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Mapping of Processed Food Product Innovation on Small and Medium Enterprises in Banten

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Abstract - **The purpose of this study is to create a mapping of small and medium enterprises (SMEs) based on their internal innovation and external conditions. The model used for mapping is Quantified-SWOT analysis by adopting the concept of Multiple-Attribute Decision Making (MADM) to simplify complex problems so analysis can be carried out on several companies simultaneously. This model was tested using case study on 60 SMEs of processed food products in Lebak and Serang District, Banten. Results show that product innovation internal factors (IFE) at the observed SMEs has a value of 2.67 (on 5 scales), and external factors (EFE) that support their development are 2.51 (on 5 scales), which are both values in a weak category. However, the overall position of SMEs in the SWOT matrix coordinate is [0.122; -0.288] which located in quadrant III. It can be interpreted that SMEs are still in a weak condition and require diversification strategies. This study also provides several recommendations to improve innovation capabilities both internally and externally. Based on Weighted Value Analysis, the priority recommendations are in improving on internal side of SMEs, which are production process innovation and increasing access to the internet, while from the external side (for the government) priority recommendations are developing a market information system for SMEs, and lowering loan interest rate policy to be more pro-SMEs-oriented.**

Keywords: SME's Mapping, Quantified-SWOT Analysis, Multiple-Attribute Decision Making, SWOT Matrix, Internal Factor Evaluation, External Factor Evaluation

I. INTRODUCTION

Innovations have been widely discussed in various scientific and technical literature, including in the social and economic sciences. (Godin, 2008) concludes that the history of genealogy is innovation through three developmental concepts namely imitation → invention → innovation. So, in this considerate, innovation is seen as the last series of processes of forming, discovering and developing values into modern scientific practices. Innovation in management science described as a managerial process, in accordance with the definition of innovation from (Baregheh, Sambrook, & Rowley, 2009) which states that "Innovation is the multi-stage process in which organizations are transformed into new products, services or processes in order to advance, compete and differentiate them as successfully in their marketplace." Similarly, (Varis & Littunen, 2010) divides innovation into two parts, first, innovation refers to the object of change, namely: product innovation, process innovation, market innovation, and organizational innovation. Second, innovation is based on the level of change, namely complete (radical) novelty and or significant improvement.

Ul Hassan, Shaukat, Nawaz, and Naz (2013) emphasized the importance of product innovation as one of the key factors of organizational success and an important strategy for increasing market share and business performance. Product innovation is an effort carried out by the organization in developing a completely new infrastructure or in the form of significant improvements from existing products. This can be related to changes in the functional characteristics of the product, technical specifications, components, friendliness in use or other functional characteristics (OECD, 2005).

Product innovation is determined by two main factors, namely internal factors, and external factors. Internal factors can be in the form of competency-derived capabilities of the company, firm's technological competences, in-house R & D (Vega-Jurado, Gutiérrez-Gracia, Fernández-de-Lucio, & Manjarrés-Henríquez, 2008), learning by doing, and experimentation on purpose. On the other hand, product innovation can also be determined by external factors such as suppliers, buyers, and government policies (Geenhuizen & Indarti, 2005). A strong combination of these two factors has been proven to improve and accelerate the process of innovation in the company (Katz, du Preez, & Louw, 2016; Ozkaya, 2011; Vega-Jurado et al., 2008).

Product innovation carried out by a company must be based on market developments, including for SMEs. Many studies have proven that SMEs are more capable and easier to innovate radically than larger companies (Geenhuizen & Indarti, 2005; Kanter, 1985; Myers, Oke, & Burke, 2007; Nassimbeni, 2001; Soto-Acosta, Popa, & Palacios-Marqués, 2016) so that SMEs are considered to be more preferable in facing market dynamics.

In Indonesia, SMEs are one of the most important pillars in the national economy, SMEs in number is more than 26 million or 90% of the total business units (BPS, 2016)[1]. If regard in numbers, the growth in the SMEs sector in Indonesia is expected to accelerate macroeconomic growth. Especially in Banten Province, there were more than 477 thousand small and medium-sized business units, and hiring 887 thousand workers, so, that SMEs expect could become the driving force economic growth in Banten Province.

Given the important role of SMEs in economic and community development, systematic efforts are needed to strengthen and develop SMEs. Therefore, it is hoped that this research can be a reference in determining policies aimed at developing SMEs, especially in Banten province.

Development policies of SMEs in Indonesia, regulated on State Law (undang-undang) number 20 of 2008 about Micro, Small-scale Enterprises and Medium-sized Enterprises (MSMEs), states that MSMEs must be organized and supported in a comprehensive, optimal, and sustainable manner through the development of a conducive climate, provision of business opportunities, protection and business development to widest possible extent. So its clear, position of SMEs in Indonesia has a strategic position in realizing economic growth, equity and increasing people's income, job creation, and poverty alleviation. In addition, the Indonesian government has constituted regulation number 17 of 2013 about Micro, Small Business and Medium Enterprises (MSMEs) as a cornerstone in realizing and optimizing the role of MSMEs in building the national economy.

Scrutinize of SMEs role in the economy and community development, it is needed systematic efforts to strengthen and develop SMEs, therefore, this research expected to be a reference in determining policies intended to developing SMEs, especially in Banten province.

II. LITERATURE REVIEW

Resource-based Theory

Barney (1991) defines resources as all assets, organizational capabilities or processes, company attributes, information, knowledge, and others, which can be controlled by the company and can be used to achieve its strategic objectives effectively and efficiently. The Resource-based theory states that resources will be very heterogeneous between companies and not easy to be transferred to other (resource immobility), heterogeneity and immobility of these assets that are able to create competitive advantages for companies in the industry. This explains why the resources that have been owned and developed will be more dominant or advance than the types of resources that are obtained openly.

Internally, every company has unique competencies compared to other companies. The main factor determines a company's competitive position is a process of formulating

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[1] http://se2016.bps.go.id/Lanjutan/index.php/site/tabel?tid=5&wid=0#, access 6/10/2018

strategies based on company's internal capabilities (Lidija & Robert, 2014). For SMEs, product innovations originating from their internal capabilities will be more effective and efficient.

Innovation among SMEs

Barnet (1953) simply defines innovation as the introduction of something new. Several years later, (Thompson, 1965) provided a broader definition of innovation that was interpreted as the renewal, acceptance, and implementation of new ideas, new processes, new goods and services. In the era of the 90's the definition of innovation was broadened, as stated by (Amabile, Contti, Coon, Lazenby, & Herron, 1996) which defines innovation as the successful implementation of creative ideas in organizations. A more comprehensive definition is conveyed by (West & Farr, 1990), which defines innovation as an attempt to convey something new in a planned manner, the application of new products, processes, procedures, or new ideas designed to provide benefits for individuals, groups, organizations or wider society.

In the management science literature, innovation interpreted as a multidimensional concept. If it is associated with the growth of the company, it will find various dimensions of innovation in the form of product innovation, process, service, market, logistics and organizational innovations (Geenhuizen & Indarti, 2005; Soto-Acosta et al., 2016). Companies such as SMEs can not only implement one form of innovation but can implement several innovations at once. The success of SMEs in conducting innovation has been proven in several research (Anderson, Potočnik, & Zhou, 2014; Ghazalian & Fakih, 2017; Ozkaya, 2011; Soto-Acosta et al., 2016; Walker, 2014)

III. METHODOLOGY

The object of this research is SMEs of processed food products in Lebak and Serang District, Banten. Data collection was carried out in a survey with random sampling. The level of analysis is individual, this level of analysis should be taken within the present review (ter Haar, 2018). From 81 questionnaires was distributed, there were 21 questionnaires that were not included in analysis, this because the questionnaire was not returned and/or incomplete. Therefore, only 60 survey results were included in further analysis.

The model used for data analysis is Quantified-SWOT and Multi-Attribute Decision Making (MADM) to create measurement indicators hierarchically (Argawal, Grassl, & Pahl, 2012; Chang & Huang, 2006; GÜRel, 2017). Using MADM, 34 indicators were obtained from four main factors in SWOT analysis, each indicator is weighted based on the importance level, see table I & II. To evaluate internal and external conditions, each indicator is given a scale of 5 and then we use a value 2.6 as a cut-off, it is to determine

perceptual position of each indicator on SWOT category. Therefore, if perception value (mean of assessment score) is less than (<) 2.6 then the indicator is considered as weakness or threat. Conversely, if perception value is more than (>) 2.6 then the indicator is considered as strength or opportunity.

Quantified-SWOT Analysis chose as a model to map the condition of SMEs in Banten, mapping each SMEs position in the industry, identify potential SMEs, eliminate threats and concludes by delivering an internal strategy to compete and or suggest a government policy externally. The research flow is as follows:
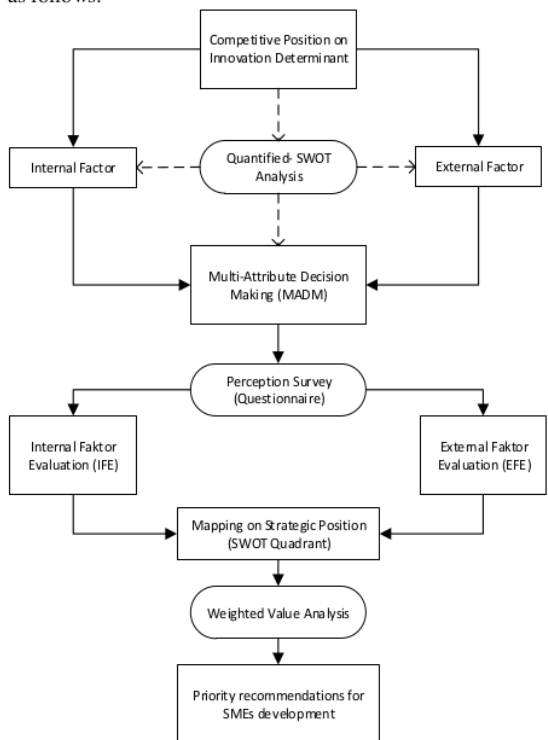

Fig. 1 Mapping Model of Processed Product Innovation SMEs in Banten Province.

IV. RESULT AND DISCUSSION

Data analysis was performed on two main factors that construct the innovation, the internal factors, and external factors. Measurements were made using 16 internal indicators and 18 external indicators perceptually.

A. Internal Factor Assessments Score

Internal factor analysis was carried out using 16 indicators, from the results of the analysis found 9 indicators perceived as a source of strength for SMEs while 7 other indicators are still considered a source of weakness. The analysis results are presented in the following table I:

TABLE I
INTERNAL FACTOR ASSESSMENTS SCORE

	Indicator	Importance Weight (W)	Assessments Score (a)	SWOT Category (cut off 2,6)
D1	Row Material diversifications	0,055	1,62	Weakness
D2	Innovation on Production Process	0,095	2,03	Weakness
D3	Product Development	0,098	3,05	Strength
D4	Packaging	0,062	2,60	Weakness
D5	Innovation on Marketing	0,054	3,55	Strength
D6	End Product Distribution	0,045	2,58	Weakness
D7	Payment/sales transaction mechanism	0,035	3,05	Strength
E1	Ability to use Internet	0,062	3,03	Strength
E2	Use of e-Commers facilities	0,045	2,45	Weakness
E3	Access to the Internet	0,075	2,47	Weakness
E4	Ability to use Computer	0,045	2,80	Strength
F1	Row material procurement	0,065	2,88	Strength
F2	Row Material Availability	0,075	2,63	Strength
F3	Supply Shortage	0,062	2,57	Weakness
F4	Row Material channel	0,062	3,07	Strength
F5	Stability of raw material prices	0,065	3,00	Strength

*Assessment Score (a) = mean each indicator
**If (a) > 2,6 = Strength; if (a) < 2,6 = Weakness

Assessment results show that SMEs in Banten has several sources of strength to develop and innovate, for example by conducting marketing innovations (3.55), develop a raw material supply channel (3.07), product development (3.05), develop payment systems or banking-based transactions or other services (3,05), has the ability to use the internet (3.03), stability in raw material prices (3.00), good raw material procurement (2.88), and managing the availability of raw materials (2,63). While several other indicators are still in the weak category, particularly in diversifying raw materials (1.62), innovation in the production process (2.03), the use of e-commerce (2.45), access to the Internet (2.47), raw materials shortage (2.57), and packaging (2.60).

B. External Factor Assessments Score

External factor analysis was carried out using 18 indicators, from that results of the analysis showed 5 indicators perceived as a source of opportunity for SMEs while 12 other indicators were still considered to be a source of weakness. Analysis results are presented in the following table II:

TABLE II
EXTERNAL FACTOR ASSESSMENTS SCORE

	Indicator	Importance Weight (W)	Assessments Score (a)	SWOT Category (cut off 2,6)
A1	Infrastructure and Transportation	0,062	2,95	Opportunity
A3	Electricity and Clean Water	0,035	3,70	Opportunity
A5	Telecommunications Network	0,096	3,10	Opportunity
A6	Supporting infrastructure for business place	0,015	2,27	Threat
B1	Assistance to capital access	0,062	1,62	Threat
B2	Integrated promotion amenities from government	0,093	2,23	Threat
B3	Ease of business administration	0,042	3,33	Opportunity
B5	Interest Rate Policies for Small Business	0,085	2,52	Threat
B6	Other financial sector policies	0,035	1,60	Threat
B7	Market Information System	0,089	3,00	Threat
B8	Business licensing mechanism	0,032	3,72	Opportunity
B10	Business development assistance	0,083	2,25	Threat
B11	IPR assistance	0,035	2,12	Threat
B12	raw material amenity from the government	0,025	2,27	Threat
C1	Access to bank loan	0,072	2,02	Threat
C2	Access to non-banking loan	0,035	2,50	Threat
C4	Loan term of condition for small business	0,042	1,77	Threat
C5	Additional source of working capital	0,062	2,33	Threat

Assessment Score (a) = mean each indicator
**If (a) > 2,6 = Opportunity; if (a) < 2,6 = Threat*

Assessment results of external factors showed SMEs in Banten still need to develop, because there are still many indicators that are in the threat category, for example, government financial policies (1.62), assistance to increase capital access (1.62) and loan requirements for small businesses (1.77) is still considered burdensome to SMEs. In addition, there are several indicators of a good perceived, and categorized as opportunities for SME development, for example, business licensing (3.72) which is considered very

easy, availability of electricity and water for production (3.70), availability of communication networks (3.10), and availability of infrastructure and transportation (2.95) which is good enough.

C. Internal Factor Evaluation

After an assessment of the various internal and external indicators, the next stage is an evaluation based on the weight of each indicator. Evaluation results of the internal condition of SMEs indicate IFE value of 2.695 of a scale of 5 (see Table III). If using a value of 2.6 as a cut-off, then the value of this IFE can be interpreted that in general SMEs processed food products have internal strength to innovate. Nevertheless, this internal strength still needs to be increased to above value 3.6 in order to SMEs of processed food products can compete in the global market

TABLE III
INTERNAL FACTOR ASSESSMENTS SCORE

	Indicators	Index Value (a x W)*
D1	Row Material diversifications	0,089
D2	Innovation on Production Process	0,193
D3	Product Development	0,299
D4	Packaging	0,161
D5	Innovation on Marketing	0,191
D6	End Product Distribution	0,116
D7	Payment/sales transaction mechanism	0,107
E1	Ability to use Internet	0,189
E2	Use of e-Commerce facilities	0,110
E3	Access to the Internet	0,185
E4	Ability to use Computer	0,126
F1	Row material procurement	0,187
F2	Row Material Availability	0,197
F3	Supply Shortage	0,159
F4	Row Material channel	0,190
F5	Stability of raw material prices	0,195
	Internal Factor Evaluation (IFE) Index**	**2,695**

Index Value = Assessment Score (a) x Importance Weight (W)
***IFE Index = $\sum$ (a x w); from 5 scale*

D. External Factor Evaluation Score

Development of SMEs is not only determined by internal factors but also highly dependent on external conditions. Results of evaluation on external factors indicate an EFE value of 2.5268 (see table IV), this value can be interpreted that the external conditions of SMEs are imperfect to encourage product development and innovation for SMEs. The EFE value considered ideal for SME development is above 3.6.

TABLE IV
EXTERNAL FACTOR ASSESSMENTS SCORE

|	Indicators	Index Value $(a \times w)^*$
A1	Infrastructure and Transportation	0,183
A3	Electricity and Clean Water	0,129
A5	Telecommunications Network	0,298
A6	Supporting infrastructure for business place	0,034
B1	Assistance to capital access	0,100
B2	Integrated promotion amenities from government	0,208
B3	Ease of business administration	0,140
B5	Interest Rate Policies for Small Business	0,214
B6	Other financial sector policies	0,056
B7	Market Information System	0,267
B8	Business licensing mechanism	0,119
B10	Business development assistance	0,186
B11	IPR assistance	0,074
B12	raw material amenity from the government	0,057
C1	Access to bank loan	0,145
C2	Access to non-banking loan	0,087
C4	Loan term of condition for small business	0,074
C5	Additional source of working capital	0,145
	External Factor Evaluation (EFE) Index*	**2,5168**

*Index Value = Assessment Score (a) x Importance Weight (W)
**EFE Index = ∑ (a x w); from 5 scale

Referring to the index value of each indicator, the first order indicator is telecommunications network (0.298), and the next is market information system (0.267), interest rate policy for small business (0.214), and integrated promotion amenities from the government (0.208). This can be interpreted that indicators above are the main determinant on improving SMEs innovation nowadays.

E. Mapping on SWOT Diagram

SME development process certainly cannot be sporadic but must do a structured and based on objective conditions in individual SMEs. Therefore, mapping needs to be done to facilitate the development process in accordance with the objective conditions of each SME.

Mapping results showed that more than 45% of SMEs that are observed have internal strength for innovation and business development. But overall the potential for SME development is still in quadrant III, which means that most SMEs have the power to innovate and develop but the majority still face constraints from the external side. Following are the results of mapping SMEs of processed food products in Banten province:
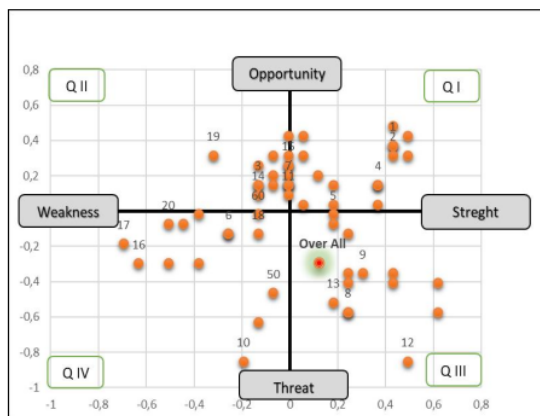
*Q I = 25 SMEs (25%); Q II = 17 SMEs (28%); Q III = 14 SMEs (23,3%); Q IV = 14 SMEs (23,3%)
**Over All = Q III

Note:
*Coordinate on X axis (Internal factor) = ∑ (strength – weakness)
**Coordinate on Y axis (External factor) = ∑ (Opportunity – Threat)

Fig. 2 Mapping Model of Processed Food Product Innovation SMEs in Banten Province.

Quadrant I - a condition was very potential to be developed. In this position, there are 15 or around 25% from SMEs were observed. SMEs in this position requires the development of an aggressive strategy or growth-oriented strategy. In general, SMEs in this position are SMEs that have strong bargaining power in the market so they are able to control market conditions, this is a determining factor of competitiveness.

Quadrant II - SMEs in this position has the advantage of external conditions or in other words have a big enough opportunity to continue to grow. However, from the internal side, it is still very weak so that the potential or opportunities that are likely to be wasted. Based on analysis, as many as 17 or 28% from SMEs was observed, were in this position. They require an internal partnership strategy or turnaround-style strategy that prioritizes internal development to capture more opportunities.

Quadrant III - SMEs in this position is the SMEs that have a good internal strength and has the potential to be developed, but they faced external threats were disrupt growth. As many as 14 or 23% from SMEs observed, was in this position. They require a diversification strategy, which uses internal strength to catch more opportunity thus can reduce the impact of existing threats.

Quadrant IV - in this position, SMEs will face many obstacles in their development process. As many as 14 or 23% from SMEs observed, were in this position. They highly vulnerable to external threats. Their internal weakness makes they are not good enough to take advantage of existing opportunities, and many threats that cannot be eliminated that causes SMEs in this position have no bargaining power in the market.

F. SMEs Priority Improvement Index

To improve the condition and position of SMEs to be more innovative and competitive, a priority scale is needed by decision makers. This research uses Weighted Value Analysis to produces a priority index based on each factor importance level, thus this analysis obtains a sequence of indicators that can be implemented on SMEs development. Improvement priorities are presented in the following Table V:

TABLE V
Priority Improvement Index

External Factor Priority Improvement

	Indicator	Priority Index (P index)
B7	Market Information System	0,0445
B5	Interest Rate Policies for Small Business	0,0396
B2	Integrated promotion amenities from government	0,0391
B10	Business development assistance	0,0349
C5	Additional source of working capital	0,0285
C1	Access to bank loan	0,0281
C2	Access to non-banking loan	0,0175
B1	Assistance to capital access	0,0167
C4	Loan term of condition for small business	0,0164
B11	IPR assistance	0,0137
B12	raw material amenity from the government	0,0110
B6	Other financial sector policies	0,0091
A6	Supporting infrastructure for business place	0,0066

Internal Factor Priority Improvement

	Indicator	Priority Index (P index)
D2	Innovation on Production Process	0,0380
E3	Access to the Internet	0,0338
F3	Supply Shortage	0,0304
E2	Use of e-Commerce facilities	0,0198
D1	Row Material diversifications	0,0160

Priority Index (sorted) = Importance Weight (W) x Normalize Assesment Score (a)

Referring to results of the analysis, there are three external factors priority for SMEs improvements, which consist of: First, build a market information system for SMEs, this system will increase opportunities for SMEs to bring their products closer to the market and improve SMEs to collect feedback from their customers. If market has access to SMEs, the customer knowledge sharing process will be created and accelerate the innovation process based on consumer needs. Second, improving the interest rate policy for small businesses. This priority of improvement will accelerate growth and become a foundation for consumer-based

innovation which is aligned with first priority decision. Third, the government is expected to be more aggressive and more proactive in providing promotional and endorse facilities to all existing SMEs. These three priorities are a platform for SMEs to be closer to consumers, introduce their products, strengthen working capital and accelerate the innovation process.

On the internal side, the improvement and development priorities consist: first, improve and innovate the production process, by strengthening this, SMEs will get the ability to respond to the market quickly and effectively. Second, increasing access to the internet. This internal capability will have a positive impact if SMEs use the internet for business development activities. Third, internal improvement priorities that must be done by SMEs is to manage the supply of raw materials for production. If raw material procurement and inventory managed properly, then the production process will run effectively and efficiently which will drive the innovation process better.

IV. CONCLUSION

Economic growth in most developing countries was supported by their SMEs development. In Indonesia, with a large number of SMEs, the improvement of SME performance will certainly contribute to national macroeconomic growth. Processed food industry based on local resources is a sector that must considerably develop because it is sustainable and has a significant multiplier effect on local economic growth.

Successful SMEs development is not only determined by internal factors but also need to be supported by external factors improvements, joint efforts between the government and entrepreneurs are needed in order to create a business climate that encourages innovation to increase their competitiveness.

Production technology advancement, openness to information and increasing use of the internet as a marketing tool has been encouraging SMEs to transform into innovative business units. For entrepreneurs, this must be seen as an opportunity to carry out various innovations based on customer needs rather than threats. for the government, it is expected to establish progressive policies to accelerate the development of SMEs in a structured manner in accordance with their objective conditions

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