MANAGEMENT-BASED CLUSTERING IN FISHERY AGROINDUSTRIES PRODUCTS: A CASE STUDY OF JEMBER REGENCY

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ABSTRACT

Recently, the classical problems dealing with raw materials (fish) supply, technology availability, and business management remain to happen in fishery products. In facing such problems, an integrated and comprehensive solution should strongly be implemented. This study aims to study managerial characteristics of agro industries in coastal areas of Jember regency using managerial clustering method. The population of the study was all fishery agro industry business units of the selected areas. The respondents were determined by snowball sampling method in every coastal area, consisting of 79 businessmen in the agro industry. They were interviewed concerning the aspects in the study, and cluster analysis method was conducted. It reveals that, based on managerial characteristics, there were two clusters of fishery agro industry identified, namely (1) cluster of fishery agro industry using a conventional management practices and (2) that of fishery agro industry using a formal/modern management. The first cluster comprises a dominant one because 68 businesses were in this cluster while the second one comprises 11 businesses applying a formal or modern management practice. One of the implications relevant to this result is that all efforts to resolve the problems of fishery agro industries should be based on managerial characteristics in each of the clusters.

Key words: Managerial Characteristics, Marketing Aspect, Financial Aspect, Business Alliance Aspects, Organization Aspect, Modern Cluster, Traditional Cluster.

INTRODUCTION

Jember Regency, with its agriculture potential, has opportunities to develop the agriculture sector including the fishery. It has some advantages since the region has some agro industry products that are supported by specific potential of the region. Currently, the fishery potential in Jember Regency has been developed in some coastal areas, namely in the county (*Kecamatan)* Puger, Kencong, Gumuk Mas, and Ambulu. Potentially, fishery in Jember Regency comprises a picture of Small and Medium Scale Enterprises (SME) agro industry that develops rapidly as fish processing units. These SMEs vary in technologies, ranging from minimally processed to advance technology processed SMEs.

In coastal area, one of economic activities that potentially can support the local economic and region development is an industry that transforms fishery resources into various products. This industry is specific and based on local resources. The majority of businesses in fishery agro industry is dominated by SMEs (Dahuri, 2004). Some evidence shows that SME in fishery agro industry faces some classical problems, such as raw material (fish) supply, technology availability, business management, capital raising, storage, and marketing information. As a system, these problems need an integrated and comprehensive solution that requires a model of development strategy with

the involvement of external parties, especially government as policy makers. However, heterogeneity of fishery agro industry SMEs, in terms of management practices, requires a non-generic development strategy. In other words, the agro industry needs a specific strategy that is suitable for the business condition. Therefore, the identification of managerial characteristics in fishery agro industry is highly required. This articles aims to study the managerial characteristics of the agro industry in coastal areas in Jember Regency using managerial clustering method that can be used to formulate the model of strategy develop for the agro industry.

THEORITICAL FRAMEWORK
Scope of Agro industry
In a dynamic economy, the existence of agro industry is really required. With such an industry, the durability of products, nutrition value as well as revenues, and profitability could be improved such as by processing agriculture products into food and non food product (Hicks, 1991). These agriculture products, as raw materials, can be produced from crop plants, animal husbandry, and fishery.

In relation to the effort above, Tambunan (2000) argues that the number of small and medium enterprises including agro industry is considered significant. They are scattered widely in rural and urban areas and a local specific. In addition, the products of agro industry have unique characteristics, such as seasonality, perishability, and variability. In connection with it, there are three basic components in agro industry, namely raw material fulfillment, processing, and marketing. In agro industry, marketing is considered a starting point. In reality, the failure of agro industry is often due to the inappropriateness between production and marketing (Austin, 1981).

Problems in Agro industry
In relation to agro industry condition, Brunsveld (1982) stated that problems in

agro industry is classified into micro problems mainly related to financing and macro problems related to the policy, economic and social environment of agro industry. For example, Hicks (1991) explained that problems in agro industry relates to variation of raw material, raw material continuity, labor sufficiency, packaging, infrastructure, and technology availability. More specifically, Lim (1990) said that the most popular problems in SME agro industry is access to banking, technology, management, training, marketing, government policy, and business operation.

More specifically, Tambunan (2000) noted that the weaknesses of SME agro industry are in some aspects, such as business development financing limitation, lack of expertise, lack of technology, and business knowledge mainly in global marketing. Still with the problems, Bjerke (2000) stated that bank financing comprises general problems that happen mainly in South East Asia. Theng and Boon (1996) also identified that there are three success factors and failure of SMEs, namely interest rate, taxes, and lack of government support. In another occasion, Tambunan (2000) also reiterated that the roles of government especially in regional or local level, promotion, supports, and bargaining position to other local business comprises important factors in development of SME strategy. Krishnankutty (2000) stated that low prices, low quality, and unorganized market comprise a general problem in SME agro industry.

In a study by Bjerke (2000), it was found that the characteristics of SME agro industry in South East Asia are as the following: (a) starting from family business, very few businesses cooperates with others, (b) owner or manager plays dominant role in decision making, (c) Businessmen are generally not good risk taker, (d) beginning capital generally comes from informal source, (e) SMEs tend to produce and sell good only for local need, and (f) in marketing, pricing is an important thing while personal selling comprises an important activi-

ties in promotion.

Like Bjerke, Tambunan (2000) found that in Indonesia SMEs have formed a cluster but the cluster is considered as insignificant compared to other businesses and it did not make any marketing cooperation or raw material purchasing. SMEs are also less serious in terms of input and output pricing, market opportunity, and solving business problems. Weijland (2000) and Glasmeier (2000) reported that in Indonesia, trade intermediate and wholesale are dominant in daily business of SME through marketing contact or partnership.

Development Strategy for SMEs
Conceptually, Hadi (2006) envisaged that the development strategy for SMEs can be classified into two levels of strategies: internal strategy and external strategy. First, the internal development strategy includes (a) the development of business strategic planning (based on the study of Upton et. al, 2004), (b) the formulation of expansion and exit strategy (Hadi, 2006), (c) the improvement of a low awareness about the concept of marketing (Carson, 1993 in Tzokas et. al, 2001), and (d) the development of an export quality product. Secondly, the external development strategy for SMEs can be conducted by (a) the initiation of e-commerce program in which its application should follow the concept of ladder (Taylor and Murphy, 2004), (b) the development of research and development program that supports the successfulness of SMEs.

Tanabe and Watanabe in Arinaitwe (2006), consider the SMEs limitation in technology capability, technology supports, and financial capability, (c) the development of micro finance institution since SMEs tends to have incapability in accessing sources of fund, such as banking or other third party. (Arinaitwe, 2006), (d) the establishment of a cluster network consisting of manufacturers, trade associations, and providers of training, research and development services, and the establishment of access to funding to make the bargaining position of SMEs in the market (Hanna and Walsh, 2002), and (e) the establishment of cooperation with main stakeholders in the form of synergy among SMEs, government as policy maker, and higher education institution as educators and business researchers (Leonidou, 2004).

Empirical Study on Application of Cluster Analysis
The applications of cluster analysis have been conducted by some researchers, such as Jurowski and Reich (2000), Jogaratnam (2002), Thilmany *et.al* (2006), Kunto and Khoe (2007), and Sharma and Wadhawan (2009). Jurowski and Reich (2000) applied cluster analysis to identify market segmentation in tourism industry. They found two segments in the industry in the study, such as segment (cluster) of frequent traveler and segments (cluster) of home bodies. Jogaratnam (2002) used cluster analysis to classify small independent restaurant into entrepreneurial posture and conservative group. This finding showed that both groups exercised different strategies and attained different performance levels. This study implied that entrepreneur and conservative strategy comprises two unequal strategies.

Thilmany *et.al* (2006) applied cluster analysis and factor analysis to Profile the segments of meat consumers and factors influencing these segments. He found five clusters of meat consumers, namely quality seekers cluster, health and natural consumers cluster, moderate consumers cluster, empathetic value seekers cluster, and price conscious cluster.

Kent and Khoe (2007) applied cluster analysis as a complement of CHAID (*Chi-square Automatic Interaction Detector*) analysis to form clusters in male user and non user group of a facial wash product in Surabaya. Sharma and Wadhawan (2009) applied *cluster analysis* to identify the taxonomy of SMEs in India. The result of analysis concluded three clusters of SMEs in India, namely cluster of SMEs oriented to growth and having an intensive network (66

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companies), cluster of innovator with sustainable growth (14 companies), and cluster of independent survivors (55 companies). Managerial

RESEARCH METHOD
Population and Samples
This study is an exploratory endeavor, which basically explores clusters in SMEs fishery agro industry. The population is all business units in fishery agro industries in coastal areas of Jember regency. The sample was determined by snowball sampling method in every coastal area.

Research Data
The data were gathered by means of questionnaires that cover business unit identity, business aspect, marketing aspect, financial aspect, human resources aspect, and others. Beside, the data were also obtained directly from respondents through small discussion. From this, 79 respondents of businessmen fishery agro industry in Jember Regency were interviewed related to whether they are practicing in some aspects of human resource, marketing aspect, financing aspect, strategic alliance aspect, organization and Management, government support, companies development strategies, and other aspects. The total is 42 questions distributed to them.

DATA ANALYSIS AND DISCUSSION
Cluster analysis method was implemented, with the steps as the following (Hair, 1998):
Database preparation
This step was aimed to detect the existence of data outlier and evaluate whether the data have the same unit of measurement (standardized). The detection of data outlier was based on non formal method (i.e. graphical method). The pair wise removal of data outlier can be used when the data outlier exist. The process of data standardization was done by giving a *coding* on the every response.

Examination of the existence of multicollinearity among variants

One of important assumption in Cluster Analysis is that the variants must not correlate with other variants since multicollinearity can cause misleading in the clustering. Analysis of correlation technique was used to detect the multicollinearity among variants. Variants with coefficient correlation score between 0.8 - 0.9 would be categorized as multicollinear variants. One of multicollinear variants should be removed.
Determination of the number of clusters
The number of clusters was determined by using *K-means clustering*. Therefore, number of clusters was predetermined.
Identification of managerial characteristics
After the clustering process, managerial characteristics in every cluster was identified by profiling the managerial characteristics of respondents that were member of a cluster.

Generally, fishery agro industry in Jember regency scatters in four counties (*Kecamatan*), namely *Kecamatan* Puger, *Kecamatan* Gumuk Mas, *Kecamatan* Kencong, and *Kecamatan* Ambulu. The existence of fishery agro industry in these regions are due to these regions comprises a potential coastal area. Perishability characteristic of fishery products has forces the fishery agro industry to be established in surrounding coastal areas. The types of agro industry businesses developed in Jember regency include dried fish ago industry, preserved fish, smoked fish, fish chips, fish oil, fish powder, and *terasi* (tasty flavor). The management of fishery ago industry varies according to aspects business managerial. The following is the Profile of fishery agro industry in Jember regency.

Types of Business
The types of respondents' business vary. The detail of the types of business is presented in Table 1.

The distribution in Table 1 shows that the types of businesses were dominated by preserved fish, dried fish, and *terasi* agro industries. These businesses generated products that had relatively high demand potential, mainly for household consumption.

Table 1
Profile of the Types of Businesses of Respondents

Research Area	Dried Fish	Preserved Fish	Smoked Fish	Fish Chips	Fish Powder	Fish Oil	Terasi (tasty Flavor)	Total
Puger Kulon	14	6	0	1	10	0	10	41
Puger Wetan	3	5	0	0	0	2	4	14
Gumuk Mas	0	8	2	0	0	0	0	10
Kencong	0	0	7	0	0	0	0	7
Ambulu	0	5	0	0	0	0	2	7
Total	17	24	9	1	10	2	16	79

Source: primary data, 2009.

Table 2
Profile of Resource Management

Variable	Description	Total Respondents	%
Source of Raw material	Fishermen in companies surrounding	62	78,48
	Alliances with Fishermen	15	18,99
	Produced by companies	2	2,53
Availability of Human resource	From surroundings	70	88,61
	From other areas	9	11,39
Technology Support	Traditional Technology	67	84,81
	Low Technology	11	13,92
	High Technology	1	1,27
Awareness of Quality	Quality is Important (due to hygienist reason)	2	2,53
	Quality is Important (due to competition reason)	55	69,62
	Quality is not Important (market not demand it)	20	25,32
	Quality is not Important (no competitor)	2	2,53
Research and Development	Available	69	87,34
	Not Available	10	12,66

Source: primary data (2009)

Meanwhile, other types of businesses, namely fish chips, fish powder, and fish oil agro industry, consists of agro industries that use a relatively complex technology compared to other businesses. Therefore, the number of them is small in terms of number.

In terms of regionalism, Puger Wetan and Puger Kulon comprise two regions that have variety of types of businesses compared to other regions. Businesses in *Kecamatan* Gumuk Mas are concentrated on the preserved fish and smoked fish. Generally, businessmen in this *Kecamatan* get the supply of fish from fishermen in *Kecamatan* Puger. This is because the potency of fish catching in coastal area of *Kecamatan* Gumuk Mas is not sufficient to supply business need.

In *Kecamatan* Kencong, agro industries are focused on the smoked fish one. The supplies of fish in this region are from coastal area of Paseban village which the fish catching is not as big as the one in *Kecamatan* Puger. Therefore, the variety of businesses in this *Kecamatan* is very low. In *Kecamatan* Ambulu, businessmen obtain their raw material of fish from coastal area of Ambulu, namely Plalangan village and Tanjung Papuma beach. But, due to the environment damage, supply of fish in *Kecamatan* Ambulu is procured by fishermen in Tanjung Papuma beach.

Resource Management Aspect
Profile of resource management in agro industry is presented in Table 2. It shows that the majority of business in fishery agro industry in *Kabupaten* Jember obtained fish

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Table 3
Profile of Aspect Marketing

Variable	Description	Total Respondents	%
Packaging	Not Using Packaging	27	34,18
	Using Packaging	52	65,82
Understanding the importance of Marketing	Perceived Marketing Concept as not Important	59	74,68
	Perceived Marketing Concept as Important but not Applied it	15	18,99
	Perceived Marketing Concept Important and Applied it	5	6,33
Understanding Phenomenon of Global market	Not Know the Phenomenon of Global market	26	32,91
	Know Phenomenon of Global market, But Ignore it	39	49,37
	Know Phenomenon of Global market, Not Able to Manage It	9	11,39
	Know Phenomenon of Global market, Able to use it for business progress	5	6,33
Pricing Analysis	Follow Market/ Distributor price	50	63,29
	Conduct Price Analysis , in simple way	19	24,05
	Conduct Price Analysis, considers ROI	1	1,27
	Conduct Price Analysis , Price as strategy	9	11,39
Coverage of Product Marketing	Kabupaten Jember	26	32,91
	Kabupaten Jember and surrounding	44	55,70
	East Java Province and other province	9	11,39
Use of Marketing Information System	Use Market Information System	53	67,09
	Not Use Market Information System	26	32,91
Use of Technology Information for Marketing	Telephone/Hand telephone	66	83,54
	Facsimile	2	2,53
	e-mail	0	0,00
	Internet	11	13,92

Source: primary data (2009)

Table 4
Profile of Financial Aspect

Variable	Description	Total Respondents	Proportion
Financing From Banking	Yes	31	39,24
	No	48	60,76
Source of Non Bank Financing	Equity	62	78,48
	Equity and Cooperatives	8	10,13
	Equity and Investors	9	11,39
Accounting Practice	No Accounting Practice	40	50,63
	Yes, Simple Accounting	38	48,10
	Yes, Standard Accounting	1	1,27
Evaluation on Financial Performance	No Evaluation, since no document	45	56,96
	No Evaluation, but document exist	7	8,86
	Do Evaluation, to get feedback	8	10,13
	Do Evaluation, to measure the performance	19	24,05

Source: primary data (2009)

supply from fishermen surrounding the business location. Majority of businessmen (88%) in the regions employed neighborhood as workers. Majority of businessmen in various types of business (85%) used traditional technology. The awareness of businessmen on the importance of quality was very good. Fifty seven respondents (72,16%)

stated that they had concerned very much on the quality of product and process of production. In general, the business in those regions did not conduct research and development activity in relation to their business.

Marketing Aspect

The profile of marketing aspect of respondents is presented in Table 3. Generally, the use of packaging (starting from simple packaging, like bamboo basket, to representative packaging, such as plastics) in fishery agro industry was relatively high. Businessmen deciding not to use packaging were the ones which were focused on production only. The units using packaging were relatively dominantly (66% of respondents). Understanding about marketing among respondents was very weak. Majority of respondents (75%) perceived marketing as not important in their business operational activity while the remaining stated that they knew phenomenon of global market but they did not have any capability to manage. On the other side, majority businessmen of fishery agro industry in Jember regency did not conduct an analysis to set price of processed product. 63,29% of respondents stated that they merely followed market or distributor prices. This indicated that most of businessmen in fishery agro industry were price taker and had a weak bargaining position in catering the consumers.

Market coverage of fishery product in agro industries tend to be local, mainly in Jember regency and others in East Java Province. It was 89 percent of respondents marketed their processed product in these areas. Most of respondents (75,71%) perceived that information system were needed. This group felt that information about market dynamics, such as demand potency in certain market, were needed so that they could predict whether their processed product could be well absorbed by market. Majority of businessmen used telephone/hand telephone as communications equipment to get information about the market. Very few used facsimile facility as communication

equipment. Meanwhile, None of businessmen used e-mail but very few of them used internet to download information relevant with the improvement of product and processing quality.

Financial Aspect

The profile of financial aspect of Respondents is presented in Table 4. Generally, fishery agro industries that could get fund access from banking were very few, about 39 percent. This indicates that the dependency of fishery agro industries on liability fund was relatively low. All respondents financed their industries from equity or capital owner since basically a business should have it. In managing companies' financial, most of businessmen in fishery agro industries (51%) did not implement the accounting process. They assumed that accounting was difficult to do. Meanwhile, 49 percent of respondents stated that they have practiced accounting, either simple accounting or the standard one. Consistent with capacity to practice accounting, most of respondents (65,8%) did evaluation on their business financial performances periodically.

Business Alliances Aspect

The profile of business alliances aspect of respondents is presented in Table 5.

Bargaining position of businessmen to supplier and consumer was relatively good. Most of respondents (61%) have relatively high bargaining position to both supplier and consumer and 28 percent of respondents had a low bargaining position to both supplier and consumer. Some respondents (42%) perceived that substitute product exist while the remaining perceived that substitute product did not exist. The existence of substitute product indicated that they considered the existence of threat from substitute product. Most of respondents assumed that alliances with raw material supplier were not needed since raw material needed in production process could be easily obtained in the market and their product comprised a final undifferentiated product.

Table 5
Profile of Business Alliances Aspects

Variable	Description	Total Respondents	Proportion
Bargaining Position to Supplier and Consumer	Supplier: Relatively high Consumer: Relatively high	48	60,76
	Supplier: High Consumer: Relatively Low	7	8,86
	Supplier: Low Consumer: Low	22	27,85
	Supplier: Low Consumer: High	2	2,53
Perception to Substitute Product	Exist	33	41,77
	Not Exist	46	58,23
Business Alliances With Raw Material Supplier	Alliances Not Needed (since needed raw material can be easily get in market)	45	56,96
	Alliances with Fishermen is needed (to ensure availability of raw material)	24	30,38
	alliances with middle man is needed (to ensure availability of raw material)	10	12,66
Business Alliances With Other Companies	Not Conduct Alliances (Since product of companies is final product)	62	78,48
	Conduct Alliances (since product of companies is an input for other companies)	14	17,72
	Conduct Alliances (since product of companies is marketed together with other product in an common outlet or store)	3	3,80

Source: primary data (2009)

Table 6
Profile of Organization and Management

Variable	Description	Total Respondents	Proportion
Business Status	Family Company	64	81,01
	Not Family Company	13	16,46
	Combination	2	2,53
Business Plan	No Business Plan (Not Know How to Make)	52	65,82
	No Business Plan (Document is not beneficial)	11	13,92
	Have Business Plan (But not being used)	13	16,46
	Have Business Plan (and being used)	3	3,80
Domination of Owner In Decision Making	Owner is Manager	74	93,67
	Owner Conduct Monitoring Only	1	1,27
	Owner Delegate to Companies Manager	4	5,06
Effort Toward Bankable Companies	Bankable (For Small Loan)	32	40,51
	Bankable (For Huge Loan)	11	13,92
	Not Bankable (Not Meet Formal Requirement)	34	43,04
	Not Bankable (Need Others Help)	2	2,53

Source: primary data (2009)

Organization and Management Aspect
Profile of organization and management aspect of respondents is presented in Table 6.

From business status point of view, the majority of fishery agro industries businesses in Jember regency comprised family companies (81%). In terms of the existence business plan, about 80% of respondents stated that they did not have this document. This indicated that most of fishery agro industry businessmen in Jember regency run business activities non-formally since the development of business from time to time was not planned well. In terms of decision making, majority of respondents stated that their roles were not only acted as the owner

cal Government Support

Variable	Description	Total Respondents	Proportion
Policy,	No Support at all	71	89,87
Management	Support in form of an Incidental Program	3	3,80
Training and other	Support in form of Local Act	0	0,00
Support	Support in form of the Development Program	5	6,33
Easiness in	Yes	8	10,13
Taxation	No	71	89,87
Access to Cheap	Able to Access	17	21,52
Credit Rate	Not able to Access (Since Facility did not exist)	62	78,48
Promotion Support	No Promotion support	77	97,47
	Promotion Support as Local Product	1	1,27
	Promotion Support in Form of Showroom (Outlet) Facility	0	0,00
	Include Product In Exhibition	0	0,00
	Upload Product Info in Local Government Website	1	1,27

Source: primary data (2009)

Table 8
Profile of the Development Strategy

Variable	Description	Total Respondents	Proportion
Strategic Planning	Have no Strategic Planning (Not Know How to Make It)	42	53,16
	Have no Strategic Planning (Document is not beneficial)	11	13,92
	Have Strategic Planning (not using it as guidance)	23	29,11
	Have Strategic Planning (use it as guidance)	3	3,80
Expansion	Exist	24	30,38
Strategy	None	55	69,62
Exit Strategy	Exist	56	70,89
	None	23	29,11
Analysis on	Conduct Analysis on Environment Change	34	43,04
Environment	Not Conduct Analysis on Environment (Not influenced By Environment Change)	15	18,99
Change	Not Conduct Analysis Environment (Not Know How to Do)	30	37,97

Source: primary data (2009)

of company but also as manager of company. It means that a daily control activity was conducted by them. Very few of fishery agro industry businessmen stated that they did not play a dominant role in business decision making and business management. About 54% of respondents stated that they have been *bankable* either for small loan or huge one. This indicated that most of fishery agro industry businessmen have met a formal requirement of credit application in banking. Meanwhile, 46% of respondents perceived that they were not bankable. In this group, majority of businessmen thought that they were not able to be bankable since they could not satisfy the formal requirement stated by bank.

Local Government Support Aspect
The profile of local government support to respondents' business is presented in Table 7. Majority of respondents stated that there were no local government supports in form of policy, management training, supporting organization, product marketing, promotion and others. This indicated that the develop-

Table 9
Involvement of Other party

Variable	Description	Total Respondents	Proportion
Cooperation With	Yes, in Training Activity	1	1,27
Higher education or	Yes, in Extension Activity	2	2,53
Other institution	Yes, in Seminar Activity	0	0,00
	None at all	76	96,20
Contribution of Higher	Accept Contribution	3	3,80
Education or Other	Not Accept Contribution	76	96,20
Institution in the			
Business Development			
Cooperation With	None at All	73	92,41
Stakeholders	Conduct a Incidental Cooperation	6	7,59

Source: primary data (2009)

ment of businesses was due to their maximum effort without any technical assistance from local government. In terms of taxation, majority of respondents (almost 90%) stated that they did not get any ease in taxation. This indicated some possibilities namely (a) tax allowance was not given since they were considered as business that have income lower than a non tax deductible income, (b) businessmen have paid the tax but they did not get any incentive from local government. From financing point of view, role of local government (including banking) to give a lower cost of capital was not realized by most of respondents (79%). Meaning to say, if they needed a loan then they had to pay a cost of capital that is the same as the prevailing interest rate in banking. In addition, role of local government to give promotion support and technical assistance on the use of information technology relevant with the development of fishery agro industry considered as insignificant.

Development Strategy Aspect
The profile of development strategy of respondents is presented in Table 8. In terms of strategic planning, most of respondents (67,1%) stated that they did not have document of strategic planning that can be used as guidance for their business management. Only 37,9% of respondents stated that they had the document. In terms of expansion strategy, most of respondents (69,6%) stated

that they did not have any planning to develop the business, either written or not. This indicated that they run business conventionally, as their capacity, and tended to follow dynamics happening in market only. Most of respondents (70, 89%) stated that they had exit strategy planning, mainly in relation with business succession to next generation. Forty three percent of respondents stated that they conducted business environment analysis. They watched the environment changes and assessed whether the changes will influence their business. For example, when the issue on use of formalin as preservative of product arises, they responded this by using natural preservative that will not threaten human health. 57% of respondents stated that they did not conduct environmental analysis for two reasons. First, they did not conduct environmental analysis since they thought that their business was not influenced by environmental changes. Second, they thought that so far their product was marketed locally and had a relatively stable market.

Other Aspect
The involvement of other party in the development of fishery agro industry in *Kabupaten* Jember is presented in following Table 9.

Cooperation between fishery agro industry in Jember regency and Higher Education or other institution, both institutionally and

Table 10
Variants Differentiating the Cluster

Variants	Cluster		Error		Calculated	Significance
	Mean Square	df	Mean Square	df		
Raw material	8.010	1	.853	77	9.386	.003
Use of Technology	7.416	1	.572	77	12.971	.001
Understanding to Global market	10.455	1	2.689	77	3.888	.052
Price Analysis	18.871	1	3.642	77	5.181	.026
Market Coverage	4.790	1	1.566	77	3.059	.084
Credit Access	18.871	1	.733	77	25.732	.000
Source of Capital	8961.486	1	1.769	77	5065.0	.000
Substitute Product	4.898	1	.935	77	5.241	.025
Alliance with Supplier	13.224	1	2.385	77	5.545	.021
Access to banking	94.573	1	5.543	77	17.060	.000
Environmental Analysis	13.045	1	3.145	77	4.148	.045

individually, was hardly found in recent years. Majority of respondents stated that they did not conduct cooperation at all in recent years. This condition showed that the development of fishery agro industry was not part of Higher Education or other institution programs. Contribution of Higher Education or other institution in development of fishery agro industry in Jember regency was also not experienced by businessmen. Ninety six percent of respondents stated that there was no contribution from Higher Education or other institution in the business development. In terms of cooperation with stakeholders, such as Higher Education, Businessmen Association, policy makers, and researchers, the majority of respondents stated that these institutions had not implemented the programs in the some recent years.

Results of Analysis
The result of multicollinearity analysis showed that there was no significantly high correlation among variants. K-means method was used to get the number of clusters explored from the database. The result showed that the number of clusters were two clusters. The result of ANOVA (analysis of variance) in Table 10 informed that there were 11 variants that could differ both clusters, namely raw material, use of technology, understanding to global market, price analy-

sis, market coverage, credit access, source of capital, substitute product, alliance with supplier, access to banking, environmental analysis. Table 10 also implied that other variants statistically did not differentiate the two clusters.

The next step after the process of clustering was identification of managerial characteristics of every cluster. Based on variants in Table 10, characteristics of every cluster are summarized in Table 11.

Table 11 showed that Cluster 1 had the number of members higher than the number of members in Cluster 2. Cluster 1 consisted of fishery agro industry that were depending on the availability of raw material in market, not using technology in their production process, not understanding about phenomenon of global market, not conducting price analysis, not getting access to fund provided by banking, using equity financing, not conducting alliances with supplier, depending on other party help to be a bankable company, and not environmental conducting analysis. While Cluster 2 consisted of fishery agro industry that were having cooperation or alliances in raw material fulfillment, using technology in production process (at least low technology), understanding about phenomenon of global market, relatively paying attention to pricing, getting access to funding from banking, depending on fund from investors, not conducting alliances with

Table 11
Managerial Characteristics of Fishery Agro industries in Jember Regency

Aspects	Cluster 1	Cluster 2
Member	68	11
Raw material Fulfillment	Member of cluster in general satisfies the need of raw material from surrounding, part satisfies raw material through cooperation or alliances with fishermen, and very few produces their own raw material.	Member of cluster mostly satisfies the need of raw material through cooperation or alliances with fishermen and very few satisfies from surrounding
Use of Technology	Member of cluster in general used traditional technology, some used low technology, and very few used high technology.	Member of cluster mostly used low technology and very few used high technology.
Under-standing about Global market	Member of cluster in general did not know phenomenon of global market and very few know phenomenon of global market but ignore it	Member of cluster had a heterogeneous understanding about global market. Most did not know phenomenon of global market. Some knew but ignore it. And very few know the phenomenon but think cannot overcome it.
Price Analysis	Most of business in this cluster did not conduct Price Analysis (but they set price as competitors') and very few conduct simple Price Analysis	Unit business in this cluster varies in conducting Price Analysis. Some businesses did not conduct Price Analysis. Very few conducted a simple Price Analysis and only one business considered investment rate of return to set the price.
Credit Access	Majority of business units in this cluster have not got access to funding from banking (only 3 unit businesses have accessed)	All of business units in this cluster have got access to funding from banking.
Source of Capital	Majority of business units funded their business through alliances with investors and very few (3 unit businesses) funded the business by equity .	All of business units in this cluster satisfied need of fund through alliances with investors.
Alliances with Supplier	Majority of business units in this cluster did not conduct alliances with supplier due raw material could be easily obtained from surrounding and some conducted alliances with supplier to ensure the availability of raw material.	All of business units in this cluster did not conduct business alliances with supplier since raw material could easily obtained from surrounding.
Access to Banking	Business units in this cluster tended to require other party assistance since they did not have any formal requirement needed by banking.	Business units in this cluster had capacity to get fund from bank although in small amount.
Environmental Analysis	Majority of businesses in this cluster did not conduct environmental analysis.	Some of businesses conduct environmental analysis and some did not.

supplier, bankable company, and conducting environmental analysis.

Based on this general description, Cluster 1 tends to be conventional or traditional and Cluster 2 tends to be formal/modern. Therefore, Cluster 1 is named as Cluster of Conventional/Traditional Fishery Agro industry and Cluster 2 is named as Cluster of Formal/Modern Fishery Agro industry.

The managerial characteristics of cluster 1 indicate that all aspects in this cluster needs to be improved. Companies in cluster 1 have to conduct a strategic alliance or co-operation with supplier to ensure the availability of raw material by establishing a co-operative or other form of alliances organization. This cluster has to be introduced with a relatively new and modern technology of

production process. This will help companies in the cluster in producing healthier fishery products. All managers/owners of business in this cluster need financial management knowledge so that they can make a price analysis and have better access to source of fund. Lastly, their capability in doing environmental analysis need to be improved so that they will be relatively understand to the dynamics of their business environments, including the global market dynamics. A better understanding in the environment analysis will gradually increase the competitiveness of their business.

The companies in cluster 2 are relatively better in the aspects related to financial management. They have exercised a relatively good financial practice so that (a) they do not have any problem in accessing the banking funds, (b) they are able to collaborate with investors, and (c) some of them are able to conduct price analysis. Also, they use a relatively higher technology of production process. This cluster needs to be improved in their capability in conducting an environmental analysis so that they have a better capacity in understanding the dynamics of business environment and its impact on the business competitiveness.

Beside specific characteristics, both clusters in fishery agro industry have general characteristics derived from aspects that could not differentiate both clusters statistically. The followings are general characteristics:
Human resource need was satisfied from people in surrounding area;
Most of businesses did not conduct Research and Development;
Most perceived that marketing aspect is not important but quality product is important;
Market coverage include mainly in Jember regency and other regencies in East Java Province;
Businessmen have used information technology for the sake of information system;
Majority of businesses satisfies the need of fund from equity;
Most of businesses had very good bargaining position to supplier and consumer;
Most of businesses did not conduct alliances with other companies, either as consumer or raw material supplier;
Majority did not have legal aspects and did not conduct performance evaluation;
Majority of businesses were controlled directly by the owner;
Majority of businesses did not receive technical assistance from and did not conduct cooperation with stakeholders, including government, higher education, supporting institution, and banking;
Majority of businesses did not conduct business promotion, either individually or collectively, and did not conduct product diversification; and
Majority of businesses did not have strategic planning, business development planning, and exit strategy.

These general characteristics indicate that both clusters have some weaknesses that need to be improved. Practically, the fishery agro industry companies have no capability to write their plan of business. The majority of the businesses did not have strategic and development planning, performance evaluation mechanism, and marketing development program. It means that the planning and controlling are weak in majority of the businesses. In addition, majority of the businesses did not consider marketing as an important aspect. They did not conduct both promotion and product diversification. As a result, the products of this agro industry are only sold on traditional market. By conducting product diversification, such as packed-high quality dried fish, the products can penetrate into modern markets (i.e. super markets) which provide higher margins. These general characteristics imply that the effort to develop the fishery agro industry has to be focused on the improvement of business management practices.

CONCLUSSION AND IMPLICATION
It is concluded that there are two clusters of businesses in fishery agro industries. First, it is the cluster of conventional or traditional

fishery agro industries. Second, it is the clusters of formal or modern fishery agro industries.

The first cluster consists of fishery agro industries that merely depend on the availability of raw materials in the market, not using technology in their production processes, not understanding about the phenomenon of global market, not conducting price analysis, not getting access to fund provided by banking indusrties, using equity financing, not conducting alliances with supplier, depending on other party help to be a bankable company, and not environmental conducting analysis.

The second cluster consists of fishery agro industries that have cooperation or alliances in raw material fulfillment, using technology in production process (at least low technology), understanding about phenomenon of global market, relatively paying attention to pricing, getting access to funding from banking, depending on fund from investors, not conducting alliances with supplier, bankable company, and conducting environmental analysis.

It showed that there are two clusters in fishery agro industry in Jember regency, namely cluster of conventional/traditional fishery agro industry and cluster of formal/modern fishery agro industry. This finding conceptually has some implications related to the development of fishery agro industry businesses in Jember regency. This can be asserted as the following.

First, this clustering indicated that the efforts to develop the businesses in fishery agro industries in Jember regency could not be implemented in ordinary way. This implies that the efforts to develop the businesses should be oriented to the condition and characteristics of each of clusters.

Second, in general the business management practices in various aspects in the study are relatively weak in both clusters. Therefore, the development strategy should focus on strengthening these managerial aspects.

Third, the intensity of technical assis-

tance by stakeholders for the business development of this agro industry should be focused on cluster 1 due this cluster contains businesses with a conventional/traditional business management that need to be improved and majority of businesses are in this cluster. Technical assistance from higher education, local government, and other supporting institutions is highly required by members of this cluster.

Fourth, the role of stakeholders is required to support further development of business in fishery agro industry. Therefore, the analysis on roles of stakeholders in the business development in fishery agro industry is needed as a follow up. Last, this study could be followed up by conducting further study related to formulation of business development strategy, including the model to develop the strategy.

Suggestions

Based on the results of the study, there are three suggestions in relation to the development of agro industrial fishery products in Jember regency. First, all businessmen in both clusters should improve their business management practices, in all aspects, either with or without the assistances of all stakeholders in the business. Second, local government should formulate agro industrial fishery products development program that fits to the needs and characteristics of every agro industry cluster. Third, higher educations and other supporting institutions should work together to provide a technical assistance, such as in the use of technology, access to financial sources, business marketing, and others, especially to businesses in Cluster 1.

Limitations

There are some limitations in this study. First, it studies all types of businesses existing in the research areas without any specific classifications. To obtain a better managerial characteristic, further research could classify the respondents into simple processes business (consisting of dried fish, preserved fish,

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and smoked fish) and processed product business (consisting of fish chips, fish powder, fish oil, and terasi/fermented flavor). Second, the clustering process was based on all 42 variables as a whole. For that reason, further research may group these variables into seven managerial aspects using factor analysis and then identify the cluster based on smaller number of variants.

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