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A study on priority factors of competitiveness and performance of manufacturing companies using Analytical Hierarchy Processes (AHP)

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Abstract. Implementation of some best management practices such as supply chain management, total quality management, and quality culture can encourage increased competitiveness and business performance. The purpose of this study was to identify and analyze the priority factors that determine the competitiveness and performance of manufacturing companies in South Sulawesi. This study was conducted in Makassar City, Gowa Regency, and Maros Regency. The key informant in this study are stakeholders which consist of managers, governments, associations, NGO, and universities. Method of data analysis used descriptive statistics and analytical hierarchy processes (AHP). The results showed that some priority factors determine competitiveness and performance of manufacturing companies. Three of the priority factors are management supervision policies, product quality, and information sharing. While the other factors are company's partnership with its suppliers and customers, cost efficiency policies, innovation capabilities, speed of product delivery, flexibility, long-term relationship orientation with partners, and service mission based on customer need. Also, increasing competitiveness and performance of manufacturing companies is also determined by the dynamics of the business environment and government policies support.

1. Introduction

World economic forum reported that manufacturing competitiveness in Indonesia since the enactment of the ASEAN Economic Community in December 2015 tended to decline [1]. The implementation of the ASEAN economic community has become an opportunity and a threat to manufacturing companies in Indonesia, including in South Sulawesi. According to WEF, Indonesia's economic competitiveness rating in 2015 was decreasing from number 34 last year to 37 of 140 countries. In the 2015-2016 Global Competitiveness Report released by the World Economic Forum (WEF), Indonesia's competitiveness lower than three neighboring countries, namely Singapore which was ranked 2, Malaysia ranked 18th and Thailand ranked 32. Nevertheless, at the ASEAN level, Indonesia is still superior to the Philippines (47), Vietnam (56), Laos (83), Cambodia (90), and Myanmar (131). This phenomenon for manager of manufacturing companies could be an opportunity for efforts to increase both competitiveness and firm performance. The competitiveness and company performance can be improved through continuous improvement effort in overall business activities [2]. The focus of improvement in the organization is to meet the needs of consumers or customers.



In the literature of operations management, Total Quality Management, Supply Chain Management, and Quality Culture are well known as management principles, and also a set of strategies and practices that can be used in enhancing the competitiveness and performance of companies through meeting customer needs and satisfaction [3, 4, 5]. Total Quality Management is an approach to improving quality systematically using many dimensions. Many companies have widely applied TQM with the aim of improving performance such as quality, productivity, and profitability [6].

The supply chain management practices based on the correct SCM concept can have an impact on increasing competitive advantage on products and the supply chain system that built by the company [5]. The supply chain management is not only oriented to the internal but also the external of the organization that concerning on relationship company with partners in a supply chain system [3]. The supply chain management is an extension of logistics management. Logistics management activities include companies, suppliers and customers [7]. Whereas supply chain management coverage is broader than logistics management, namely between suppliers, own companies, customers, wholesalers and retailers that are integrated to be more efficient. Then, there are two important things in supply chain management. First, supply chain management is a joint business collaboration between each part or process in the product cycle. Second, supply chain management must cover all product cycle activities [8].

Quality-oriented organizational culture is very important in encouraging competitiveness and company performance. The implementation of TQM can change the cultural orientation of an organization toward a quality culture that ultimately can improve overall organizational competence and performance [9]. Quality culture as part of the organizational culture can support competitiveness and organizational performance in the long run [10]. The study of TQM from the stage of construct development, testing the relationship of TQM practices with performance, and the relationship of techniques and quality management systems to performance have produced different results. This is because TQM operationalized as a single construct and a multi-dimensional construct in analyzing the relationship between TQM, competitiveness, and company performance.

Furthermore, quality culture is a subset of organizational culture [11]. The study concluded that the dimensions of organizational culture influence the values of TQM practices in organizations which can enhance both competitiveness and company performance [12,13, 14].

Previous research that examines the effect of TQM practices, SCM practices and quality culture on competitiveness and company performance has been found in the management literature. Some research results conclude that the practice of TQM, SCM practices and quality culture as a best practice approach in corporate strategy can improve the performance and competitiveness of companies [15-18]. This study aims to identify and analyze the priority factors that determine the competitiveness and performance of manufacturing companies in South Sulawesi using a different approach, namely through AHP analysis.

2. Methods and Materials

This study used a qualitative descriptive approach through focus group discussion (FGD). There were 10 people as key informants who come from managers of companies, association representative, universities, NGOs, and local governments. Focus group discussion (FGD) is well known as a method in collecting data and information from stakeholders directly. The result of this discussion used to analyze and determine the priority factors that determine competitiveness and company performance by using AHP, Analytical Hierarchy Processes. Then, data, and information processed by using the Expert Choice 9.0 software. Analytical Hierarchy Process is well known as a tool that supported by a simple mathematical approach and it can be used to solve decision-making problems such as policy-making or strategic decision based on stakeholders perception or experts opinion [19, 20]. Then, AHP analysis using a 1-9 assessment scale with meaningful rating sequences of importance weights [19].

Furthermore, this study used AHP to determine priority factors that increased competitiveness and company performance. Decision making with the analytical hierarchy process model was based on three main principles, namely:

- Hierarchical arrangement; The formulation of the problem hierarchy is a step to define complex problems so that it becomes more clear and also detailed. The authority of decision-based on the views of those who have expertise and knowledge in the relevant field.
- Priority determination; The priority of the criteria elements can be seen as the weight or contribution as an element to the purpose of decision making. AHP performs an elemental priority analysis with a pairwise comparison method between 2 elements to all elements covered.
- Logical consistency; The consistency of the respondents' answers in determining the priority of the elements is the main principle that will determine the validity of the data and the results of a decision. Then, the level of acceptable ratio consistency is smaller than 0.10 (CR <0.10).

3. Results and discussion

AHP analysis begins with identifying the factors that determine the competitiveness and firm performance through a quantitative approach. Then, focused group discussions conducted involving relevant stakeholders. Briefly, the list of stakeholders who joint the FGD can be presented in the following table.

Table 1. Stakeholders List of Focus Group Discussion

No.	Description	Frequency (person)	Percentage (%)
1.	Association	1	10.00
2.	NGO	1	10.00
3.	Local government	2	20.00
4.	University	2	20.00
5.	Managers of company	4	40.00
	Total	10	100.00

Table 2. List of factor determined of competitiveness and business performance

No.	Description	Code
1.	Information sharing	FP-1
2.	Company's partnership with its suppliers & customers	FP-2
3.	Long-term relationship orientation with partners	FP-3
4.	Management supervision policies	FP-4
5.	Cost efficiency policies	FP-5
6.	Product quality	FP-6
7.	Innovation capabilities	FP-7
8.	Flexibility	FP-8
9.	The speed of product delivery	FP-9
10.	Service mission based on customer need	FP-10
11.	Dynamics of the business environment	FP-11
12.	Government policies support	FP-12

Based on table 1, it can be seen that stakeholders involved in the focus group discussion (FGD) activities consist of some elements, i.e.: universities, local governments, associations, managers of the company and NGO. Then, factors that influence competitiveness and performance of manufacturing companies in South Sulawesi can be divided into twelve

important factors, namely: information sharing (FP-1), the company's partnership with its suppliers and customers (FP-2), long-term relationship orientation with partners (FP-3), management supervision policies (FP-4), cost efficiency policies (FP-5), product quality (FP-6), innovation capabilities (FP-7), speed of product delivery (FP-8) , flexibility (FP-9), service mission based on customer need (FP-10), dynamics of the business environment (FP-11), and government policies support (FP-11). The important factors that determine the competitiveness and performance of the company can be presented in table 2.

Furthermore, in the FGD activities, stakeholders are asked to provide opinions on a questionnaire that contains a comparison of the level of importance between factors one with other factors. Furthermore, the informants' answers were collected for further analysis. The results of the AHP analysis of factor weights indicate the level of priority of each factor that can be presented in the following table.

Table 3. Results of priority factor weighting analysis

No.	Description	Code	Weights	Rank
1.	Information sharing	FP-1	0.1102	3
2.	Company's partnership with its suppliers & customers	FP-2	0.1040	4
3.	Long-term relationship orientation with partners	FP-3	0.0510	10
4.	Management supervision policies	FP-4	0.1385	1
5.	Cost efficiency policies	FP-5	0.0985	5
6.	Product quality	FP-6	0.1220	2
7.	Innovation capabilities	FP-7	0.0722	8
8.	Flexibility	FP-8	0.0950	6
9.	The speed of product delivery	FP-9	0.0820	7
10.	Service mission based on customer need	FP-10	0.0521	9
11.	Dynamics of the business environment	FP-11	0.0418	11
12.	Government policies support	FP-12	0.0328	12
Consistency Ratio (CR)				0.0022

Based on the results of the AHP analysis it can be seen that the Consistency Ratio value is smaller than 0.10 ($CR = 0.0022 < 0.10$) so that it can be inferred that the inconsistency of respondents' opinions/answers can be accepted. Then, the data in the table above showed that the management supervision policies have the highest priority weight value and are in the first rank position with a weight value of 0.1385. This indicates that the management of the company contributes greatly to improving competitiveness and company performance. The second priority factor was product quality with a weight of 0.1220. Then, the third priority factor was information sharing with a weighting value of 0.1102. Additionally, the other factors that can increase the competitiveness and performance of the company in a sequence were the company's partnership with its suppliers and customers (0.1040), cost efficiency policies (0.0985), flexibility (0.0950), speed of product delivery (0.0820), innovation capabilities (0.0722), service mission based on customer need (0.0521), long-term relationship orientation with partners (0.0510), dynamics of the business environment (0.0418), and government policies support (0.0328).

The findings of this study support that organizational creativity and innovation are a source of competitiveness and company performance [21]. The results of this study are also stated that the competitiveness of companies will be better through information sharing activity among company partners along the supply chain [8, 22, 23]. The results of this study also strengthen the results of studies conducted that leadership, and product quality as part of total quality management can improve competitiveness and company performance [15,18]. Related to these findings, the product quality is an important element of business competitiveness and firm performance [6, 24].

Furthermore, leadership in the organization is an important factor that determines the success of the organization. The vision and mission of the organization's guidelines must be able to be adequately implemented in the form of programs and operational activities. Therefore, management must have the ability to supervise the company's operational activities. Management's ability to perform operational activities efficiently, speed in sharing information with partners, and quality policies on products produced are key elements in enhancing competitiveness and company performance [25]. Also, the factors such as external environment support and government policies that are pro-business are also important factors in supporting the success of small and medium businesses in South Sulawesi [26].

4. Conclusions

The results of this study indicate that twelve important factors can improve both competitiveness and company performance. The priority factor was management supervision policies. Then, the second priority factor was product quality, and the third priority factor was information sharing. Furthermore, other factors that can increase competitiveness and the company's performance in sequence, namely company's partnership with its suppliers and customers, cost efficiency policies, flexibility, speed of product delivery, innovation capabilities, mission-based services on customer need, long-term relationship orientation with partners, dynamics of the business environment, and government policies support.

The results of this study provide data and information that are important for the management of the company in formulating company policies, especially related to improving competitiveness and company performance. For academic purposes, this study will enrich previous studies that are relevant by providing different information about the study of competitiveness and company performance through the implementation of best practices management that consists of supply chain management, total quality management, internalization of quality culture within an organization, external environmental support, and government support to SMEs development.

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