The Role of Working Capital, Productivity, Applied Technology and Selling Market Prices on Fisherman’s Revenues

Iskandar Muda¹*, Rahmanta², Adi Syahputra³ and Marhayanie⁴

¹,²,³ Universitas Sumatera Utara, Medan, Indonesia
*Correspondence author. E-mail: iskandar1@usu.ac.id

Abstract: The purpose of this research is to map and form the cluster model of marine and fishery product derivative products and ideal model in the preparation of document of Regional Innovation System (SIDA) in East Coast of North Sumatera. Expected results will be the Regional Innovation System Innovation (SIDA) documentation of marine and fishery product results where the role of Higher Education helps local governments in empowering coastal fishermen to support Indonesia as the world maritime center and ultimately contribute and input to stakeholders so that the program, activities and budget adequate for fishermen so as to improve the life of the fishermen. Factors working capital, technology, working hours to go to sea, and fish prices affect the fishermen’s income in North Sumatra. The ideal budgeting pattern of the product clusters The Marine And Fishery Product Output on the East Coast of North Sumatra is a Performance Based Budget Pattern that adapts the needs and Patterns of Clusters of Derivative Products of Marine and Fishery Products To Support the Regional Innovation System (SIDA) East Coast of North Sumatra is by development capture fisheries to support the Agromarinepolit of program.

Keywords: Regional Innovation System (SIDA), pattern of pattern program and pattern of budgeting.

1. INTRODUCTION

Innovation is a research, development, and or engineering activity aimed at developing practical application of new values and scientific contexts, or new ways to apply existing science into products or production processes (Law No. 18 of 2002). Innovation can be said as the mobilization of knowledge and technical skills (diffusion of science and technology) as well as experience in creating new processes and results. The perspective of innovation as a system furthermore known as innovation system is then described as a group of actors, institutions, networks, partnerships, antaraksi, productive processes and policies that influence the developmental direction, speed and diffusion of innovation and learning process. The approach
then encourages the emergence of innovation policies directed at the development of innovative systems that are able to adapt. Thus, the implementation of the innovation system is not only the responsibility of the central government, but also the responsibility of the local government. At the regional level, the regional innovation system referred to here is essentially an integral part of an array of actors, institutions, relationships, networks, interactions and productive processes that influence the development and pace of innovation and diffusion (including technology and good practice) and the learning process at an area. The regional innovation system is not only influenced by aspects/universal factors but also local/locational specific aspects/factors and how the dynamics of its interaction with the outside world that the Regional Innovation System (SIDa) is a systematic and systematic pattern of systematic approach to regional development. Through this SIDa development approach, all actors, institutions, networks, partnerships, actions, production processes and policies affecting the developmental direction, speed and diffusion of innovation and learning process are implemented to achieve the development of a region. The principles in the development of SIDa, among others (Santoso, 2012):

1. Strategic thinking and consistent with long-term framework,
2. Regional Innovation Strategy which is a regional priority agenda and an integral part of regional development strategy;
3. Strategy of regional innovation is a strategic policy of enhancing regional competitiveness;
4. Focus on local best potential and be open to creative ideas that are beneficial to regional progress; and
5. Setting clear goals and rational outcomes.

The principle is then summarized in the SIDa policy framework which shows the relationship between elements in the SIDa approach as a system. Development essentially wants a condition that is better than the condition of the past. The development process carried out by a country will not stop. The output produced by a development is a combination of resources, so the resources are absolutely absolute in the development process. Resource exploitation should pay attention to its sustainability. Excessive exploitation leads to undertaken development that can be set back. The target of economic development is the creation of an independent and reliable economy, among others, characterized by strong and advanced industries, tough agriculture and optimal utilization of natural resources in order to increase the prosperity of the people more evenly. North Sumatra is one of the provinces with vast sea area. Therefore, the productivity of capture fishery in North Sumatra is high and occupies the 3rd position in Indonesia as a contributor to the availability of fish in Indonesia. Still more fish imports due to natural factors and technical processing. During this time, North Sumatera fish production centers are located in Sibolga, Tanjung Balai, Sei Berombang Labuhan Batu, Percut, Fruit Sialang, Tanjung Beringin, Bandar Khalipah, Belawan and Tanjung Tiram. The biggest fish production in North Sumatera is Anchovy, Gembung, Tenggiri, Aso-Aso, Jackfruit, Peacock and Kakap. Based on data at Fisheries and Maritime Office in 2010, the production of sea fishing fishery as much as 370,507.8 tons later in the Year 2011 increased to 379,769.7 tons. Meanwhile, general fishery, in the Year 2010 as many as 24,978.5 tons, realization in the year 28.975.

Judging from the resources allocated by fishermen in running the fishing business, not all fishermen in North Sumatra use motorized boats as a catch fleet in running the fishing business. However, there are
still using the boat without a motorcycle or outboard motor boat. Differences in catching fleets and work equipment used by fishermen mean the existence of technological differences in fishing that in this study are grouped into modern technology and traditional technology. Fishermen who have modern technology are characterized by the use of motorized boats as a catch fleet that is accompanied by a global positioning system (GPS) as a directional tool and fish finder (detecting the presence of fish). While fishermen who have traditional technology is characterized by the use of motorized boats and motorized boats, but not equipped with GPS and fish finder. The time spent by fishermen per once to sea is also different based on the type of fleet used. Fishermen with motor boat catching fleets typically spend 12 hours per time at sea. While the fishermen with a fleet of fishing boats spend time ranging between 48-56 hours per once to sea. Even if there are among the fishermen with a fleet of motorized fishing boats that spend 12 hours per time to sea, only a small part of the number of fishermen who use this type of fleet catch. The occurrence of differences in working hours spent by fishermen based on the type of fleet catch is used, because fishermen with motor boat catching fleet can reach a wider sea area when compared to fishermen who use motorized boats.

Another factor that can affect the production yield (catch of fish) by fishermen is the season. Season is a natural factor that can not be avoided by fishermen. As stated by Kusnadi (2002) that the poverty suffered by the fisherman community comes from two things. First, the natural factor, which is related to fluctuations in the catching seasons and the natural structure of fishery economic resources. Second, non-natural factors, which are related to the limited capability of capture technology, inequality in the profit-sharing system and the absence of definite social labor security. In fact, fishing activities in North Sumatra are also influenced by seasonal factors. In addition, the movement of the wind as a natural factor is also very decisive decision of fishermen to go to sea or not to go to sea. So that the season factor not only affects the activities of fishermen, but also affects the size of the catch and the willingness of fishermen to go to sea. The seasons referred to in this study consisted of the western and eastern seasons. In the western season fishermen usually reduce the frequency of fishing, this is due to natural factors in the season that is considered less profitable for fishermen. The waves in the western seasons are relatively large, thus risking the security of fishermen in fishing. On the other hand, the eastern seasons are the seasons favored by the fishermen. In the east season sea waves are relatively small, so natural factors in the season is very beneficial for fishermen. This is what causes fish catches obtained by fishermen in the east season is greater when compared with the catch in the west season. The amount of working capital issued by fishermen to run their business, technological differences in this case is the type of fleet catch and equipment used to go to sea, the number of working hours allocated to run the activities of fishermen and seasonal factors of course can determine the size of the catch within a certain period of time.

Similarly, the price of fish that can determine the value of fishery production produced by fishermen. In turn, the size of the income of fishermen can be seen as a function of working capital, technology, working hours and price factors. While the season factor in this case is the west season and the east season can be seen as a natural factor that can lead to differences in income among fishermen. This is related to the natural conditions that cause the difference in the intensity of the tendency of fishermen to go to sea in both seasons. Small-scale business is a stand-alone productive economic enterprise, conducted by an individual or a business entity that is not a subsidiary or not a branch of a company owned, controlled, or becomes part of the direct or indirect business of a medium or large business that meets the criteria of the
Business Small as defined in this Law. Medium Enterprise is a stand-alone productive economic enterprise, conducted by an individual or business entity that is not a subsidiary or a branch of a company owned, controlled, or becomes part directly or indirectly with a Small Business or a large business with a net worth or annual sales proceeds as provided in this Law.

The problem of increasing the added value of the product and its marketing becomes an important thing to be observed. Dynamic markets require constant innovation and creativity. The goal is to be able to exist in the market, even to be improved. If this condition can be realized then it has implications for the economic improvement of society and regional income (Sirojuzilam et al., 2016; Tarmizi et al., 2016 and 2017). Based on the background described in advance it can be seen that the actual superior products of North Sumatra need market development. But this is necessary for a more in-depth study of this matter. This study is expected to map the economic area where the growth of MSMEs of fishery and marine both has special facilities and incentives to integrate all economic activities from upstream to downstream by prioritizing Cluster Industry concept (based on commodity and product specificity), facilitating the growth and development of medium industries and small (SMEs), focusing on processing industries, is a processing industry developed to increase the added value of superior commodities in the form of derivative industries from MSMEs.

The idea of Cluster Industry concept is to form a Masterplan of MSME or in other words called Master Plan because its content is about comprehensive planning (comprehensive) and integrated (integrative) on MSMEs. Wikipedia also termed the Master Plan as Comprehensive Plan. An exhaustive plan concerning the design of the utilization of a large enough land. Can be in the thousands of square meters, up to tens and hundreds of hectares. In certain contexts, the Master Plan talks about the development or development plans of a community residence area, especially MSMEs. Both city and countryside with all its aspects. Such as residential plans, highways, railway networks, educational, entertainment and recreation facilities, business and economic facilities, electricity, water or gas installations, green open spaces and various public facilities and social facilities. This initial idea needs to be followed up with concrete steps, in order to create clusters of superior products of marine and fishery commodity processing that are expected to improve the economic condition of the region and the welfare of the fishermen themselves.

2. THEORETICAL REVIEW

2.1. Competency-Based Advantages

The recent development of the resource-based production effort paradigm is the focus on a basis, consistent with tangible and intangible assets, and resource-based excellence, that is competence. Within this framework, production efforts should focus on core competencies. A core competency can be defined as a set of integrated resources, skills and technologies (Muda et al., 2017). A production business competence is not the same thing as the individual skill of its personnel, but it is an integration of the existing skills. It is also not the same as resources alone, because competence is more of an asset. Business units, distribution networks, and brands, all of which are assets (and resources), however, a special ability to manage business units, distribution networks, or brands is a competency. A competency can be identified if it meets certain conditions.

The main requirements for a competence are openness to new markets, new possibilities, and adaptive qualities. The manager of a business production business that has a competence should think about how
an integrated set of skills is applied to competitive product domains. Therefore, a competency-based outlook starts from a focus on production-level business strategies and starts to face corporate-level strategies, and determines the right type of business (business). Competence and capability of resources in an area will create excellence which has unique area covering aspects of Human Skill, Natural Resources, Environment, Culture, and Market Prospect, both for food and beverage product (Gusnardi et al., 2016; Lubis et al., 2016; Dalimunthe et al., 2016 and Sadalia et al., 2017). The characteristics of capability and core competence of a region consists of 3, namely:

1. Have potential access to various markets - regional competencies should be able to develop marketable products or services
2. Regional competence should create a tangible contribution to benefit from its products.
3. Regional competence should have something difficult to imitate by other competitors / other regions, in other words is unique; the smell of its natural resources, human resources, and supporting infrastructure.

Methods and analytical tools that can be used in the assessment of regional superior competence are:

(a) Methods for evaluating the capability of local natural resources
(b) Methods for obtaining pre- eminent product ranking priorities.

Value Chain Economy Analysis, which begins by conducting chain map of the priority flagship product classified as the main rank, by outline the stages from input to product marketing to consumer. A reason to prioritize a superior product area is;

1. can absorb a lot of labor
2. the value of production is high or high
3. the image of the product is a trade-mark for the region.

2.2. Value Chain Map of Marine and Fishery Products

Priority priority products are found from identified product competencies, where the selection criteria are to consider:

- Uniqueness
- Competitiveness
- Openness to new markets
- Better benefits for customers/consumers.

Based on the categories of component-component ultimately the determination of criteria can bring Tententu Product as a superior competence product Region.

3. RESEARCH METHODS

Type of research first and second year is quantitative research. The design of this study is survey. The research data used is primary data and secondary data. Secondary data collection using documentation and primary data collection techniques using questionnaires and interview instruments. Questionnaires and questionnaires used by the Research Team are designed based on related problems and theories (Muda et al., 2017).
This study uses primary data and secondary data in the form of survey results as much as 198 (one hundred ninety eight) samples spread over 9 (nine) fishermen residential location in North Sumatra. Furthermore the minimum sample amount is allocated to each district City using the principle of proportional allocation of the Yamane formula. Primary data is collected by the source directly from the source. This is taken through survey by direct interview using questionnaire to respondent, that is responder fisherman and perpetrator of UMKM fishery related to research variable. While secondary data obtained from agencies/institutions/institutions are associated with research problems. To solve the problem, descriptive statistic technique is used by using multiple regression analysis. The equations that can be formed as follows:

\[ Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e \]

Where :

- \( Y \) = Pendapatan Nelayan
- \( X_1 \) = Working Capital
- \( X_2 \) = Work Hours
- \( X_3 \) = Applied Technology
- \( X_4 \) = Market Price
- \( e \) = error

Data analysis used in this research is Partial Least Square (PLS) approach. PLS is a model of Structural Equation Modeling (SEM) equations based on components or variants. PLS is an alternative approach that shifts from a Covarian-based SEM approach to a variance-based (Ghozali and Latan, 2015). This SEM test uses SmartPLS version 3.0 program.

4. RESULT AND DISCUSSION

4.1. Research result

4.1.1. Measurement Model (Outer Model)

The measurement model is used to test the validity of the construct and the reliability of the instrument (Abdillah and Jogiyanto, 2015). Test validity of the construct used two methods of convergent validity and discriminant validity while the construct reliability test used composite reliability (Abdillah and Jogiyanto, 2015).

4.1.2. Convergent Validity

An indicator is said to be valid if it has a loadings factor above 0.5 and an average variance extracted (AVE) value above 0.50 towards the intended construct. AVE value of the PLS result The SmartPLS program algorithm can be seen in the following table:
The Role of Working Capital, Productivity, Applied Technology and Selling Market Prices on Fisherman’s Revenues

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Cronbach’s Alpha</th>
<th>rho_A</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Technology</td>
<td>0,749</td>
<td>0,893</td>
<td>0,835</td>
<td>0,641</td>
</tr>
<tr>
<td>Fisherman Income</td>
<td>0,879</td>
<td>0,888</td>
<td>0,918</td>
<td>0,737</td>
</tr>
<tr>
<td>Market Price</td>
<td>0,789</td>
<td>0,775</td>
<td>0,855</td>
<td>0,664</td>
</tr>
<tr>
<td>Work Hours</td>
<td>0,820</td>
<td>0,843</td>
<td>0,864</td>
<td>0,687</td>
</tr>
<tr>
<td>Working Capital</td>
<td>0,900</td>
<td>0,913</td>
<td>0,937</td>
<td>0,833</td>
</tr>
</tbody>
</table>


The loadings factor and AVE values of the PLS results The SmartPLS program algorithm can be seen in the following table:

Table 2

<table>
<thead>
<tr>
<th></th>
<th>Applied Technology (X')</th>
<th>Fisherman Income (Y)</th>
<th>Market Price (X')</th>
<th>Work Hours (X')</th>
<th>Working Capital (X')</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X1.2</td>
<td></td>
<td>0,877</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X1.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X2.1</td>
<td></td>
<td></td>
<td></td>
<td>0,934</td>
<td></td>
</tr>
<tr>
<td>X2.2</td>
<td></td>
<td>0,945</td>
<td></td>
<td>0,708</td>
<td></td>
</tr>
<tr>
<td>X2.3</td>
<td></td>
<td></td>
<td></td>
<td>0,915</td>
<td></td>
</tr>
<tr>
<td>X3.1</td>
<td></td>
<td>0,904</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X3.2</td>
<td></td>
<td></td>
<td></td>
<td>0,904</td>
<td></td>
</tr>
<tr>
<td>X3.3</td>
<td></td>
<td></td>
<td></td>
<td>0,904</td>
<td></td>
</tr>
<tr>
<td>X4.1</td>
<td></td>
<td></td>
<td></td>
<td>0,927</td>
<td></td>
</tr>
<tr>
<td>X4.2</td>
<td></td>
<td>0,840</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X4.3</td>
<td></td>
<td>0,881</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y11</td>
<td></td>
<td>0,715</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y12</td>
<td></td>
<td>0,801</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y13</td>
<td></td>
<td>0,899</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Discriminant Validity

If the AVE root value of each construct is greater than the correlation value between the constructs and the other constructs in the model, it is said to have good discriminant validity (Fornel and Larcker, 1981 in Ghozali and Latan, 2015). AVE root values of the PLS results The SmartPLS program algorithm can be seen in the following table:
Table 3
Fornell–Larcker Criterion

<table>
<thead>
<tr>
<th></th>
<th>Applied Technology (X₁)</th>
<th>Fisherman Income (Y)</th>
<th>Market Price (X₂)</th>
<th>Work Hours (X₃)</th>
<th>Working Capital (X₄)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Technology (X₁)</td>
<td>0,800</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisherman Income (Y)</td>
<td>0,385</td>
<td>0,858</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Price (X₂)</td>
<td>0,192</td>
<td>0,180</td>
<td>0,815</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Hours (X₃)</td>
<td>−0,271</td>
<td>0,180</td>
<td>0,070</td>
<td>0,829</td>
<td></td>
</tr>
<tr>
<td>Working Capital (X₄)</td>
<td>0,675</td>
<td>0,536</td>
<td>0,319</td>
<td>−0,174</td>
<td>0,913</td>
</tr>
</tbody>
</table>


Composite Reliability

Ghozali and Latan (2015) stated that a latent variable has high reliability if the value of composite reliability is above 0.60. The composite reliability value of the PLS result of the SmartPLS program algorithm can be seen in the following table:

Table 4
Value of Composite Reliability

<table>
<thead>
<tr>
<th></th>
<th>Composite Reliability</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Technology (X₁)</td>
<td>0,835</td>
<td>Reliable</td>
</tr>
<tr>
<td>Fisherman Income (Y)</td>
<td>0,918</td>
<td>Reliable</td>
</tr>
<tr>
<td>Market Price (X₂)</td>
<td>0,855</td>
<td>Reliable</td>
</tr>
<tr>
<td>Work Hours (X₃)</td>
<td>0,864</td>
<td>Reliable</td>
</tr>
<tr>
<td>Working Capital (X₄)</td>
<td>0,937</td>
<td>Reliable</td>
</tr>
</tbody>
</table>


Structural Model (Inner Model)

R-square

The higher the value of $R^2$, the better the prediction model of the proposed research model. The strong model is shown with a value of 0.67, a moderate model indicated by a value of 0.33 and a weak model indicated by a value of 0.19 (Chin, 1998 in Ghozali and Latan, 2015). The value of $R^2$ is used to explain the effect of latent variables (independent) to latent variables (dependent) or how much influence. The R-square value of the PLS result The SmartPLS program algorithm can be seen in the following table:

Table 5
R-Square value

<table>
<thead>
<tr>
<th></th>
<th>R Square</th>
<th>R Square Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisherman Income (Y)</td>
<td>0,374</td>
<td>0,368</td>
</tr>
</tbody>
</table>

Hypothesis testing

Hypothesis testing used 5% significance level and 95% confidence level. For a hypothesis to be accepted then t-statistics should be > 1.96 (Syahyunan et al., 2017). Table 6 shows the results of the path coefficients and t-statistics.

Table 6
The value of Path Coefficients and T Statistics

| Applied Technology ($X_3$) $\rightarrow$ Fisherman Income ($Y$) | 0.126 | 0.130 | 0.049 | 2.558 | 0.011 | Accepted |
| Market Price ($X_4$) $\rightarrow$ Fisherman Income ($Y$) | -0.029 | -0.018 | 0.036 | 0.802 | 0.423 | Rejected |
| Work Hours ($X_2$) $\rightarrow$ Fisherman Income ($Y$) | 0.305 | 0.318 | 0.056 | 5.480 | 0.000 | Accepted |
| Working Capital ($X_1$) $\rightarrow$ Fisherman Income ($Y$) | 0.514 | 0.514 | 0.048 | 10.709 | 0.000 | Accepted |


The resulting model is as follows:

Figure 1: Research Model
5. CONCLUSION AND SUGGESTION

5.1. Conclusion

1. Factor working capital, technology, working hours to go to sea, and fish prices have an effect on fisherman income in North Sumatera.

2. The ideal budgeting pattern of the product clusters Derivatives of Marine and Fishery Products on the East Coast of North Sumatra is a Performance Based Budget budget that adapts to needs.

3. Pattern of Product Clusters Derivative of Marine and Fishery Products To Support the Regional Innovation System (SIDA) of East Coast of North Sumatra is by developing capture fishery to support Agromarinepolitan program.

5.2. Suggestion

1. Location of development roadmap for fishery development to support Agromarinepolitan program

2. Integrating synergistically into 9 districts/municipalities on the east coast about the master plan for the development of agromarinepolitan coastal, small islands and outermost islands in North Sumatra;

3. Integrating synergies to nine districts/municipalities on the east coast about the master plan for the development of agromarinepolitan coastal, small islands and outermost islands in North Sumatra;

4. Provide a definitive future direction for the development of coastal areas, small islands and outer islands in North Sumatra;

5. To be the foundation for the government, business and other stakeholders for the development of coastal areas, small islands and outer islands in North Sumatra.

6. This research is important because of the declining life of fishermen and the need for academic thinking to improve the living standards of fishermen by forming an integrated system of Regional Innovation System (SIDA) East Coast of North Sumatra for products Derivatives of Marine and Fishery Products so that the stakeholders of this research can arrange programs and activities with the utilization of innovation on the results of fishermen.

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