

# *Developing Synergy of Triple Helix: Mapping Product Basic Quality and Product Packaging Safety for SMEs Producing Fish-Based Products*

*Jun Surjanti*  
Universitas Negeri Surabaya  
[junsurjanti@unesa.ac.id](mailto:junsurjanti@unesa.ac.id)

*Rosa Patrifia Juniarti*  
Universitas Negeri Surabaya  
[rosajuniarti@unesa.ac.id](mailto:rosajuniarti@unesa.ac.id)

*Dian Anita Nuswantara*  
Universitas Negeri Surabaya  
[diananita@unesa.ac.id](mailto:diananita@unesa.ac.id)

*Dewi Rahayu Mende*  
Universitas Negeri Surabaya

*Heni Musfidah*  
SMAN V Surabaya

**Abstract**—To objectify the Indonesia economic sector acceleration program, government can employ Triple Helix Synergy to develop SMEs fish-based foods through cooperation, guidance, and supports. Up to these days, SMEs' problems have generally been in product basic quality and product packaging safety. This study is descriptive qualitative percentage and aims to map the problems as product basic quality and product packaging safety in which can be used to determine policy to implement triple helix, referring to University for Science (S), Industry for Business (B), and Government (G). Data were collected by collecting fish-based products from market/sellers. The products were categorized into types: dried products, frozen products, cooked products, fried products, and other processed products. The products were analyzed for their quality and packaging safety and scaled into good and poor. The subjects were 51 SMEs who produced 52 products. The results showed that the triple helix (cooperation, guidance, and support) was best to be implemented to SMEs who produced poor products for both basic quality and packaging safety. SMEs that needed to improve their basic quality were ones producing frozen and fried products and SMEs that needed to improve their packaging safety were ones producing dried and frozen products

**Keywords**—*Developing synergy, Fish-based foods SMEs, Packaging safety, Product basic quality, Triple Helix*

## I. INTRODUCTION

In Indonesia, SMEs with fish-based food products continually are developed, as it has vast ocean with abundant fish, so to develop national economy, government and other elements need to give more attention in this area. According to Ozols et al, modern economy needs continually developed through unended innovation [1]. Grant, Meyer, & Kuusisto, (2014) stated that most of activities are supported by interest and user's prerequisite (industry) and it can be done by increasing knowledge and generating consensus and innovation through Triple Helix. According to Hughes,

innovation can be advanced through universities, industries, and government collaboration [3].

To accelerate economic growth, Indonesian government created grand plan named Activities in Masterplan for Acceleration and Expansion of Indonesia's Economic Development. One among many designs generated is SMEs empowerment for fish-based. Previous studies indicated that Triple Helix was able to develop SMEs. One of studies mentioned that triple helix was possible to be a model for further economy-based development [4]. Many models can be used to improve the synergy in cooperation, guidance and support in triple helix, one of them is Balanced Model (S-G-B). Hence, to obtain the best result in implementing it, drawing map, especially to categorize SMEs with fish-based products as the business element (B) in triple helix is needed, as it is to avoid inaccuracy of triple helix beneficiary. According to Olmos and Castillo clear, qualified, and trusted approach was needed to develop business and all interested parties, such as industry, government, and academics were responsible in creating policy [5]. During years, SMEs have always faced with problems especially in quality and control management in production process. This study was specially conducted referring to related problems by drawing map to categorize SMEs. By categorizing the SMEs, appropriate treatment whether cooperation, guidance, or support can be given fairly. This mapping is based on the basic quality and packaging safety for fish-based products.

The objects of the study were SMEs producing fish-based products in Lamongan, East Java. Lamongan is one of towns in north coast area of East Java which is very famous for its seafood. As reported by East Java Department of Revenue, 72000-ton fish in a year had been caught by fishermen during 2012, despite fishery cultivations reaching almost 37000-ton fish, in a year (<http://bappeda.jatimprov.go.id/>). This is one of reasons why this town has high potential to be developed, especially related fish-based products.

## II. LITERATURE REVIEW

### Triple Helix Model

Erosa (2012) mentioned that applying model to boost the interaction among government, academics, and business actors needed not only model definition but also program and funds. Triple Helix concept as innovation strategy is based on participation and collaboration of three entities with different purposes, yet those draw into one purpose aligning the differences. Ivanova & Leydesdorff (2014) explained that triple helix includes of institutions playing roles as university for the science, industry for the business, and government for the governance. G. F. Khan & Park (2013) mentioned that triple helix understands the relationship pattern among university, industry, and government. However, there are effects that ought to be carefully analyzed by government before making policies, as some unexpected occurrence would be emerged resulted from those policies (Lee & Kim, 2016).

### Mapping Product Basic Quality

McKenzie, Paquet, Marie-Jeanne, Dubé, & Ferland (2010) stated that every product must have alignment in color, cooked (meat), hue, material content (according to particle size). Furthermore, Anđjelković, Gajdošik, Gašo-Sokač, Martinović, & Josić (2017) highlighted on production process. Kuo, Yuo, & Lu (2014) divided quality into 15 characters: natural ingredients in products, product taste and flavour, delectable products, nutrient content in products, product with safety test, product with effect test, product with effectivity indication, government certified products, products with affordable price, product recommended by experts, products with advertisement, sale-convenient products, products with after-sales, well-packaged products, products with production origin. The acceptance of alternative foods indicates increasing interest in producing, processing, and selling food. As mentioned by [13] consumers are attracted by foods that carry out political values and ethics which imply on production, sales, and development of sustainable food system. Analyzing product basic quality is based on: for dried food, especially crackers, is on the crispness; for frozen food is on the tenderness; for cooked food is on crispness; and for other other processed food is on the taste or flavour.

This study collected data based on referred condition from SMEs; afterward data collected were processed and analyzed. The result was used to draw the map which supposedly develop triple helix method to increase economic state of SMEs, especially those who produce fish-based products.

Implementing triple helix in the selected SMEs, experts who conducted the guidance and evaluation were from Universitas Negeri Surabaya and represented S (Science) elements in triple helix. Moreover, the governance and evaluation were conducted by government represented by Department of Cooperation (KUD).

Before implementing triple helix, SMEs products were evaluated based on basic quality of the raw

materials/ingredients standards and categorized them into good or poor, in which followed by given triple helix. After it was given, the map was drawn as the results of the inclination of the SMEs.

### Mapping Product Packaging Safety

Presswire & Jan (2012) based on respondent from food and beverage industries mentioned the related factors in product packaging safety as: prerequisite private label agreement, demand for private label, benefits in manufacturing private label, main market for private label growths, new trends in private label manufactures, expected changes in private label sales, packaging materials, packaging techniques for food protection, expenditure on new packaging solutions, main trends in packaging and its driver, key demand for environmentally friendly packaging, and materials used for sustainable packaging. To limitate the range of study, this study focused on the packaging quality from its design that meet the standard stated by consumers, including: (a) name, (b) ingredients, (c) registration number, (d) net weight, (e) expired date, and (f) producer or manufacturer name and address.

As conducted in mapping product basic quality, drawing a map for product packaging safety also followed same procedures. Finally, the map was drawn after all the data completed and analyzed.

## III. RESEARCH METHOD

The study was descriptive qualitative with percentage research. Data were collected by collecting samples from SMEs that produced fish-based. The samples were analyzed and categorized into 5, namely: dried food, frozen food, cooked food, fried food, and other processed foods. Those samples were scaled into good and poor based on basic quality and packaging safety. The subjects were 51 SMEs that produced 52 types of fish-based products. The 51 selected SMEs were taken as voluntary participants after joining seminar of SMEs development and those were met the requirements set by researchers to carry out triple helix method

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## IV. RESULT AND DISCUSSION

The data analyzed were carried from S (Science) represented by Unesa as university with credibility in

research; G (Government) was represented by Department of Agriculture, Department of Fishery, Department of Health, Department of Cooperation and Industry Lamongan, KUD Mina Tani, and PT Ajinomoto; and the B (Business) was 51 SMEs characterized on 78% women actors, 50% SMEs with less than 5 years experienced indicating that SMEs were categorized as developing or not success yet, 55% actors graduating from senior high school, 6% SMEs producing crackers products, 88% with frozen food (fishball, fishball tofu, fish nugget, fish sausages, fish flour, and fish fries), 60% SMEs producing fried food (fish chips and abon), and less than 1% for other processed food (sambal).

As selected SMEs represented of Business (B) in triple helix, two others element of triple helix, S (Science) and G (Government) were needed in order to implement this method. The S element was Unesa as university which submerges in the conducting research and developing knowledge and technology. Unesa played a role in giving evaluation as well as guidance for the best method to increase the quality of products. While the G element representing government in giving evaluation and setting the policy which affect to the economic value of the products.

**Mapping Product Basic Quality and Product Packaging Safety of SMEs Fish-based Foods**

51 SMEs producing 52 fish-based products in this study became the objects of the study. Based on types of products produced, they were divided into 5, as dried food, frozen food, cooked food, fried food, and other processed food. From them, they study scaled the products into good and poor based on their basic quality and packaging safety. Table 1 shows the results for each category mentioned.

Table 1. Product Basic Quality and Packaging Safety of SMEs Fish-based Foods

No	Product	Variants	Product Basic Quality				Product Packaging Safety				Notes
			Good (G)		Poor (P)		Good (G)		Poor (P)		
			N	%	N	%	N	%	N	%	
1.	Dried	7	16	4	1	6	6	35	1	65	Crackers
2.	Frozen	8	12	7	88	4	50	5	50		Fishball, fishball-tofu, fish nugget, fish sausage, fish flour, and fried-fish
3.	Cooked	8	8	100	0	0	5	62.5	3	37.5	crackers, rengginang, amplang, and rempeyek
4.	Fried	10	4	40	6	60	6	60	4	40	Fish chips and abon
5.	Others	2	2	100	0	0	2	100	0	0	Sambal

Based on product basic quality, table 1 shows that: 100% was scaled from cooked and other processed foods, categorized good and 94 % was scaled from dried food, categorized good. Meanwhile, 60% was scaled from fried food, categorized poor and 88% was scaled from frozen food, categorized poor.

From product packaging safety, table 1 shows that: 100% was scaled from other processed food, categorized good; 62.5% was scaled from cooked food, categorized good; and 60% was scaled from fried food, categorized good as well. Meanwhile, dried food and frozen food were categorized poor.

After categorizing and scaling, triple helix was given in order to find the effect of its treatment for each category. That categorizing was necessary before giving triple helix as treatment, because it defined the lead in this study. The result showed different effects of triple helix for each category. From then on, the map for the prerequisite conditions in implementing triple helix was able to be drawn. One of data was taken from SMEs producing Ikan Sunduk chips “Giono”. Before given triple helix, this SME considered as small business with low ability to develop further. Yet, after given triple helix, it developed quite significantly and became one of the best SMEs in Lamongan and and other areas in Indonesia as well (reported in Masterplan for Acceleration and Expansion of Indonesia's Economic Development report year 2015-2017).



Figure 1. “Giono” products

**V. CONCLUSION**

In conclusion, triple helix was best given to SMEs producing frozen food and fried food based on product basic quality, and for product packaging safety, triple helix was best given to SMEs producing frozen food and dried food. Along the result, this study was expected to be able to improve SMEs potential especially for SMEs with fish-based products as well as to be implemented to others food-based SMEs.

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**REFERENCES**

- [1] A. Ozols, E. Ozola, and J. Eglītis, "Introduction of Triple Helix Model in Latvia Based on Experience of Sweden, Singapore and South Korea," vol. 43, pp. 58–69, 2012.
- [2] K. Grant, M. Meyer, and J. Kuusisto, "Can processes make relationships work? The Triple Helix between structure and action," *Prometh. (United Kingdom)*, vol. 32, no. 4, pp. 351–368, 2014.
- [3] T. Hughes, "Co-creation: moving towards a framework for creating innovation in the Triple Helix," *Prometh. (United Kingdom)*, vol. 32, no. 4, pp. 337–350, 2014.
- [4] L. Martini, J. H. Tjakraatmadja, Y. Anggoro, A. Pritasari, and L. Hutapea, "Triple Helix Collaboration to Develop a Economic Corridors as Knowledge Hub in Indonesia," *Procedia - Soc. Behav. Sci.*, vol. 52, no. Zain, R., Marchand, C., Sun, J., Nguyen, C. H., Bisagni, E., Garestier, T., H el ene, C. (n.d.). Design of a triple-helix-specific cleaving reagent, 771–777. Verlinde, S., Macharis, C. (2016). Innovation in Urban Freight Transport: The Triple Helix Mode, pp. 130–139, 2012.
- [5] R. Esp ritu-Olmos and M. A. Sastre-Castillo, "Personality traits versus work values: Comparing psychological theories on entrepreneurial intention," *J. Bus. Res.*, vol. 68, no. 7, pp. 1595–1598, 2015.
- [6] V. E. Erosa, "10th Triple Helix Conference 2012 Dealing with cultural issues in the Triple Helix Model implementation : a comparison among Government , University and Business Culture," vol. 52, no. Zain, R., Marchand, C., Sun, J., Nguyen, C. H., Bisagni, E., Garestier, T., H el ene, C. (n.d.). Design of a triple-helix-specific cleaving reagent, 771–777. Verlinde, S., Macharis, C. (2016). Innovation in Urban Freight Transport: The Triple Helix Mode, pp. 25–34, 2012.
- [7] I. A. Ivanova and L. Leydesdorff, "Rotational symmetry and the transformation of innovation systems in a Triple Helix of university–industry–government relations," *Technol. Forecast. Soc. Change*, vol. 86, pp. 143–156, 2014.
- [8] G. F. Khan and H. W. Park, "The e-government research domain: A triple helix network analysis of collaboration at the regional, country, and institutional levels," *Gov. Inf. Q.*, vol. 30, no. Zain, R., Marchand, C., Sun, J., Nguyen, C. H., Bisagni, E., Garestier, T., H el ene, C. (n.d.). Design of a triple-helix-specific cleaving reagent, 771–777. Verlinde, S., Macharis, C. (2016). Innovation in Urban Freight Transport: The Triple Helix Mode, pp. 182–193, 2013.
- [9] Y. H. Lee and Y. Kim, "Analyzing interaction in R&D networks using the Triple Helix method: Evidence from industrial R&D programs in Korean government," *Technol. Forecast. Soc. Change*, vol. 110, pp. 93–105, 2016.
- [10] D. S. A. McKenzie, C. Paquet, K. Marie-Jeanne, L. Dub e, and G. Ferland, "Evaluation of food quality in geriatric institutions," *Can. J. Diet. Pract. Res.*, vol. 71, no. 4, pp. 192–198, 2010.
- [11] U. Andjelkovi c, M.  . Gajdo ik, D. Ga o-Soka c, T. Martinovi c, and D. Josi c, "Foodomics and food safety: Where we are," *Food Technol. Biotechnol.*, vol. 55, no. 3, pp. 290–307, 2017.
- [12] C. M. Kuo, S. H. Yuo, and C. Y. Lu, "Integration of the Kano and QFD model in health food development: Using black beans as examples," *Qual. Quant.*, vol. 48, no. 1, pp. 225–242, 2014.
- [13] P. H. Howard and P. Allen, "Beyond organic and fair trade? An analysis of ecolabel preferences in the United States," *Rural Sociol.*, vol. 75, no. 2, pp. 244–269, 2010.
- [14] M. Presswire and C. C. Jan, "Research and Markets : Global Food and Beverage Survey 2012 : Private Label Manufacturing and Innovative Packaging , Trends and Opportunities , Budget Allocation and Key Growth Markets," pp. 2–4, 2012.