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Family vs Village-Based: Intangible View on the Sustainable of Seaweed Farming

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Abstract. Compare to other fishery activities for instance fish mariculture and catching fisheries, seaweed farming is considered easier. Also, the market for seaweed is wider and will keep growing. Thus, makes seaweed farming as one of the fastest commodity to improve the welfare of a coastal community. There are technical and non-technical factors in seaweed farming management, for non-technical on this intangible factors vary between family-based and village-based management, therefore aimed of this study was to simulate farmers decision to choose between family-based and village-based on seaweed managing system trigger by intangible factors. We conducted our study in Southeast Maluku, data collecting conducted from October to December 2016 by depth interview and questionnaires on seaweed farmers. We used logistic regression to compare each intangible factors on family and village-based seaweed farming management. The result showed that for family-based management farmers were willing to transfer their knowledge among each member in the household. For village-based revealed that farmers with higher education background tend to work on village-based, also, the result also stated that in village-based management member were those who have better capability and skill, at the same time village-based management had a small probability for conflict to occur compared to family-based.

1. Introduction
Family-based farming management tends to be associated with an inadequate system that conducted their farming system scattered around the area [13] with no particular time frame for farming activity during each farming season also the owner and operational business runs by same people [1]. In some rural area in a developed country like Canada, many family-based farm system now has adjusted to becoming more industrialized by adopted recent technology [2]. Although, for an undeveloped country like in West Africa for instance, the challenge for family-based farming was entirely differed which related to government policy, market structure, resources and potential demand [4]. The gap between family-based farming in developed and undeveloped on their ability to adjust brings more attention to the important role of each government to address the problem that family-based farming faced, especially in the country like Indonesia [6]

In Indonesia, Kei Islands, in particular, are the rural coastal area which located in the east on Indonesia which makes this area is considered isolated from a big city where also the center of the industry since most of the large cities located on the west side. The geographical condition added difference challenge to family-based farming especially in the fisheries sector in this area, which is related to information, selling price projection and delivery cost. Most commonly farming activity in
Kei Islands is seaweed farming where most of remaining seaweed farmers are family-based with only a few left of village-based seaweed farming group. Village-based seaweed farming is a group that formed by local government consist of a farmer from the same village that is supported with tools and equipment to conducted seaweed farming. The local government of Southeast Maluku District has roughly over 100 village-based farming system under their management, but since 2012 number of active village-based farming group keeps decreasing [5].

Both family-based seaweed farming and village-based seaweed farming are not sustained either on their productivity and their durability. Each of farming based has their particular problem to deal with, for family-based, it's about the financial aspect where for village-based technical factors are factors come to attention. In Addition to management and professionalism problem on both family and village-based seaweed farming, conflict among members related to profit sharing and capability's gap among members also factors that have to put into consideration [3]. This study aimed of this study was to simulate farmers decision to choose between family-based and village-based on seaweed managing system trigger by intangible factors, where intangible aspects that put into consideration in this study were education background, willingness to transfer knowledge, conflict avoidance, trust among member, capability of each member, sex, and gender. The outcome of this study is to provide real insight to local government on maintaining the productivity of seaweed in the area by forming the better seaweed farming system in the area.

![Figure 1. Study area](image)

2. Methodology

This study measures the durability and sustainability regarding production activities based on intangible assets approach, where [8] stated that intangible assets refer to intellectual capital, where Roos proposed intellectual capital that consists of two types of capital, first human capital and second structure capital. Attitude, relationship, transfer of knowledge for the development of each member’s capability, conflict management, and trust are intangible factors that have to be considered on conducted business, which also can become assets for competitive advantage.
For collecting the data we used structured questionnaire, for trust variable we adopted concept proposed by [7], that trust is one the most important sources of competitive advantage where one person belief on their partner behavior to uphold their commitment which they have agreed upon. Each group may have a different degree of capability [9] either of family-based or village-based group, therefore, capability used in this study emphasize more on operational capabilities, where [10] stated that operational capability as ability to perform tasks for better operational function of the organization or in this study groups of seaweed farming system. For conflict, we adopted study from [11] proposed to identify conflict which refers to a situation where specific identity (such as family, business owner, etc.) act inconsistently with their respected role. For transfer knowledge, we adopted studies by [12] of their model on transfer knowledge between from people inside the organization who has more knowledge and experience to people with less knowledge and experience, the type of knowledge that being transfer focus on tacit knowledge.

2.1. Data analysis

This study conducted in seaweed villages in Southeast Maluku District, Indonesia. We used purposive sampling method approach on six villages that being divided into three clusters. The first cluster is villages that have the high productivity of seaweed namely Letuan and Ohoidertutu, for the second cluster consists of villages that have the average productivity of seaweed namely Namar and Ohoillir and the third cluster includes villages that have the low productivity of seaweed Sathean and Debut (Figure 1). Total 160 questionnaires being spread to seaweed farmers of these villages but only 136 questionnaires to meet the requirement for processing data. We used logistic regression for data analysis with STATA 12.0 software.

Econometric model in this study can be seen as follows:

$$\text{Pr}[y_i^f = 1 | x_i] = F(\beta_0 + \text{Age} \beta_{\text{Age}} + \text{Sex} \beta_{\text{Sex}} + \text{Edu} \beta_{\text{Edu}} + \text{TK} \beta_{\text{TK}} + \text{Tr} \beta_{\text{Tr}} + \text{Cf} \beta_{\text{Cf}} + \text{Cap} \beta_{\text{Cap}})$$

$$\text{Pr}[y_i^v = 1 | x_i] = F(\beta_0 + \text{Age} \beta_{\text{Age}} + \text{Sex} \beta_{\text{Sex}} + \text{Edu} \beta_{\text{Edu}} + \text{TK} \beta_{\text{TK}} + \text{Tr} \beta_{\text{Tr}} + \text{Cf} \beta_{\text{Cf}} + \text{Cap} \beta_{\text{Cap}})$$

Where $y_i^f$ and $y_i^v$ represent binary variable for family-based ($f$) and Village-based ($v$). If $y_i^f$ farmers prefer to work on family-based seaweed farming, then it equals one and zero if otherwise, whereas, $y_i^v$ equals one if farmers prefer to work in the village-based system and otherwise equals zero. For explanatory variables, we have seven categories age, sex, education, transfer knowledge (TK), Trust (Tr), Conflict (C) and Capability (Cap).

2.2. Respondent Characteristics

As it shoed on table 1, over half of farmers on this study were 25-44 years old with roughly 39% were 45 to 70 years old. Most of the farmers on this study were male around 82.4% and female 17.6%. Based on educational background, the result showed a fascinating result which also described the real condition of seaweed farmers in the area, where over 95% of seaweed farmers in the area did not have sufficient educational background to the least at diploma level. This may cause a problem since seaweed cultivation for productivity is to be considered easy compared to other marine culture, but it requires some basic knowledge on downstream and upstream to make this business can be sustained in rapid competition. Therefore, local government needs to conduct an intensive and structured training on seaweed cultivation and post-production process to maintain the durability of seaweed productivity in the area. Over half of farmers in the study have conducted seaweed farming between 6 to 12 years; this means respondent of our study has enough experience on seaweed cultivation although because of the lack of education background, still lack on an effort to maximize the revenue of farmers especially in post-production.
Table 1. Respondent Characteristics

| Age                  | Frequency | Percentage |
|----------------------|-----------|------------|
| <25 years old        | 7         | 5.1        |
| 25-34 years old      | 37        | 27.2       |
| 35-44 years old      | 39        | 28.7       |
| 45-54 years old      | 30        | 22.1       |
| >54 years old        | 23        | 16.9       |

| Sex                  | Frequency | Percentage |
|----------------------|-----------|------------|
| Male                 | 112       | 82.4       |
| Female               | 24        | 17.6       |

| Education                         | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| No Formal Educational Background  | 40        | 29.4       |
| Elementary                        | 35        | 25.7       |
| Junior High                       | 57        | 41.9       |
| High School                       | 2         | 1.5        |
| College                           | 2         | 1.5        |

| Years conducting seaweed farming | Frequency | Percentage |
|----------------------------------|-----------|------------|
| < 3 years                        | 14        | 10.3       |
| 3-5 years                        | 17        | 12.5       |
| 6-8 years                        | 55        | 40.4       |
| 9-12 years                       | 36        | 26.5       |
| > 12 years                       | 14        | 10.3       |

N=136

3. Result and Discussion

3.1. Family-based seaweed farming management system

In Table 2 can be seen the estimation results of equation (1) for intangible view on family-based seaweed farming system in Southeast Maluku. The value of the pseudo-$R^2$ is 0.206, the likelihood ratio test (LR = 13.12; Prob>chi$^2$ = 0.069) suggests that the explanatory variables are jointly significant at the 10 percent level. These statistics indicate that the model fits the data relatively well for a binary regression model.

Logistic regression results showed that farmers who willing to transfer their knowledge to a member of seaweed farming would prefer to work in family-based seaweed farming, where all socio-economy indicators and other intangible factors have a non-significant effect on farmers who choose family-based seaweed farming. Willingness to transfer knowledge in the family member is rational and predicted behavior. Since blood relation will provide the high emotional bond to diminish barrier from one farmer to share their knowledge with their close relatives.
Table 2. Logistic regression result on family-based seaweed farming management system

| Variable                          | Coefficient | p-Value |
|-----------------------------------|-------------|---------|
| Socio-Economy                     |             |         |
| Age                               | 0.045       | 0.256   |
| Education                         | -0.005      | 0.991   |
| Years of seaweed farming          | -0.111      | 0.465   |
| Intangible Factors                |             |         |
| Transfer Knowledge                | 2.437       | 0.014** |
| Trust                             | 0.846       | 0.280   |
| Capability                        | 0.383       | 0.725   |
| Conflict avoidance                | 0.351       | 0.644   |

Log-likelihood                  -22.861
Pseudo-R²                        0.206
Likelihood ratio                 13.12
Prob>chi²                        0.069
Hosmer-Lemeshow                  2.93

3.2. Village-based seaweed farming management system

In Table 3 can be seen the estimation results of equation (1) for intangible view on family-based seaweed farming system in Southeast Maluku. The value of the pseudo-R² is 0.117, the likelihood ratio test (LR = 19.44; Prob>chi² = 0.006) suggests that the explanatory variables are jointly significant at the 1 percent level. These statistics indicate that the model fits the data relatively well for a binary regression model.

Based our finding on socio-economy factors, education had a negative effect on farmers who choose to work on the village-based system. This result means that farmers in the area tend to be against the idea of working with another member of the village when they have better education level than another farmer in the same village. This result also aligns with the logistic result on the family-based system, because the more educated farmers mean they have more knowledge than those who have less. In addition, willingness to transfer knowledge heavily related to emotionally attached factor in the coastal community. Although farmers who prefer to join village-based managing system have high expectation to enhance their capability by learning from another member from the village, the result also indicated that those prefer to avoid conflict on conducted seaweed farming tends to choose village-based managing system.

Table 3. Logistic regression result on village-based seaweed farming management system

| Variable                          | Coefficient | p-Value |
|-----------------------------------|-------------|---------|
| Socio-Economy                     |             |         |
| Age                               | 0.002       | 0.891   |
| Education                         | -0.562      | 0.017** |
| Years of seaweed farming          | 0.041       | 0.566   |
| Intangible Factors                |             |         |
| Transfer Knowledge                | 0.822       | 0.190   |
| Trust                             | -0.691      | 0.133   |
| Capability                        | 2.099       | 0.007** |
| Conflict avoidance                | 0.639       | 0.083*  |

Log-likelihood                  -77.302
Likelihood ratio                 19.44
Pseudo-R²                        0.117
Prob>chi²                        0.006
Hosmer-Lemeshow                  2.49
4. Conclusion
In coastal area much like in Kei Islands where the understanding of business in ideal form is still lacking also the influence of local wisdom and custom belief from the community around the area makes it necessary to carefully crafted better seaweed farming management system to maintain the sustainability on the profitability. This study concluded that combination of village-based and family-based seaweed farming managing system is the best form regarding intangible factors. Each managing system has its advantages for the family-based system it has to have at least one member with better capability in seaweed farming because it will sustain in the long run because our study showed that willingness to transfer knowledge on this system among other intangible factors measured. In the other side, in village-based managing system member in this system tend to have intention increase their ability from learning from another member in this scheme at the same time it has a low potential of conflict occurrence. Therefore we proposed combination system where the local government needs to focus on village-based system and make is as center on the developing of farmers on every village before they return to conduct seaweed farming with their family.

References
[1] Calus, M. and Van Huylenbroeck, G 2010 The Persistence of Family Farming: a Review of Explanatory Socio-economic and Historical Factors. Journal of Comparative Family Studies Volume XXXXI (5) 639-660.
[2] Smithers, J., and Johnson, P 2004 The dynamics of family farming in North Huron county, Ontario. Part I. Development trajectories. The Canadian Geographer/Le Géographe Canadien, 48(2), 191-208.
[3] Indian Ocean Commision (IOC) 2012 Implementation of a Regional Fisheries Strategy For The Eastern-Southern Africa and India Ocean Region; The Farming of Seaweed, Smartfish Agrotec Report/SF/2012/28.
[4] Toulin, C., & Guèye, B 2005 Is there a future for family farming in West Africa?. IDS Bulletin, 36(2), 23-29.
[5] Teniwut W. A dan Kabalmay. J 2014 Studi Empiris: Evaluasi Usaha Budidaya Rumput Laut Di Kabupaten Maluku Tenggara. Prosiding Seminar ilmiah Tahunan ke-2. Langgur, Indonesia. 16 Desember 2014 [in Indonesian].
[6] Teniwut W. A 2016 For sustainable revenue of fisheries sector in small islands: evidence of Maluku, Indonesia. AACl Bioflux 9(3):722-732.
[7] Sundaramurthy, C 2008 Sustaining trust within family businesses. Family Business Review, 21(1), 89-102.
[8] Baxter, R., & Matear, S 2004 Measuring intangible value in business-to-business buyer–seller relationships: An intellectual capital perspective. Industrial Marketing Management, 33(6), 491-500.
[9] Mahmood, I. P., Zhu, H., and Zajac, E. J 2011 Where can capabilities come from? Network ties and capability acquisition in business groups. Strategic Management Journal, 32(8), 820-848.
[10] Nada, N., and Ali, Z 2015 Service value creation capability model to assess the service innovation capability in SMEs. Procedia CIRP, 30, 390-395.
[11] Shepherd, D., and Haynie, J. M 2009 Family business, identity conflict, and an expedited entrepreneurial process: A process of resolving identity conflict. Entrepreneurship theory and practice, 33(6), 1245-1264.
[12] Cabrera-Suárez, K., De Saá-Pérez, P., and Garcia-Almeida, D 2001 The succession process from a resource-and knowledge-based view of the family firm. Family Business Review, 14(1), 37-46.
[13] Yang, H., Zhang, X., & Zehnder, A. J 2003 Water scarcity, pricing mechanism and institutional reform in northern China irrigated agriculture. Agricultural Water Management, 61(2), 143-161.