Research Field : Industrial Engineering

Extended Abstract
Roadmap of Policy Strategy for Reinforcement Regional Innovation System (RIS) in Sector Maritime Industry SME of Folk Ship in Lamongan

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Abstract- Lamongan has potential marine that supported by folk ship industry and become part of Laskara organization to make modern folk ship industry nationally in 2020. But it still does not have Roadmap for reinforcement Regional Innovation System (RIS) as a pillar of national development areas. This research aims to develop Roadmap based on seven aspects builder of regional competitiveness through the integration of model development using value chain analysis, Technometrics, SWOT, cognitive maps and ISM (Interpretative Structural Modelling). Value chain was used to identification value-added activities, while technometrics was used to measure the contribution of technological components as the basis for developing an alternative strategy using SWOT analysis. The result will be fundamental to develop structural hierarchy models using Cognitive Maps combined with ISM. This research generated some value added activities including inbound logistics, outbound logistics, marketing and sales, and services. Technometrics shows that humanware has the highest contribution rate (0,636), followed by technoware (0,504), inforware (0,491), and orgaware (0,382) with TCC (0.564) included semi-modern. Structural model of digraph ISM also generated alternative policy strategy which chosen based on seven aspects with increased access to information and communication in the form of RIS and the proposed partnership that was made.

Keywords: RIS, Value chain, SWOT, Technometrics, Triple Helix, Cognitive maps, Interpretative Structural Modeling (ISM), and the Roadmap.

INTRODUCTION

Regional Innovation System (RIS) is considered as integral of National Innovation System (NIS) reinforcement. The roadmap is one important thing that must be had in regional and national development agenda [1]. Lamongan, is one region in East Java which has potential marine supported by maritime sector of folk ship industry. But it does not have Roadmap for developing folk ship industry that emphasizes the achievement of competitiveness based on human resources, natural resources and technology. Value chain analysis is the strategic approach that is the effective and efficient way to analyze the entire flow of material and activities in an organization [2], including actors, technology, and the process of competitive advantage in the area [3]. In addition, technology is an important component for supporting competitiveness which closely related to regional innovative [4]. Technometrics is a method for measure contribution of component technology, namely technoware, humanware, inforware, and orgaware [3]. In order to make Roadmap, the important component to is the strategic direction and form of policy strategy that will be taken. A complex strategic tool which adequates to collect information value chain and technological content in supporting innovative competitiveness is SWOT analysis [5]. Each of the strategic direction and policy strategy in the Roadmap should be synchrony and support each other. This research using integration of cognitive maps and ISM to develop a structural model in selection policy strategy as a newest strategic approach. It used to analyze complex decision making also taking account the relationship or influence between factors in bridging the heterogeneity perspective of the problems in the system [6]. It also develops policy strategy of RIS in maritime sector SME of folks ship in Lamongan among variable selected [7] on the relationship triple helix [8].

METHOD

This study uses an integrated approach to developing model of structural hierarchy. In order to select policy strategy, it draws up Roadmap for reinforcement RIS with an integration of several methods such as Value chain, Technometrics, SWOT analysis, Cognitive maps, and ISM. Value chain was used to analyze competitiveness of organization using interview and opened questionnaire spread, including the flow of materials, resources, commodities, and value added activities [9]. From this information, it will be obtained several technology components which used in folks ship industry. According to [10], technometrics was used to measure contributions and content of technology components (T,H,I,O) by calculating TCC (Technology Contribution Coefficient) using questionnaire [11]as shown below:

$$TCC = T\beta t * H\beta h * I\beta i * O\beta o ....(1)$$

Based on value chain and technology contribution rate, it will obtain information from triple

helix actors that play a role in any business activities. SWOT Analysis was used to analyze the strengths, weaknesses, opportunities and threats [12].

Having obtained information from the previous stage, Cognitive maps was developed from a signed digraph [13]. Integration of Cognitive maps as input ISM will generate structural hierarchy which forms priority based on seven aspects builder of regional competitiveness [14], namely: (1) Growth regional economy, (2) Optimizing the role of banks and financial institutions, (3) a productive business environment, (4) infrastructure, (5) the quality of human resources, (6) Innovation, and (7) Accessibility and internationalization.

RESULT

From this research, analysis of value chain that composed from questionnaire show diagnosis of the value chain has the profit margin on the product of folk ships ± Rp 500 million for a ship without engine and ± Rp 1 billion per ship ready to operate. These results can be improved by increasing the performance of craftsman to maximize result that considers support from triple helix in any activity of industrial processes. On inbound logistics, as value added activity, it should be considered material procurement of wood. On outbound logistics, it should be considered the technology that will be used, as well as marketing and sales activities. While in services activity, it should be considered the expansion of product marketing aboard. By considering of the value chain in the folk ship industry, it is expected to improve cost efficiency and increase the competitiveness of ships industry. Table 1 showed that humanware have the highest contribution (0.633) as below :

Table 1. Result Score of TCC

Komponen	Limit		SOTA	Kontribusi	Intensitas	TCC
	Lower	Upper				
1. Technoware	2	6	0,633	0,504	0,239	
2. Humanware	2	7	0,744	0,636	0,581	0,564
3. Inforware	2	7	0,483	0,491	0,111	
4. Orgaware	3	4	0,438	0,382	0,069	

Analysis of internal and external factors in the folk ship industry obtained nine strategic variables (SO, WO, ST, and WT) [8] and [9]. Based on results of causality, it shows the relationship and influence of one factor with the others to build regional competitive. Similarly, the strategy taken contain a positive, negative, or both influence. Roadmap of policy strategy was built from digraph models ISM that formed from the respective priorities based on each aspect [10] with the proposed partnership.

CONCLUSION

This research formed structural model development for decision-making to make Roadmap. Results of roadmap derived from value chain that identifies value-added activity that are consists of inbound logistics, outbound logistics, marketing and sales, and services. Technometrics show that humanware are most

responsible technology component (0,633) and orgaware are the most needed repair component (0,438). In addition, SWOT analysis was used as the basis for formulating alternative strategies with a combination of cognitive maps and ISM. The results of identification of selected policy strategies for each aspect builder competitiveness are (1) regional economic growth by improved its industrial productivity, (2) optimization of financial institutions by created active cooperation to accelerate investment, (3) productivity of environmental business by formed association craftsman, (4) infrastructure and environmental condition by expansion of market, (5) quality of human resources and employment by increasing creativity and transfer of knowledge, (6) innovation by linked triple helix actors to accelerate technological innovation, and (7) accessibility and internationalization by increased information and communication

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