indicates that the innovation system has the ability to influence competitive advantage in the market. Thus, the results of this study provide empirical support for the importance of developing and maintaining an effective innovation system as a strategy for achieving sustainable competitive advantage. MSMEs that are able to integrate innovation into their operational processes have a greater chance of succeeding in a dynamic market.

3.3. Discussion of Results

Innovation strategies, processes, and systems become the key factors in increasing sustainable competitive advantage for MSMEs in Yogyakarta. These findings not only support resources and theory but fill important theoretical and practical gaps. This research makes a significant contribution to empirical studies of innovation practices in MSMEs (Hwang et al., 2020; Tidd & Hull, nd). This research also focuses on the influence of innovation strategies, innovation processes, and systems on the sustainable competitive advantage of MSMEs.

Innovation strategy as hypothesized shows that innovation strategy positively influences sustainable competitive advantage through innovation processes and systems. As an important part of implementing an innovation strategy, innovation processes and innovation systems are stated to be able to increase sustainable competitive advantage in MSMEs (Aminullah et al., 2022; Candraningrat et al., 2021; Gao et al., 2023). Research on innovation strategy shows that processes and systems have a significant impact and emphasizes the need for special efforts to implement innovation at a strategic level, especially with active efforts to update products and services to respond to diverse market needs (Kilay et al., 2022; Octasylva et al., 2022; Suharyati & Utami, 2022). Understanding the importance of business predictions among Yogyakarta MSMEs is crucial by using forecasting techniques. MSMEs are able to identify opportunities and challenges in the future, as well as respond to changes in customer demand.

The innovation system is an important factor in implementing strategies that will have a significant impact on the sustainable competitive advantage of MSMEs. Several important indicators in the innovation system that influence sustainable competitive advantage include knowledge, which is considered as an important element in maintaining sustainable competitive advantage, both from an internal and external perspective; involving customers in product or service development with the aim of ensuring that the product or service can meet their needs; Sis3-Open communication facilities to all parts involved in the business, and Sis4-Act as a good partner with business partners and customers to expand and maintain mutually beneficial relationships." By adopting practices, MSMEs can increase the use of knowledge resources to innovate (Salunke et al., 2019). This will help employees better understand the company's vision, mission and goals, and increase engagement and innovation in the workplace.

The results of this research are in accordance with the results of previous research, which was conducted by Thi et al. (2023), Phung et al. (2021); and Severo et al. (2020). Thus, it can be concluded that innovation strategies through innovation processes and systems can increase sustainable competitive advantage. Innovation in the form of strategies, processes, and systems plays an important role in increasing the sustainable competitive advantage of MSMEs, especially in the Special Region of Yogyakarta. This research has contributed to the development of innovation strategies in building sustainable competitive advantages in MSMEs, which is significant to current knowledge in guiding innovation practices in MSMEs (Hwang et al., 2020); (Puspita et al., 2020). This emphasizes the importance of innovation strategy in influencing innovation processes and systems, as well as the relationship between processes, systems, and sustainable competitive advantage.

4. Conclusion

Innovation strategy significantly influences the innovation process as a form of functional innovation. This shows that MSMEs that carry out innovation strategies using process innovation practices can produce better products or services to reduce valueless processes with more efficient and effective processes. This can be achieved by identifying, evaluating, and optimizing each stage in the business process. Innovation strategy has a positive influence on the innovation system. This research indicates that the influence of innovation strategy on the innovation system allows MSMEs to have better access to the latest information and technology in business. In this way, MSMEs can more easily keep up with emerging business developments and trends, such as changes in consumer preferences and new technology. The innovation process has a significant influence on sustainable competitive advantage. This is proven by the existence of a good innovation process, which will produce sustainable competitive advantage for MSMEs in the market. Implementing innovation can improve operational efficiency, meet evolving market needs, and maintain sustainable competitive advantage in a changing environment. Innovation systems influence sustainable competitive

advantage positively. The innovation system encourages MSMEs to continue to develop new ideas, technology, and processes that can increase efficiency, productivity, and product or service quality. The existence of an MSME innovation system can be more responsive to market changes and maintain a sustainable competitive advantage. Therefore, the innovation system is one of the key elements in achieving sustainable competitive advantage. The results of previous research or literature are limited and do not fully meet the needs of researchers, causing this research to have shortcomings in the process and the results are not optimal. Future researchers should be able to expand the scope of research because current research is not yet fully able to cover all aspects of MSMEs. The use of more optimal and effective data collection techniques must also be considered to obtain highest quality and quantity of data.

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