

## **The Mediating Role of Entrepreneurial Orientation on the Knowledge Creation-Firm Performance Nexus: Evidence from Indonesian IT Companies**

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### **ABSTRACT**

*Disruptive innovation has created fast changes in the business environment and competition among companies, especially on information technology companies. Knowledge creation and entrepreneurial orientation are two variables that can improve firm performance. There is still limited study on how knowledge creation and entrepreneurial orientation both affects firm performance. This study aims to discuss how to effectively apply knowledge creation and entrepreneurial orientation to develop firm performance. A questionnaire has been conducted to 55 medium-large IT companies in Jakarta, Indonesia, and analyzed using structural equation modeling (SEM). The result showed that knowledge creation did not directly affect firm performance but indirectly affected entrepreneurial orientation. Knowledge creation also had a positive and significant effect on entrepreneurial orientation, and so does entrepreneurial orientation towards firm performance. Therefore, IT companies should consider both variables to improve their performance. Future studies may consider using qualitative or mixed-method approaches, conducting research for small IT companies and in other countries.*

## **1. Introduction**

The world is changing fast with the innovation that happens in the world. Disruptive innovation, where a new market disrupts and replaces the old market, shows how quickly the world is changing [1]. This situation raises the competition among companies as well [2].

Disruptive innovation heavily impacts the information technology (IT) sector. As the largest economy in South East Asia, Indonesia has many growing industries, especially in the digital sector [3]. Nevertheless, IT companies need to prepare themselves for disruption and the competitive environment to survive.

According to dynamic capabilities theory, companies need to explore their knowledge assets to face rapid technological change [4]. Knowledge is an essential part of IT companies that focus

more on intangible assets to compete. Knowledge creation is a way to create value for IT companies.

Technology advancement that changes rapidly can help companies find new opportunities to improve their performance [5]. One of the sectors that are affected by these changes is the IT sector. So, IT companies need to find a way to seek opportunities within this condition. Entrepreneurial orientation can be one way where they will be able to survive the competition and to increase their performance [6].

Although there are a lot of previous studies talking about how knowledge creation is related with entrepreneurial orientation [7, 8] and how each of those variables are related with firm performance [9], [10], but there is still limited study on how knowledge creation and entrepreneurial orientation both affects firm performance. It is also interesting to see how the variables will be related in IT sector that relies on intangible assets, such as knowledge. These explanations show the novelty of this study.

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This study aims to enrich the literature by investigating the interaction between knowledge creation, entrepreneurial orientation, and firm performance. Overall, this study makes two contributions: (1) It expands the understanding of the knowledge creation-firm performance relationship in IT companies, and (2) It explores how entrepreneurial orientation can be related to knowledge creation and firm performance.

## 2. Literature Review

### 2.1. Firm Performance

Firm performance is a variable that is often used to measure how good companies run. Researches often use firm performance as a dependent variable [11]. This study used firm performance to measure how good IT companies manage their businesses.

Firm performance is derived from the organizational effectiveness theory [12]. The performance of a company can show the effectiveness of that organization [13]. It takes more than just the financial factor to measure performance [12].

In this study, the firm performance was measured using financial and non-financial performance. It used five indicators: revenue, ROI, employees, products, and development [14, 15]. Financial performance was measured by using revenue and ROI, while non-financial performance was measured using employees, products, and development.

### 2.2. Knowledge Creation

Knowledge creation is an activity or process of developing new knowledge by sharing and combining tacit and explicit knowledge [16]. It enables firms to improve efficiency and create value [17]. Knowledge creation needs participation from individual members of an organization to be effective [18].

Knowledge-based view of the firm is the most common foundation used to define knowledge creation theory [19]. This view argued that firms' significant resources are mainly intangible and dynamic, such as knowledge [20]. This view is derived from dynamic capabilities.

Socialization, Externalization, Combination, and Internalization (SECI) are indicators to measure knowledge creation [18]. These indicators are representing the interaction between tacit and explicit knowledge [19]. This study used SECI as indicators to measure knowledge creation.

### 2.3. Entrepreneurial Orientation

Entrepreneurial orientation is one of the most researched topics in entrepreneurship literature [21]. It is the processes, practices, philosophy, and decision-making activities that help companies innovate [22]. Companies with the right entrepreneurial orientation continuously try to find new opportunities and strengthen their competitive positions [8].

The foundation of entrepreneurial orientation was based on entrepreneurship theory itself, where the main point of entrepreneurship is to understand how companies can seek and exploit opportunities [23]. Opportunities do not have to be related to something new, but they can focus on optimizing the existing framework. To discover the opportunities, companies must possess prior information related to the opportunities and cognitive properties to value them.

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Five indicators are commonly used to measure entrepreneurial orientation. Those indicators are autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness [6]. The earlier concept of entrepreneurial orientation used three aspects: innovativeness, proactiveness, and risk-taking [24], but now it has been improved by adding the other two indicators. This study used the five indicators mention above to measure entrepreneurial orientation.

### 2.4. Hypothesis Development

Knowledge is one of the critical intangible resources that can help companies develop their performance [9, 25]. A lot of previous studies discuss how vital knowledge creation in relationship with performance [19]. High-tech companies need to have adequate knowledge resources in order to remain competitive [26]. Hence the hypothesis:

H1: There is a positive effect of knowledge creation towards firm performance.

Entrepreneurial orientation has been known to have a positive association with firm performance [8,9]. It has been tested in different contexts and countries [27]. This statement is also argued to be true for technological companies [28]. Therefore, hypothesis two is predicted as below.

H2: There is a positive effect of entrepreneurial orientation towards firm performance.

Knowledge creation and entrepreneurial orientation are often researched together. Previous studies showed that both variables are related [7, 8]. IT companies need to pay attention to both variables to maximize their performance. Therefore, hypothesis three states:

H3: There is a positive effect of knowledge creation towards entrepreneurial orientation.

Even though most of the previous research discussed how knowledge creation and entrepreneurial orientation separately affect firm performance, some studies talked about how they can simultaneously affect firm performance by having entrepreneurial orientation as the mediating variable [29]. This study argued that innovativeness and competitive aggressiveness as part of entrepreneurial orientation play the mediator between knowledge and performance. Hence the hypothesis:

H4: There is a positive indirect effect of knowledge creation towards firm performance mediated by entrepreneurial orientation.

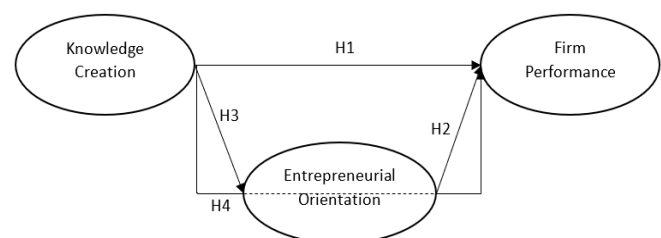


Figure 1: Research Model

## 3. Research Methodology

This study was conducted using an online survey with quantitative analysis. The unit analysis of this study is medium-

large IT companies in Jakarta. Indonesian Micro, Small, and Medium Enterprise Regulation No.20 (2008) defined medium enterprises as companies with 2.5-50 billion IDR revenues per year or 178-3.5 million USD and large enterprises as companies that have >50 billion IDR revenues per year or >3.5 million USD. According to 2016 Economic Census by Statistics Indonesia, the population of medium-large IT companies in Jakarta, the capital of Indonesia, is 303 companies [30].

This study used probability sampling design with simple random sampling. The samples for this study were 55 companies. The minimum sample size was 33 data, calculated using two arrows pointing at a construct, 5% significance level, and minimum R Square 0.25 [31]. Therefore, the samples are sufficient for this study. The survey was conducted for three months, from August to November 2020. The unit of observation in this study was a managerial level employee. Only one employee per company participated in this study.

Based on the companies' established period, most of the respondents (42%) were companies that have already been established for at least twenty years, and the smallest frequency came from new companies that have only been established for less than five years (7%). This data shows that many medium and large IT firms in Jakarta took a long time to develop their business into a medium-large company. Table 1 shows the details of the company establishment period.

Table 1: Companies' Established Period

Established Period	Frequency	Percentage
<5 years	4	7%
5-9 years	11	20%
10-14 years	9	16%
15-19 years	8	15%
>=20 years	23	42%
TOTAL	55	100%

Most of the company respondents have 11-50 employees (40%). Only one respondent has less than ten employees, while

seven companies have more than five hundred employees. This data shows that medium or large companies do not mean that they must have many employees. Table 2 below shows more details on the numbers of employees.

Table 2: Companies' Number of Employees

Number of Employees	Frequency	Percentage
<=10 employees	1	2%
11-50 employees	22	40%
51-200 employees	20	36%
201-500 employees	5	9%
>500 employees	7	13%
TOTAL	55	100%

This study was done by using exploratory empirical research. The data analysis was done by partial least squares structural equation modeling (PLS-SEM). PLS-SEM is mainly used for the development of theories and exploratory research [31]. The analysis for this study was done using the smartPLS program. This study used a five-point Likert scale on the questionnaires. A five-point scale increases the response rate and quality of the responses while reduces the stress of the respondent [32].

#### 4. Results and Discussion

##### 4.1. Results

Validity was measured by removing items with less than 0.7 outer loadings. From the result, the risk-taking indicator measuring entrepreneurial orientation is not valid. Other indicators are all proven to be valid. Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) measure reliability. Variables should have Cronbach's Alpha >0.5, CR >0.6, and AVE >0.5 to be considered reliable [31]. The result showed that all the variables are reliable. More details on validity and reliability test result on entrepreneurial orientation (EO), firm performance (FP), and knowledge creation (KC) can be seen in table 3.

Table 3: Validity & Reliability Test Result

Variables	Indicators	Items	Instrument	Outer Loading	Cronbach's Alpha	CR	AVE
EO	Autonomy	EO11	Our company gives freedom to employees or team to express their business concept and vision, and oversees them until finish	0.783	0.892	0.913	0.569
		EO12	Our company has the self-directed ability and willingness to seek for opportunities	0.809			
	Innovativeness	EO21	Our company supports employees' creativity	0.771			
		EO22	Our company has a lot of new marketable products/services within the last five years	0.723			
	Proactiveness	EO41	Generally, our company's top managers have the tendency to lead the competition with new idea or product	0.721			
		EO44	Our company reacts quickly on the market demand	0.743			
	Competitive Aggressiveness	EO51	Our company is very aggressive	0.756			
		EO52	Our company is very competitive	0.723			
FP	Employee	FP12	Our company has good planning towards the future of employees	0.706	0.865	0.899	0.597

	Product	FP22	Our company's automation is higher than our competitors in the same industry	0.830			
	Development	FP31	Our company is very keen on investing in new market development	0.733			
		FP32	Our company is very keen on investing in new technology development	0.778			
	Revenue	FP41	Our company's income is higher than our competitors in the same industry	0.779			
	ROI	FP51	Our company's Return on Investment is higher than our competitors in the same industry	0.803			
KC	Socialization	KC11	Our company emphasizes on the creation of working environment that helps employees learn skills	0.700	0.930	0.939	0.586
		KC12	Our company arranges employee meetings to share and trade knowledge and experiences	0.742			
	Externalization	KC21	Our company uses collaborative learning tools	0.741			
		KC22	Our company usually develops working group discussion by using several techniques through internet	0.775			
		KC23	Our company usually share information, experiences, best practice, and learning to solve problems	0.732			
	Combination	KC31	Our company emphasizes on manual and document creation on products and services	0.835			
		KC32	Our company emphasizes content creation from management data gathering	0.791			
		KC33	Our company emphasizes content creation from technical information gathering	0.872			
	Internalization	KC41	Our company emphasizes on value seeking and sharing	0.764			
		KC42	Our company emphasizes on new thoughts seeking and sharing	0.709			
		KC43	Our company usually use on the job training to enrich knowledge	0.744			

Based on the result of Fornell-Lacker criterion, discriminant validity, all three variables are valid. Correlation between items and the square root of AVE shown no problem with the top numbers being the biggest one. Table 4 shows the details of discriminant validity.

Table 4: Fornell-Lacker Criterion

	EO	FP	KC
EO	<b>0.754</b>		
FP	0.752	<b>0.773</b>	
KC	0.689	0.570	<b>0.766</b>

The last part of discriminant validity measure beside loading factor and Fornell-Lacker criterion is Heterotrait-Monotrait Ratio (HTMT). The score for HTMT ratio should be <1.00 [31]. Based on the result, all variables are valid. Table 5 shows the HTMT result.

Table 5: HTMT Ratio

	EO	FP	KC
EO			
FP	0.848		
KC	0.703	0.616	

R Square shows the proportion of variation of dependent variables towards independent variables. Results showed that 57,1% of firm performance could be described through entrepreneurial orientation and knowledge creation, while 47.5% of entrepreneurial orientation can be described through knowledge creation. R square result can be seen in table 6.

Table 6: R Square

	R Square	R Square Adjusted
EO	0.475	0.465
FP	0.571	0.554

Goodness of fit can be seen from the value of Standardized Root Mean Square Residual (SRMR) and Normal Fit Index (NFI). On this study, the result of SRMR estimated model is 0.108 while the NFI score is 0.555. Although there are several PLS-SEM based model fit measures, but those measures are still in development [31].

After testing the validity and reliability, the next step was to test the path between variables. The test was done using SmartPLS. How the research model looked with the path coefficient and t-value can be seen in Figure 2.

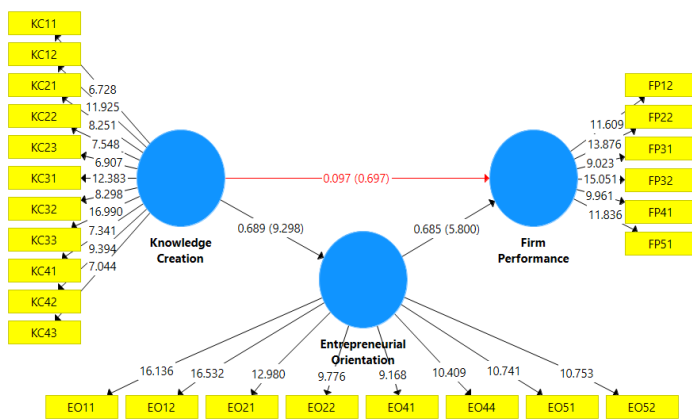


Figure 2: Research Model with Path Coefficient and T-Value

T-value should be  $>2.021$  and p-value  $<0.050$  for a significant path on a 5% error rate [33]. From the result, the direct effect of entrepreneurial orientation is positive and significant towards firm performance, and the direct effect of knowledge creation is positive and significant towards entrepreneurial orientation. However, knowledge creation has an insignificant direct effect on firm performance. By measuring the indirect effect, knowledge creation has a positive and significant effect on firm performance mediated by entrepreneurial orientation. Details on the structural equation model (SEM) test result can be seen in table 7.

Table 7: SEM Test Result

	Path Coef.	T-Stat	P-Value	Sig.
KC-> FP	0.097	0.697*	0.486*	Insignificant
EO -> FP	0.685	5.800	0.000	Positive & Significant
KC->EO	0.689	9.298	0.000	Positive & Significant
KC->EO->FP	0.472	4.873	0.000	Positive & Significant

#### 4.2. Discussion

Based on this study, knowledge creation does not have a significant effect on firm performance. This argument supported previous research [34]. IT companies should not only be focusing on knowledge creation if they want to raise their performance. They should also think about other factors to make the knowledge creation effective. Therefore, hypothesis 1 is rejected.

Entrepreneurial orientation in this study is proved to have a positive and significant effect on firm performance. This statement strengthened the arguments done by previous researches [21,35,36]. By focusing on entrepreneurship, IT companies can find and exploit opportunities to improve their performance. Therefore, hypothesis 2 is accepted.

Knowledge creation has a positive and significant effect on entrepreneurial orientation, according to this study. This result strengthened previous research that argued the correlation between knowledge creation and entrepreneurial orientation [37] and supported the argument that showed knowledge creation affected entrepreneurial orientation [7]. IT companies must pay attention to

knowledge creation to increase their entrepreneurial orientation. Therefore, hypothesis 3 is accepted.

This study showed that knowledge creation has a positive and significant effect on firm performance when it is mediated by entrepreneurial orientation. This result supported the previous research on the same topic [29]. Both knowledge creation and entrepreneurial orientation are essential factors to improve IT company performance. Therefore, hypothesis 4 is accepted.

#### 4.3. Implication

IT companies generally rely on intangible resources such as knowledge as their important asset. Nevertheless, the result of this study showed that knowledge alone is not enough to make the company perform better. Therefore, medium-large IT companies in Jakarta should think about other factors while focusing on their knowledge creation.

Technology changes rapidly. IT companies should think about a way to face this challenge. Entrepreneurial orientation can help the companies to seek opportunities and adapt to changes. The result of this study showed that it is important to develop entrepreneurial orientation in the companies to increase their firm performance.

Another important result from this study is the relation between knowledge creation and entrepreneurial orientation. This study showed that knowledge creation is important to develop entrepreneurial orientation, which in the end raise the firm performance. Therefore, IT companies should develop both their knowledge creation and entrepreneurial orientation.

### 5. Conclusion

#### 5.1. Conclusion

The results of this study indicate the factors that can increase IT firm performance. This study's main conclusion is that knowledge creation and entrepreneurial orientation are essential antecedents of firm performance, especially for companies in the IT sector. However, knowledge creation alone is not enough to raise firm performance. It must also be mediated by entrepreneurial orientation.

The interesting finding in this study is that entrepreneurial orientation mediates the relationship between knowledge creation and firm performance. It indicates that IT companies should create an environment that supports knowledge creation for the employees. Companies should also have entrepreneurial orientation to adapt with the fast-changing environment.

#### 5.2. Limitation and Future Work

This study has several limitations. The analysis in this study was done by quantitative approach. Adding qualitative approaches by having interview or focus group discussion on future research will enrich this study. Mixed-method research is also a good approach to understand more about the industry.

The companies observed is also limited to medium-large IT companies. Future research can be done to small IT companies. The knowledge creation might be different in small companies and their way to face the changes can also be different. Therefore,

doing study in small IT companies or conducting comparative study between small, medium, and large IT companies will enrich this study.

Other limitation is the scope of this research. This study used IT companies in Jakarta, Indonesia. Therefore, it will be hard to generalize this result to other countries. Future research ought to be held on other countries as well.

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