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Disruptive Innovation-Based Model of Sustainable Competitiveness Development in Small and Medium Food Industries

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ABSTRACT
Small and Medium Food Industries (SMFIs) play an important role in the national economy but its competitiveness is low due to the limited innovation applied by business managers. Current innovation research is partial and excludes disruptive innovation and sustainable competitiveness. This research fills the gap by developing a model for increasing the competitiveness of SMFIs based on disruptive innovation and identifying constraints faced by SMFIs if the model is implemented. Data was collected through Focus Group Discussions and surveys using questionnaires. With a model framework approach, the model is composed of six subsystems, namely input, production process, post production, marketing, and supporting institutions. The potential for disruptive innovation lies in the quality of functional food products and low production costs because resources are available locally. However, the potential for disruptive innovation has not been utilized optimally by SMFI due to various obstacles. The role of government is very important to optimize the competitiveness potential of SMFI.
Keywords: disruptive innovation, SMFI, sustainable competitiveness

Model Disruption Innovation dalam Pengembangan Daya Saing Berkelanjutan pada Idustri Makanan Kecil dan Menengah

ABSTRAK
Industri Kecil dan Menengah Makanan berperan penting dalam ekonomi nasional tetapi daya saingnya rendah karena terbatasnya inovasi yang dilakukan oleh pengelola usaha. Penelitian inovasi saat ini bersifat parsial dan belum mencakup disruptive innovation dan daya saing berkelanjutan. Penelitian ini mengisi kekosongan tersebut dengan menyusun model peningkatan daya saing IKM makanan berbasis disruptive innovation dan mengidentifikasi kendala-kendala yang dihadapi dalam penerapannya. Data dikumpulkan melalui Focus Group Discussion dan survei menggunakan kuesioner. Dengan pendekatan kerangka analisis model, maka model peningkatan daya saing IKM makanan yang berkelanjutan disusun dari enam subsistem, yaitu input, proses produksi, pasca produksi, pemasaran, dan institusi pendukung. Potensi disruptive innovation terletak pada kualitas produk makanan fungsional dan biaya produksi yang murah karena sumber daya tersedia secara lokal. Namun, potensi disruptive innovation belum dimanfaatkan secara optimal oleh IKM makanan karena berbagai kendala. Peran pemerintah sangat penting untuk mengoptimalkan potensi daya saing yang dimiliki IKM makanan.
Kata Kunci: disruptive innovation, *IKM makanan, daya saing berkelanjutan*

INTRODUCTION

Small and Medium Industries (SMEs) play a very important role for the economic development of a Nation. In Indonesia, in 2010, data from the Central Statistical Body showed that the number of SMEs is majority, which amounted to 99 percent of the total number of companies. SME also contributed 58 percent of Gross Domestic Product (GDP) (Taneo et al., 2013b). In the last five years, based on data from the Ministry of Cooperatives and Small and Medium Enterprises of the Republic of Indonesia, the contribution of the SME sector to GDP

has even increased from 57.84 percent to 60.34 percent (Kementerian Koperasi dan UKM, 2017); Rahman et al., 2017). Furthermore, the absorption of labor in this sector reaches 97 percent. These data prove the potential of SME as the main driver of the nation's economy.

The business sectors that have huge potential are the food and beverage processing sector. There are approximately 56 million SMEs in Indonesia and 70 percent of them consist of food SMEs. In the first quarter of 2013, data from the Central Statistical Body of Indonesia showed that the production growth of the food SME industry had increased by 10.76 percent (Kantor Staf Kepresidenan RI, 2016). In the last four years the contribution of the Food and Beverage Industry sub-sector to the national economic growth is an average of 31.69 percent (Lestari, 2018). This is an indicator that the food industry that is managed by SME has great potential to be developed.

However, SMEs in general still have to deal with various kinds of problems and challenges. Low productivity is often claimed as a major problem. Organizations that are less professional, weak technology mastery, improper application of innovations, limited market access, difficult access to raw materials, and the low quality of entrepreneurship among business actors are some of the obstacles faced by SMEs (Tambunan, 2008; Lestari, 2018).

In addition, SMEs only contribute 17 percent of total national exports (Pramono, 2018). This data indicates that Indonesian SMEs still have low competitiveness in the global market. Lantu et al. (2016), argues that the high contribution of SMEs in Indonesia has not been able to encourage them to have high competitiveness. Competitiveness is one of the toughest challenges for SME when it comes to dealing with fellow SME and large companies. Whereas competitiveness is one of the main aspects that must be achieved by all types of businesses including SMEs. Rostek (2012) stated that SMEs should increase their competitiveness if they want to survive in a tough business competition and a changing environment.

Until now there have been many studies that have attempted to identify driven factors that support the improvement of SMEs competitiveness. Some of the factors identified include: employment, marketing, productivity, innovation, capital supply, opportunities, productivity, globalization, knowledge-based development, business relations, management, organization structure, alliances, cost-efficiency, networks, compliance (Kadocsa and Borbas, 2010); workers expertise or level of education, expertise of entrepreneurs, availability or access to capital, organizational and management systems, availability or mastery of technology, availability or mastery of information (Tambunan, 2008); availability and condition of the business environment, business capabilities, policies and infrastructure, research and technology, financial support and partnerships, performance (Lantu et al., 2016).

In a previous study, (Taneo et al., 2013a) revealed factors that affect SME competitiveness, namely (1) financial management skills, (2) access to financial resources, (3) market analysis skills, (4) innovation, (5) social networking systems, and (6) business value legacy. In further research in the same year Taneo et al. (2013a) found that the speed of innovation is one of the main keys to sustainable competitiveness in SMEs. Of the many studies on driving factors of SME competitiveness, innovation is identified by researchers as a key driver of competitiveness (Porter, 1980; Kadocsa and Borbas, 2010; Callon et al., 1992; Hakansson and Snehota, 1995; Branzei and Vertinsky, 2006; Forsman and Temel, 2011; Russell and Millar, 2014).

Recently, many researchers are interested in researching the implementation of disruption innovation in various types of SMEs and from various perspectives on aspects of SMEs (Nagle and Golden, 2009; Chishakwe and Smith, 2012; Shin, 2017), and all of these researchers agree that disruptive innovation has a positive impact on SMEs development in general. However, previous studies have not revealed disruptive innovation in food SMEs, which is innovation that was initially considered inferior but developed and finally able to compete and even dominate the market (Christensen, 1997).

Disruptive innovation is a process whereby a product or service originates from a simple application, with a limited market which then relentlessly moves to a broad market, eventually displacing established competitors (Christensen and Raynor, 2003). Disruptive innovation products offer other benefits - usually simpler, more convenient, and cheaper that attract new consumers or less demanding consumers. Disruptive innovation is also an innovation that creates new markets and value networks that ultimately disrupt existing markets and

value networks, replace existing products, alliances, and market leaders (Christensen and Raynor, 2003; Rahman et al., 2017).

Disruptive innovation research in SMEs mostly in the field of non-food and macro cases such as the transportation industry (Gemici and Alpkan, 2015), developing regional markets (Vertakova et al., 2016), productivity (Feder, 2018), high-tech start-up (Majamäki and Akpinar, 2014). These studies also only discuss disruptive innovation partially and have not been done comprehensively to create sustainable competitiveness.

Taneo et al. (2018) research was conducted to fill the gap with the aim of: (1) analyzing the relationship between disruptive innovation and sustainable competitiveness, (2) factors that influence disruptive innovation, and (3) developing a model of sustainable competitiveness in SMFIs based on disruptive innovation.

This article presents the third objective of the study. The results of this study are expected to provide comprehensive information and enrich the existing literature on the factors that influence disruptive innovation and its relationship with the sustainable competitiveness of SMFIs. This information will fill the empirical research gap on disruptive innovation on SMFIs and enrich the existing literature related to the application of the model according to Balci (2007 in SMFIs.

The results of Taneo et al. (2018) confirm that disruptive innovation is positively related to sustainable competitiveness in SMFIs. It was also found that disruptive innovation is influenced by many factors originating from internal and external SMFIs. This result is used to formulate a model of sustainable competitiveness in SMFIs.

Disruptive innovation has developed and covered not only products but also business model innovations such as department store discounts, low prices, direct flights on aircraft, and online education businesses (Chistensen and Raynor, 2003); Christensen, 2006; Rahman et al., 2017). Disruptive innovation is claimed to be the most influential business idea at the beginning of the 21st century (Bagehot, 2017).

Markides (2006) classifies disruptive innovation into three different types: technological innovation, business model innovation, and radical product innovation. To distinguish disruptive innovation from other types of innovation, Markides (2012) proposes two criteria. First, disruptive innovation must start as inferior in terms of performance according to consumers, but superior in price. Second, disruptive innovation must develop to be quite good in performance and at the same time remain superior in price.

As stated by (Stachowiak, 1983), a model must have the following three things: (1) must be original (mapping feature); (2) only reflects a choice (relevant) of the original (reduction feature); and (3) can be used for several purposes (pragmatic features). The first two conditions are met when the model is projecting a complex reality. The third condition will depend very much on the practical purpose of the model being built.

While (Kuhne, 2005) asserted that the main purpose of model is to describe something. A description or analogy used to help visualize something that is not directly observable. In addition to describing, the model is also useful in simulations to reflect the original nature of the model and construction plan in refining the model to its original nature.

Models are representations and abstractions of a real system, proposed systems, futuristic system designs, entities, phenomena, or ideas Balci (2007). Balci then classifies the model into abstract and physical models, each of which can be static and dynamic (Figure 1). Abstract models are shaped by symbols and logic, while physical models are usually physical replicas, often with a smaller scale than the system they represent.

Assessing from its characteristics, the model to be built in this study, constitute an abstract model that is dynamic, non-linear, unstable, and temporary. Disruptive innovation can take place in a relatively long process of innovation that is low-end disruptive but can be very short on new-market innovation. Disruptive innovation also causes high volatility so that economic conditions become unstable and not linear

The innovation model developed recently relates to models for understanding the innovation process (du Preez et al., 2014; Freeman et al., 2015), innovation models related to difficulties and risks associated with innovation activities (Zyl, 2006), innovation models and their impact on company capability (Gunday et al., 2010), industrial growth (Sengupta, 2014), and identification of existing innovation models (Taferner, 2019). There is no specific innovation model about disruptive innovation and its relationship to sustainable competitiveness.

Competitiveness is "The ability of a company to win consistently in the long run in a situation competition" (Black and Porter, 2000; 213). In the company's internal perspective, Barney (1991) developed a company-based internal resource theory framework, known as Resource-Based View (RBV). This theory shows the relationship between resources and sustainable competitive advantage. In this theory an analysis framework abbreviated as VRIN is developed, namely Value-creating, Rare, In-imitable, and Non-substitutable.

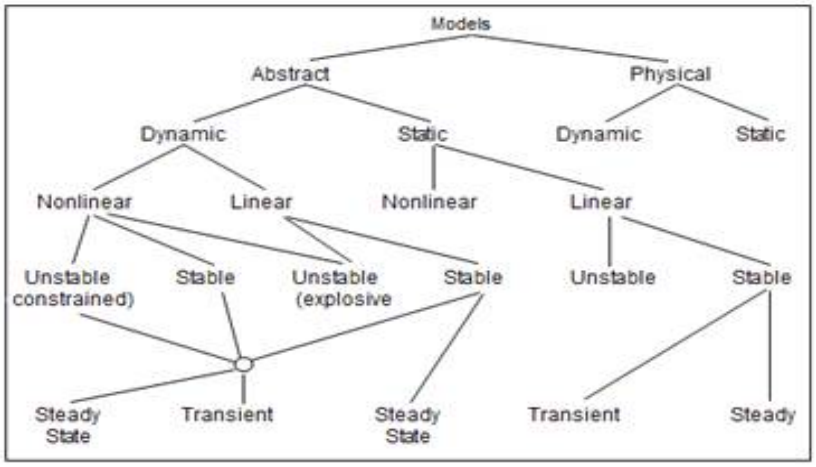

Figure.1. Classification of Models

Source: Balci (2007)

Companies who meet these four indicators will create a sustainable competitive advantage.

This analytical framework then reap a pros and cons, and to respond to the criticisms, Barney and his colleagues refined the RBV to become a Resource-Based Theory (Barney and Clark, 2007) with the analytical framework being VRIO. The indicators or parameters are the same except that N (non-substitutable) is replaced by O (organized), namely the ability of a company to manage its resources to create competitiveness. In this analytical framework, a company will have sustainable competitiveness if: (1) the company is able to create products that have more value in its industrial environment (value); (2) resources are controlled by a small number of companies (rare); (3) companies without a certain resource face costs or conditions that are not profitable in obtaining or developing these resources (in-imitability); and (4) company procedures and policies are organized in support of the use of valuable, rare and expensive resources to replicate (organized).

METHOD

The object of the study is processing food SMI in Malang Regency. The purpose of this article is to formulate a sustainable development model for food competitiveness based on disruptive innovation. This is one of the goals in the Fundamental Research grant from the Ministry of Research, Technology and Higher Education 2017-2018.

The model formulated in this article is based on the definition of the model according to (Balci, 2007), which is a representation and abstraction of a real system. The real system referred to in the context of this research is the food industry, which consists of input components or subsystems, production processes, post-production handling, up to marketing and related institutions.

Explanation of each subsystem or component is based on the following information:(1). Secondary data Analysis of SMFI available at the Office of Industry and Trade of Malang Regency. Functional food that has the potential for disruptive innovation was identified and, raw materials and equipment were identified as important factors that determine the production of processed foods. (2). Focus Group Discussion (FGD) with government institutions that closely related to the development of SMFI. It was held on August 11, 2017 with Malang Regency

Regional Development Planning Agency, Office of Small and Medium Enterprises and Cooperatives, and the Office of Industry and Trade of Malang Regency. The aim was to obtain information on SMFI development and to identify problems faced in the development of SMFI. (3). Analyses of primary data on factors encourage and inhibit the development of disruptive innovation in SMFIs. Data was collected through surveys using a questionnaire and then processed using WarpPLS software. (4.) FGD with SMFIs actors. It was held on October 27, 2017 with 5 owners and managers of SMFI in Malang Regency. The aim was to identify the inhibiting and driving factors ranging from raw materials to the marketing of SMFI products, including supporting institutions.

RESULT AND DISCUSSION

Malang Regency is administratively comprised of 33 sub-districts. SMFIs are located in 24 sub-districts. This data based on the SMFI that registers at the Regency Office of Industry and Trade. SMFIs are mostly located in Dampit, Gondanglegi, Kepanjen, Pagelaran, Pakis, Pakisaji, Singosari, and Turen districts.

Table 1 shows that there are three types of SMFIs that are most widely carried out in the Malang Regency: bakery, chips and crackers. Each type of SMFI is respectively spread in 11 districts, 10 districts and 6 districts.

The model for the development of sustainable competitiveness of food-based SMEs based on disruptive innovation is presented in Figure 2. This model consists of several subsystems: input, production process, post production, marketing, sustainable competitiveness of SMFI, and institutions.

Labor is sufficient in quantity but based on the FGD it is known that there are still problems in terms of quality aspects such as; (a). skills, work culture, and work ethics. Primary data analysis also proves that the quality of labor has a significant effect on disruptive innovation. (b). Main raw materials in food processing industry are agricultural and fishery products, cooking oil, flour, and eggs. The problems arise from the characteristics of agricultural products, based on FGD are seasonality, perishability, susceptibility to pests and diseases, and large volumes but small value. From the FGDs, information was also obtained that cooking oil is not always available when needed. East Java there has been self-sufficiency in eggs but sometimes there is a large price fluctuation. (c). Supplementary raw material or seasonings are ingredients such as salt, sugar, butter, onion and garlic, soy sauce, pepper, chili, etc. Statistical analysis of secondary data shows that the cost of the main and (d). Additional raw materials has a significant effect on the production of bread and cake SMFIs and chips.

Table 1. Types of SMI by their Distribution

No.	Product Types	Found on
1	Bakery	11 districts
2	Chips (fruit, tubers, vegetables / mushrooms, and others)	10 districts
3	Crackers (from various raw materials)	6 districts
4	Preserved fruits	5 districts
5	Dried Cocoa	4 districts
6	Foods from soy and nuts	3 districts
7	Processed and preserved meat	3 districts
8	Macaroni, noodles, sphageti, vermicelli, so'un and the like	2 districts
9	Processed Coffee	2 districts
10	Rice flour, bean flour, tuber flour and the like	2 districts
11	Nata de coco, confectionery, soy sauce, and other foods and the like	1 districts

Source: Summarized from the industry and trade office of malang regency (2017).

Based on the FGD, information was obtained that production process depends on and related to equipment used, energy needed, process quality, and seasons. Electronic equipment is closely related to the use of electricity which results in increased production costs. Statistical analysis of secondary data proves that equipment investment has a significant effect on production in the chips industry.

Post-production is closely related to the target market. Information obtained from the FGDs that SMFIs face various obstacles in entering the

market related to procedures and costs. If the target is a modern market, the obstacles faced are barcodes, brands, nutritional information, halal certification, and expiration.

Malang Regency Government has collaborated with Indomaret so that SMFI products are sold through Indomaret. Information obtained through the FGD that the collaboration did not run smoothly due to the high cost of obtaining barcodes and nutritional information, information about packaging products, etc. SMFI managers mostly do offline marketing due to limited knowledge, skills and internet access. SMFIs managers have difficulties in determining their positioning. Statistical analysis of primary data also confirms that the quality of labor has a significant effect on disruptive innovation in SMFIs.

The model uses VRIO analytical framework. (a). Value, that is contained in processed food products such as local food, functional, organic, using natural dyes. (b). Rarity, related to specific location and taste. For example, Malang Apple Chips, Malang Tempe Chips, original taste. (c). Imperfect imitation that it is expensive or difficult to be imitated. This is related to the control of resources so that competitors need large costs to be able to do so. (d). Organization refers to the procedures and policies carried out by SMFIs to manage their resources that support the creation of sustainable competitiveness. For example, to produce good quality products it is necessary to make Standard Operating Procedures (SOP) so that the quality of the products produced is consistent.

The results of statistical analysis of primary data using WarpPLS software indicate that sustainable competitiveness is significantly and positively influenced by disruptive innovation.

Based on the FGD, information is obtained that the institutions involved in SMFIs are government, private companies, and non-profit institutions. (a). Government Institutions, such as the Office of Industry and Trade, the Office of Cooperatives and Micro, Small and Medium Enterprises (MSMEs), the Office of Agriculture, Fisheries and Livestock. (b). Profit institutions: private businesses or companies that supply cooking oil, flour, eggs, and others. (c). Nonprofit institutions: universities, nongovernmental organizations, religious institutions, and others.

The results of statistical analysis from primary data proved that institutions, economic and law had a significant effect on disruptive innovation carried out by SMFIs.

Based on the FGD and statistical analysis of secondary data as well as primary data indicate that disruptive innovation can be carried out on the input, production process, post-production and/or marketing subsystems.

The model is prepared with the aim of optimizing the potential of disruptive innovation to improve sustainable competitiveness of SMFI. As a system, each subsystem plays an irreplaceable role in the process of value creation in a company. However, each element contributes unevenly to the creation of company value (Zhang et al., 2016). There is a dominant element in the model and some elements are indispensable components of the company's development model (Lambert and Davidson, 2012). Input, production processes, post-production, and marketing are dominant elements, while supporting institutions are indispensable elements.

On the input subsystem, the amount of labor that widely available can be a source of disruptive innovation because it can reduce the cost of production through cheap labor wages (Vertakova *et al.,* 2016). The problem lies in the quality of labor because it is closely related to skills, work culture, and work ethic (Wallin and Von Krogh, 2010; Moghavvemi et al., 2012; (Fischer and Rohde, 2013). Education, training, and apprenticeship are alternatives to overcome labor quality problems. The problem of the quality of raw materials to be overcome starts from cultivation techniques and good harvesting methods at the farmer level up to transportation (Agustiar, 2012; Hamidah et al., 2015).

Wheat flour is an imported product but substitution efforts have not provided optimal results (Yuliatmoko and Satyatama, 2012; Ginting et al., 2014). Fluctuations in the price of chicken eggs have also not been overcome properly (Nuryati and Nur, 2012; Priyanti and Inounu, 2016).

One of the potential disruptive innovations in processed foods is the opportunity to use natural coloring ingredients but have not been used optimally because of limited knowledge and skills (Puji Lestari, 2015).

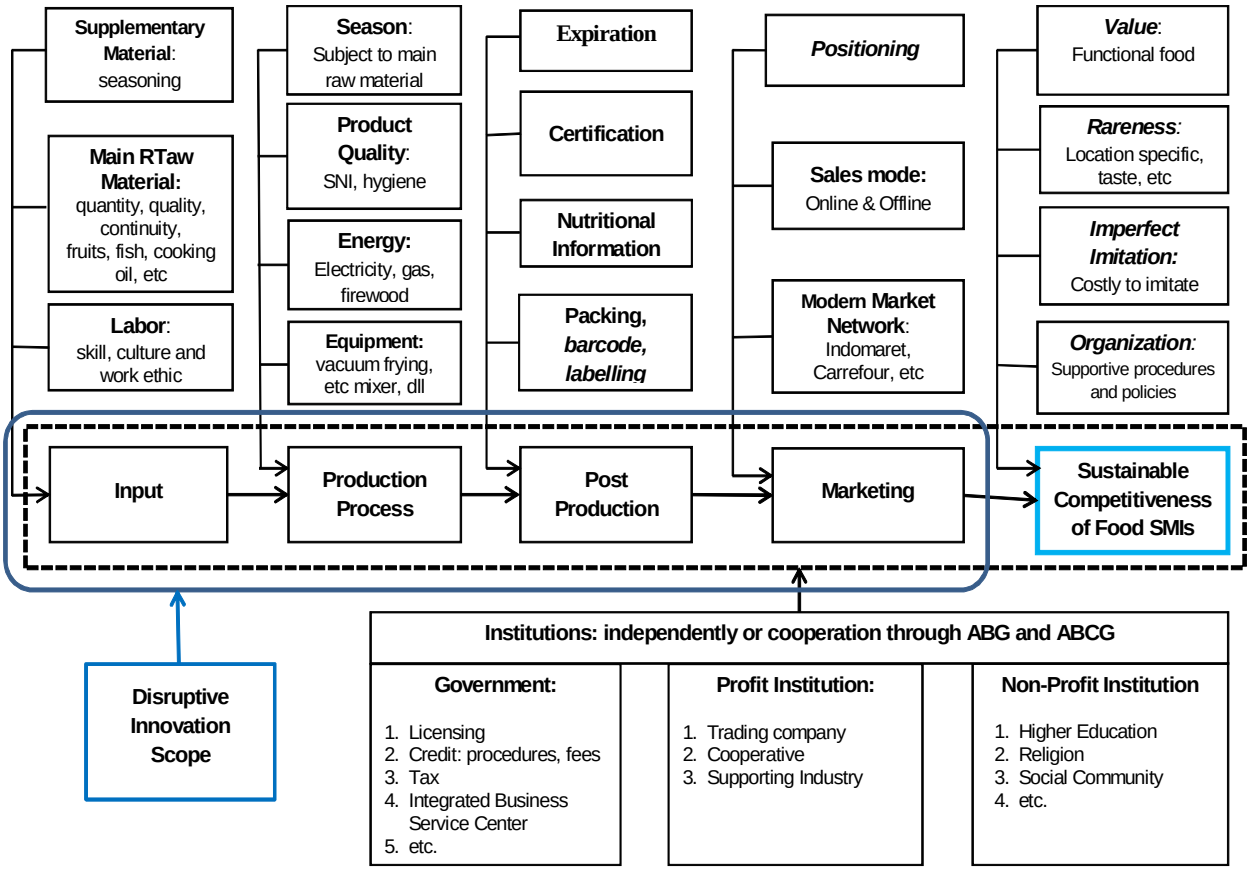

Figure 2. Disruptive Innovation-Based Model of Sustainable Competitiveness Development in SMFIs

Source: Chistensen (2003)

On the production subsystem, the equipment used affects product quality and production costs. Chips produced using vacuum fryer is of a better quality than fried chips (Putro et al., 2012; Nurainy et al., 2013). Modern electronic equipment saves more on electricity usage but the price is more expensive. Electricity is also used when using well water (pumps) that use electricity. The use of electricity will ultimately affect production costs.

Process quality and product quality are interrelated to one another (Herawati and Mulyani, 2016). In the food industry, hygiene and guidelines from the Indonesian National Standard, the Drug and Food Control Agency, and Indonesian Council of Ulama (halal certification) need to be seriously considered.

In the post-production subsystem, to fulfill marketing requirements through the modern retail market (Indomaret) SMI needs to be improved access and capabilities to provide nutritional information, barcodes, and expiration

Food SMI entrepreneurs in general are still limited in knowledge, skills, access, and financial ability to be able to utilize online marketing. Products without chemical treatments, using natural dyes, functional foods for health would be good positioning (Wibowo et al., 2015; Udaya et al., 2015; Wijaya and Sirine, 2016) to create disruptive innovation. Government plays in important role in facilitating SMIs to licensing and certification to strengthen the positioning.

Government, private and non-profit institutions independently or jointly support the development of food SMI through ABG (Academics, Business, and Government) cooperation and will be more complete when forming ABCG (ABG plus Community) (Viale, and Pozzali, 2010). Included in the Community are groups of women who make bread and cakes, farmer group, and others local communities.

This model of developing disruptive innovation based SMFIs competitiveness has several limitations. First, this model is based on SMFIs in general, while each type of food has specific characteristics, especially raw materials, production processes, and post-production handling. Future research should focus on one type of food so that it can reveal specific characteristics.

Second, this study does not distinguish between SMFIs belonging to groups and individuals, while SMFIs who are members of groups have access to marketing and supporting institutions greater than individuals. Future research should separate disruptive innovation and the competitiveness of SMFIs belonging to groups and those who do not.

Third, this study also does not consider the age of SMFIs. Research proves that SMEs that have just entered the market tend to make radical market innovations while SMEs that have long been operating generally carry out incremental and operational innovations (Forsman and Temel, 2011). Future research should consider the age of the enterprises.

CONCLUSION

The model of SMI competitiveness development provides a comprehensive framework about efforts to increase the competitiveness of food SMIs as one of the local resource economic bases.

Disruptive innovation does not only occur in high-tech companies but has also found in various fields of community life. The potential of disruptive innovation in SMFI lies in the quality of functional food products and cheap production costs because resources are locally available.

However, the potential of disruptive innovation has not been optimally utilized by SMFIs in Malang Regency due to various obstacles such as limited capital, knowledge, skills, and access to supporting resources from input until marketing subsystem. Therefore, the role of supporting institutions, especially the government, is very important to improve the capability of the SMFIs to be able to optimize the potential they have to improve sustainable competitiveness.

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