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Strengthening Institutional Capacity of Guitar Cluster: Implementation of DEA and MACTOR

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ABSTRACT

This study aims to analyze the efficiency level of the use of guitar input and the output acquisition in guitar production and to analyze the influence and interests of stakeholders in the guitar industry. This study used a mixed-method approach. The research object is guitar business units that conduct production process, in which many business units only perform the production process with subcontracts from collectors and large producers. Efficiency and stakeholder analysis were used to determine the level of business efficiency and mapping of stakeholders in the guitar cluster. The results show the efficiency level of the guitar business was low. In general, the guitar business had not been efficient in using input and producing output. The inputs that led to the insufficient business were the number of labors and labor costs, while the outputs that caused inefficient business are turnover and profit of the business unit. The cluster organization needed to be improved by involving various key stakeholders in the development of guitar clusters and maintaining the sustainability of the guitar business.

1. Introduction

Small and Medium Enterprises (SMEs) have a pivotal role in developing the economy, both at regional and national levels. In 2019, as many as 99.9% of the market was controlled by SMEs, which absorbed 97% of the national workforce and contributed 60% of GDP (Badan Pusat Statistika, 2020). The high percentage of the number of business units and the absorption of SMEs workforce has not been equaled by the percentage of SMEs contributions to GDP (Isa & Mangifera, 2019)). Furfthermore, SMEs are the most vulnerable business units to external macro-environment changes so it is essential to formulate an appropriate SMEs development model to improve performance and sustainability (Setyawan, et al., 2018).

The economic structure of Sukoharjo Regency in 2015-2019 was dominated by three leading sectors: manufacturing industry, wholesale and retail trade, car and motorcycle repair, and agriculture. The manufacturing industry is a sector that provides the largest contribution, comprising 38.80 percent of Regional GDP. The processing industry consists of 17,113 business units, of which 97.28% are micro and small businesses, 2.0% are medium enterprises, and 0.72% are large businesses. The processing industry includes 41.59% of agro-forestry products industry, 32.41% of chemical, metal, machinery, and electrical industries, and 26% of textile and various industries (Badan Pusat Statistika of Sukoharjo Regency, 2020).

The guitar business is one of the 19 superior products of Sukoharjo Regency. It is according to the Regional Regulation of Sukoharjo Regency Number 2 of 2018 on Industrial Development Plan of Sukoharjo Regency for 2018-2038. As the regional superior product, the guitar industry operates as a group in 5 villages in Baki Subdistrict, Sukoharjo Regency, Central Java, consisting of Bentakan, Gedingan, Mancasan, Menuran, and Ngrombo villages where the industry forms a cluster (Hastiningsih et al., 2019). The guitar industry has experienced a significant development, where there has been an increase in the guitar business unit, which was from 65 craftsmen in 2007 to 174 guitar craftsmen in 2019. The guitar industry can absorb up to 528 workers, thereby reducing unemployment and poverty (Badan Pusat Statistika of Sukoharjo Regency, 2020).

Until now, many guitar businesses have been managed traditionally and have not implemented proper management principles (Hastiningsih et al., 2019), making a high level of inefficiency (Ishak & Somadi, 2019). The inefficiency symptom is indicated by the waste of input, such as raw materials and labor in the production process. In effect, it will make products to be high-priced and the products become less competitive. Moreover, the gain of output is suspected to be inefficient. Production factors have not been utilized optimally to obtain maximum output.

Research on efficiency and analysis of SMEs institutions is required to be conducted to improve their performance and competitiveness. Efficiency is the ratio between output and input. Increased efficiency in the production process will reduce cost per unit of output, thus products can be marketed at a more competitive price. An appropriate method to measure efficiency is Data Envelopment Analysis (DEA) (Ishak & Somadi, 2019). DEA is an operations research method that measures the relative efficiency value of a number of business units or known as the decision-making unit (DMU). Apart from efficiency, the performance of the guitar business is also determined by the institution. The performance of a business unit is not only regulated by the business unit but also by related stakeholders, such as cluster managers, government, suppliers, consumers, and universities (Isa & Mangifera, 2019) (Fauzi, 2019). Hence, the institutional aspect is very important for improving the performance of the guitar business unit. At the present, no research has analyzed the efficiency of the guitar business with the institutional analysis, so this research proposes a novelty. Finally, this study aims to analyze the efficiency level of the use of guitar input and the output acquisition in guitar production and to analyze the influence and interests of stakeholders in the guitar industry in Sukoharjo Regency.

2. Literature Review

Efficiency

Isa (2009) and Ishak & Somadi (2019) explain efficiency as the ratio between output and input. Efficiency can also be defined as the ability of a business unit to maximize output by using certain inputs or using minimal input to produce a certain output. A business unit is perceived to be efficient

if it uses the least amount of input to produce a certain amount of output and uses several inputs yet produces the maximum amount of output. Efficiency consists of three types, namely technical efficiency, allocative efficiency, and economic efficiency. Technical efficiency describes the ability of a business unit to obtain maximum output from the input used, while allocative efficiency is the ability of a business unit to use the least amount of input. The combination of these two types of efficiency will result in economic efficiency.

Efficiency measurement is needed to assess the performance of a business unit. Ningsih et al., (2015) suggests two approaches to measure efficiency: input-oriented measurement and output-oriented measurement. Input-oriented measurement is the calculation of various inputs that can be reduced without changing the amount of output produced. It is illustrated by a business unit that produces output Y with two inputs, which are X1 and X2 with the assumption of Constant Return to Scale (CRS).

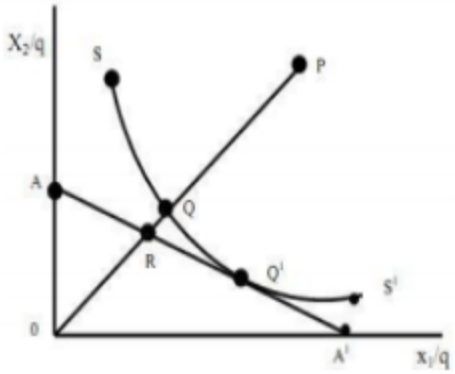

Figure 1. Efficiency Curves with Input-Oriented Measurement
Source: Emrouznejad and Cabanda (2015)

The OP line describes the input combination used by the business unit. The isocost line AA' shows the input combination used by the business unit at the same cost level (allocative efficiency), while the isoquant line as the SS' curve depicts the input combination to produce the same output (technical efficiency). Point Q' shows the level of technical and allocative efficiency. Point P represents inefficiency as it is not on the isocost and isoquant curves. Point R indicates allocative efficiency and Q is for technical efficiency.

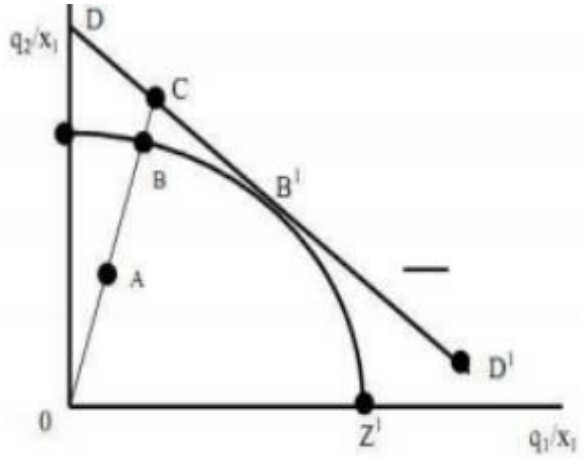

Figure 2. Efficiency Curves with Output-Oriented Measurement
Source: Emrouznejad and Cabanda (2015)

Output-orientation approach, which is the calculation of various outputs that can be increased without changing the amount of input produced. As an illustration, a business unit produces two outputs (Q1 and Q2) with an input X. The assumption is Constant Return to Scale (CRS) so that the Production Possibility Curve is obtained which is represented by ZZ' curve, which shows the upper limit of the production possibility. Point A shows technical inefficiency as it can optimize output which is below the Production Possibility Curve line to point B. Point B, which is on the Production Possibility Curve, shows technical efficiency. Point C shows the technical efficiency. Point B' displays the level of technical and allocative efficiency which is the most ideal level. Thus, the Overall Revenue Efficiency can be obtained by considering the two equations above.

Ivanni, et al. (2019) state that efficiency analysis with multi-input and multi-output is most suitably analyzed using a frontier approach. This analysis measures efficiency into two types, namely parametric and nonparametric frontiers. Parametric analysis is measured using parametric statistical tests such as the Stochastic Frontier Approach (SFA) and the Distribution Free Approach (DFA). The non-parametric frontier analysis is measured using a nonparametric statistical test, which is Data Envelopment Analysis (DEA). A parametric test is a test in which the model requires specific assumptions regarding the distribution of the population to be normal (Isa, 2009).

SMEs Cluster as Multi-Actor System

The SMEs cluster has a complex multi-actor because it involves various organizations, such as business actors, communities, educational institutions, and government working simultaneously for mutual benefit (Sugiarto et al., 2004). In cluster development, it is inevitable not to involve many actors. Actors are institutions, groups, or individuals that have major roles within the system (Rees & MacDonell, 2017). Participation of actors has a connection with the involvement of their active interaction in creating value, as well as ownership of economic resources that determine the capacity of actors in defining and legitimizing institutions, rules, and system values (Tronvoll, 2017). Actors with important involvement are referred to as stakeholders, which can be divided into primary and secondary stakeholders

The multi-actor system triggers the emergence of conflicting interests related to the strategic objectives the system is trying to achieve (Ariyani et al., 2020). Therefore, understanding the SMEs cluster, particularly how actors act, react, and interact with each other, is a fundamental requirement in any decision-making in this sector. Analyzing actors is very useful for determining points of agreement or disagreement among actors on the objectives of the system that will be achieved so that appropriate analysis tools are needed for the actor analysis process to produce accurate information.

3. Research Method

This research is mixed-methods research, namely a quantitative approach to analyze technical efficiency and a qualitative approach to analyze guitar institutions. The population comprises 174 business units, namely manufacturers of guitars, suppliers of raw materials and accessories, and service businesses that support the production and sales of guitars. Of the 174 business units, 60 business actors produce guitars, whereas others focus on selling raw materials, accessories, semi-finished and finished goods. Of the 60 guitar business units, 16 business units that conduct the production process themselves were selected, while 44 other business units performed the production process with subcontracts from collectors and large producers (Hastiningsih et al., 2019).

In efficiency analysis, this study utilized two variables, which are input and output variables (Ishak & Somadi, 2019). The input variables consist of total labor, raw material costs, fixed costs, and labor costs. Meanwhile, the output variables include turnover and profit. To determine input and output variables in the guitar production business, it was obtained from theory, previous research, brainstorming results, interviews, and direct observation with guitar business owners. The selected input and output variables proceed as variables measuring the efficiency level at each business unit

examined in this study. The data collected and processed were primary data with a ratio scale. The data were collected by filling out a questionnaire distributed to guitar business owners. Data are analyzed through efficiency analysis based on the DEA approach. DEA is a mathematical programming technique to evaluate the relative efficiency of various similar business units in managing input into output (Ningsih et al., 2015). Isa (2009) explains that DEA can manage various variables and does not limit the input and output to be selected. Overall, a business unit is considered to be efficient if it has an efficiency value of 1, and if the value is less than 1, indicating that the DMU is inefficient.

The stakeholder is analyzed using Mactor software (Matrix of Alliances and Conflicts Tactics, Objectives, and Recommendations). Mactor is developed by Michel Godet in 1991 for analyzing in-depth the power relations among actors, the competitiveness of actors, and the attitudes of actors towards goals/objectives. The operation of Mactor is based on inter-actor influence, which is divided into direct influence, indirect influence, and potential influence. Direct influence occurs if actor A affects actor B, whereas indirect influence occurs if actor A affects actor B and actor B affects actor C, and through the transitivity process, actor C is indirectly influenced by A. Potential influence takes place if there is a presupposed influence of actor A on actor B. Mactor functions based on a structural analysis approach (Fauzi, 2019).

4. Results and Discussion

Guitar is a musical instrument made of wood and its strings are made of nylon or steel. Guitars are divided into two types, acoustic and electric. The acoustic guitar is played as a solo instrument using a comprehensive fingerpicking technique, while the electric guitar is a guitar that relies on an electronic amplifier capable of manipulating the sound of the guitar. The guitar is one of the superior products of the Sukoharjo Regency (Hastiningsih et al., 2019). The guitar industry in this region is an inherited business that has been operating since 1975. The products are not only guitars, but also various wooden musical instruments such as ukulele, Cajon, kroncong, and so on. Craftsmen obtained raw materials and production tools from collectors in the area. This business is categorized as a Micro and Small Enterprise since the production is conducted in the house's surroundings and there are limitations in the amount of capital and labor. Labors generally consist of junior high school and high school graduates from the area. Limited marketing reach has resulted in inadequate marketing and has made prices increasingly competitive. It also happens as the marketing is taken by the collectors so that the profit of guitar craftsmen remains low.

Of the 174 guitar business units in this cluster, most run businesses or shops, either selling guitars or guitar accessories. This study focuses on examining guitar business units within the micro-business category where its labor between zero and 4 people. This business group is profoundly weak in terms of management, thus identifying weaknesses is important to improve this aspect. According to 174 business units, 16 business units own financial records. Relative efficiency analysis was performed on these 16 guitar business units. The input variables used are total labor, raw material costs, fixed costs, and labor costs, whereas the output variables used are amaunt of sales and profit..

Table 1. Efficiency Level of Guitar Business Unit

No	Guitar Business Unit	Efficiency Value	Information
1	Vega	100,00	Efficient
2	Casser	100,00	Efficient
3	Nanto	100,00	Efficient
4	Nissa	69,27	Inefficient
5	Nardi	63,93	Inefficient
6	Aji	62,94	Inefficient

7	Gembung	61,54	Inefficient
8	Yamto	60,39	Inefficient
9	Eko	62,94	Inefficient
10	Baggins	61,54	Inefficient
11	Musicman	56,11	Inefficient
12	Frado	54,04	Inefficient
13	Yamahanan	52,91	Inefficient
14	Akustiku	52,39	Inefficient
15	Riyanto	52,20	Inefficient
16	Suhardani	48,80	Inefficient

Source: DEA Analysis Results (2020)

Based on the 16 business units under the study, 3 business units were found efficient, including Vega, Casser, and Nanto. Meanwhile, the remaining 13 business units had not yet reached the efficiency level of 100%, in other words inefficient. There were 13 inefficient business units as they had not used input efficiently. Based on the 4 types of input variables used, namely the number of workers, labor salaries, raw material costs and fixed costs, the labor aspect is an inefficient input. Labor is a common problem for micro and small enterprises. Many people do not put an interest in working in this sector as they prefer medium and large enterprises. The presence of many medium and large enterprises has affected the interest of those working in micro and small enterprises. Recently, many textile factories and textile products have opened branches in the Solo Raya area and have influenced people's interest in choosing places to work. Based on the results of the interview, many guitar businesses in this area offered greater income than those working in medium and large enterprises. Many people preferred the prestige of working in large businesses, such as the sustainability of employment and the pension program offer.

Besides the input aspect, 13 guitar businesses were inefficient in obtaining output. Of the 4 types of input used, comprising the number of labors, labor costs, raw material costs, and fixed costs, business actors should obtain greater output than what is currently available. The amaunt of sales and profit of the business unit were low and there is an opportunity to increase. The success of the guitar business in the form of a cluster is very dependent on the existing institutional aspects. The institutional aspect heavily determines the success rate of the guitar business, where so far the institutional aspects of the SMEs cluster are still relatively weak. Given this notion, it is necessary to strengthen the guitar business institution to improve business performance and productivity. Institutional strengthening is carried out by reducing various transaction costs in managing the guitar business.

The management of the guitar business requires a number of other expenses besides the production costs which expense quite a lot. These costs include the cost of finding information on raw materials, the cost of finding labors, and the cost of shipping products. Yustika (2015) includes the cost of finding information on raw materials and labor, as well as the cost of free shipping or product discounts in the price bargaining process, which are included in the category of transaction costs. It is affirmed by (Mburu, 2002) that the cost of finding information and negotiation costs are included in transaction costs. These costs are the impact of the limitations of a micro and small business in general. Meanwhile, negotiation costs such as free shipping and product discounts are given to accelerate business activities. It is because often defective information occurs regarding factors of production and employment.

In addition to production and employment factors, there are also costs for participating in exhibitions outside the city. Yustika (2015) categorizes exhibition accommodation costs, advertising costs, information costs, and exhibition participation as transaction cost categories. This category

implies all costs incurred for goods/services to reach the market. Indeed, the accommodation cost is burdensome for micro and small business actors because this expenditure is not in simple figures.

Institutional strengthening is departed from various potential aspects of the guitar industry, including the ability of business actors to market their products, and the ability of business actors to earn profits. The discussion of the institutional aspects in this study is closely related to the analysis of the influence, dependence, convergent and divergent stakeholders of the guitar business (Wardono et al., 2019). Existing stakeholders include suppliers of raw materials, business actors, consumers, government, clusters, financial institutions, and universities. The institutional aspect creates social networking, social cohesion, and mutual trust so that it will support the development of the guitar business. Savitri, (2018) explains that currently, guitar business actors have limitations in purchasing raw materials, limited skilled labors, capital, and product marketing.

The institutional analysis in this study used a stakeholder analysis using MACTOR. This analysis is used to identify and map the influence and interests of stakeholders in the guitar industry. This study used the concept of ABGC involvement which covers 13 key persons representing 10 types of stakeholders, namely academics, bureaucracy, community leaders, and business actors involved in this stakeholder analysis.

Stakeholders were asked about perceptions of their daily activities related to the guitar industry. The highest goals or interests of stakeholders in carrying out activities related to the guitar industry are increasing the regional economy, maintaining the sustainability of the guitar industry, and carrying out the main tasks and functions. Hence, it is found that the objectives of the various activities of these stakeholders are increasing the regional economy, maintaining the sustainability of the guitar industry, and carrying out their main tasks and functions. The interests of gaining profit and income seemed relatively small for stakeholders. Of the 5 goals, 3 strong goals are increasing the regional economy, maintaining the sustainability of the guitar industry, and carrying out its main tasks and functions.

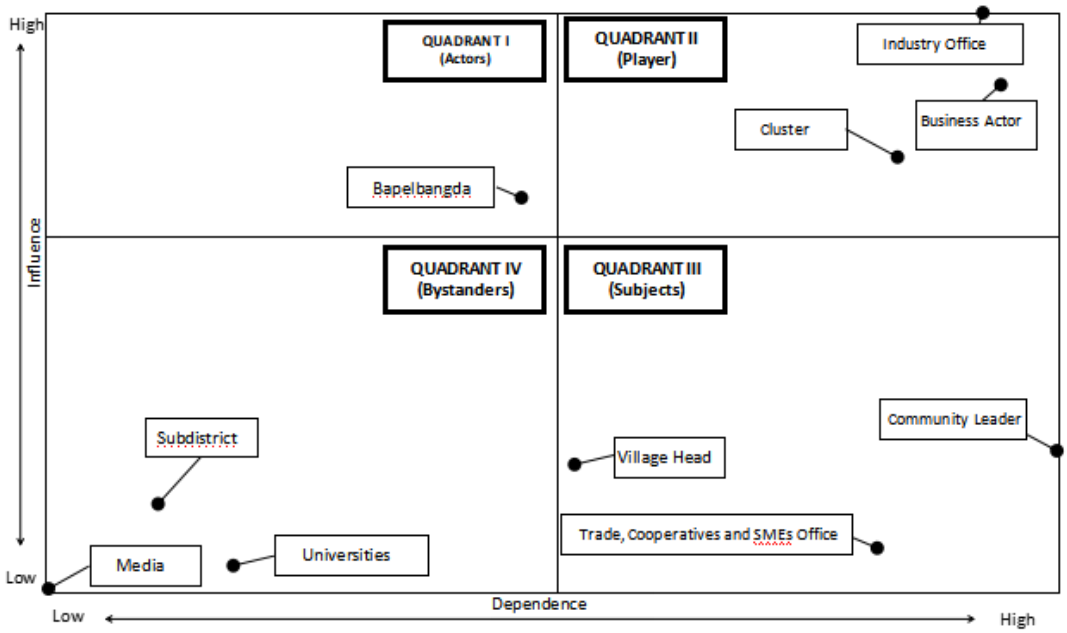

Figure 3. Map of Influence and Interdependence between Stakeholders
Source: MACTOR Analysis Results (2020)

Figure 3 draws the position of stakeholders from two main aspects, which are influence and dependence. The results of the mapping categorize stakeholders into 4 quadrants; quadrant 1, actors; quadrant 2, players; quadrant 3, subjects; and quadrant 4, bystanders (Isa et al., 2019) (Rees & MacDonell, 2017). Actors are stakeholders who possess a low interest, yet have high influence in the development of the guitar industry. Stakeholders in this group usually have an interest in planning at the local government level, namely the Regional Agency for Research and Development.

Players are the most active stakeholders in actualizing the guitar industry because they have great interest and influence. This quadrant includes Industry Agency, business actors, and guitar business clusters. Stakeholders in this quadrant provide various resources in realizing the development of the guitar industry, covering human resources, information, facilities, and products. The strengthening program mainly ensure the availability of raw materials and products, market, and strengthen the business. The components of players have high influence among stakeholders. They have the authority to maintain product availability and business development.

The subjects experience high effect, yet have low influence to stakeholders on the other side. This quadrant is occupied by trade, cooperatives, and SMEs office, village heads, and community leaders. Stakeholders in this quadrant with the highest interest are those who support the development of the industry. Underlying the involvement of stakeholders, they involve in the planning and development of industry and SMEs. The level of dependence of groups in this quadrant is related to research, regional economic development, and product marketing. The influence that stakeholders have in the subject quadrant is low. Groups in this quadrant do not have the authority in guitar production and industrial development; they only play in direction and promotion as well as consumers.

Bystanders are stakeholders with low interest and influence in the development of the guitar industry. This quadrant is owned by universities, media, and subdistrict officials. Based on the involvement, benefits obtained, and the level of dependence on the guitar industry, the stakeholders in this quadrant have a very low value. This group only performs its tasks as a supporter and also as a motivator or innovator. Stakeholders in this quadrant have a very low value and do not make a big contribution to the management of the guitar industry.

The guitar business cluster enables the development of collaborative networks between universities, business actors, government, society, and also financial institutions. Cluster members will obtain various facilities related to financing and capital, production, and marketing, as well as the technology application (Huseini, 2015). The existence of a guitar cluster is an effort to develop a competitive business unit. Theoretically, cluster members have a better chance of growth than business units outside the cluster area. Agglomerations of skills, management, marketing, and capital are reasons that facilitate clusters to develop. The sustainability of the guitar business in Sukoharjo Regency is determined based on 3 (three) aspects; (1) support from the government regarding various policies to ensure the business sustainability; (2) the presence of an input, which is the power of suppliers of raw materials, supporting and complementary materials that fulfill the sustainable production; and (3) the power of output, which is the driving force for the product to enter the market. SMEs clusters and internal cluster networks, big companies, universities, bank and finance, suppliers, business consultants, supporting institutions, central and local governments, and technical training institutions (Fereshti & Saputro, 2008).

5. Conclusion

From the results and discussion that has been carried out, the conclussion that can be taken are: (1) The efficiency level of the guitar business in Sukoharjo Regency was still low. Of the 16 existing business units, 3 were found efficient and 13 were inefficient. Input aspects that led the business to be

inefficient are the number of labors and labor costs, while the output aspects that caused the business to be inefficient are turnover and profit of the business. (2) The guitar cluster institutional still required improvement by involving various key stakeholders.

Business actors need to improve their performance and promote the sustainability of the guitar business. Guitar business actors are expected to be more realistic in determining various inputs used in the production process, such as the number of labors, labor costs, raw material costs, and fixed costs of the business unit. Guitar business actors shall optimize the use of their inputs in order to obtain the maximum amount of output and sales of output. The government is encouraged to carry out various policies such as the stipulation of regulations, training, coaching, and assistance for business actors. The head of the cluster should be more active in coordinating, collaborating, and fostering business actors who are also members of the cluster. Higher education needs to conduct research and service so that it is more operational following the problems and needs of the business world, especially the guitar business in Sukoharjo Regency.

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