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To cite this article: Suliyanto *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **255** 012054

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How to Improve The Competitiveness of Palm Sugar? The Role of Technical Innovation

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Abstract. One of the causes of the low competitiveness of palm sugar MSMEs to enter the modern and export market is the low quality of products. The product's low quality is caused by the low technology which is used in the palm sugar's production process. Therefore, a research is needed to analyze the influence of technical innovation on the marketing performance of palm sugar MSMEs. Respondents of this research were the owners of Palm Sugar MSMEs in Banyumas Regency. Data were collected using questionnaires, in-depth interviews, observation, and Focus Group Discussion (FGD). Based on the analysis using mediation regression analysis with causal step method, it is obtained that the results of technical innovation has a positive influence on competitive advantage and marketing performance. Furthermore, competitive advantage mediates the relationship between technical innovation and marketing performance. Based on the results of the research, some recommendations are formulated; the palm sugar MSMEs need to make technical innovations at the stages of *penderesan* or collecting, processing and packaging technology in palm sugar production.

1. Introduction

Micro, Small and Medium Enterprises (MSMEs) play a very important role for Indonesian economy [7]. In 2017, MSMEs were able to absorb a lot of human resources, which amounted to 97.22%, and were able to make a high contribution to Indonesia's Gross Domestic Product, which amounted to 60.34%. One of many types of MSMEs in Indonesia is palm sugar MSMEs because Indonesia is the largest palm sugar producer in the world. One of the regions in Indonesia, which has the largest palm sugar production, is Banyumas Regency, with the production reach 58,892 tons per year. In Indonesia, the welfare of palm sugar producers is generally still very low [9], one of the reasons why palm sugar producers have low welfare is the low productivity and quality of the palm sugar. Non-standardized palm sugar quality products make it difficult to enter the modern and export markets [9].

One of the causes of low productivity and quality of palm sugar is the usage of low quality technology [9]. The technology that is used to produce palm sugar in Indonesia is generally still very simple [6] which effects the productivity and the low quality of produced palm sugar. The low quality of



palm sugar causes the low ability of palm sugar to enter modern and export markets [11]. The inability of the palm sugar producers to enter the modern and export markets has an impact on their low welfare.

The low level of innovation is a problem that is generally faced by MSMEs, including MSMEs of palm sugar. It can be seen from the production process and equipments that are used in palm sugar MSMEs that have not been changed from year to year which are passed down from generation to generation. Innovation is a way to continuously build and develop an organization that can be achieved through the introduction of new technologies, new applications in organizations (Gana, 2013). Innovation is a factor that determines competitive advantage [1]. Competitive advantage is closely related to market leadership, innovation, efficiency, productivity and service. Gomes et al., [3], besides that, innovation will also directly improve the marketing performance [2]. In brief, innovation is very important to improve the performance of MSMEs including MSMEs of palm sugar.

Han et al., (1998) classify innovation into two types, namely technical innovation and administrative innovation. Technical innovation is innovation related to products, services, production process technology. Technical innovation relates directly to the activities of basic work in the organization and determines the processes and results of production, while administrative innovations are innovations related to organizational structure and administrative processes. This innovation is not directly related to the activities of basic work in the organization (Han et al., 1998). Technical activities in palm sugar MSMEs are more dominant than administrative activities; therefore, technical innovation in palm sugar MSMEs is more important than administrative innovations. As a result, this study only focuses on technical innovation.

The characteristics of the modern and export markets for palm sugar are the demands of high quality, standardized sizes, and standardized colors. The profit margin of palm sugar that is marketed in the modern and export markets is much higher than those which are marketed in traditional markets. Thus, the marketing of palm sugar in the modern and export markets is expected to improve the welfare of palm sugar producers. One alternative to improve the quality of palm sugar is to innovate. To do an innovation, costs and changes in the mindset of the palm sugar MSMEs producers are needed. Based on these problems, it is necessary to do a research whose aim is to analyze the influence of technical innovation on marketing performance in the palm sugar industry, and to identify technical innovations that can be used to improve palm sugar's productivity and quality.

2. Material and Methods

This research is both quantitative and qualitative research. Quantitative approach is used to analyze the influence of technical innovations both directly and indirectly on marketing performance, while a qualitative approach is used to identify the technical innovation formulation of MSMEs. This research was conducted in Banyumas Regency, which is the largest palm sugar producer in Indonesia. Data are collected using observation, in-depth interviews, and questionnaires. To analyze the influence of technical innovation on marketing performance, distributing questionnaires to 110 palm sugar producers in Banyumas Regency did data collection. Sampling is done by purposive sampling method with criteria for palm sugar MSMEs owners who have marketed their products to modern or export markets. The analytical tool used is mediation regression analysis using the causal step method. The technical solutions are formulated by benchmarking palm sugar centers in other areas that have advantages in terms of technology. The results of the new technology formulation obtained from other regions were then discussed in a Focus Group Discussion (FGD) forum among the stakeholders of the palm sugar industry including palm sugar producers, academics, palm sugar collectors, and palm sugar farmer groups.

3. Results And Discussion

3.1. Profile of Respondents

To analyze the influence of technical innovation on marketing performance, data was collected by using questionnaires distributed to palm sugar centers in Banyumas Regency with the respondents' profile as follows:

Tabel 1. Respondents' Profiles of Palm Sugar Producers

Characteristics	Criteria	Respondents	
		Total	Percentage (%)
GENDER	MALE	99	90,00
	FEMALE	11	10,00
Age	31-40 years old	30	27,27
	41-50 years old	36	32,73
	≥ 51 years old	44	40,00
Education Level	Elementary School	79	71,82
	Junior High School	17	15,45
	Senior High School	10	9,09
	College	4	3,64
Length of Work	≤ 10 years	37	33,64
	11-20 years	36	32,73
	21-30 years	29	26,36
	≥ 31 years	8	7,27
Number of Employees	≤ 10 people	40	36,36
	11-20 people	25	22,73
	21-30 people	25	22,73
	31-40 people	18	16,36
	≥ 41 people	2	1,81

Based on Table 1 it is known that most of the respondents are men because they have the responsibility to provide their families. Palm sugar business is the main source of income for the respondent's family. Based on the age of the respondents, most of them are above or equal to 51 years, whereas in the younger age range, there are fewer respondents. It indicates the existence of regeneration problems in the palm sugar industry, while based on the length of business, many of whom have been in this business for more than 11 years. This shows that the palm sugar business has good sustainability even though the business margin is small. In general, palm sugar producers are able to absorb less than 10 workers, but some producers are able to absorb more than 11 workers, this shows that the palm sugar business is a labor-intensive business that can absorb a lot of workers, so that it is very strategic to improve the community welfare.

3. 2. Analysis of the Technical Innovation Influence on Marketing Performance

Test the validity of the research instrument using product moment correlation analysis by looking at the correlation of each item with the total value, while the reliability test uses Cronbach alpha. Table 2 presents the results of the questionnaire's validity and reliability test.

Table 2. Instruments' Validity and Realibility Test

Variable	Indicator	Product Moment Correlation	Alpha Cronbach
Technical Innovation	Developing a new product	0,828	0,722
	Improving production process	0,798	
Competitive Advantage	Using of the latest technology	0,780	0,539
	Excellence in quality	0,644	
	Excellence in production efficiency	0,629	
	Excellence in distribution	0,669	
	Excellence in image	0,783	
Marketing performance	Sales target achievement	0,620	0,619
	Sales growth	0,759	
	Marketing network Increase	0,649	
	The Number of costumers growth	0,718	

Based on the results of testing the three constructs, namely technical innovation, competitive advantage, and marketing performance, it is obtained that all items in each construct have a significant correlation to the total construct value. So that, all indicators are valid for measuring each construct, and the Cronbach construct alpha value technical innovation and constructional marketing performance > 0.60. It has high reliability, while alpha Cronbach competitive advantage > 0.50 has moderate reliability [4].

Based on the results of the mediation regression analysis using causal test, the influence of technical innovation on marketing performance with competitive advantage as a mediating variable obtained the following results:

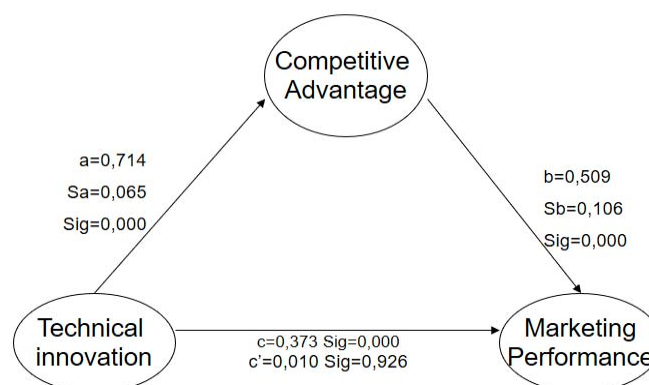


Figure 1. Results of Regression Analysis using Mediation Variables with Causal Step Method

Based on Figure 1, it can be seen that technical innovation has a positive influence on competitive advantage (Sig. 0.000) and marketing performance (Sig. 0.000). Competitive advantage has a positive influence on marketing performance (Sig. 0.000). Before including competitive advantage into the model, technical innovation has a positive influence on marketing performance. However, after entering competitive advantage into the model, technical innovation's influence on marketing performance decreases from 0.373 with a significance of 0.000 to 0.010 with a significance of 0.926. So that, competitive advantage absolutely mediates the relationship between technical innovation to marketing performance. By this evidence that is proven about technical innovations has a positive and direct influence (through competitive advantage) on marketing performance, it is necessary to make efforts to formulate technical innovations in the process of palm sugar production.

3.3. Analysis of Technical Innovation in Palm Sugar Business

Having proven that technical innovation has a positive influence both directly and indirectly on marketing performance, technical innovations can be identified as one of the variables that is strongly can be used to improve the marketing performance of palm sugar MSMEs. Based on the results of observations, in-depth interviews, and Focus Group Discussions, technology problems can be identified and there are some technical innovations that can be formulated as follows:

3.3.1. Penderesan or Collecting technology

The problem of *Penderesan* or collecting technology in palm sugar production that can be identified is the use of *Pongkor*. *Pongkor* is a device that is used to hold the sap during the collection stage of palm sugar production. In general, *Pongkor* which is used today is *pongkor* which is made of bamboo and *pongkor* from buckets. The weaknesses of Bamboo *Pongkor* are heavy, difficult to be cleaned, and easily broken especially if it has been exposed to heat and rain continuously. Besides that, the price of bamboo *pongkor* is increasingly expensive, this is because the bamboo tree population is decreasing. In addition, the palm sugar producers also use small bucket as *pongkor*. Because the bucket is not specifically designed to collect the sap, the size does not match the needs and it is difficult to handle. The technical innovation solution offered is by using *pongkor* which is specially designed with degradable plastic material. So that, both the shape and size are match to the needs. Furthermore, it is also safe for health. Based on the evaluation result, this kind of technical innovation is more suitable for the needs, easier to clean, lighter, more durable, and more hygienic.

3.3.2. Processing technology

The problem of processing technology starts from the design of the production room. In general, the design of the production room is not specifically designed for processing palm sugar. Consequently, the production room is not efficient enough to carry out the production process. So that, it is necessary to do technical innovation in the production room. By designing an efficient production room which considers the effectiveness and aesthetics aspects, a good production process can be carried out well.

The second innovation in processing technology is the innovation in the sap filter. All of this time before, palm sugar producers filter the sap using nonstandardized tools such as nets, fabrics, coconut milk filters and others. This results in the difficulty in using filters because they are not specifically designed. The innovation offered is to design a special sap filter, so that it is easy to use and produce high quality palm sugar.

The next innovation is the stove innovation. There are many palm sugar producers who use wood-fueled stoves. The problem with the use of wood-fueled stoves is the more expensive cost of processing due to the decreased number of fuel. Furthermore, processing palm sugar using wood-fueled

stove produces more smoke and dust that can contaminate the palm sugar. The solution of technical innovation offered is to design stove using husks or sawn timber fuel-based. By using this kind of stove, the palm sugar producers can produce cleaner and more cost-effective palm sugar.

The next innovation is the innovation in palm sugar molds. At the first time, the molds that are used in the palm sugar production are molds made of bamboo, molds in the form of bowls, and molds with concave-formed wood. By using such molds, the size of palm sugar is not in accordance with market demand and not standardized. The technical innovation solution offered is by designing aluminum molds that have standardized size in accordance with the demands of modern and export markets, besides, aluminum mold is easier to clean and more hygienic.

3.3.3. Packaging technology

So far, many palm sugar producers do not pack the products adequately because they just sell their products to collectors. These collectors will market the products to exporters, modern markets, traditional markets, and consumers. The collectors also have not done the packaging well yet, so that the products produced are easily damaged in the process of storage and distribution. They are also lack of attractiveness. The technical innovation solution offered is by designing packaging that considers the effectiveness and aesthetics aspects; so that, palm sugar products are safe in the distribution process and attract consumers in the market. The packaging for palm sugar products can be made from plastic materials that have been branded and labeled.

4. Conclusions

The low ability of palm sugar producers to enter the international and modern markets is due to the low quality of palm sugar, while the low quality of palm sugar is due to the poor production process, especially at the stages of *penderesan* or collecting, processing, and packaging. Problems at those stages are caused by low awareness and low knowledge of palm sugar producers due to the lack of training and assistance to produce best quality palm sugar as the demand of international and modern market quality standard. To improve the quality of palm sugar, it is necessary to conduct training and mentoring for palm sugar producers to be able to produce best quality palm sugar as the demand of international and modern market quality standards on a regular and sustainable basis by involving local governments, universities, associations or groups of palm sugar producers, as well as non-governmental organizations (NGOs).

Acknowledgments

Thank you to the Director General of Higher Education who has funded this research with the National Strategy (*stranas*) scheme.

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