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Impact of Innovation Leadership on Supply Chain Efficiency: The Role of Process Improvement

Purwoko[1]* and Zainudin Bin Hassan[2]

Abstract
Research aims: This research aims to determine the influence of innovation leadership on supply chain efficiency mediated by process improvement.
Design/Methodology/Approach: The objects of this research were micro, small, and medium enterprises (MSMEs) players in the creative economy sector in the Yogyakarta Special Region, Indonesia. Measurements of the outer model, inner model, and hypothesis testing (directly and indirectly) were carried out on the data sample of MSME actors in the creative economy sector in Yogyakarta Special Region utilizing the SmartPLS statistical tool. The sampling employed purposive sampling with a total sample size of 267 creative economy MSMEs.
Research Findings: The results uncovered that innovation leadership positively affected supply chain efficiency, implying that innovation leadership could significantly improve supply chain efficiency. Innovation leadership also positively influences process improvement, showing that if the innovation leadership is good, process improvement will increase significantly. In addition, process improvement positively impacted supply chain efficiency, indicating that process improvement could significantly improve supply chain efficiency. Lastly, process improvement could mediate the effect of innovation leadership on supply chain efficiency significantly, denoting that process improvement has a highly important role in improving supply chain efficiency.
Theoretical Contribution/Originality: This study indicates that innovative leaders are highly important in improving their supply chain efficiency, and process improvement as a mediating variable, a novelty in this study, has a very significant role for innovative leaders in improving supply chain efficiency.
Practitioners/Policy Implications: Creative economy MSMEs must become innovative leaders in their businesses to increase efficiency in the supply chain. In addition, MSMEs need to continuously improve their business processes, especially in the supply chain.
Research Limitations/Implications: The independent variable in this research was only one, i.e., innovation leadership, so it is less comprehensive. To be more comprehensive, other independent variables, such as intellectual capital or moderating variables of government policies, can be added.
Keywords: Innovation Leadership; Supply Chain Efficiency; Process Improvement

Introduction

The concept of supply chain management has been in the limelight since the 1980s when many companies realized that internal innovation alone was not enough to produce fast, cheap, and high-quality products.

Companies need the participation of suppliers, operators, and distribution networks to recognize the existence of cheap, fast, and high-quality products, which is ultimately summarized in the concept of supply chain management (Moore, 2008). Supply chain management is a management activity that aims to obtain and process raw materials into semi-finished products and finished products and then, through a distribution system, deliver these products to consumers (Heizer et al., 2018). Supply chain management also aims to coordinate activities to maximize supply chain competitive advantage and benefits for end users (Heizer et al., 2018). Through effective supply chain activities, organizations and suppliers can maintain their competitive advantage and position and improve their performance in the face of dynamic industry competition challenges (Heikkilä, 2002).

According to Jacobs (2019), an efficient supply chain is the optimal utilization of resources, including financial, human, technological, or physical, that results in reduced operational costs for materials and packaging and reduced time wastage. Lee et al. (2011) suggested that supply chain efficiency refers to profitability, flexibility, reliability, and waste management and can be a hallmark for any organization to support better business processes and use information systems to accelerate delivery or response to customer demand.

Supply chain efficiency can be influenced by innovation leadership, as stated by Yoon et al. (2016) and Jermsittiparsert and Srihirun (2019). Innovation leadership positively influences supply chain efficiency when innovative leaders can provide good knowledge and understanding of supply chain management activities, have a high work ethic, and establish open relationships with organizations to support operational processes and supply chain efficiency (Lovelace et al., 2001). The essence of innovation leadership is the leader's ability to encourage individual initiative, i.e., individual responsibility, conduct clear and inclusive work evaluations, encourage a strong work orientation, and build great trust in team members (Carmeli et al., 2010). Research conducted by Yoon et al. (2016) revealed that innovation leadership positively affected process improvement.

Consequently, leaders must develop effective processes and provide appropriate resource support to encourage process improvement to enhance quality services (Schneller & Smeltzer, 2006; Shih et al., 2009). Process improvement also has a positive effect on supply chain efficiency. A study by Yoon et al. (2016) also showed that process improvement positively influences supply chain efficiency. In other words, the higher the process improvements the company makes, the more the company's supply chain efficiency will increase (Mulyawan & Sri, 2018). Process improvements also improve speed and communication, eliminate unnecessary steps, reduce waste and costs through innovation, and increase supply chain efficiency (Heim & Peng, 2010; Lin, 2014).

Process improvement can act as a mediating variable in the effect of innovation leadership on supply chain efficiency. Research carried out by Yoon et al. (2016) and Bag and Anand (2016) demonstrated that process improvement mediates the positive influence of innovation leadership on supply chain efficiency. Innovation leadership can encourage leaders to take a more active role in creating renewal, emphasizing team

performance, and encouraging initiative in employees so that they can play a role in improving operational processes related to supply chain management to obtain a fast exchange of information to achieve supply chain efficiency (Yoon et al., 2016). Innovation leadership also encourages leaders to innovate process improvements through cost reduction and improved product and service quality to improve supply chain efficiency and provide better customer value (Flint et al., 2008).

Nevertheless, Shen et al.'s (2021) research results uncovered that the company's innovation leadership did not apply to suppliers, meaning that innovation leadership could not control suppliers properly, so the supply chain could no longer be efficient. Likewise, Hong et al.'s (2019) research found that supply chain quality management could not improve the company's operational performance; in other words, the company's supply chain management could not reduce costs, or the company could not make efficiency in its supply chain.

Due to such contradictions, this study aims to test the role of process improvement in mediating the influence of innovation leadership on supply chain efficiency. Because innovative leaders are crucial in increasing supply chain efficiency and bridging the gap in previous research, process improvement is included as a mediating variable, especially for Micro, Small and Medium Enterprises (MSMEs) in the creative economy sector in the Special Region of Yogyakarta. The Special Region of Yogyakarta has the potential to continue to develop into the hub of Indonesia's creative industry. Yogyakarta Special Region is also known to be strong in the creative economy in the culinary, craft, and fashion sectors, so this is interesting to study further. Second, previous research only took the health industry context, such as research conducted by Yoon et al. (2016). In comparison, this research takes a different context from previous research, i.e., the MSMEs in the creative economy sector in the Special Region of Yogyakarta.

Literature Review and Hypotheses Development

Innovation Leadership and Supply Chain Efficiency

Reza and Dirgantara (2010) argues that leadership is the backbone of organizational development since it is difficult to achieve organizational goals without good leadership. Organizations need strong leadership and management to optimize effectiveness and efficiency (Robbins & Timothy, 2015). According to this theory, an organization is influenced by leadership; in this study, the leadership is innovation leadership. In addition, Adjei (2013) defines innovation leadership as different organizational leadership styles influencing employees to generate creative ideas, new products, services, and solutions. Since innovation leadership is a complex concept, no single explanation or formula exists that a leader should follow to increase innovation (Adjei, 2013).

Alsolami et al. (2016) suggest that innovation leadership is relevant to several leadership attributes. Charismatic leadership and transformational leadership attributes are the forerunners of innovation leadership. This statement can provide insight into how

innovation leadership can improve organizational performance in modern organizations. According to Cummings and O'Connell (1978) in Yoon et al. (2016), leadership and innovation are widely studied as complex issues in various fields and are one of the basic concepts in organizational theory. Further, Carmeli et al. (2010) argue that the essence of innovation leadership is that leaders can encourage initiative in individuals, i.e., individual responsibility, conduct clear and inclusive work evaluations, encourage strong work orientation, and build great trust in team members. For instance, a transformational leader supports followers to try a new perspective in working, changes the existing process and system to benefit long term, and helps followers to take the effective opportunity. The leader can directly introduce new ideas in the organization and support the innovation initiative to the followers (Suhana et al., 2019).

The results of studies carried out by Lovelace et al. (2001), Samad (2012), Mazzola et al. (2015), Yoon et al. (2016), Mulyawan and Sri (2018), Jermsittiparsert and Srihirun (2019), and Aulia (2020) stated that innovation leadership positively affects supply chain efficiency. Yoon et al. (2016) then developed organizational innovations that strengthen organizations internally and externally, innovation leadership that supports efficiencies to help organizations survive in a competitive environment driven by ever-increasing customer expectations and technological advances. "I have found that I need Innovative leaders who can provide good knowledge and understanding of supply chain management activities, have a high work ethic, and establish open relationships with organizations to support operational processes and supply chain efficiency within the organization" (Lovelace et al., 2001). Moreover, Bag and Neeraj (2016) revealed that a leader must utilize innovative leadership to work in challenging and uncertain situations. Innovation systems, out-of-the-box thinking, and innovation tools are needed to improve organizational performance and maintain the existence of the organization or company in the future. A leader's ability to effectively lead an organization is critical to service delivery, customer satisfaction, and overall success in the industry (Yoon et al., 2016).

H_1: Innovation leadership positively affects supply chain efficiency.

Innovation Leadership and Process Improvement

Jermsittiparsert and Srihirun (2019) revealed that organizations need to improve management and leadership to increase responsibility by eliminating inefficiencies and continuing to make process improvements to the supply chain. Research conducted by Aulia (2020) indicates that innovation leadership positively and significantly affects process improvement. The results of research conducted by Aulia (2020) also concluded that innovation leadership focuses on improving operational processes and providing better value to customers through reducing costs and improving product and service quality. A study by Yoon et al. (2016) supports the positive influence of innovation leadership on process improvement. In this case, transformational leadership alludes to a methodology by which pioneers inspire employees to consent to hierarchical objectives and interests to surpass expectations. Transformational leaders take opportunities of presenting new job strategies, transform the current systems and processes for long-

standing advantages, and assist the employees with grasping chances successfully (Buil et al., 2019; Udin & Syaikh, 2022).

Research conducted by Herzlinger (2006), Schneller and Smeltzer (2006), Flint et al. (2008), Shih et al. (2009), Yoon et al. (2016), Mulyawan and Sri (2018), and Aulia (2020) uncovered that innovation leadership had a positive effect on process improvement. As such, leaders must develop effective processes and provide appropriate resource support to encourage process improvement to improve quality services (Schneller & Smeltzer, 2006; Shih et al., 2009).

H₂: Innovation leadership positively affects process improvement.

Process Improvement and Supply Chain Efficiency

Studies by Heim and Peng (2010), Lin (2014), Yoon et al. (2016), Mulyawan and Sri (2018), and Aulia (2020) exposed that process improvement had a positive influence on improving supply chain efficiency. Process improvements enhance speed and communication, eliminate unnecessary steps, reduce waste and costs through innovation, and increase supply chain efficiency (Heim & Peng, 2010; Lin, 2014). The higher the process improvements the company makes, the more the company's supply chain efficiency will increase (Mulyawan & Sri, 2018). Process improvement also increases the speed of delivering products to consumers and develops efficient forecasting processes to manage environmental uncertainty to achieve supply chain efficiency for reduced operating costs and waste (Aulia, 2020).

H₃: Process improvement positively affects supply chain efficiency.

Innovation Leadership, Supply Chain Efficiency, and Process Improvement

Research conducted by Kim and Rifai (1992), Flint et al. (2008), Yoon et al. (2016), Bag and Anand (2016), Mulyawan and Sri (2018), Mahdyantoro (2018), and Aulia (2020) showed the results of process improvement mediating the positive influence of innovation leadership on supply chain efficiency. Innovation leadership encourages leaders to innovate by making process improvements by reducing costs and improving the quality of products and services to improve supply chain efficiency and provide better customer value (Flint et al., 2008). The higher the leader's emphasis on making process improvements, the higher the company's supply chain efficiency will increase (Mulyawan & Sri, 2018).

H₄: Process improvement can mediate the positive effect of innovation leadership on supply chain efficiency.

Research Methods

The population is a complex domain of objects or subjects with specific qualities and characteristics that researchers have determined to study and then draw conclusions (Sugiyono, 2017). The population of this research was MSME players in the creative economy sector in the Special Region of Yogyakarta, totaling 1,877 business units (BAPPEDA Special Region of Yogyakarta, Special Region of Yogyakarta Cooperative and SMEs Office, 2020). From this large population, this study used a sample. According to Malhotra and Birks (2007), sampling is taking a part of the population as a representation. The technique employed in sampling was a purposive sampling method, with the criteria that the researchers set: creative economy MSMEs that had been established for at least five years and had a workforce of at least five people. From these criteria, a total sample size of 267 MSMEs was obtained.

This research used primary data. Primary data are research data obtained directly from the source without interpretation, intermediary or second-party filtering (Blumberg et al., 2014). The data collection technique utilized in this research was a questionnaire survey technique. The measurement scale used to measure indicators on variables was carried out using a Likert scale (1-5). According to Sekaran and Bougie (2009), the Likert scale has five levels of answer preferences (scores 1-5) with details: 1) Strongly Disagree; 2) Disagree; 3) Neutral; 4) Agree; 5) Strongly Agree. The innovation leadership variable employed four statement items, the process improvement variable used three-statement items, and the supply chain efficiency variable utilized six statement items.

In this study, the SmartPLS statistical analysis tool was used to estimate the quantitative impact of changes in one or more other events. This research used multivariate analytical techniques with three independent, mediating, and dependent variables. According to formulated hypotheses, this study began with an external model, internal model measurement evaluation, and hypothesis testing (direct and indirect). Ghozali (2017) revealed that Partial Least Square (PLS) can be used for all data scales and does not require many assumptions because it is a data analysis method that is soft modeling. PLS is typically used as a confirmatory theory, to build relationships, or for proposition testing. This study employed PLS model analysis because of the following considerations: 1) The model formed in the conceptual framework of this study showed a cascading causal relationship, i.e., innovation leadership to supply chain efficiency with process improvement as a mediating variable; 2) This study used latent variables measured using indicators. PLS can be used to confirm indicators, factors, or constructs; 3) Variant-based SEM (Structural Equation Modeling) using the PLS method is a multivariate analysis approach that can analyze multiple latent variables concurrently; and 4) PLS is such technique that is not either based on many expectations.

The steps for testing the empirical research model in measuring the SmartPLS-based outer model (Ghozali, 2017) are as follows: 1) Convergence validity is one test that shows the relationship between reflection factors and other variables. The minimum limit on the indicator's external stress factor value that can be used to represent the variable is 0.5 (Blumberg et al., 2014). Reflective measurements are highly recommended if the

correlation with the measured component exceeds 0.7, but an outer loading factor value of > 0.5 is considered sufficient (Solimun, 2010). Variable validity was tested with the Average Variances Extracted (AVE) value. If the AVE value is> 0.5, the variables used in the study are declared valid. 2) Discriminant validity is to test the validity used in measurements where the measurement results must show that the variables are not strongly correlated if the variables that are the predictor components are not strongly correlated (Indrawati, 2015). Discriminant validity is a model with good discriminant validity if each cross-loading value of a latent variable has the highest value compared to other cross-loading values on other latent variables. 3) Composite reliability is to test the reliability value between indicators of the constructs that form it using composite reliability. A variable is deemed good if the composite reliability value is ≥ 0.7 and the Cronbach's alpha value is recommended above 0.6 (Ghozali, 2017).

For hypothesis testing in this study, several tests were conducted as follows: 1) testing the direct effect, namely the effect of innovation leadership on supply chain efficiency, the effect of innovation leadership on process improvement, and the effect of process improvement on supply chain efficiency with the bootstrap resampling method and testing using the t-statistic or t-test compared to the t-table, which is higher than 1.96, so it does not require normal distribution assumptions (Ghozali, 2017). 2) The effect of indirect effects were tested, i.e., the indirect effect of innovation leadership on supply chain efficiency through the process improvement variable, using the indirect effect estimation simultaneously with the PLS-SEM triangle model. Alternatively, it is commonly called mediated regression analysis (Baron & Kenny, 1986). The requirements for the mediation effect that must be met are that the path coefficient of the independent variable on the dependent variable is significant, the path coefficient from the independent variable to the mediating variable is significant, and the mediating variable to the dependent variable is also significant (Baron & Kenny, 1986). Hair et al. (2017) revealed several criteria or benchmarks for making decisions on mediating variables, namely: 1) If the path coefficient between the independent variable and the dependent variable has a significant relationship and a fixed value, a variable is declared not to mediate; 2) If the path coefficient between the independent variable and the dependent variable shows a significant relationship and the value decreases, a variable is declared to mediate partially (partial mediation); and 3) If the path coefficient between the independent variable and the dependent variable shows a decrease in value and is not significant, a variable is declared to mediate as a whole (full mediation).

Results and Discussion

Respondent Description

The respondents in this study were MSME players in the creative economy sector in the Special Region of Yogyakarta, Indonesia, totaling 267. As shown in Table 1, most respondents were male, with 171 people or 64.04%, and 96 people or 35.96%, were female. This number denotes that the role of women entrepreneurs in the creative economy sector in Yogyakarta was quite large. Then, respondents' education mostly had

a bachelor's degree, with 126 people (47.19%), and the least had an elementary school education, as many as seven people (3.37%). For those with a Baccalaureate degree, there were 62 people (23.22%), and for those with a senior high school education, there were 45 people (16.85%). In addition, the age of MSME players in the creative economy sector in Yogyakarta was mostly included in the productive age category, as seen in Table 3. The most dominant age range was between 41 - 50 years old, with 92 people (34.46%), followed by 51 - 60 years old, as many as 72 people (26.97%). While the age range of 31 - 40 years was 21.35% or 57 people, the least were those aged 21 - 30 years, totaling 15 people or 5.62%. Those who fell into the less productive age category, ≥ 61 years, were 31 (11.61%).

Table 1 Description of Respondent

Description	Total	%
Gender		
Man	171	64.04
Woman	96	35.96
Total	267	100
Education		
Elementary school	7	2.62
Junior high school	18	6.74
Senior high school	45	16.85
Baccalaureate degree	62	23.22
Bachelor's degree	126	47.19
Masters	9	3.37
Total	267	100
Age		
21 - 30	15	5.62
31 - 40	57	21.35
41 - 50	92	34.46
51 - 60	72	26.97
≥ 61	31	11.61
Total	267	100

Measurement Model

Convergence validity is one analysis showing the relationship between the reflective factors and other variables. The measurement of latent variables is indicated by the size of the loading factor value. Each variable is tested for convergent validity and assessed based on the correlation between the item or component score estimated by the loading factor value. The minimum limit for indicator loading factor values that can be used to plot variables is 0.5 (Blumberg et al., 2014). Reflective measurements are highly recommended if the correlation with the measured component exceeds 0.7, but a loading factor value of > 0.5 is considered sufficient (Solimun, 2010). Variable validity is tested with the Average Variances Extracted (AVE) value. If the AVE value is> 0.5, the variables used in the study are declared valid. The loading factor, AVE values, and indicators for each variable can be seen in Table 2.

Table 2 Convergent Validity

Variable	AVE	Indicator	Loading Factor	Description
Innovation Leadership (KI)	0.751	KI 1	0.853	Valid
		KI 2	0.847	Valid
		KI 3	0.916	Valid
		KI 4	0.848	Valid
Process Improvement (PP)	0.739	PP 1	0.850	Valid
		PP 2	0.856	Valid
		PP 3	0.873	Valid
Supply Chain Efficiency (ERP)	0.811	ERP 1	0.936	Valid
		ERP 2	0.897	Valid
		ERP 3	0.881	Valid
		ERP 4	0.924	Valid
		ERP 5	0.902	Valid
		ERP 6	0.862	Valid

Source: Primary Data Processed

Based on Table 2, the loading factor value generated by each variable indicator for innovation leadership, process improvement, and supply chain efficiency was more than 0.5. Thus, these indicators were declared valid as latent variables. Each indicator was significant in forming variables in the innovation leadership variable, but the dominant or strongest indicator was the KI 3 indicator. In the process improvement, the variable showed good significance results, with the PP 3 indicator as the dominant indicator measuring the variable. The constituent indicators in the supply chain efficiency variable showed a good loading factor value as a measure of latent variables, with the ERP 1 indicator as the dominant indicator.

Discriminant validity was carried out to ensure that each latent variable was different. If the latent variable cross-loading value is greater than the cross-loading value of other latent variables, a model has good discriminant validity. Table 3 displays the results of the discriminant validity test for each variable.

Table 3 Discriminant Validity

Indicator	KI	ERP	PP
KI 1	0.853		
KI 2	0.847		
KI 3	0.916		
KI 4	0.848		
ERP 1		0.862	
ERP 2		0.902	
ERP 3		0.924	
ERP 4		0.881	
ERP 5		0.897	
ERP 6		0.936	
PP 1			0.850
PP 2			0.856
PP 3			0.873

Source: Primary Data Processed

Table 3 revealed that all cross-loading values for each indicator of each latent variable already had the highest cross-loading value compared to the cross-loading values of other variable indicators. It suggests that each latent variable already had good discriminant validity.

To test the reliability between indicators of the constructs that formed it, composite reliability was used. A variable is considered good if the composite reliability value is ≥ 0.7 and the Cronbach's alpha value is recommended above 0.6 (Ghozali, 2017). The following is the composite reliability value and Cronbach's alpha value in Table 4.

Table 4 Composite Reliability and Cronbach's Alpha

Variable	Composite Reliability	Cronbach's Alpha	Description
Innovation Leadership	0.889	0.923	Reliable
Process Improvement	0.824	0.895	Reliable
Supply Chain Efficiency	0.953	0.963	Reliable

Source: Primary Data Processed

Based on Table 4, the composite reliability value of the innovation leadership variable was 0.889, the process improvement variable was 0.824, and the supply chain efficiency was 0.953. Because the latent variable values were ≥ 0.7, the three variables analyzed had good composite reliability. The overall Cronbach's alpha results showed that the value of the measurement model results (outer model) could be further analyzed to evaluate the structural model.

Structural Model

After measuring the outer model, the next step was to test the structural model (inner model) to see the value between constructs. The evaluation results of the research structure model are as follows (Figure 1).
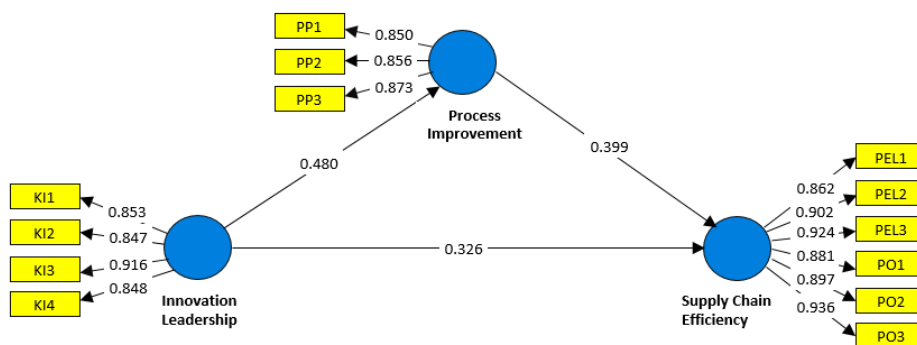

Figure 1 Result of Structural Analysis

In evaluating the PLS structural model, the R-squared of the dependent latent variable was considered. Table 5 presents the results of the R-squared estimation using PLS.

Table 5 The Goodness of Fit Value

Variable	R^2
Process Improvement	0.231
Supply Chain Efficiency	0.688

Source: Primary Data Processed

Table 5 shows the R^2 value for the process improvement variable of 0.231 and the supply chain efficiency variable of 0.688. These results indicate that the innovation leadership variable affected the process improvement variable by 0.231 or 23.1%, and the rest was influenced by variables not examined in this study. Furthermore, the innovation leadership and process improvement variables affected supply chain efficiency by 0.688 or 68.8%, and the rest was influenced by variables not examined in this study.

Results of This Study

The structural model was evaluated using the path coefficient values for the relationship among any variable. The structural model was tested after the development of the relational model. Examining structural association models aims to describe the relationships between variables within a study. Structural models were checked using t-tests. Image output and the values contained in the output of path coefficients and indirect effects were used as the basis for testing the hypothesis directly.

In addition, the direct effect test aims to determine the effect of innovation leadership on supply chain efficiency and the effect of process improvement on supply chain efficiency. Direct effect tests were performed using the t-statistic test of the Partial Least Squares (PLS) analytical model with SmartPLS support. Meanwhile, the indirect effect analysis aims to drive the mediation of process improvement on the effect of innovation leadership on supply chain efficiency. The indirect effect test was carried out using the indirect effect estimation simultaneously with the triangle partial least square (PLS) model using SmartPLS assistance. The following direct and indirect hypothesis testing results are presented in Table 6.

Table 6 Direct and Indirect Hypothesis Test Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistic (O/STDEV)	P-Values	Description
KI → ERP	0.326	0.349	0.160	2.038	0.042	Accepted
KI → PP	0.480	0.484	0.124	3.870	0.000	Accepted
PP → ERP	0.399	0.384	0.137	2.919	0.004	Accepted
KI → PP → ERP	0.192	0.188	0.089	2.145	0.032	Partial Mediation

Source: Primary Data Processed

The first hypothesis testing, the relationship between the variables innovation leadership and supply chain efficiency (see Table 6), showed a positive path coefficient value of 0.326. The positive path coefficient indicates an unidirectional association between innovation leadership variables and supply chain efficiency. The p-value revealed 0.042,

lower than 0.05, and the t-statistic amount of 2.038 was higher than the t-table value of 1.96. These results demonstrate that the relationship with innovation leadership positively impacted supply chain efficiency. This explanation denotes that the first hypothesis was accepted.

The first hypothesis states that innovation leadership positively affects supply chain efficiency. The results of hypothesis testing uncovered that innovation leadership had a positive effect on supply chain efficiency. It can be concluded that the innovation leadership possessed by MSME players in the creative economy sector in Yogyakarta Special Region significantly impacted efficient supply chain management. It indicates that MSME players in the creative economy sector in Yogyakarta Special Region had sufficient knowledge about supply chain management. Innovation leadership influenced MSME players in the creative economy sector in Yogyakarta Special Region in the efficiency of their business supply chains. With good enough innovative leadership, it will influence efficient supply chain management. Good supply chain efficiency must be equipped with good innovation leadership as well. The results of this study are supported by research conducted by Yoon et al. (2016) and Jermsittiparsert and Srihirun (2019) that innovation leadership positively influences supply chain efficiency. Innovation leadership positively influences supply chain efficiency when innovative leaders can provide good knowledge and understanding of supply chain management activities, have a high work ethic, and establish open relationships with organizations to support operational processes and supply chain efficiency (Lovelace et al., 2001). In addition, the performance of innovative leaders can create efficiency in the supply chain (Aulia, 2020). The results of this study indicate that if a leader or owner of MSMEs has an innovative and creative spirit, the MSME will be able to significantly reduce costs in the supply chain so that MSMEs can be more competitive in competing.

The results of testing the second hypothesis, i.e., the relationship between innovation leadership and process improvement variables, indicated a positive path factor value of 0.480. A positive path coefficient illustrates that the relationship between innovation leadership variables and process improvement is unidirectional. The numerical p-value was 0.000, less than 0.05, and the t-statistic value of 3.870 was greater than the t-table value of 1.96. These results imply that relationships with innovation leadership positively impacted process improvement. This explanation suggests that the second hypothesis was accepted.

The second hypothesis proposes that innovation leadership positively affects process improvement. The statistical testing results showed that innovation leadership could positively affect process improvement. It can be concluded that the innovation leadership possessed by MSME players in the creative economy sector in Yogyakarta Special Region had a major impact on process improvement related to supply chain innovation. This research aligns with the results of Yoon et al. (2016), stating that innovation leadership positively influenced process improvement. As such, leaders must develop effective processes and provide appropriate resource support to encourage process improvement to improve quality services (Schneller & Smeltzer, 2006; Shih et al., 2009). Organizations also should pay more attention to innovation leadership orientation, especially in

improving process improvement for innovation in the supply chain (Mulyawan & Sri, 2018). MSME leaders with an innovative spirit will be able to significantly improve MSME business processes, both in terms of processing products using digital technology to be faster in terms of service and can provide customer satisfaction. Likewise, in terms of marketing products, innovative MSME leaders will adopt technology currently developing to compete with other MSMEs or even compete with large companies.

The results of testing the third hypothesis, namely the relationship between the process improvement variable and the supply chain efficiency variable, showed a positive path coefficient value of 0.399. The positive path coefficient indicates that the relationship between the process improvement variable and supply chain efficiency is unidirectional. The p-value showed 0.004, so it was less than 0.05, and the t-statistic value of 2.919 was greater than the t-table of 1.96. With these results, there was a positive influence of the process improvement relationship on supply chain efficiency. This explanation denotes that the third hypothesis was accepted.

The third hypothesis puts forward that process improvement positively affects supply chain efficiency. The statistical test results disclosed that process improvement could positively affect supply chain efficiency. It can be concluded that process improvements in operational processes could positively impact supply chain efficiency. According to Aulia (2020), process improvement plays a role in increasing the speed of delivering products to consumers, developing efficient forecasting processes to manage environmental uncertainty, and achieving supply chain efficiency for reduced operating costs and reduced waste. This research is consistent with research conducted by Yoon et al. (2016) that process improvement positively influenced improving supply chain efficiency. Process improvements improve speed and communication, eliminate unnecessary steps, reduce waste and costs through innovation, and increase supply chain efficiency (Heim & Peng, 2010; Lin, 2014). The higher the process improvements the company makes, the more the company's supply chain efficiency will increase (Mulyawan & Sri, 2018). Further, business process improvement must be carried out continuously so that MSMEs can be more efficient in their supply chains. MSME owners also must improve their business processes by constantly paying attention to the business environment, both internal MSMEs and the external environment, so that MSMEs will not miss the latest information and technology and can implement the right strategies for MSME business development.

Before conducting the mediation test, the first step emphasized was to test the relationship between the innovation leadership variable and process improvement, showing a positive path coefficient value of 0.480. A positive path coefficient indicates that the relationship between innovation leadership variables and process improvement is unidirectional. The numerical p-value was 0.000, lower than 0.05, and the t-statistic value of 3.870 was larger than the t-table value of 1.96. These outcomes demonstrate the positive impact of the relationship between innovation leadership and process improvement. In addition, examining the relationship between process improvement variables and supply chain efficiency yielded a positive path factor value of 0.399. Besides, a positive path factor indicates a one-way relationship between the process improvement

variable and supply chain efficiency. The numerical p-value was 0.004, lower than 0.05, and the t-statistic value of 2.919 was larger than the t-table value of 1.96. These outcomes suggest that process improvement relationships positively affect supply chain efficiency.

Based on Table 6, the effect of innovation leadership on supply chain efficiency before the mediation variable was included showed positive results with a positive path coefficient value of 0.326 and a p-value of 0.042. In addition, the effect of innovation leadership on supply chain efficiency after the mediating variable of process improvement was included provided positive results with a path coefficient value of 0.192, a p-value of 0.032 less than 0.5, and a t-statistic value of 2.145 more than the t-table of 1.96. Based on the criteria conveyed by Hair et al. (2014), process improvement can be said to partially mediate the effect of innovation leadership on supply chain efficiency, and it can be concluded that the fourth hypothesis was accepted.

The fourth hypothesis found that process improvement could partially mediate the positive effect of innovation leadership on supply chain efficiency. The statistical testing results showed that process improvement could partially mediate the effect of innovation leadership on supply chain efficiency. The results in this study indicate that the innovation leadership possessed by MSME players in the creative economy sector in Yogyakarta Special Region would increase their supply chain efficiency by innovating in process improvement. Studies conducted by Yoon et al. (2016) and Bag and Anand (2016) have shown that process improvement mediated the positive influence of innovation leadership on supply chain efficiency. Innovation leadership encourages leaders to continue to innovate in process improvement by reducing costs and improving the quality of products and services to improve supply chain efficiency and provide better customer value (Flint et al., 2008). The results of testing the fourth hypothesis denote that the hypothesis was accepted, meaning that innovation leadership owned by leaders or managers would improve supply chain management with process improvements and jointly increase efficiency in the supply chain. The significant role of MSME business process improvement in mediating the relationship between innovation leadership and supply chain efficiency notes the importance of improving MSME business processes. It shows that innovative MSME leadership supported by improved business processes will make the supply chain efficient, meaning that MSMEs can reduce operational costs so that the selling price of MSME products will be more competitive and follow customer needs. Innovative leaders will always think to improve business processes and make efficiencies in the supply chain so that MSMEs can be more competitive and their business sustainability is well maintained.

Conclusion

Based on the data analysis previously discussed, the conclusions of this study are; first, leadership innovation had a positive effect on supply chain efficiency in MSME players in the creative economy sector in Yogyakarta Special Region. It indicates that an innovative leader can make his business supply chain efficient. Second, innovation leadership positively affected process improvement in MSME players in the creative economy sector

in Yogyakarta Special Region. It denotes that innovative leaders can improve the supply chain process so that the products produced can satisfy customers. Third, process improvement positively affected supply chain efficiency in MSME players in the creative economy sector in Yogyakarta Special Region. It implies that innovative leaders' process improvements can increase supply chain efficiency. Fourth, process improvement could mediate the effect of innovation leadership on supply chain efficiency in MSME players in the creative economy sector in the Yogyakarta Special Region. It suggests that process improvement is vital in the supply chain of creative economy MSMEs in the Yogyakarta Special Region.

From the results of this study, although all hypotheses were accepted, this study also has limitations, especially since the independent variable was only innovation leadership. In future research agendas, adding other independent variables that affect supply chain efficiency is better to make it more complex, such as intellectual capital variables and organizational culture. In addition, it can include moderating variables, such as government policies or other dependent variables, namely business continuity or competitive advantage. Besides, future research can compare creative economy MSMEs with manufacturing MSMEs.

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