Research Article

Developing Triple Helix Model for SMEs with Fish-Based Products

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Abstract: SMEs with fish-based products support Indonesia's role in the world's food supply. Triple Helix (TH) possibly helps in succeeeding the MP3EI program. This study aims to determine triple helix model applied in SMEs with fish-based products, as there is no appropriate model existed in Indonesia. This study used qualitative approach with respondents: 2 people representing SMEs with fish-based products, 6 people representing Universitas Negeri Surabaya, and 12 people representing government. Data were collected through FGD techniques and analyzed using Miles and Hubberman qualitative data techniques. Results indicated that the most appropriate TH model applied in SMEs with fish-based products is Balanced Model S-G-B with three actors, namely: Science (S), Government (G), and Business (B), and is explained as: 1) S and G actors provide assistances and supports to B actor; 2) G actor strengthens S actor, in which both possibly change its roles and create role-changing area; and (3) B actor accepts assistance and support from S and G actors and provides informations to develop new technology and make new policy for them. Implementing TH needs to be carried out not only one-way but also continuously to obtain optimal results

Keywords: Role-Changing Area, SMEs with Fish-Based Products, S-G-B, Triple Helix

INTRODUCTION

As determined in the Masterplan for Acceleration and Expansion of Indonesia's Economic Development (MP3EI), one of the programs prioritized by the Indonesian government is SMEs development, one of which is in the fishery sectors. To promote economic development in fishery sectors, Indonesian Government established program focusing on SMEs with fish-based products through "Promoting Investment and Establishing Infrastructure Development to Accelerate Qualified Economic Growth" program. Many elements need to collaborate to implement the policies as stated by Sunitiyoso (2012) that formulating policy to overcome national issues needs collaboration and interaction from all related parties.

SMEs in Indonesia significantly contribute to the national economy (Herliana (2015). However, the limited resources of SMEs, especially for SMEs with fish-based products caused the economic values of the product greatly affected. Surjanti and Nuswantara (2016) mentioned that SMEs' problems came from natural constraints (raw fish), production continuity, capital, marketing, and business transparency. SMEs having relatively limited knowledge have experienced many problems for its

survival. Formal organizations involvement, such as university possibly induces innovation as it provides knowledge and appropriate technologies. Thus, whenever collaboration and networking are set, the growth will be surely guaranteed and TH is expected to develop its synergy (Abdulai and Thomas, 2015).

Increasing potential in fishery sector is an overview not only in Indonesia but also in the world. Many Indonesian fishery products have been exported to many countries, such as Vietnam, Thailand, Singapore, Japan, South Korea, Taiwan, China, Oman, England, German, United States, Canada, etc. (ISW, 6 April 2017). As reported by the Ministry of Fishery and Ocean of the Republic of Indonesia, in 2016 the export value in fishery sector was 1,075,427 ton and it was higher than import value which was 277,472 ton.

During years, although government and universities have already supported and assisted SMEs, both mostly have worked independently without any direct collaboration and interaction. However, to successfully develop SMEs, collaboration and interaction of both are extremely required as prerequisite conditions to develop innovative process as mentioned by Abdulai and Thomas (2015). Triple Helix (TH) is one of models that

possibly elaborate the direct collaboration and interaction among university, government, and SMEs (Suntiyoso, 2012 and Nakwa, 2012). Nevertheless, to obtain the result optimally, appropriate TH model must be formulated, as it cannot be generalized for all SMEs. Proved by the study conducted by Lee and Kim (2016), they found that in Korea, TH especially for R & D networks only temporarily succeeded in the early years of its establishment and failed to improve the further synergy.

Ivanova and Leydesdorff (2014) explained that Triple Helix model is generated from three actors, namely Science (S), Government (G), and Business (B) which each of them has each role and is possibly to change its roles. According to Herlina and Etzkowits, developing and implementing TH in globalization era should be led to innovation regionally through SMEs (Herliana, 2014; and Etzkowitz, 2011). Etzkowitz (2013) mentioned that science-based innovation is one of virtual policies generated from TH as synthesis of various initiatives undertaken by many actors. Therefore, no absolute role of each actor is implemented for every condition.

This study analyzed the appropriate TH model implemented in SMEs with fish-based products especially on the relationship of three key actors, Science (S), Governance (G), and Business (B) and the roles of each actor.

Literature review

Prior Researches

By examining the intersection model on Rotational symmetry and the transformation of innovation systems for university-industry-government relations in Triple Helix, it was found that TH estimatedly measured using mathematical models, and its system had self-interaction (Ivanova and Leydesdorff, 2014). Innovation should occur consistently and its system should consist of fractal structure. Thus, in different scale it spread in Cartesian space with dimensions of (S), Science, (B) Business, and (G) Government. Khan and Park (2013) used the power of Social Network Analysis (SNA) and Triple Helix (TH) indicators to analyze the hidden characteristics and structures of the E-Government domain by focusing on network collaboration across regions, countries, and institutions and the relationships of university-industry-government (UIG) bilaterally and trilaterally. Using hybrid method, it might be possible to understand certain natures and structures in the EG domain that was hidden while using traditional SRL methods.

A study conducted in the U.S. proved that for SMEs green products, Triple Helix successfully provided total positive marginal effects in company growth (Li et al., 2016). Kim and Lee (2016) mentioned that network-related competences and interaction among helixes were important for the system to function properly. They also argued that the temporary success in the early years of policy establishment and the failure in developing further synergy for R & D networks by the Korean government were due to the negligence of possible effects on the new policies before its implementation, the regular monitor for its feedback, and the lack of encouragement and control on the implementation of TH model.

Inovation Model of Triple Helix

Ivanova & Leydesdorff (2014) described the helix model consisting three actors, namely: University (Science), Industry (Business), and Government (Government). University, despite its functions as education and research institutions, functions as business actor as well. It is by creating small-scaled innovative companies and becoming stakeholders in socio-economic development. Government functions not only as policy-makers but also as supporter to provide assistance to university by research funding and SMEs by giving capital loans. Based on the interactions for its functions, Triple Helix model was formulated. In addition, the model not only promoted policy establishment system but also proved the importance of having a holistic or systemic approach to formulate policies to overcome the complexity of national issues.

Amaral *et al*, (2017) defined helix according to the relationship of university (U) – industry (I) – government (G) into three indicators, as: 1) in U–I relationship, G dominated the relationship considering to strategies and decision-making processes; 2) U, I, and G play their roles independently (laissez-faire), yet there were definite boundaries and low interaction; and 3) there was an overlap among each factor, in which the interrelationships intensified in quantity, quality and complexity and those created hybrid organizations. From, the above explanation, the U–I–G linkages are possibly formed into several configurations or stages. Surjanti (2017) argued that to determine innovation factors, triple helix was appropriate to design strategy to develop and improve products quality or industry.

Research method

This study was qualitative study to understand the linkages among the actors, University (S-Science),

Industry (B-Business), and Government (G). There were three stages to conduct this study; first was to collect data using FDG method from all actors with 20 respondents; second was to determine the relationship among three actors (S-G-B); and third was to draw conclusion. This study analyzed using descriptive statistical analysis techniques and Mile and Hubberman qualitative analysis techniques in which focusing on the cooperations of three actors, the SMEs' model, and the joint business of SMEs with fish-based products.

Result and Discussion

Respondents

There are three key-actors in Triple Helix, as Science (S), Government (G), and Business (B). The respondents of this study were determined referring to TH actors. There were 2 people representing SMEs in Lamongan as the business (B) actor, 6 people from Universitas Negeri Surabaya representing science (S) actor, and 12 people from Lamongan government agencies representing government (G) actor.

Result

This study determined the roles of each TH actor and the relationship among them. From the pre-study, data about the potentials and weaknesses of SMEs with fish-based products in Lamongan were determined that the potential are in production and marketing/sales. Those are due to the abundance of raw materials and the wide market. However, in the same time, both production and sales become the weakness as there are no appropriate production technique and lack of marketing techniques, such as packaging, market networking, and advertising. Therefore, implementing Triple Helix as appropriate method to overcome problems (both production and marketing) became one of possible solution. By implementing Triple Helix, the study found the relationship of three TH actors as showed in Table 1.

Table 1. The Role of Triple Helix Actors SMEs with Fish-based products

Model	Actor		Description	Note
Triple Helix	S (Science)	S1	Assisting SMEs in business	Assistance
		S2	Providing knowledge, equipment, and appropriate production technique Becoming center of knowledge and technology development for SMEs	Support
		S3	Assisting SMEs to solve issues in production, sales, legality and laws (by Department of Cooperative and Micro Business)	Support
	G (Government)	G1	Assisting in product legalization process (by Department of Health) Maintaining the availability of raw materials through policy (by Department of Fishery) Providing equipment and appropriate technique for SMEs (by Department of Industry and Trade)	Assistance
		G2	Providing raw materials (in Lamongan) and aiding sales through buying-selling system (by KUD Mina Tani as government supporting unit)	Support
		G3	Providing information for the business potential to develop (for S and G) Becoming object of study and research to develop and implement new technology and government policy	Support
		G4	Becoming business actor who is assisted by S and G actor (Unesa and Lamongan	Assistance and Support

			Local Government)		
	B (Business)	G5			Cooperation
		B1			Cooperation
		B2			Cooperation
		B3			Cooperation

Source: FGD Recapitulation

Tabel 1 shows that three TH actors change each role in developing SMEs with fish-based products in Lamongan. S1 and G1 have the same role that is to assist SMEs in bussines, so both are possibly to change its position. S2 and G4 have the same role that is to support B actor meaning that each possible change other positions. Meanwhile, B1 and B2 cooperating with both actors (S and G) are by providing necessary informations to develop new technology and policy and by becoming objects of the study and recipient of new technologies and policies. Despite official government agencies, there was government supporting unit represented by KUD that providing additional assistance and support in form of cooperation to supply raw material and to sell the SMEs' products.

According to table 1, the interception of the roles of three TH actors was seen as in figure 1 where the role-changing area was in the S1-G1, S2-G4, and B1-B2.

Figure 1. *Interception of Tiple Helix actors in SMEs with fish-based products*
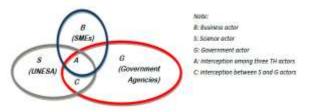

Figure 1 shows that the interception between S and G actors was from the assistance and support to B actor (expained in table 1). Whereas the interception among three TH actors was from cooperation in which B actor provide information needed by both S and G actors, while both S and G provide knowledge referring to information given by B actor. Another cooperation of three TH actors was B actor as recipents of the policy established by G actor and new technology researched by S actor answering problems of B actor.

Conclusion

In conclusion, Triple Helix model in SMEs with fish-based products was determined by three actors (S-G-B). The relationship among those three created interception which became role-changing

areas. These areas allowed three actors developed further and those created systematical synergy of S-G-B. Government supporting unit (KUD Mina Tani) was a part of G actor in which assisting B actor, especially in supplying raw materials to SMEs and selling products from SMEs.

Recommendation

The TH model developed for SMEs with fish-based products in Lamongan is not only model that assists government in policy-making but also can be a source of information to develop other TH models that can be implemented for other SMEs

Acknowledgement

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