Knowledge Management, Innovation, and Firm Performance: The Case of Batik Industry in Indonesia

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Abstract

The purpose of this research is to explore the empirical evidence about the effect of knowledge management and innovation on the performance of the batik industry in Indonesia. We collected data by using questionnaires to the business owner of batik in Indonesia. The total of 350 questionnaires in this study was distributed and 227 were returned. Structural equation modeling was done to analyze the hypotheses. The result of our study support the conceptual framework and demonstrate that knowledge management and innovation useful to improve the batik industry performance in Indonesia. The finding also proved that innovation in a firm can mediate knowledge management's effect on the performance of batik in Indonesia. We suggest to the implementation of knowledge management and innovation should be enhanced by the owner of batik firms to boost the performance of batik business in Indonesia. Originality/value of this study is that our model proposed in this study applies successfully which suppose the knowledge management and innovation on batik industry's performance. This present study also finds that innovation has a role as an intervening variable which enhances knowledge management's effect on batik industry performance in Indonesia.

Keywords: *knowledge management; innovation; performance; Batik industry.*

1. Introduction

Batik is one of the creative industry and potentially become a favorite fashion in Indonesia (Manurung, Kurniasih, Zulfikar, & Saddhono, 2018). In recent years, the phenomenon shows that the performance of the batik industry in Indonesia tends to decline. Figure 1 explains the decreasing of Batik's performance in Indonesia from 2015-2018.

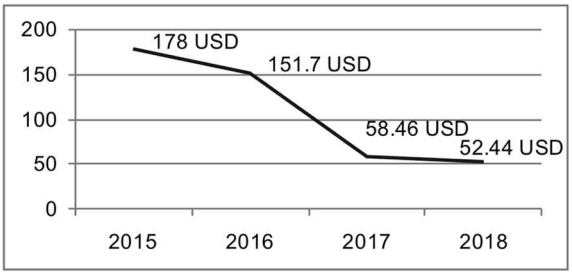

Figure 1. Batik Exports of Indonesia (in Million USD)
Source: Kemenperin.go.id

In this study, we examine knowledge management and innovation's effect on batik's industry performance in Indonesia. Our model proposed in this study based on Darroch & Darroch, (2012) that highlight the influence of knowledge management and innovation on performance. Knowledge management and innovation very important to improve firm performance (Carneiro, 2000; Kridalukmana, Farida, & Nugraha, 2016; Valdez-Ju, Garcia Perez de Lema, & Maldonado Guzman, 2018).

The existence of knowledge in a firm has brought great changes in business activities. Knowledge management and innovation are very crucial to achieve firm performance. Kridalukmana, Farida, & Nugraha, (2016) discussed the implementation of knowledge management and innovation in Batik industry. They found that the implementation of knowledge management with the focus of using information technology (IT) has a contribution to help the firms in marketing or selling process and also can be extended to improve the quality of batik production. In paper conducted by (Valdez-ju et al., 2018) also discussed a study about knowledge management practices in Northwestern Mexico. They found that knowledge management as a driver of innovation and profitability in SMEs. In this study, we also examine the knowledge management's effect on innovation. This opinion based on Plessis (2007) said that knowledge management has a role in innovation. The previous study conducted by Darudiato & Setiawan (2013) also states that one of the many benefits of knowledge management implementation in a firm is an increase of the firm ability to innovate both in products and services. Darroch & Darroch, (2012) also said that a firm with a capability in knowledge management is also likely to be more innovative in their business activities. Besides that, innovation also the keys to the success of the organization today, the ability to innovate effects the firm competitiveness (Ismanu, 2019). Farida, (2017) conducted the effect of innovation on batik performance. In her study only focus on marketing performance.

This research only focused on batik sector, because this sector is a new topic to discuss with the model of knowledge management, innovation as antecedent variables and performance as dependent variables. Therefore, our study intended to fill the gap in the previous study. We expected that this study

will give a better understanding of the importance of knowledge management and innovation to the performance of the batik industry in Indonesia. Therefore, this paper aims to examine the influence of knowledge management and innovation on firm performance of batik industry in Indonesia.

2. Literature Review

2.1. Knowledge Management

Lin (2011) cited that knowledge management (KM) considered as involving the process of the management related to organizational knowledge to meet the existing and emerging needs of the firms, identify and exploit the existing knowledge assets of the firm and acquiring new ones, and developing new business opportunities. Stauss, Milford, & Decoster, (2009) knowledge management has a function to enable organizations in increasing collaborative efforts, incorporate lessons learned from experts, encourage innovation in a firm, and can maintain both valuable tacit knowledge and intellectual capital. Cebi, at al, (2010) in their study measure six activities of knowledge management such as creating, organizing, diffusing, exploiting transferring, and storing knowledge. Alegre & Lapiedra (2011) there are two main knowledge management practices in a firm, they are consist of knowledge dissemination and knowledge storage. Jyoti, et al, (2011) cited that knowledge management program in a firm can affect the generation of innovative, distinctive competencies by developing employee skills in investment and knowledge flow management; the acquisition, transfer, dissemination and internal application of knowledge in a firm.

2.2. Innovation

Innovation in a firm is important to business success Jose et al., (2015) cited that the results of the innovation of process can integrate the various components arising from the process of firm innovation, namely innovation of product, the innovation of process, organizational innovation and innovation in marketing. Farida (2017) innovation means creating new product and offering it into the market. Therefore, we define innovation as the process of creating something new, whether in creating a new product, service, or marketing in a firm.

Innovation has three capabilities that can be summarized by the following: First, product/service innovation that refers to the provision of differentiated, improved or new products or services in the market. This product innovation can be done by radical innovation or incremental innovation (Obeidat & Al-Suradi 2016). Product innovation to produce products that meet consumer needs and changing consumer tastes, in addition to creating new products, the improving of quality, updating shapes, or developing product packaging must be done to make outstanding products (Ismanu, 2019). Second, process innovation which is a process in which a firm can provide a better manufacturing or service process than the current operation. Third, managerial innovation that is a capability to implement the new managerial regulations, systems, practices, methods and so on, that aim to increase managerial efficiency.

2.3. Firm's Performance

The term of firm performance related to the profitability gained by the firm (Sar, 2017) or the ability of an organization to cope with processes, i.e. inputs, outputs, transformations, and feedback effects(Damanpour & Evan, 1984). The perspectives of firm performance are firm growth, financial gains by the firm, and customer orientation (Parida, 2009). In the paper (Darroch, 2005) to measures, the firm performance uses the comparative and internally reflective that compare the growth of one firm to another firm.

2.4. Hypotheses and Research Model

2.4.1. The influence of knowledge management on innovation

Several studies about the relationship between knowledge management and innovation in a firm have been conducted (Obeidat & Al-Suradi, 2016; Agarwal& Ikeda, 2017; Darroch & Darroch, 2012). Obeidat & Al-Suradi, (2016) conducted a study in Jordanian consulting firm, showed that knowledge management impacts innovation of the firm. The implementation of knowledge enhanced the ability of the firm to innovate. This finding in the previous study also found by Stanovcic, et al., (2015) that knowledge contributes to the innovation of a firm. Stanovcic, et al., (2015) said that the firm should invest in knowledge management, the investment in knowledge – management – practices in a firm trigger innovation, for example, the environmental innovation.

H1: Knowledge management influence innovation

2.4.2. The influence of knowledge management on firm performance

The successful of knowledge management implementation will enhance firm performance (Nawab at all., 2015). The knowledge management practices in a firm effectively will improve the internal performance of an organization and also will contribute to improving the external performance (Cebi, at al., 2010). Knowledge management, innovation affect firm performance (Jenny Darroch, 2005). Knowledge management implementation in a firm will contribute to the performance of a firm (Yang, 2011). The previous study concluded that knowledge management affects innovation performance. Knowledge management is also known as an important driven to get a firm's competitive advantage a firm and improving organizational performance (Lee & Wong, 2015). Knowledge management positively impacts on innovation performance (Alegre & Lapiedra, 2011). Cuevas-Vargas, Enriquez, & Casorena, 2014) in their paper also discussed knowledge management. They found that the knowledge management implementation in a firm and innovation activities in a firm positively and significantly affect on processes of production, and the production processes enable the firm to have a higher level of firm competitiveness in a rapidly changing environment which currently face by the firm.

H2: Knowledge management influence firm performance.

2.4.3. The influence of innovation on performance

The ability of a firm to innovate will improve firm competitiveness (Ismanu, 2019). Innovation enhances organizational growth and survives (Gaynor, 2002). The innovativeness as known firms' ability to introduce new products, a new concept to customers, or create new markets will enhance the firm performance (Parida, 2009). Innovation is considered vital for its contributions to business performance. The innovation in the firm which leads firm more competitive requires systemic and effective management on knowledge and learning. The key success of improvement and innovation is on the ability to integrate newly acquired knowledge (Dasgupta & Gupta, 2009).

H3: Innovation influence firm performance.

Based on the literature, we proposed the conceptual model below:

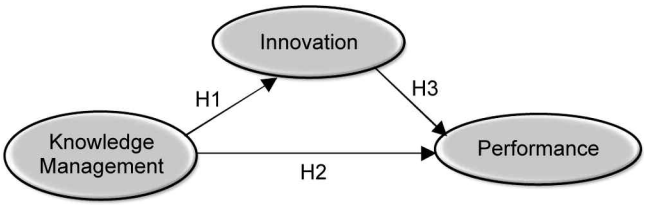

Figure 2. Conceptual Framework

3. Research Methodology

3.1. Participants

This study is empirical research that has been conducted at batik firms in Indonesia by using a quantitative approach. The sample in this study is the owner of batik firms located in West Java and Central Java Province in Indonesia. Questionnaires were distributed as many as 350 and 227 questionnaires were returned. Data that has been collected was processed by using the Structural Equation Modeling method with the help of Amos Software Version 23.

3.2. Measures

This study uses a survey by asking questions about knowledge management, innovation, and performance. The total instrument in our study consists of 17 items that we measured on Likert scale 1 to 5: 1-very low, 2-low, 3-moderate, 4-high, 5-very high). In this study, we measured knowledge management by using 9 items of questions, innovation using 4 items of questions, performance using 4 questions adopted from (Zaim, Muhammed, & Tarim, 2018). (Kang, Kim, & Chang, 2018) (Darroch, 2005), (Obeidat & Al-Suradi, 2016).

Variable	Indicator	n item
Knowledge Management	1. Knowledge Sharing 2. Knowledge Acquisition 3. Responsiveness to Knowledge	9
Innovation	1. Product innovation 2. Improve or revise existing services 3. Adapt existing product/service to meet specific customer requirements 4. Responds to environmental changes	4
Performance	1. The firm growing more rapidly 2. The firm performing better than 5 years ago 3. The firm has met the objective 4. The firm more profitable if compare with others	4

Table 1. Construct and Measurements
Source: (Zaim et al., 2018), (Kang et al., 2018), (Darroch, 2005), (Obeidat & Al-Suradi, 2016)

4. Finding

4.1. Normality Testing

Normality test is useful to determine the data has been collected in the normal distribution or taken from a normal population. In conducting the structural equation modeling, the skewness and kurtosis values are used to examined and determine whether the variables in the data set are normally distributed or not (Schumacker & Lomax, 2010).

Variable	Skew	C.R.	Kurtosis	C.R.
P1	.001	.008	-.298	-.918
P2	.160	.982	-.293	-.902
P3	-.101	-.622	.047	.146
P4	.095	.584	.072	.220
INNO1	.141	.869	-.320	-.984
INNO2	.162	.997	-.444	-1.366
INNO3	.263	1.620	-.256	-.786
INNO4	.304	1.870	-.273	-.840
KS1	.180	1.109	-.168	-.517
KS2	-.016	-.097	.111	.341
KS3	-.004	-.025	.185	.568
KA1	-.094	-.581	-.015	-.046
KA2	.012	.077	-.299	-.919
KA3	-.016	-.097	-.125	-.384
KR1	.318	1.959	-.079	-.243
KR2	.151	.931	-.246	-.757
KR3	.075	.464	-.317	-.974
Multivariate			7.538	2.234

Table 2. Normality Testing
Source: Data Processing

The range of skewness and kurtosis values between -2 to +2 is considered normal (Civelek, 2018). Meanwhile, according to Schumacker & Lomax, (2010) said that to determine the normality of the data, the skewness, and kurtosis values between 1.0 to 1.5 and the critical ratio must not exceed 2.58. The result of normality testing in Table 1 shows that the data in this study are normally distributed. Statistics result on skewness and kurtosis of all manifest variables (indicators) in the range of 1.0 to 1.5, and the CR value of the multivariate test results is 2.234 < 2.58. Therefore, the data used in this study are normally distributed.

4.2. Measurement Model

The measurement model explains the relationships between manifest (observed variables) and latent variables (unobserved variables). The loading factor value, the Composite Reliability (CR), and Average Variance Extracted (AVE) was used to see convergent validity test. The recommended loading factor value of > 0.50 (Bagozzi, Yi, & Sing, 1991), while the recommended Composite Reliability (CR) value of > 0.70 and the Average Variance Extracted (AVE) value > 0.50 (Hair at all, 2013).

The result of loading factor of all statement items used in this study has a value > 0.50. The high value of the loading factor is 0.84 while the lowest loading factor is 0.57. So that the factor loading value is on the recommended value. The Composite Reliability (CR) value shows value > 0.70, and all Average Variance Extracted (AVE) value show value > 0.5. It means the data in this study are valid and reliable.

Variables	Item	Factor Loadings	CR	AVE
Knowledge Management	We are willing to share our insights and intuition gained by our work (KS1)	0.692	0.903	0.510
	We are willing to share knowledge or know-how gained by our work (KS2)	0.670		
	E-mails, mobile applications are effectively used to share knowledge among our colleagues (KS3)	0.683		
	Our firm continually gather information to support the firm's operations and activities (KA1)	0.785		
	We actively observe and adopt the best practice in our sector place (KA2)	0.782		
	The firm has a well developed financial reporting system(KA3)	0.749		
	We always respond to customer complaints and suggestion (KR1)	0.688		
	Our business always responsive to technological change (KR2)	0.702		
	We always develop marketing function (KR3)	0.664		
Innovation	We often change our products or services to reduce costs (INNO1)	0.707	0.816	0.526
	We often improve or revise existing services(INNO2)	0.741		
	We adapt existing product/service to meet specific customer requirements (INNO3)	0.728		
	Our firm responds to environmental changes flexible (INNO4)	0.724		
Performance	Compared with the industry average, we are growing more rapidly (P1)	0.726	0.803	0.505
	In general, our firm is performing better than it did five years ago (P2)	0.755		
	Over the past 12 months, our firm has met its performance objective (P3)	0.730		
	Compared with the industry average, we are more profitable (P4)	0.626		

Table 3. The Measurement Model

4.3. The Goodness of Fit Test of the Model

In conducting the Structural Equation Modeling, some model-fit criteria are used to test the data to get the fit model. The criteria, i.e probability value > 0.05, the value of Adjusted GFI (AGFI) > 0.90, the value of Goodness of Fit Index (GFI) > 0.90, the value of CFI > 0.90, TLI value > 0.90, RMSEA < 0.08, and RMR value < 0.05 (Hair et al, 2017), (Schumacker & Lomax, 2010).

The Goodness of Fit Index	Result	Decision
Cmin/DF	1.181	Good Fit
P-value	0.116	Good Fit
Adjusted Goodness of Fit (AGFI)	0.901	Good Fit
The goodness of Fit Index (GFI)	0.925	Good Fit
Comparative Fit Index (CFI)	0.988	Good Fit
Tucker Lewis Index (TLI)	0.985	Good Fit
Root Mean Square Error of Approximation (RMSEA)	0.028	Good Fit
Root Mean Square Residual (RMSR)	0.024	Good Fit

Table 4. The Goodness of Fit Test of the Model

Table 4 shows that the model in this research is acceptable and in good fit criteria. The Probability value has a value of 0.116 > 0.05. Adjusted Goodness of Fit (AGFI) value of 0.901 > 0.900. The value of Goodness of Fit Index (GFI) is 0.925 > 0.900. Comparative Fit Index (CFI) has a value of 0.988 > 0.900. Tucker-Lewis Index (TLI) has a value of 0.985 > 0.900. The Root Mean Square Error of Approximation (RMSEA) has a value of 0.028 < 0.080 and Root Mean Square.Residual (RMSR) has a value of 0.024 < 0.05. The overall model shows a good level of suitability and has met the criteria that have been determined.

4.4. Hypotheses Testing

The test statistic to test hypotheses is the critical ratio (C.R.) and probability value (Byrne, 2010). The critical ratio needs to be > 1.96 and a probability level of .05 (Byrne, 2010).

Relation	Estimate	CR	P
Knowledge Management on innovation	0.603	6.922	.000
Knowledge Management on performance	0.272	3.117	.002
Innovation on performance	0.548	5.514	.000

Table 5. Hypothesis Testing Result

The hypotheses results show that all the hypotheses proposed in this study was accepted. The results show that all forms of relationships between exogenous variables (knowledge management and innovation) on the endogenous variable (performance) have a critical ratio > 1.96 and probability value < 0.05. The model of the effect of knowledge management on innovation can be seen in figure 3.

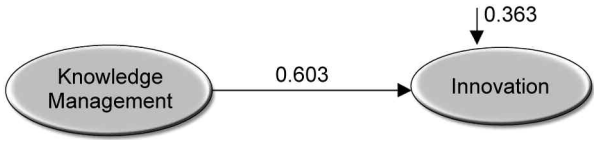

Figure 3. The Model of Sub Structure 1

The equation of the structural model is
Innovation = 0.603*Knowledge Management + 0.363.
The factor loading of knowledge management on innovation is 0.603 with the Critical Ratio (CR) of 6.922 > 1.967 and a probability 0.000 < 0.05 Therefore, it means that knowledge management positively and significantly influences innovation.
The model of the effect of knowledge management on innovation can be seen in figure 4.

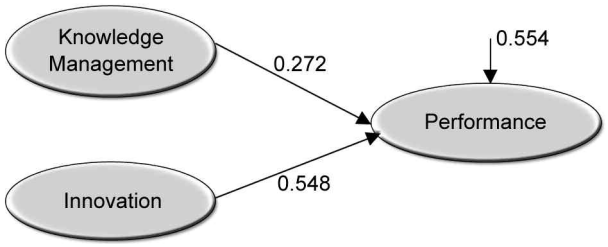

Figure 4. The Model of Sub Structure 2

The equation of the structural model is Performance = 0.272*Knowledge Management + 0.548* Innovation + 0.554. The Critical Ratio (CR) of knowledge management on performance is 3.117 > 1.967 and a probability value of 0.002 < 0.05. It means that knowledge management positively and significantly influences firm performance. The Critical Ratio (CR) of innovation on performance is 5.514 > 1.967 and a probability 0.000 < 0.05. It means that innovation positively and significantly influences performance.

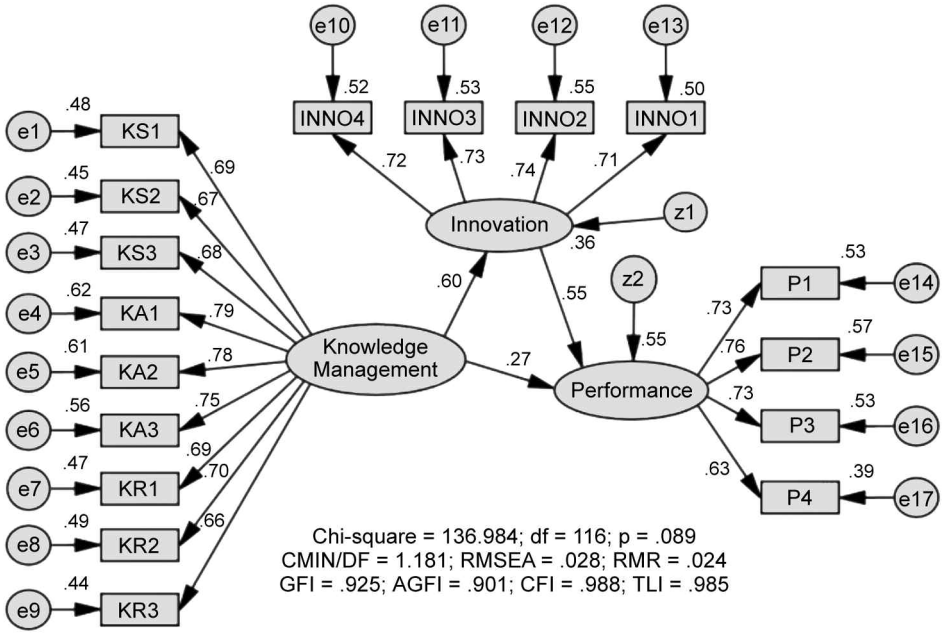

Figure 5. The Full Model of Research

4.5. Discussion

This research explores the relationship of knowledge management, innovation on the batik firm's performance in Indonesia. The results of the study prove that all hypotheses that we have proposed in this study are acceptable. It means that knowledge management and innovation can improve the batik firm's performance in Indonesia.

Starting from knowledge management, the evidence shows that knowledge management positively impacts on innovation. The factor loading of knowledge management on innovation is 0.603. This means that knowledge management contribution to innovation in this study is 60.3%. It means that knowledge management implementation demonstrated from knowledge sharing, knowledge acquisition, and firm's responsiveness to knowledge will enhance the capability to innovate of batik firms in Indonesia. Our finding consistent to the previous study that found the link of knowledge_management on innovation (Stanovcic, et al., 2015).

The second hypothesis in this study testing the influence of knowledge management on performance. The loading factor of knowledge management on the performance is 0.272. This means that knowledge management contribution in this study to knowledge management on performance is 27.2%. The knowledge management's effect through innovation on performance is 0.331 or 33.1%. This shows that the knowledge management's effect indirectly through innovation on the performance is greater than the direct influence of knowledge management on the performance. This means that innovation has a role as a mediation that can increase the influence of knowledge management on the performance of the batik industry in Indonesia. The second hypothesis results in our study consistent to Lee & Wong, 2015; Alegre & Lapiedra, (2011) that found evidence about the impact of knowledge management on performance.

The third hypothesis in this study demonstrates the influence of innovation on performance. The loading factor of innovation on the batik firm's performance is 0.548. This means that innovation has a direct effect on the performance of 54.8%. This result supported by the previous study indicates that innovation makes higher sales and higher productivity (Kasseeah, 2013). Ismanu (2019) also found that innovation is a very important predictor to improve the quality of the product and can improve firm competitiveness. In this present study, we find that the factor loading of innovation has a greater loading factor on batik's performance in Indonesia. This shows that innovation has a very important role in improving the performance of batik firm in Indonesia.

5. Conclusion

The result of our study finds that the conceptual framework of knowledge management and innovation in this study useful to improve the performance of the batik business in Indonesia. All hypotheses we proposed in this study were accepted. Knowledge management and innovation influence the performance of the batik industry in Indonesia. Knowledge management positively effect innovation. Innovation has the most influence on performance. The effect of knowledge management indirectly to performance through innovation is greater than the effect of knowledge management on performance directly. Therefore, innovation can mediate knowledge management's effect on performance.

6. Implication

The findings show that innovation has the biggest loading factor on performance. It means that innovation gives the biggest contribution in improving the performance of the batik industry in Indonesia. Consequently, the owner of the batik industry in Indonesia should more innovative in business activities. The knowledge management practices in the batik industry in Indonesia is crucial to encourage firm innovation. The low level of knowledge management implementation will give impact to the innovation ability of the batik industry. Consequently, the owner of the batik's firm in Indonesia must apply and support the knowledge management practice in their firms. The better knowledge management implementation, the ability to innovate will be better.

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