Determination model for flagship industry based on potential commodity

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Abstract. The assignment of industry type at a location generally influenced by, the amount of flagship industry and the factors number of potential infrastructure existed at a location. A kind of factors that affected to determination of flagship industry, observed in this research namely production, export, infestation, labour and location quotient. Complexity conditions of decision-making that focuses on the number of flagship industry, and every type of industry affected by the dominant factors that impact on a site, provide a model that unite a kind of its factors. This paper will be presented a model that focused to assign priority development of flagship industries in an area, respect to affected factors with analytic hierarchy process (AHP). The model consists of nine types of flagship industries which potentially to be developed, and affected by a potential factor consists on the flagship industry. Results of the study showed, in order to determine an important flagship industry developed in the future, depend on the availability of LQ index and production, which required to be able to follow the needs of the development of the dynamics of the market competition in the future for seaweed commodity.

1. Introduction
In a competition era, the economic development of a country, determined by the economic development of the regions that became part of the country. The economic development in an era of competition, characterized by the ability of each region to explore, natural resources which transformed into a product that has value to compete in the global market, which in line with Turnovsky [1] and Anderson [2]. Some of the countries used creativity to performed they advantage, namely Singapore that achieve to number one in the field according on world economic forum (WEF) of how to manage business transaction in the world which signed by all best product office assigned on that country [2]. The utilization of natural resources component, which made as advantage economy commodities [1], in order to be sold in a global market affected by production capacity, it is in line with the research Haraguchi and Yong-Long et al. [3,4], the ability of the region to attract investors, which in line with Adegbite and Ayadi [5] and Tvaronavicius and Tvaronaviciene [6], the availability of human resources, which in line with Barbiero and Brown [7] and Portes and Benton [8] which able to establish, operate, maintain, and enhance the natural resources potential, the ability of cooperation with especially users from abroad in the form of sustainable export, which in line with Agrawal [9], as well as the performance of the utilization of natural resources into products, in the form of location quotient (LQ) [10-12].
The ability of a region that lies in the ability to utilize the potential of natural resources converted into advantage products in the global market, which became one of the key competition in the industry 4.0, which in line with Turnovsky [1], Haraguchi [3], and Norcliffe [12]. Creativity to change raw materials, semi-finished materials, become the next product that is capable of being consumed in a simple and healthy, become the main requirement is needed by consumers in global markets, it is in line with studies Yong-Long et al. [4] and Barbiero and Brown [7]. The target commodities modified to have value added that focused to agriculture, plantations, forestry, and fishery.

Obstacles faced by a region in utilize the potential of the region, is determining the leading commodity that must be developed and built, which in line with [3]. This condition is affected by the ability of production, investment, human resources, export capability, and performance of the industry. The focus of the research is concentrated in the Eastern Indonesia, which has nine viable commodities developed and built its industrial infrastructure. The research focused on a province located in the eastern of Indonesia, as well as having nine flagship commodities: seaweed, fish, cocoa, coconuts, palm, wood, rattan, resin, and atsiri.

2. Aim of research
The research is directed to determine the flagship of industry in the region of eastern Indonesia, and became the benchmark in order to take decisions to determine industry priorities. Assessment of factors: facilities and production volume of a commodity which is in line with Haraguchi [3], where necessary a change toward technology. While Yong-Long et al. discuss on the importance of green production to keep the balance of nature [4]. The availability of human resources to construct, operate, maintain, and develop the flagship industries in line with Barbiero and Brown [7], where explained the importance of human resources with knowledge and skills in collaboration, and Portes and Benton which discusses about the capabilities of the resources to be absorbed by the industry and the global market [8].

Government policy is an influential factor in the macro, to investors to infuse capital in the industry, which in line with Turnovsky [1] and Tvaronavicius and Tvaronaviciene [6]. While the ability of employers to fulfil aspects of volume and quality to exports covered by Agrawal [9], which emphasized the importance of the ability of the region industry to compete in the global market, as well as the performance of the industry to maintain and increase productivity through index LQ, which in line with a study Chiang [10], Leigh [11], and Norcliffe [12], where focus on using land to efforts economically to increase productivity with the size of the flow of trade in the global market.

With regard to the five factors that influence on decision making, to determines the priority of a flagship industry in the province "X" in the eastern of Indonesia is the hallmark of multi criteria decision making (MCDM). MCDM device used in this research is Analytical Hierarchy Process (AHP) [13], by way of disseminating a questionnaire to respondents, and the results were processed by software Expert Choice Version 3.0. Some research concerning the development of the region based on the resulting commodity nature, by using AHP study by Ehie [14], which discusses about the selection of the oil mines management project. He which discusses election distribution of natural resource management [15], as well as Greenberg and Nunamaker discussing about selection of production on the public sector to manage natural resources [16].

3. Methods
At this research the specified steps in order to get a result, directing a research objective. As for the steps are:

3.1. Step 1 (determining the problem)
In this step we done fieldwork on a region located in the eastern of Indonesia’s, thus obtained nine commodities is estimated to have the potential, to be developed into the leading industry.
3.2. **Step 2 (literature study)**  
Literature search in the form of journals and books, that deal with the research of the development of an area-based upon natural resources. At this stage of the journal obtained with regard to the development of the topic application of AHP as well as factors that influence on the determination of flagship industries.

3.3. **Step 3 (deploy questionnaires)**  
Deploy questionnaires to 40 respondents consisting of the parties concerned, in order to develop a flagship industrial commodities in the region of eastern Indonesia, namely from the authorities, in this case the Department of industry of the region, employers that cultivate results natural products, farmers and fishermen as suppliers of materials for agriculture, plantations, timber and fishery.

3.4. **Step 4 (processing questionnaire)**  
In this step the processing is done by using a *software expert choice version 3.0*, in the following order:  
- Constructing Hierarchy Diagram.  
- Perform extraction questionnaire into nine scale [13].  
- Insert the results into the questionnaire Expert Choice extract version 3.0

3.5. **Step 5 (analysis)**  
At this stage carried out analysis of influential factors of determination against the industry, in order to get an alternative flagship industries that need to be developed, accompanied by a discussion of alternative viable flagship industry developed

4. **Result and discussion**

4.1. **Hierarchy diagram**  
Determination of the leading industry in this regard for the research, the five determinants of flagship industries, namely: production, labour, investment, exports, and LQ. The number of the leading commodities were observed in these studies amounted to nine: seaweed, fish, timber, cocoa, coconut, oil palm, rattan, resin, and atsiri. Figure 1 shows the hierarchical relationships between the five determinants of uggulan industry, with industrial commodities that should be selected.

![Figure 1. Research hierarchy diagram.](image-url)
4.2. Result

A diagram of the hierarchy to be input to a software expert choice version 3.0, along with the results of the questionnaire in the form of an answer from the respondent. Both of these components are processed and the results are presented in figure 2, which shows the weighting of each factor effect on the determination of the leading industry in the region of eastern Indonesia, while figure 3 present information commodity weights Sumberaya Agriculture, fisheries, forestry and plantations, the potential can be developed into a flagship industries.

![Figure 2. The flagship industries factor weight.](image)

| Industry   | Weight |
|------------|--------|
| Seaweed    | 0.265  |
| Fish       | 0.087  |
| Coconut    | 0.115  |
| Palm       | 0.079  |
| Cacao      | 0.185  |
| Wood       | 0.188  |
| Rattan     | 0.047  |
| Resin      | 0.035  |
| ATSIRI     | 0.029  |

![Figure 3. Potential commodities weight.](image)

4.3. Discussion

The results of the AHP software from expert choice version 3.0, as shown in figure 2 shows, that the potential industry development in the region observed, need to pay attention to LQ factor which valued 0.397 or 39.7%. The measure shows that, respondents said to determine the flagship industry in the future, it is important to focus on economic land use which in line with Chiang [10], than improvements of technology and production quantity which in line with the research Haraguchi [3]. The weight of production on this research amount 34.3% or 0.343, although those values are not significantly different with LQ weighting, but it can be stated that land use and increased production had to develop simultaneously, as in line with the research conducted by Yong-Long et al. [4].

While the demands of the product from a flagship industrial should be an export commodity has a weight 0.148 or 14.8%. The condition indicates that flagship industries in the region observed should focus to the efforts of fulfillment of raw materials in the country, compared to attract investors (0.076 or 7.6%), and sufficiently reliable workforce (0.036 or 3.6%). Specifically regarding labor, the availability is still low and not have a good knowledge and skills to support the existence of the flagship industry in the region observed, so it’s important established training centers oriented, fulfillment of human resources for industries base on natural resources, in Eastern of Indonesia.

Figure 3 shows a potential commodity that needs to be developed in the region observed. Based on the calculation of AHP, demonstrated that commodity seaweed get weighting of 0.265 or 26.5%.
This condition shows that according to stake holder which become respondents, the commodity of seaweed judged ready to be developed to be the flagship industry. While other commodities just getting weights 10% to under 10%, which shows that those commodities have yet to be exploited economically by stakeholders, so it requires a relatively better infrastructure high compared with seaweed.

In order to strengthen the information about, the reliability of the decision to determine seaweed as commodity chosen in this research, we try to conduct the analysis using dynamic sensitivity analysis, from expert choice version 3.0 software. The analysis was done by changing the weighting of the five factors that affect to the commodity determination of which could be developed into a flagship industry, as 50% based on the efforts to encourage the development of flagship industries, that have an economic utilization ability utilization, against the utilization of its natural resources. The initial conditions of the analysis are shown in figure 4, while the results of the analysis are presented in table 1.

Based on the information from table 1. It can be stated that the commodity of seaweed have reliability on all factors that affected it. Seaweed is only offset by cocoa commodity, at a time when investment factor raised to 50%. The condition shows that seaweed commodity, have readiness infrastructure, utilization, and technology better than other commodities [4].

### 5. Conclusion

Determination of the leading industry-based on agricultural commodities, plantations, fisheries, and forestry, on this research largely determined by factors of utilization of economic resources indicated by index LQ, as well as the utilization of technology right to do production. On this research obtained that seaweed commodities elected as potential industry to be develop, which consider with location quotient, could be developed into a flagship industry, which became the mainstay to develop in the area observed.
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