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Effect of use of information technology on innovation capability, competitiveness, and firm performance: Case of manufacturing industry in South Sulawesi

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Abstract. This study aimed to investigate the effect of information technology on innovation capability, competitiveness, and firm performance. [To](#) examines the impact of innovation capability on competitiveness, and firm performance. [To](#) examines the [effect](#) of competitiveness on firm performance. The population of this study was some medium and large-scale manufacturing companies in Makassar City and Gowa Regency, South Sulawesi Province in Indonesia. The number of samples was 160 units of manufacturing companies. Method of analysis used descriptive analysis and structural equation modeling analysis. The results showed that the use of information technology has a direct and positive effect on innovation capability, competitiveness, and firm performance. Innovation capability has [a direct](#) and positive [effect](#) on competitiveness, and firm performance. Competitiveness has a positive [effect](#) on firm performance. Also, firm performance can be improved directly through the use of information technology, innovation capability, and competitiveness. The firm performance can be increased indirectly through improvements some indicators of innovation capability variable, and competitiveness.

1. Introduction

Since the implementation of the ASEAN-China Free Trade Agreement (ACFTA) in early 2010, the Indonesian market flooded with imported consumer goods, especially from China. The success of imported consumer goods entering the domestic market occurs because of the weak competitiveness of goods in the domestic manufacturing industry. One of the important factors that determine the competitiveness of the firm is information. Some previous studies in the management field which conducted many researchers found that information is the most valuable resource for an organization in achieving competitive advantage. Therefore, information can be said to be a source of competitive advantage [1, 2].

Furthermore, the study emphasizes the importance of the role of information technology in organizations today. Therefore it is very important for the organization to review its main business environment factors to create the best product or service. The business environment has an impact on business activities. Information technology can support business activities to achieve efficiency in operation, in turn, to improve company performance [3]. Information technology consists of the hardware and software that needed to support the company's information system. Information content refers to shared information between producers and



customers. While the quality of information related to the level of quality of information shared between producers and customers [1, 4].

Innovation capability is the most important factor in a company, primarily to improve operational reliability and create superior performance. From a resource-based strategy (RBV) point of view emphasizes the importance of resources and ability to develop a competitive advantage from the company. Innovation is a key that leads to a competitive advantage. Therefore innovation and its relationship to organizational resources and capabilities require further research [5]. Innovation begins from an existing one, then given added value. Innovation starts with things that seem trivial by opening your eyes and ears to listen to the aspirations or complaints of consumers, employees, the environment and society. The subject of the application of innovation itself can be individuals, groups or companies. This means that there can be individuals or groups that are very brilliant and innovative. But the ideal company becomes an institutionalized place for people who are gathered to exploit new ideas [6].

Due to innovation, several ways can be taken to produce innovative products are by developing new product attributes, developing various levels of quality, and developing product models and sizes. Therefore, the capability of innovation is related to the company's ability to produce innovations by developing new attributes, developing various levels of quality, and developing the model and size of products produced [7].

Both competitiveness and company performance can be improved through continuous improvement in overall business activities. The focus is to meet the needs of consumers or customers. Continuous improvement activities are carried out in the whole organization that emphasizes competitiveness and company performance components [8]. Some previous studies that examine the relationship between competitiveness and company performance have been found in management science. Related to testing the effect of competitiveness on company performance is carried out by Li et al. [9], who found that supply chain management practices can improve competitiveness, and increase the performance of corporate organizations. Competitiveness has a direct positive influence on company performance. Then, the research found that ISO 9000 and TQM practices did not have a direct positive relationship with company performance [10]. However, there is one important finding from the research, namely the effort to get ISO 9000 certification and TQM practices can improve the competitiveness of corporate organizations.

The study found that when an organization can able to create a high-quality product, so that organization will able to improve competitiveness and increase the performance of organizations both directly and indirectly [11]. Then, competitiveness has a positive effect on the performance of corporate organizations. Furthermore, a study found that business performance will increase when companies become stronger its competitiveness through improvements in four dimensions, namely: quality, cost, delivery, and flexibility [10]. Moreover, the main cause of differences in performance among companies is due to differences in specific resources and accumulation of competencies owned by the company [12]. Competitive advantage and performance generated by the company are consequences of specific resources and competencies.

The main dimensions of competition that shape a company's competitive position include cost, product quality and reliability, delivery speed, delivery reliability, flexibility, and new product introduction speed in the market [13]. Then the cost, quality, time, and flexibility are the priority of competition and are sources of competitive advantage for every company [8].

Furthermore, company performance refers to how well an organization achieves its marketing and financial goals [9]. Then, the company's performance can be measured in two performance measures, namely marketing and financial performance. Company performance can also be measured using marketing and financial measures, such as ROI (return on investment), market share, profit margins from sales, ROI growth, sales growth, market share growth, and return on assets (ROA) [9-11, 14,15].

Based on the results of the literature review, the purpose of this study was to analyze the effect of information technology on innovation capabilities, the effect of information technology

on the competitiveness, the effect of information technology on company performance, the effect of innovation capabilities on competitiveness, and to analyze the effect of innovation capabilities on company performance, and the effect of competitiveness on company performance of manufacturing companies in South Sulawesi.

2. Methods and materials

This study used a quantitative approach that is an approach that emphasizes testing theories or concepts through empirical investigation [15]. There were 355 large and medium scale manufacturing companies which operated in Makassar City and Gowa Regency. The number of samples of 160 business units was obtained by using Slovin formula. Respondents in this study were managers of the firm who had sufficient ability to provide accurate answers to a questionnaire. There were three methods or techniques used in research data collection include observation, questionnaire, and documentation.

Testing instrument validity conducted through item analysis by using Pearson Product Moment Correlation method. An indicator/item can be said valid if it has a value of correlation coefficient more than 0,30 [15]. Then, the reliability test carried out to determine the reliability of an instrument. Reliability testing conducted using Alpha Cronbach () coefficient. An instrument can be said reliable if the value of Alpha Cronbach () coefficient was greater than 0.60 [15, 16]. Furthermore, the analytical methods used in this study were both descriptive analysis and structural equation modeling analysis (SEM). Processing data performed by using SPSS and AMOS software.

3. Results and discussion

After the data collected through a questionnaire then performed the structural equation model (SEM) analysis. This analysis was carried out through two steps, i.e.: (1) testing the fit model, and (2) analyzing the relationship among variables in the research model. Examining the suitability level of the structural equation model can be performed based on reference values or cut-off values. Briefly, the results of testing the suitability level of the structural model in this study were presented in the following table.

Table 1. The result of Goodness of fit indices Overall Model

The goodness of fit index	Cut of value	Model result	Description
Chi-Square	expected small	115.233	Good
CMIN/DF	2.00	1.566	Good
GFI	0.90	0.958	Good
RMSEA	0.08	0.040	Good
CFI	0.95	0.958	Good
TLI	0.95	0.954	Good

The results of the test on some suitability criteria of the structural model listed in the table above indicate that all criteria have been met the good/fit model requirements. Therefore, this research model can be used to estimate and analyze the results of further research. Briefly, the structural model results on the effect of the use of information technology variable on innovation capability, competitiveness, and firm performance in this study can be presented in the following figure.

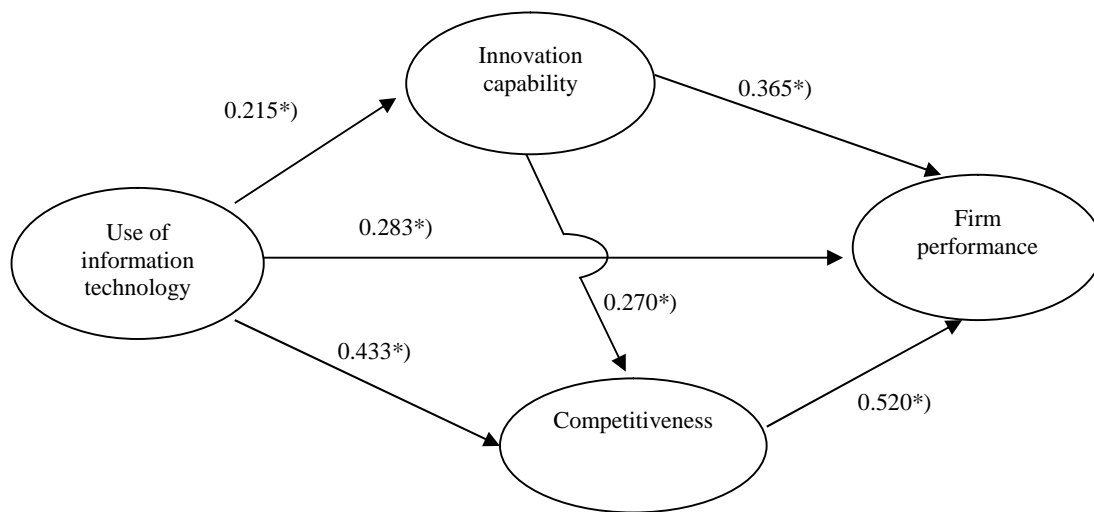


Figure 1. The result of the Structural Model Test

Based on the results of the structural model above, it can be presented the results of testing the hypothesis of this study which explains the relationship among variables both directly and indirectly in the model can be seen in the following table.

Table 2. The result of Hypothesis Testing

Description	Estimate	Critical Ratio (CR)	Prob.	Description
Use of information technology---→innovation capability	0.215	2.440	0.034	Significant (H1, accepted)
Use of information technology ---→competitiveness	0.433	6.228	0.000	Significant (H2, accepted)
Use of information technology ---→firm performance	0.283	3.105	0.012	Significant (H3, accepted)
innovation capability ---→competitiveness	0.270	2.980	0.028	Significant (H4, accepted)
innovation capability ---→firm performance	0.365	5.180	0.000	Significant (H5, accepted)
competitiveness ---→firm performance	0.520	7.680	0.000	Significant (H6, accepted)

*) significant at: 0,05

The table above showed that variable of use of information technology has a significant effect on innovation capability. This can be seen from the value of the critical ratio (CR) which was greater than the t-table ($2,440 > 1,960$). Then, the use of information technology has a significant effect on competitiveness. This can be seen from the critical ratio (CR) value which was greater than t-table ($6,228 > 1,960$). Furthermore, the use of information technology also has a significant effect on firm performance. This can be seen from the critical ratio (CR) value which was greater than the t-table ($3,105 > 1,960$). Therefore, Hypothesis 1, 2, and 3 which proposed in this study that the use of information technology can improve innovation capability,

competitiveness, and firm performance can be accepted, or in other words, the hypothesis supported by empirical facts.

Furthermore, it can also be known that the variable of innovation capability has a significant effect on competitiveness. This can be seen from the critical ratio (CR) value which was greater than the t-table ($2,980 > 1,960$). Then, the variable of innovation capability also has a significant effect on firm performance. This can be seen from the critical ratio (CR) value which was greater than t-table ($5.180 > 1.960$). Therefore, Hypothesis 4, and 5 which proposed in this study that innovation capability can improve competitiveness and firm performance can be accepted, or in other words, the hypothesis supported by empirical facts.

Moreover, the variable of competitiveness has a significant effect on firm performance. This can be seen from the value of the critical ratio (CR) which was greater than the t-table ($7,680 > 1,960$). Therefore, Hypothesis 6 which proposed in this study that the variable of competitiveness can be able to increase firm performance accepted, or in other words, the hypothesis supported by empirical facts.

The results of this study were consistent that the adoption and implementation of information technology could encourage a company's ability to create innovate [1]. Information technology can also improve competitiveness and company performance [4]. The findings of this study were also stated that information technology applied to areas of production, administration, and communication could improve firm competitiveness [2]. Related to these findings, the others study said that innovation capability is the most important factor in a company, primarily to improve competitiveness and superior performance [5]. Resource-based strategy (RBV) theory emphasizes the importance of resources and ability to develop competitive advantage from companies. Innovation is a key that leads to a competitive advantage. Dynamic capability in flexibility, agility, speed, and adaptability is intended to improve the company performance.

The findings of this study were in line with others that competitiveness would increase through creative and innovative efforts within an organization [17]. Furthermore, the business performance will increase when companies become stronger its competitiveness through improvements efforts in four dimensions, namely: quality, cost, delivery, and flexibility [10]. The company performance refers to how well an organization achieves its marketing and financial goals [9]. Competitiveness consists of capabilities that make an organization different from its competitors by optimizing the use of its strategic resources. The firm competitiveness can be measured through price/cost, delivery dependability, product innovation, and time to market have a direct effect on firm performance [18,11]. Related to the findings of this study, the level of acceptance of information technology and the ease of use have a significant effect on competitiveness and firm performance [19].

4. Conclusions

This study found that the variable of use of information technology has a positive effect on innovation capability. Use of information technology also has a positive effect on competitiveness and firm performance. Then, the variable of innovation capability has a positive impact on competitiveness. Innovation capability can also affect firm performance. Also, the competitiveness variable has a positive impact on firm performance. Therefore, the firm performance can be increased through an intensive effort by firm managers on some elements or indicator from competitiveness, innovation capabilities, and use of information technology which have a lower value. The results of this study provide data and information that is useful for company managers in formulating relevant policies and programs by prioritizing the adoption and use of information technology in all functions/areas within the company. Also, some systems that support innovation effort and efficiency of operating costs in the organization must be formulated precisely. Furthermore, all activities must be able to measure, and it carried out consistently and sustainable.

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