

The Influence of Knowledge Management on the Performance Through the Competitive Advantages of Polytechnics in Indonesia

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Abstract

This research aims to analyze: 1) the influence of knowledge management on the performance of Polytechnics, 2) the influence of knowledge management on the competitive advantage of Polytechnics, 3) the influence of competitive advantage on the performance of Polytechnics. Analytical techniques use *Structural Equation Model* (SEM) with *SmartPLS*. The data was collected through the dissemination of questionnaires. The research respondents were the chairman of the head study program, the head of the department, and the deputy director at six polytechnics in Indonesia. The results of the analysis show that knowledge management affects competitive advantage; competitive advantage affects performance; knowledge management does not affect the performance of polytechnics. Statistical test results show that all constructs of model builders are at a high level. The influence of knowledge management on performance is greater when it uses competitive advantages and is not significant when it is direct on performance. Based on the results of this study, it is recommended that Polytechnics always increase the competitive advantage. In the future, research involving more specific and detailed variables is needed to test the competitive advantage and performance of Polytechnics such as digital infrastructure, and their impacts on the *sustainability* of Polytechnic competitive advantage.

Keywords: Knowledge management, competitive advantage, performance, Polytechnics

1. Introduction

Researchers in the field of Knowledge Management such as Antoncic (2007) and Kefela (2010) believe that the current era of knowledge economy requires everyone and organization to strive to possess, create, disseminate, and use knowledge effectively in the framework of economic and social development. This trend has led every individual and organization to better appreciate *intangible* assets.

Pillania (2008) states that Knowledge Management is relevant to educational organizations. A similar thing is also conveyed by the researchers who state that educational organizations (universities) are the ecosystem of Knowledge Management and are strongly related to the development of research and acceleration of Innovation (Paez et al., 2016). If the development of research as expressed by Paez et al is used as a Knowledge Management indicator, it will be seen that the Knowledge Management at Polytechnics is still very low.

This is revealed from the quality of scientific publications indexed Scopus such as international publications indexed Scopus of Jakarta State Polytechnic (PNJ). From the beginning of the establishment of PNJ on September 22, 1982, until now, which is almost 40 years old, the number of publications of Scopus Quartile 1 has only been 14 articles. Quartile 2 has 45 articles and Quartile 3 has 56 articles, the majority of Quartile 4 articles have 118 articles while the unindexed Quartile has 89 articles.

Wong & Aspinwall, (2005) argues that the need for MP studies is driven by two complementary perspectives. The first perspective is called the "pull perspective". This perspective explains the potential benefits of Knowledge Management that are crucial to internal educational organizations such as increased competence, efficiency, innovation, and learning. The second perspective is called the "push perspective". This perspective explains that Knowledge Management is important to deal with external or environmental pressures, such as competition pressures, globalization, other similar organizational pressures that are increasingly agile in adopting knowledge-based organizations. Knowledge Management in the perspective of CBV provides new tools to survive, grow, and maintain a Competitive Advantage because knowledge is a new organizational resource in the era of the knowledge economy (Acosta-Prado et al., 2020).

Gold et al., (2001) states that theoretically, two dual constructs build Knowledge Management capabilities, namely Knowledge Management Infrastructure and Knowledge Management Process. Theoretical gaps are found in further searches of the literature on Knowledge Management. In general, theoretical and empirical gaps show that the research of Knowledge Management capabilities uses the construct of Knowledge Management Infrastructure in the form of culture, structure, and technology. Researchers in general only try to test the influence of Knowledge Management capabilities on organizational performance and only Nguyen (2010) seeks to test the capabilities of the organization.

Knowledge Management serves as a resource to achieve Competitive Advantage. According to Singh et al., (2006,) organizational infrastructure is an artifact of knowledge that becomes the memory of organizational knowledge. As a memory of organizational knowledge, experts such as Bharadwaj (2000); Singh et al., (2006); Teece et al., (1997) suggest that infrastructure is essential for the evolution of knowledge within the organizations. Infrastructure has ever-evolving capabilities as a resource to establish a better Competitive Advantage. Knowledge Management capabilities would not have been formed without the presence of the Knowledge Management process (Gold et al., 2001). Library research shows that Knowledge Management researchers refer to the Knowledge Management process studied by Gold et al. (2001) namely the process of acquisition, conversion, application, and knowledge protection.

The originality of this research is to try to test and explain the performance of Knowledge Management at six polytechnics in Indonesia. In this case, the variable involved as mediation in building performance is competitive advantages.

2. Literature review

Bermúdez et al., (2018) define knowledge management as a process that can help organizations find, select, disseminate, and transfer information that is important and necessary for activities such as problem-solving, dynamic learning processes, and planning

and decision-making strategies. In general, knowledge management of polytechnics is a process that coordinates the use of information, knowledge, and experience in polytechnics. Thus, there are differences in the meaning of data, information, and knowledge. Based on its hierarchy, information comes from data that has been processed so that it can be interpreted while knowledge is the result of further processing of information using certain methods to generate competitive and performance advantages (Akinuwesi et al., 2020).

Competitive Advantage is a strategic step of Polytechnics to develop or master a set of attributes (or executing actions) that allow it to perform beyond its competitors (Wang, 2014). Gilavand (2017) and Paez et al. (2016) suggest that Competitive Advantage is necessary as it relates to the ability to strengthen its knowledge and proactively conduct learning to fit the demands of the environment.

Therefore, competitive advantage is a factor in which a polytechnic can be superior to its competitors in a competitive environment. The high level of competition encourages universities to be creative to construct the various programs offered. It starts from quality learning, facilities, and infrastructure, student activity units that drive student leadership skills to entrepreneurship and soft skills, and support the quality of services that adopt the advancement of information technology. In addition, universities must be able to accommodate the need of the industry for the competence of their graduates. Thus, their curriculum, teaching practices, teaching materials, and teaching targets must be in line with the needs of their graduates. Competing strategy is one way for organizations to achieve sustainable competitive advantage. According to Porter in Wheelen and Hunger (2010), through an increasingly competitive industry, the company formulates a competitive strategy by developing a lower-cost strategy and a differentiation strategy. Competitive advantage is the result of an effective combination of the overall circumstances and is a competitive strategy of a company. This condition can create a situation in which the company can achieve a wider competitive advantage up to the international level and have good opportunities. For this purpose, the company must have the right competitive strategy.

In addition, management can also use performance measurement to evaluate past periods with necessary actions to improve them. The measure of organizational performance relates to the measure of success that can be achieved by the organization. During this time, the traditional performance measurement of a company only prioritizes its finance which is less able to provide the information needed to measure and manage all competencies of the company.

Financial measures only describe various past events. Long-term capabilities investment and relationships with customers are not important factors to achieve success (Kaplan & Norton, 2000). Measurement of company performance is no longer considered good if it is only seen from the financial side which is considered unable to reflect the complexity and value inherent in the company. It is because the measurement does not pay attention to other things outside of finance, namely the sides of customer and employee which are important factors for the company as well as the driving force of the company (Gosh, 2006).

With these limitations, Kaplan and Norton (2000) suggest a new form of performance measurement. In addition to overcoming these limitations, it is expected that the concept can overcome other social aspects, which is known as *the balanced scorecard*. Kaplan and

Norton (2000) state that the balanced scorecard is a measurement system that balances between the old measuring tools emphasizing the financial aspect and the new tools emphasizing the non-financial aspects. Based on this explanation, this study proposes a hypothesis:

H1= Knowledge Management affects the performance of the Polytechnic

H2= Knowledge management affects competitive advantage

H3= Competitive advantage affects the performance of the Polytechnic

3. Research Method

First, conducting a literature review to define and identify the size of the research variables. The results of the literature review were then followed up with an in-depth interview process. The process was stopped when the information provided was saturated, i.e. the informants provide relatively the same information (Bekhet & Zauszniewski, 2012). *Second*, based on the results of the first stage, a research questionnaire was made and a questionnaire of 68 items was produced. The measurement scale used a Likert scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Doubtful; 4 = Agree and 5 = Strongly Agree (Joshi, et al., 2015; Malhotra, 2006).

Table 1. Description of research variables

Variables	Dimension	Items	Researchers
Knowledge Management	Process of knowledge management	8	(Bermúdez et al., 2018)
	Infrastructure of knowledge management	6	
Competitive advantage	Creation	4	(Wheelen & Hunger, 2010)
	Responsiveness	9	
	Efficiency	5	
	Quality		
Performance	Vision, Mission, Goals and Strategy for Achievement	5	(Kaplan, 2009; Toivonen & Tammela, 2013)
	Governance, Leadership, Management System and Quality Assurance	5	
	Students and Graduates	6	
	Human Resources	6	
	Curriculum, Learning and Academic Atmosphere	4	
	Financing, Facilities and Infrastructure, and Information Systems	4	
	Study	5	
	Service/Community Service	3	
	Outcome	3	

Third, research respondents. The respondents of this research were the leaders of the Polytechnic consisting of the Head of Study Program, Head of Department and Deputy Director at the six largest Polytechnics in Indonesia, namely the Jakarta State Polytechnic, Medan State Polytechnic, Sriwijaya Polytechnic, Bandung Polytechnic, Semarang

Polytechnic, and Malang State Polytechnic. Initially, the questionnaires were distributed through social media. The total real respondents were 68 people. Referring to the opinion of Sekaran & Bougie, (2016) that for most studies, the sample size should range from 30 respondents to 500 respondents. SEM-PLS can be used to perform *confirmatory analysis* (Ringle & Wende, S. Will, 2005). The consideration to use SmartPLS is that SmartPLS was developed based on modeling and bootstrapping paths, and recommended by Tenenhaus & Esposito, (2005). The research model developed was a reflective model. The purpose of the reflective model was data analysis, in which further researchers can confirm the results of the analysis based on the theory that has been built.

4. Results

4.1. Research respondents profiles

Research respondent profiles provided information about the reality surrounding the respondents who participated in the research. The information obtained was classified by gender; Female (78%), and Male (22%). Respondents were classified based on age 30-39 years (11%), 40-49 years (27%), 50-59 years (52%) and >60 years (10%). Based on educational background: doctorate (31%), master (69%); based on academic level: expert assistant (14%), lector (44%), head lector (42%); based on position in campus: deputy director (14%), head of department (30%), and head of study program (56%).

4.2. Fit Test Model

The analysis of the suitability of the SEM with the PLS research model was carried out in three stages, namely outer model analysis, inner model analysis, and hypothesis testing (Chin, 1998).

Outer model analysis

Based on the results of running data using the smartPLS software, the suitability of the research model is obtained, which meets the criteria required for the outer smart PLS model, namely the reflective model measured by loading indicators ($> 0,5$); Cronbach's alpha & rho_A with a value of $> 0,6$ composite reliability with a value of $> 0,7$ and AVE $> 0,5$ (Leguina, 2015). Table 2 shows the output loading factor of all constructs.

Table 2. Criteria for Validity and Reliability

	Cronbach's Alpha	rho_A	Composite reliability	Average Variance Extracted (AVE)
Competitive advantage	0,743	0,783	0,837	0,568
Performance	0,853	0,876	0,881	0,557
Knowledge management	0,657	0,665	0,818	0,692

Output: SmartPLS (2021)

Table 2 shows that all criteria for the suitability of the outer model meet the cut-off value, thus it is sufficient to continue the analysis of the inner model.

Inner Model Analysis

The analysis of the inner model can be seen from several indicators which include: coefficient of determination (R²); *Predictive Relevance* (Q²); *Goodness of Fit Index* (GoF) (Chin, 1998). The following is a calculation for each indicator.

1. Coefficient of Determination (R²)

The following shows the R² value of the smartPLS software output.

Table 3. Values of R²

	R Square	Adjusted R Square
Competitive advantage	0,574	0,557
Performance	0,635	0,604

According to Chin, (1998), the R square value above 0.67 is strong, between 0.67 to 0.19 is moderate, and below 0.19 is weak. Sarwono (2010) adds an R² value > 0.7 as strong. So, all variables involved in this study are categorized as having a moderate relationship.

2. Predictive Relevance (Q²)

To calculate Q² the following formula can be used

$$Q^2 = 1 - (1 - R_1^2) (1 - R_2^2) \dots (1 - R_n^2)$$

$$Q^2 = 1 - ((0,443) (0,396))$$

$$Q^2 = 0,825$$

This test was conducted to determine the predictive capability with the *blindfolding procedure*. According to Chin (1998), if the value obtained is between 0,02 and 0,15, the model has a small predictive ability. If the value obtained is between 0,15 to 0,35, the model has a moderate predictive ability. Finally, if the value obtained is above 0,35, the model has a high predictive ability. If the calculation of the value of Q² obtains a result of 0,825 then the model has a large predictive capability.

3. Goodness of Fit Index (GoF)

GoF values in SEM with PLS are calculated manually (Tenenhaus & Esposito, 2005) with the formula

$$GoF = \sqrt{AVE^2} \times \sqrt{R^2}$$

$$GoF = 0,76$$

Tenenhaus & Esposito (2005) formulate that the GoF value is small at 0,1, moderate at 0.25, and large when it is 0.38. This study proves that the calculation of the GoF value is 0.76. Therefore, it is concluded that the research model can capture the real phenomenon of the influence of knowledge management on Polytechnic performance through competitive advantage. Thus, the inner model test proves that all the research results meet the relevant criteria.

Hypothesis test

The structural model in SEM-PLS is done by bootstrapping process which produces t-statistic value. If the t-statistic value is greater than that of the t-table with a 95% confidence level (> 1.96), then the effect is significant (Asparouhov & Muthén, 2009). The following is presented in Table 6. The results of the research hypothesis test.

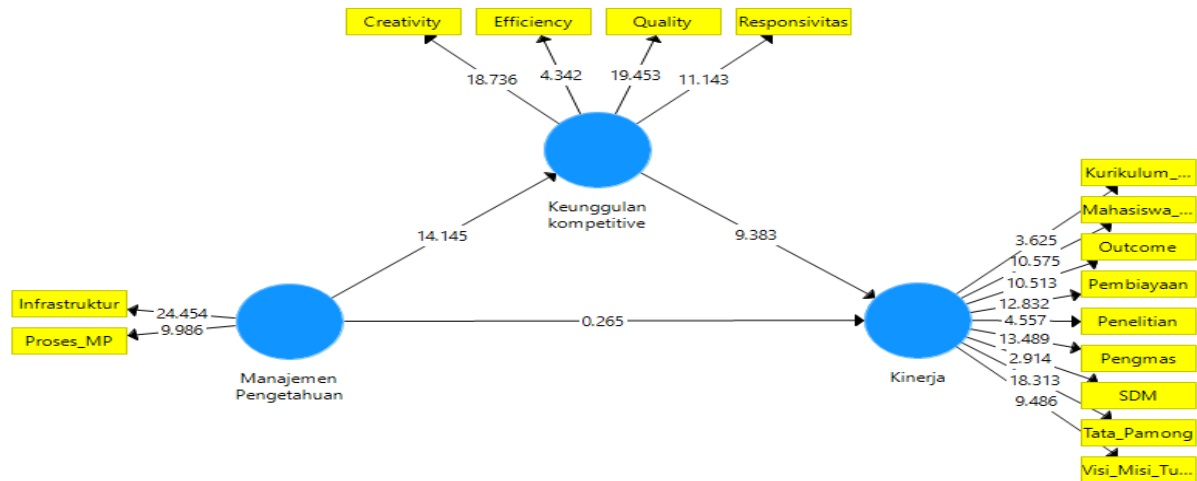


Figure 1. smartPLS bootstrapping output.

(Source: Research data, 2021)

Figure 1 presents all dimensions of the significant study to construct variables at the 99% confidence level (>2.58) while the influence between research variables proved significant at the 99% confidence level, namely knowledge management on competitive advantage and competitive advantage on performance. Knowledge management on performance has no significant effect. Meanwhile, the level of influence of the dimensions in following the variable is known by looking at the *loading factor value* of the original sample (O) output. The following is presented in Figure 2. The output of the SmartPLS Algorithm.

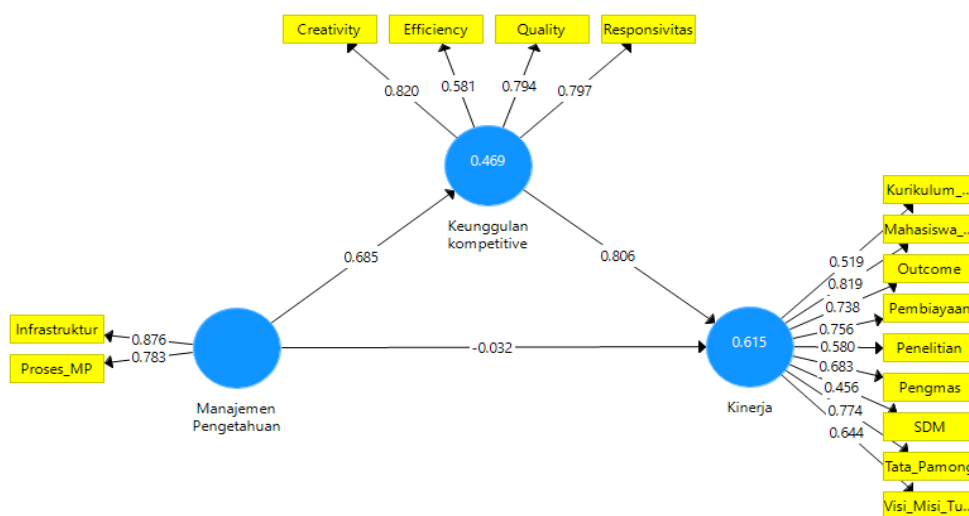


Figure 2. SmartPLS Algorithm

(Source: Research data, 2021)

Figure 2, smart plus algorithm, shows that all hypotheses are significant at the 99% confidence level (>2.58). The following is presented in Table 4. The output of the results of data processing with smartPLS.

Table 4. The output of data processing with smartPLS.

	Sample Origin (O)	Sample Mean (M)	DeviationStandard	T Statistics	P Value	Conclusion
Competitive Advantage -> Performance	0,806	0,809	0,086	9,383	0,000	Accepted
Knowledge management -> Competitive advantage	0,685	0,71	0,048	14,145	0,005	Accepted
Knowledge management -> Performance	-0,032	-0,026	0,123	0,265	0,792	Rejected

Output: Research result (2021)

4.3. Discussion

Knowledge management is one of the factors that distinguish between educational institutions and business institutions. Knowledge management is seen as one of the sources of competitive advantage in the face of a constantly changing environment. Knowledge management values applied to the Polytechnic are one of the factors that determine the survival of the Polytechnic.

Even though the knowledge management practices at each Polytechnic are not the same, knowledge management describes how the knowledge infrastructure and processes are implemented (Goetsch & Davis, 2016). This is confirmed by the research of Agostini et al. (2016) who states that knowledge management affects the competitive advantage of Polytechnics. This study reinforces those findings.

Polytechnic's ability to create competitive advantage is determined by the ability to manage the learning resources. Therefore, learning is an important process for Polytechnics to Achieve a Competitive Advantage. This result is in line with the research results (Sirmon et al., 2007).

The influence of Knowledge Management on organizational competitive advantage is a form of knowledge management dimension consisting of infrastructure elements and knowledge management processes. Elements of organizational infrastructure enable the Polytechnics to manage their knowledge effectively through coordinating individual activities and integrating individual knowledge so that it can be converted into organizational knowledge. Meanwhile, adequate elements of Knowledge Management Infrastructure enable the organizations to obtain better Knowledge Management Processes that drive competitive advantage.

Both dimensions have great value in compiling knowledge management variables. The knowledge management infrastructure has a value of 0,86 while the knowledge management process has a value of 0,80. These two dimensions depend on each other. The process of Knowledge Management can run well if there is an adequate Knowledge

Management Infrastructure. While the formation of dimensions of competitive advantage includes *creativity* (0,824), *efficiency* (0,558), *quality* (0,794) and *responsiveness* (0,807).

This finding is in line with the views of previous experts, for example, Cantner et al. (2011) who conclude that there is an influence of knowledge management on competitive advantage and competitive advantage also affects performance. Knowledge according to Barney (2001) is an intangible resource for organizations that, if managed properly, will be able to provide organizational excellence, including in Polytechnics. Barney's opinion shows that there is a relationship between knowledge management, especially with a competitive advantage, because well-managed knowledge will encourage creativity, innovation, responsiveness, and quality.

Competitive advantage is a strategy used by polytechnics to compete and excel. This happens because the competitive advantage of Polytechnics is the key to encourage better organizational performance. These results which are in line with several previous studies show that competitive advantage affects the performance of polytechnics. For example, (Anggraini et al., 2018; Cuadrado-Barreto, 2020; Haloho et al., 2018) reveal that the effect of competitive advantage on organizational performance can be achieved when the management can use creativity and implement strategies to withstand a lot of imitation, and to create a barrier factor in the long term.

5. Conclusion

Knowledge management has significant effects on *competitive advantage* and *competitive advantage* has effects on performance. That is, knowledge management effectively shapes the performance of the Polytechnic only through competitive advantage. This is understandable because the Polytechnics being studied are the largest and oldest Polytechnics in Indonesia which have a long history of the competition with similar universities. Knowledge management does not directly affect the performance of the polytechnics. That is, from a strategic management point of view, it is proven that the practice of knowledge management has not been ideal and does not contribute to the performance of the Polytechnics. Field findings indicate that there is a proportion of lecturers with academic degrees and academic positions who are less qualified to shape performance at the Polytechnic. The majority of the leaders at the Polytechnic still hold master's degrees, while the highest position is the head lector. On the other hand, the practitioners of Polytechnic Campus who are assumed to mainstream the competence of students have not shown significant progress to work together with the academics to build Polytechnic.

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