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Buyer-Supplier Social Capital, Supplier Integration, and Operational Supply Risk of SMEs Craft Batu Alam in Ngeposari, Semanu, Gunungkidul

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ABSTRACT

This research aims to analyze the influence of buyer-supplier social capital on the operational supply risks with supplier integration as a mediation variable in natural stone craft SMEs in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency. Sampling techniques using nonprobability techniques with census methods are as many as 45 SME Natural stone craft in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency as respondents. The data collection method used is a questionnaire. The analysis tool used in this study used SmartPLS 3.2.9. The results showed that the buyer-supplier social capital affects the operational supply risk in SME Craft natural stone in Ngeposari Village, either directly or indirectly through supplier integration.

Keywords: Buyer-Supplier Cognitive Capital, Buyer-Supplier Relational Capital, Buyer-Supplier Social Capital, Operational Supply Risk, Supplier Integration

JEL Classification: L20, L23, L29

INTRODUCTION

Business competition today is not only about price and product competition, but companies that have good supply chain management will survive and win the competition in the market (Sherlywati, 2018). To manage the supply chain, companies are faced with several challenges such as complexity and uncertainty in the supply chain (Pujawan, 2005). This complexity and uncertainty can make the supply chain more vulnerable to risk, especially if the company operates across a country's borders. In general, risks in the supply chain are divided into two types, namely operational risk and risk of disruption. Operational risk refers to uncertainties inherent in uncertain demand, supply, and costs. While the risk of disruption caused by natural and human disasters and economic crises (Tang, 2006).

One of the risks faced by SMEs in Indonesia is operational risks sourced by supply uncertainty. To overcome some of the vulnerability factors of supply chain operational risks, SMEs can use social capital in establishing cooperation with suppliers. Social capital has three dimensions: structural capital, relational capital, and cognitive capital (Nahapiet & Ghoshal, 1998). In this study, the social capital relationship between buyers and suppliers was adopted from all three dimensions.

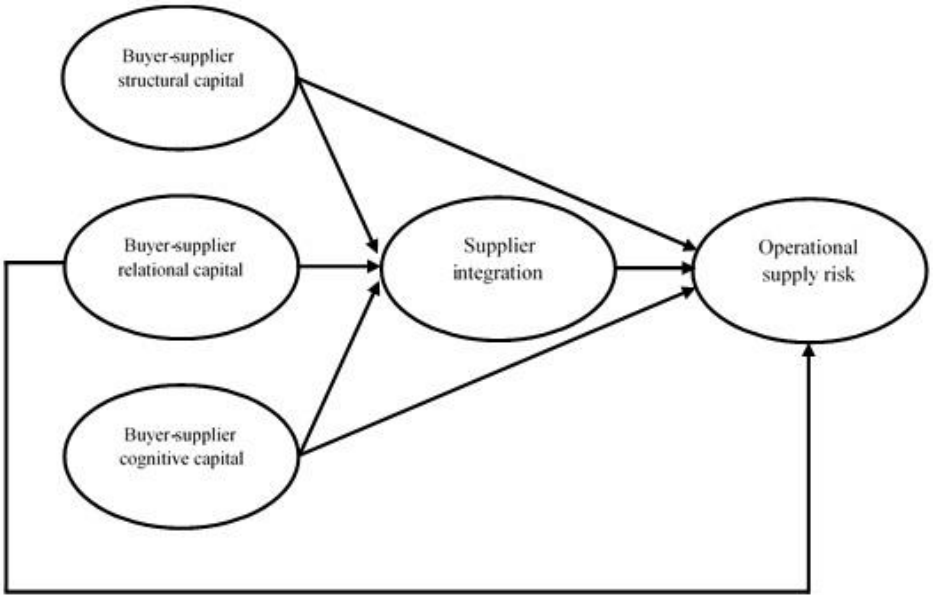
The first dimension in social capital is buyer-supplier structural capital refers to the frequency of social interaction among network members (Carey et al., 2011). Through social interaction will foster mutual attitudes to help overcome risks among buyers and suppliers.

The second dimension is a buyer-supplier relational capital looking at the extent of personal relationships that have been formed in a network (Nahapiet & Ghoshal, 1998). Relationships that have been developed will foster trust then facilitate coordination for the common good.

The last dimension is a buyer-supplier cognitive capital that includes some common attributes and collective ideologies, such as common goals, ambitions, and values, language and code as well as business philosophies between buyers and suppliers (Villena et al., 2011). Increased cognitive capital between buyers and suppliers provides a common understanding and ideology so that it is possible to reduce the occurrence of supply variations (Chowdhury et al., 2019). A good relationship between SMEs and suppliers can strengthen social capital which can then increase integration with suppliers. Supplier integration is defined as the process of SMEs connecting with suppliers through sharing information and resources and coordinating business functions to benefit together (Yim &Leem, 2012).

Based on the description above, researchers will research SME Craft Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency to find out the influence of buyer-supplier social capital on the operational supply risk directly or indirectly through supplier integration. The selection of the location is because SME Craft Batu Alam in Ngeposari Village is very dependent on raw materials derived from suppliers. This has the potential to increase the operational risk of the supply chain, so a way is needed to mitigate it.

The hypothesis in this study can be formulated as follows:



H1: Buyer-supplier structural capital negatively affects operational supply risk.
H2: Buyer-supplier relational capital directly negatively affects operational supply risk.
H3: Buyer-supplier cognitive capital directly negatively affects operational supply risk.
H4: Buyer-supplier structural capital positively affects supplier integration.
H5: Buyer-supplier relational capital positively affects supplier integration
H6: Buyer-supplier cognitive capital positively affects supplier integration.
H7: Supplier integration negatively affects operational supply risk.
H8: Supplier integration mediates the influence of buyer-supplier structural capital on operational supply risk.
H9: Supplier integration mediates the influence of buyer-supplier relational capital on operational supply risk.
H10: Supplier integration mediates the influence of buyer-supplier cognitive capital on operational supply risk.

LITERATURE REVIEW

Operational Supply Risk

Supply chain operational risk is defined as a reflection of the difference between actual supply and the expected value of a measure of supply chain performance that may result in incomplete or unfinished orders (Chen et al., 2013). Deviations in the supply chain can occur in material quality, the quantity of materials, delivery time, and overall requirements (Chowdhury et al., 2019).

In this study, the operational supply risk indicator is adapted from previous research conducted by Chowdhury et al., (2019), which includes the requirements of raw material quality, raw material quantity requirements, overall requirements, waiting times for material delivery, supplier capacity, promises in fulfill raw material needs, and raw material prices (Chen et al., 2013; Chowdhury et al., 2017, 2019).

Buyer-Supplier Social Capital

Nahapiet & Ghoshal (1998) defines social capital as the amount of actual and potential resources embedded in, available through, and derived from relationships owned by individuals or social units. The dimensions of social capital are divided into three, namely structural capital, relational capital, and cognitive capital.

a. Buyer-Supplier Structural Capital
   Buyer-supplier structural capital is defined as social capital between buyers and suppliers with social interaction as a strength between SMEs and suppliers (Chowdhury et al., 2019). Social interaction refers to the frequency of communication, relationship strength, and gathering time between network members (Y. Li et al., 2014). Social interaction provides a channel for the flow of information, has the potential to exchange resources and gain access to valuable information (Nahapiet & Ghoshal, 1998).
   In this study, operational supply risk indicators adapted from previous research conducted by Chowdhury et al., (2019), include intensive interaction, interaction in social events, interaction in shared locations, face-to-face interaction, interaction through multiple channels (Carey et al., 2011; Chowdhury et al., 2019; Villena et al., 2011).
b. Buyer-Supplier Relational Capital
   Relational capital refers to the trust, obligation, respect, and friendship that have been developed between actors through the history of interaction (Nahapiet & Ghoshal, 1998). Through repeated transactions, the parties prove the existence of trust, friendship, and reciprocity in the relationship. Relational capital requires strengths that are built up over time, so the buyer-supplier relational dimension can be defined as the extent to which personal relationships have developed between SMEs and suppliers with each other (Chowdhury et al., 2019).
   In this study, operational supply risk indicators adapted from previous research conducted by Chowdhury et al., (2019), include trust, commitment, reciprocity, friendship, mutual respect, and togetherness (Carey et al., 2011; Chowdhury et al., 2019; Krause et al., 2007).
c. Buyer Cognitive Capital – Supplier
   The cognitive dimension refers to the resources that provide shared representations, interpretations, and systems of meaning between SMEs and suppliers (Johnson et al., 2013). With the same perception, it is easier to avoid mistakes and more opportunities to exchange ideas and resources.
   In this study, operational supply risk indicators adapted from previous research conducted by Chowdhury et al., (2019), covering business culture and values, business language, business philosophy, and business resources or capabilities (Chowdhury et al., 2019; Johnson et al., 2013; Villena et al., 2011)

Supplier Integration

Supplier integration is defined as the process of SMEs connecting with suppliers through sharing information and resources and coordinating business functions to benefit together (Yim &Leem, 2012). Supplier integration is divided into three dimensions. These three dimensions include information sharing, resource sharing, and supplier collaboration (Min et al., 2008). Information sharing between SMEs and suppliers is essential for managing supply (Prajogo & Olhager, 2012). Sharing information in the supply chain benefits supply chain partners from making decisions in the company's operations (S. Li et al., 2006). Resource sharing is the exchange of resources between SMEs and suppliers when needed (Yim & Leem, 2012). Sharing resources offered by supply chain partners can increase customer value (Tsai & Ghoshal, 1998). Supplier collaboration is coordination or joint activities carried out by SMEs and suppliers to create mutual benefits that cannot be achieved if the two parties do not cooperate (Chen et al., 2013).

In this study, supplier integration indicators were adapted from previous research conducted by Chowdhury et al., (2019). The dimensions of information sharing include sharing sensitive information, sharing information that can help others, exchanging information on time, accurate and complete, and sharing information about events that

may affect other parties (Prajogo & Olhager, 2012). Resource sharing dimensions include business experience, technical support, and financial and nonfinancial resources (Yim & Leem, 2012). The dimensions of supplier collaboration include working together to solve problems, helping each other improve quality, involving suppliers in business activities (Chen et al., 2013).

RESEARCH METHOD

This research uses quantitative research methods. The population in this study is Small and Medium Enterprises of Batu Alam Craft in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency as many as 45 business units spread across several hamlets in Ngeposari Village. In this study all members of the population were sampled for research, so the sampling technique used in this study is nonprobability sampling with census or total sampling techniques.

The types of data used in this study are primary data on variables to be examined including supply chain operational risks, buyer-supplier structural capital, buyer-supplier relational capital, buyer-supplier cognitive capital, and supplier integration. The data collection technique used in the study was to survey using questionnaires. Measurement of variables in this study using the Likert scale, with an approval scale of 1 to 5. The analysis technique in research is to use SEM (Structural Equation Model) with PLS (Partial Least Square) method and use SmartPLS 3.2.9 analysis tool.

RESULTS

A. Outer Model
Outer model test results are used to test the validity and reliability of the instrument. Validity tests are tested using convergent validity and discriminant validity. Meanwhile, reliability tests were tested using composite reliability and Cronbach's alpha.

Table 1 shows the loading factor value used to test convergent validity with the loading factor requirement >0.70 (Ghozali, 2021). Some items have a loading factor value of <0.70, so it has been removed from the model.

Table 1. Convergent Validity

	Buyer-Supplier Structural Capital	Buyer-Supplier Relational Capital	Buyer-Supplier Cognitive Capital	Supplier Integration	Operational Supply Risk	Status
X1.1	0,854					Valid
X1.2	0,790					Valid
X1.3	0,769					Valid
X1.4	0,813					Valid
X1.5	0,745					Valid
X2.2		0,736				Valid
X2.3		0,823				Valid
X2.4		0,850				Valid
X2.5		0,806				Valid
X2.6		0,779				Valid
X3.1			0,804			Valid
X3.2			0,883			Valid

X3.4			0,873			Valid
Y.1					0,829	Valid
Y.2					0,773	Valid
Y.3					0,845	Valid
Y.4					0,716	Valid
Y.5					0,734	Valid
Y.6					0,808	Valid
Z.1				0,862		Valid
Z.2				0,881		Valid
Z.3				0,842		Valid
Z.4				0,855		Valid
Z.5				0,815		Valid
Z.6				0,794		Valid
Z.7				0,806		Valid
Z.8				0,860		Valid
Z.9				0,891		Valid
Z.10				0,869		Valid
Z.11				0,777		Valid

Based on Table 1, it can be seen that all items have a loading factor value of more than 0.70 so that all indicators have qualified convergent validity. The next step is to perform an AVE (Average Variance Extract) test that has the provision of each construct must be above 0.5.

Table 2. Average Variance Extract

	Average Variance Extracted (AVE)
Buyer-Supplier Structural Capital	0,632
Buyer-Supplier Relational Capital	0,640
Buyer-Supplier Cognitive Capital	0,729
Supplier Integration	0,709
Operational Supply Risk	0,617

Average Variance Extracted (AVE) values of operational supply risk variables (0.617), buyer-supplier structural capital (0.632), buyer-supplier relational capital (.640), buyer-supplier cognitive capital (.729), and supplier integration (0.709), all of which have values above 0.50 which means the AVE value meets the criteria. Table 3 shows the cross-loading value for testing discriminant validity provided that the indicator on the variable must be larger compared to other variables.

Table 3. Discriminant Validity

	Buyer-Supplier Structural Capital	Buyer-Supplier Relational Capital	Buyer-Supplier Cognitive Capital	Supplier Integration	Operational Supply Risk
X1.1	0,854	0,655	0,534	0,691	-0,655
X1.2	0,790	0,534	0,486	0,630	-0,568
X1.3	0,769	0,521	0,532	0,508	-0,530
X1.4	0,813	0,632	0,515	0,686	-0,614
X1.5	0,745	0,491	0,368	0,644	-0,498
X2.2	0,510	0,736	0,474	0,521	-0,598
X2.3	0,667	0,823	0,556	0,676	-0,632
X2.4	0,535	0,850	0,661	0,736	-0,686
X2.5	0,575	0,806	0,546	0,714	-0,695
X2.6	0,585	0,779	0,557	0,641	-0,578
X3.1	0,406	0,553	0,804	0,637	-0,649
X3.2	0,507	0,639	0,883	0,683	-0,736
X3.4	0,651	0,603	0,873	0,668	-0,712
Y.1	-0,614	-0,693	-0,600	-0,782	0,829
Y.2	-0,557	-0,661	-0,671	-0,654	0,773
Y.3	-0,605	-0,562	-0,696	-0,728	0,845
Y.4	-0,621	-0,715	-0,523	-0,649	0,716
Y.5	-0,519	-0,566	-0,679	-0,661	0,734
Y.6	-0,494	-0,575	-0,689	-0,653	0,808
Z.1	0,635	0,675	0,753	0,862	-0,792
Z.2	0,768	0,756	0,708	0,881	-0,768
Z.3	0,645	0,723	0,651	0,842	-0,739
Z.4	0,711	0,709	0,641	0,855	-0,688
Z.5	0,569	0,631	0,515	0,815	-0,663
Z.6	0,651	0,629	0,490	0,794	-0,673
Z.7	0,669	0,715	0,614	0,806	-0,699
Z.8	0,641	0,671	0,675	0,860	-0,771
Z.9	0,811	0,755	0,730	0,891	-0,819
Z.10	0,679	0,714	0,723	0,869	-0,765
Z.11	0,598	0,676	0,643	0,777	-0,727

The next step is to conduct reliability tests conducted in several ways, namely with Composite Reliability and Cronbach's Alpha. Reliability test results can be seen in Table 4.

Table 4. Reliability

	Cronbach's Alpha	Composite Reliability	Status
Buyer-Supplier Structural Capital	0,854	0,896	Reliabel
Buyer-Supplier Relational Capital	0,859	0,899	Reliabel

Buyer-Supplier Cognitive Capital	0,814	0,890	Reliabel
Supplier Integration	0,959	0,964	Reliabel
Operational Supply Risk	0,875	0,906	Reliabel

Table 4 shows that Cronbach's alpha and composite reliability values for all constructs are above 0.70, even above 0.80. Reliability testing results in this study showed that in general the research variables had Cronbach's alpha and composite reliability values of more than 0.80 so that they could be declared reliable.

B. Inner Model

After testing the outer model qualifies, the next step is to do the inner model testing. The inner model can be evaluated by looking at the r-square values on dependent variables and the values of the path coefficient testing.

Table 5. *R-square*

	R Square	R Square Adjusted
Supplier Integration	0,819	0,806
Operational Supply Risk	0,828	0,810

Table 5 shows that the R^2 test results in this study >0.75 which mean the models in the study included strong models. The R^2 value on the supplier integration variable has a value of 0.819. That is the ability of the model in explaining supplier integration variables by 81.9%. Meanwhile, the value of R^2 on the supply chain operational risk variable shows a value of 0.828. That is, the model's ability to explain supply chain operational risk variables is 82.8%.

Table 6. Path Coefficient

	Supplier Integration	Operational Supply Risk
Buyer-Supplier Structural Capital	0,354	-0,045
Buyer-Supplier Relational Capital	0,358	-0,164
Buyer-Supplier Cognitive Capital	0,308	-0,324
Supplier Integration		-0,455
Operational Supply Risk		

Based on Table 6, it can be seen that the influence of supplier buyers' structural capital, buyer-supplier relational capital, buyer-supplier cognitive capital, and supplier integration of operational supply risk have values below 0 or can be said to have a negative influence. While for the influence of structural capital of supplier buyers, buyer-supplier relational capital, and buyer-supplier cognitive capital to the supplier integration has a value above 0 or can be said to have a positive influence.

Table 7. Direct Effect

	T Statistics (|O/STDEV|)	P Values
Buyer-Supplier Structural Capital -> Operational Supply Risk	0,471	0,638

Buyer-Supplier Structural Capital -> Supplier Integration	3,515	0,000
Buyer-Supplier Relational Capital -> Operational Supply Risk	1,095	0,274
Buyer-Supplier Relational Capital -> Supplier Integration	3,830	0,000
Buyer-Supplier Cognitive Capital -> Operational Supply Risk	3,002	0,003
Buyer-Supplier Cognitive Capital -> Supplier Integration	3,689	0,000
Supplier Integration -> Operational Supply Risk	2,994	0,003

Table 8. Indirect Effect

	T Statistics (|O/STDEV|)	P Values
Buyer-Supplier Structural Capital -> Supplier Integration -> Operational Supply Risk	2,133	0,033
Buyer-Supplier Relational Capital -> Supplier Integration -> Operational Supply Risk	2,293	0,022
Buyer-Supplier Cognitive Capital -> Supplier Integration -> Operational Supply Risk	2,480	0,013

A construct can be said to be significant if the T statistical value has a value of more than 1.96 and an A value of less than 0.05.

DISCUSSION

Hypothesis 1 which states that the buyer-supplier structural capital negatively and significantly affects operational supply risk at SME Kerajinan Batu Alam in Ngeposari Village was **rejected.** Buyer-supplier structural capital shown with intensive interaction items, interaction in social events, interaction when in the same location, face-to-face interaction, and interaction through multiple channels is less able to reduce the operational supply risk. Social interactions carried out between SMEs and suppliers of natural stone crafts in Ngeposari Village, Semanu, Gunungkidul until now are often done, but in its application, the quality of information shared is still lacking. For this reason, it is necessary to improve the quality of information and develop a collaboration strategy with suppliers to minimize the occurrence of operational supply risk.

Hypothesis 2 which states that buyer-supplier relational capital of negatively and significantly affects the operational supply risk at SME Kerajinan Batu Alam in Ngeposari Village was **rejected**. Buyer-supplier relational capital shown with the item of mutual trust, mutual respect, friendship, reciprocity, commitment to cooperation, and togetherness of members are less able to reduce the operational supply risk. Generally, suppliers of raw materials of SME natural stone craft in Ngeposari Village, Semanu, Gunungkidul not only send raw materials to SME natural stone craft actors in Ngeposari Village but also from other Gunungkidul areas. This makes the supplier have a lot of commitments that cause inattention to some customers. This can increase the potential for operational supply risk.

Hypothesis 3 states that buyer-suppliers cognitive capital negatively and significantly affects the operational supply risk at SME Craft Batu Alam in Ngeposari Village is

declared **accepted**. Thus, the higher the buyer-supplier cognitive capital can reduce the operational supply risk. Between suppliers and SMEs Craft Batu Alam in Ngeposari Village, Semanu, Gunungkidul already has similarities in understanding and ideology, to minimize the occurrence of conflict. A harmonious culture, values, and business philosophy also make it easier for both parties to achieve their goals. In addition, similar business languages can facilitate communication so that negotiations will be easier to achieve.

Hypothesis 4 states that the buyer-supplier structural capital has a positive and significant effect on supplier integration in SME Craft Batu Alam in Ngeposari Village is declared **accepted**. Thus, the higher the structural capital the buyer-supplier can increase integration with the supplier. UKM Kerajinan Batu Alam in Ngeposari Village, Semanu, Gunungkidul has done well social interaction with suppliers. Through social interaction conducted by SMEs and suppliers will facilitate the exchange of information, resources, and collaboration.

Hypothesis 5 states that buyer-suppliers relational capital has a positive and significant influence on the integration of suppliers in SME Craft Batu Alam in Ngeposari Village is declared **accepted**. Thus, the higher the relational capital buyer-suppliers can increase integration with suppliers. The close relationship between SMEs and natural stone craft suppliers in Ngeposari Village, Semanu, Gunungkidul has been going well. Generally, SMEs tend to protect the information they have, but repeated transactions can foster the trust that will encourage SME natural stone crafts in Ngeposari Village to share information with suppliers. In addition, buyer-supplier relational capital also encourages collaboration to achieve goals.

Hypothesis 6 states that buyer-supplier cognitive capital has a positive and significant effect on the integration of suppliers in SME Craft Batu Alam in Ngeposari Village is declared **accepted**. Thus, the higher the cognitive capital the buyer-supplier can increase integration with suppliers. SMEs and suppliers of Natural Stone Crafts in Ngeposari Village, Semanu, Gunungkidul in representing the value of their companies have almost the same thoughts. SMEs and suppliers in Ngeposari Village also use the same transaction language. This can avoid misunderstandings in communication so that the exchange of information sharing becomes easier to understand.

Hypothesis 7 states that supplier integration has a negative and significant effect on operational supply risk at SME Kerajinan Batu Alam in Ngeposari Village is declared **accepted**. Thus, higher supplier integration can reduce the operational supply risk. The intensity of sharing information, sharing resources, and collaborating between SME Craft Batu Alam in Ngeposari Village, Semanu, Gunungkidul with suppliers until now is often done. This can help suppliers meet the raw materials as promised with minimal deviation.

Hypothesis 8 states that supplier integration mediates the influence of buyer-supplier structural capital on the operational supply risk at SME Craft Batu Alam in Ngeposari Village is declared **accepted**. Thus, the higher the buyer-supplier structural capital can increase supplier integration which can then reduce the operational supply risk.

Hypothesis 9 states that supplier integration mediates the influence of buyer-supplier relational capital on the operational supply risk at SME Kerajinan Batu Alam in Ngeposari Village is otherwise **accepted**. Thus, the buyer-supplier relational capital can improve supplier integration which can then reduce the operational supply risk.

Hypothesis 10 states that supplier integration mediates the relationship between buyer-supplier cognitive capital and operational supply risk at Batu Alam Craft SMEs in Ngeposari Village is otherwise **accepted**. Thus, the higher the buyer-supplier cognitive capital can increase supplier integration which can then reduce the operational supply risk.

CONCLUSION

Based on the results of the research that has been outlined, it can be obtained the following conclusions: (1) Buyer-supplier structural capital has no significant effect on operational supply risk in SME Craft Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (2) Buyer-supplier relational capital has no significant effect on operational supply risk in SME Craft Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (3) Buyer-supplier cognitive capital negatively and significantly affects on operational supply risk at Batu Alam Craft SME in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (4) Buyer-supplier structural capital has a positive and significant effect on supplier integration in SME Craft Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (5) Buyer-supplier relational capital positively and significantly affects supplier integration in SME Craft Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (6) Buyer-supplier cognitive capital positively and significantly affects supplier integration on SME Craft Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (7) Supplier integration negatively and significantly affects operational supply risk at Batu Alam Craft SME in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (8) Supplier integration mediates the influence of buyer-supplier structural capital on operational supply risk at SME Craft Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (9) Supplier integration mediates the influence of buyer-supplier relational capital on operational supply risk at Batu Alam Craft SMEs in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency (10) Supplier integration mediates the influence of buyer-supplier cognitive capital onoperational supply risk at SME Kerajinan Batu Alam in Ngeposari Village, Semanu Subdistrict, Gunungkidul Regency.

Based on these conclusions, suggestions can be proposed for SME Craft Batu Alam actors in Ngeposari Village, Semanu, Gunungkidul to improve good relations with suppliers and optimize the role of supplier integration. By increasing the social capital of buyer-suppliers and supplier integration, the operational risks of the supply chain in the form of deviations in quality, quantity, waiting time, and overall requirements can be minimized as well. For future research, it is expected to explore other risks such as process risks, demand risks, and disruption risks, as well as how to mitigate those risks.

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DECLARATION OF CONFLICTING INTERESTS

The author declares that there is no conflict of interest.

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