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A MODEL OF FISH MARKETING AT PAOTERE FISHING PORTS FOR INCREASING FISHERMEN'S INCOME

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ABSTRACT

The marketing of fish harvest on demand and supply, does not make a significant difference of fishermen income. Marketing model of fish harvest becomes very important for increasing fishermen income. The research conducted on June to December, 2016. Data collection techniques include; Interviews and literature study. Respondents were determined based on purposive sampling method. The method of analysis used is Structural Ecuation Modeling (SEM). The result of analysis shows that system of fish marketing factor is significantly influence to fisherman's income, fisherman's welfare and capital capability, so that the required sale of fish harvest with an auction system that is supervised directly by superintendent and cooperative administrator. Marketing strategy is focused on improving the quality of human resources of Paotere Fishing Ports, as well as increased government support on capital assistance for increasing fishermen's income.

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INTRODUCTION

Marketing problems, viewed from the legal aspect of demand and supply, sometimes little or large fishing harvest, don't show any difference to income of fishermen's. Due to a weakness in the marketing system so that fishermen don't get the maximum of fishing harvest. This condition is experienced by most fishermen in Makassar Town, especially in Paotere Fishing Ports, so that the capture fishery activity has not contributed significantly to the welfare of fishermen as a source of income. Based on these issues, the focus of this study is to formulate models and strategies for the development of regional economic potential, especially the fisheries sector. Therefore, the authors want to know the marketing system of fish harvest in Makassar Town, especially Paotere Fishing Ports and alternative marketing strategies to increase the selling value of fish harvest, and will create an effective and efficient fish marketing model in order to increase fisherman's income (Danial, 2011). The problem solving of fish harvest marketing in Paotere Fishing Ports are very important to increase fisherman's income. Thus the purpose of this study is; 1) Analyzing the marketing system of fish harvest; 2) Formulate an effective and efficient marketing model related to fish harvest; 3) Formulate policies and strategies for marketing of capture fisheries that are appropriate, effective, efficient and equitable for fishermen.

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RESEARCH METHODS

The location of research was conducted at Paotere Fishing Ports and fish marketing area in Makassar Town. This research has been conducted from June 2016 to December 2016. The materials used in this research consist of; stationery, questionaire. The research method used is survey method. Data collection is done on a part of the population or by sampling that is considered to represent the entire population (Suryono,

2010). Data collection using interview technique and literature study. The determination of respondents is done by purposive sampling method that is choosing respondent according to requirement of research based on total population. Primary data obtained from interviews were conducted to fishermen, community leaders, traders (collectors, retailers, exporters), Marine and Fisheries agencies, and other related institutions (Rahman *et al*., 2013). Secondary data is obtained from documents or reports from related agencies (Povilanskas, *et al*., 2012 and Onoja, 2012). Data analysis was done by using inferential statistic approach with Structural Ecuation Modeling (SEM) software. SEM is a statistical technique which allows testing of a relatively complex set of relationships simultaneously. Complex relationships can be built between one or more dependent variables with one or more independent variables. There may also be a variable that doubles as a variable independent on a relationship, but becomes a dependent variable on another relationship, given the existence of a tiered causality relationship. Each dependent and independent variables can take the factor form constructed from several indicator variables. Similarly, among the variables it can form a single variable that is observed or measured directly in a research process. Such SEM have been widely recognized in social studies through various names such as: causal modeling, causal analysis, simultaneous equation modeling or structural analysis of covariance. Often SEM is also referred to as Path Analysis or Confirmatory Factor Analysis, because actually these two names are a special type of SEM (Kline *et al.,* 2001). The assumptions that must be met in the data collection and processing procedures are analyzed by SEM modeling as follows;

Sample size

The sample size that must be met in SEM modeling is a minimum of 100 and then using a comparison of 5 observations for each estimated parameter. Therefore if we develop a model with 20 parameters, then the minimum sample should be used is as many as 100 samples.

Normality and Linearity

Data distribution should be analyzed to know if the assumption of normality is met so that data can be further processed for this SEM modeling. Normality can be tested by looking at a histogram or can be tested by normality test of statistics methods. This needs to be done both for normality against single data as well as multivariate normality, where several variables are used at once in the final analysis. Linearity test can be done by looking at the scatterplots that is by choosing the pair of data and seen the pattern of dissemination to suspect there not linearity.

Outliers

Outliers are observations that occur with extreme values both univariat and multivariate ie the value that arises because of the combination of unique characteristics it holds and looks very much different from other observations. In addition, special treatment can be held on these outliers as long as it is known how the outliers emerged.

Multicolinearity and Singularity

Multicollinearity can be detected from the determinant of the covariance matrix. The very small determinant value of the covariance matrix gives an indication of a multicolinearity or singularity problem. In general, SEM computer programs have provided "warning" facilities whenever there is an indication of multicolinearity or singularity. Data treatment that can be done is to remove the variable that causes the singularity. If the singularity and multicolinearity are found in the data released, one of the treatments that can be taken is to create "composite variables", then use the composite variables in the next analysis. After SEM assumptions are seen, the next thing is to determine the criteria that will be used to evaluate the models and the effects shown in the model. Kline *et al*, (2001) state that in SEM analysis there is no single statistical test tool to measure or test hypotheses about the model. Generally for various types of fit index used to measure the degree of compatibility between models hypothesized with the data presented. Researchers are expected to test using some fit index to measure the "truth" of the model it proposes. Some of its conformance indexes and cut-off values are used in testing whether a model is acceptable or rejected, ie. Chi-Square Statistic (χ^2), Significance Probability, RMSEA (*The Root Mean Square Error of Approximation*), CFI (*Comparative of Fit Index*), IFI (*Incremental of Fit Index*), GFI (*Goodness of Fit Index*), AGFI (*Adjusted Goodness of Fit Index*), and PGFI (*Parsimony Goodness of Fit Index*).

RESULTS AND DISCUSSION

Fish Marketing System

Marketing system conducted in PPI Paotere is an open marketing system that catch fish should be sold to cooperatives, then cooperatives sell to traders and fisheries entrepreneurs. Fishermen do not bear the risk if the fish can't be marketed or damaged, while the price of fish received fishermen from fisheries cooperatives is the net price after the issued price of materials/needs to go to sea, fuel and tax are 2.5%. Marketing system at Paotere Fishing Port in Makassar is different with auction system marketing in accordance with the Minister of Agriculture Decree No.64 year 1977. Marketing system in Paotere Fishing Port, fisherman can't determine the price, because the price is determined by cooperative management especially if fishermen borrow capital from cooperatives, but if fishermen borrow capital from punggawa or collector, then the price is determined by the punggawa. Although there are fishermen who have their own capital in fishing operations, but still have to sell the catch on the cooperative in Paotere Fishing Port. The marketing system occured in Paotere Fishing Port right now, more in Figure 1.

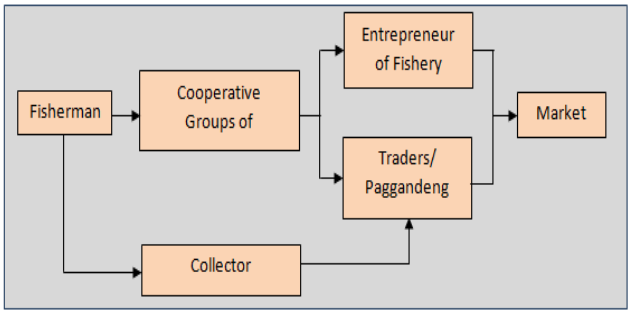

Figure 1. Marketing Mechanism of Fish Harvest in Paotere Fishing Ports (Danial *et al*., 2011)

The current fish marketing system shows that the fisherman's choice in selling or marketing the catch is only on Cooperative or Collector. These conditions make the fishermen to

determine the price of the fish catch, especially the fishermen generally borrow capital from the cooperative or colector. The capital loan becomes a bond, so the fishermen have no other option to sell the fish. The best option that can be increasing fishermen income is by selling direct catch to the market or consumer. Selling directly to the consumer will provide an opportunity for fishermen to determine the price of the fish catch. According to Onoja (2012) that the determination of market participation will give a high impact on the income of fishermen.

Fish Marketing Models

Compatibility model with the data based on the results of theoretical studies with reference to the path diagram that has been designed earlier, it can be compiled early models by conducting SEM analysis. In Figure 2, shows the interaction between constructs with constructs and between constructs with variables.

The results obtained have not met the feasibility test index standards as a condition of a fit model based on the rules, as the limits and criteria for assessing a model. The following shows the evaluation of the Goodness of Fit Index criteria for the initial model on the measurement of each construct with confirmatory factor analysis. The objective is to measure whether the fish marketing model in Paotere Fishing Ports to increase the income of the fishermen has met the Goodness of Fit Index criteria based on the requirements of a fit model as the constraints and criteria for assessing a model (Guswanto *et al*, 2012). The results of the evaluation are shown in Table 1. Based on the Feasibility Index, the resulting model is not fit because the Chi-square value is relatively high is 642,74 and the probability value (p) = 0.000 is smaller than 0.05. Therefore the model will be modified by looking at the value of Modification Indices (MI). The highest MI score of 11.42 connects the covariance of the X42 variable with X11. So the model will be revised by correlating the knowledge variable about the handling or processing of fish harvest (X42) with the variable (X11), then the Chi-Square value decreased by 11.42.

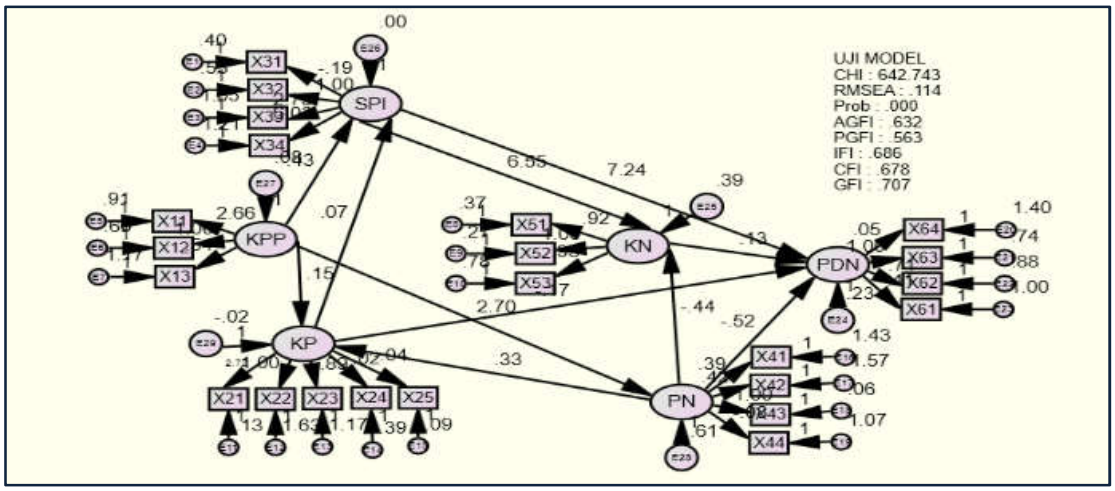

Figure 2. Initial Model of Fish Marketing

Description:

X11	Managemen of Paotere Fishing Port	X41	Knowledge of fishing methods
X12	Facilities and Infrastructure	X42	Knowledge of season /weather
X13	Government Support	X43	Knowledge handling/processing
X21	Fund source of the capital itself	X44	Knowledge of fish prices
X22	Fund source of fishermen group	X45	Maintenance of catching facilities
X23	Fund source of entrepreneurs (punggawa)	X51	Ability to finance the necessities of life
X24	Fund source of financial institutions	X52	Ability to educate their children
X25	Fund source of government	X53	Availability of home
X31	Auction sale system	X61	Revenue from self-sailing
X32	Sold through cooperatives	X62	Revenue from revenue share with owners Revenue
X33	Sold through entrepreneurs/punggawa	X63	from other business
X34	Sold directly to consumers	X64	Family side business income

Table 1. Feasibility Index of Initial Models

Feasibility Index	Index	Results	Remarks
Chi-square	Expected smaller	642.74	Good
Significance Probability	≥0.05	0.000	Moderate
RMSEA(*root mean square error of approximation*)	≤0.08	0.114	Bad
CFI (*comparative fit index*)	≥0.90	0.678	Bad
IFI (*incremental fit index*)	≥0.90	0.686	Bad
GFI (*goodness-of-fit index*)	≥0.90	0.707	Bad
AGFI (*adjusted goodness-of-fit index*)	≥0.90	0.632	Bad
PGFI (*parsimony goodness of fit index*)	≥0.90	0.563	Bad

Sources: SEM Analysis (2016)

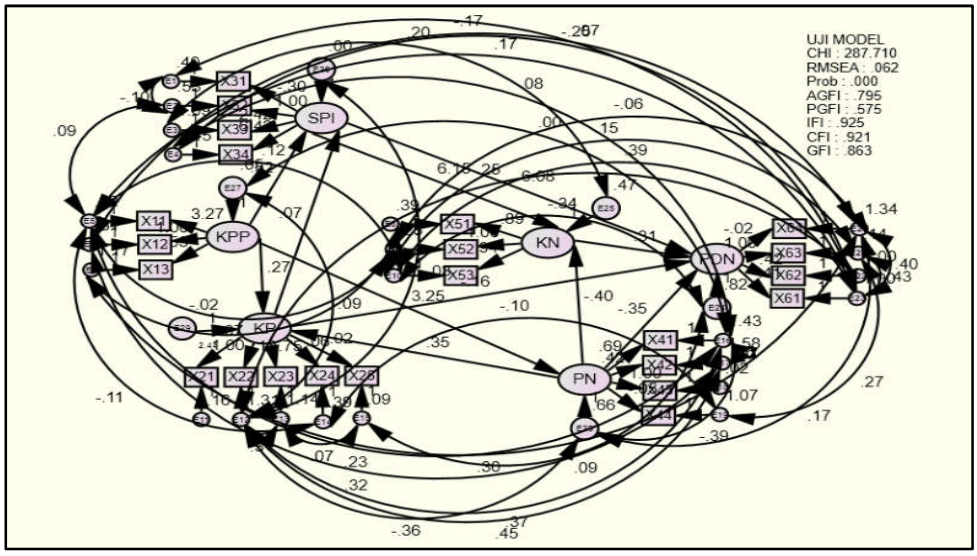

Figure 3. Final Model of Fish Marketing

Table 2. Feasibility Index of Final Models

Feasibility Index	Index	Results	Remarks
Chi-square	Expected smaller	287.710	Good
Significance Probability			Good
RMSEA(*root mean square error of approximation*)	≥0.05	0.000	Good
CFI (*comparative fit index*)	≤0.08	0.062	Good
IFI (*incremental fit index*)	≥0.90	0.921	Good
GFI (*goodness-of-fit index*)	≥0.90	0.925	Moderate
AGFI (*adjusted goodness-of-fit index*)	≥0.90	0.863	Moderate
PGFI (*parsimony goodness of fit index*)	≥0.90	0.795	Moderate
	≥0.90	0.575	

Sources: SEM Analysis (2013)

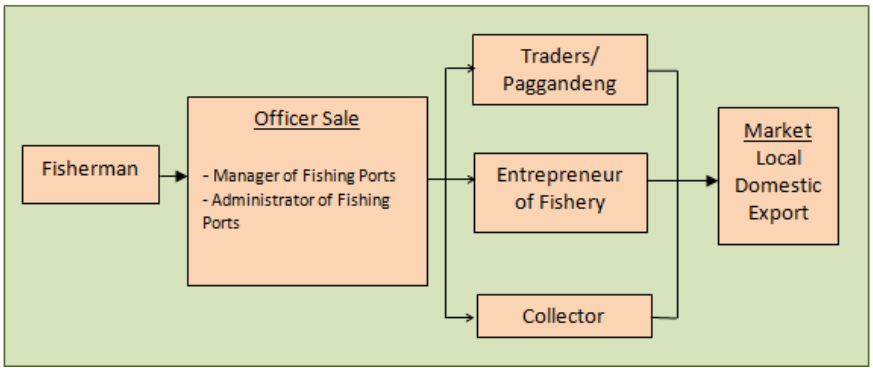

Figure 4. Model of Fish Marketing in Paotere Fishing Port

X11	Management of Paotere Fishing Port
X12	Facilities and Infrastructure
X13	Government Support
X21	Fund source of the capital itself
X22	Fund source of fishermen group
X23	Fund source of entrepreneurs (Punggawa)
X24	Fund source of financial institutions
X25	Fund source of government
X31	Auction sale system
X32	Sold through cooperatives
X33	Sold through entrepreneurs/punggawa
X34	Sold directly to consumers
X41	Knowledge of fishing methods
X42	Knowledge of season /weather
X43	Knowledge handling/processing
X44	Knowledge of fish prices
X45	Maintenance of catching facilities
X51	Ability to finance the necessities of life
X52	Ability to educate their children
X53	Availability of home
X61	Revenue from self-sailing
X62	Revenue from revenue share with owners Revenue
X63	from other business
X64	Family side business income

Then correlate the variables having the greatest MI value with the requirement that the value is more than 4 (MI>4), until a model is considered to be perfectly fit, as illustrated in Figure 3. Testing of conceptual model in Figure 3 after index modification, showing the value of the goodness of fit criteria produced has met the requirements as a fit model and evaluation of the result based on the criteria of goodness of fit index, obtained the result as in Table 2.

According to Table 2 and Figure 3, the value of chi-square is smaller than the initial model, as one of the fit model criteria of 287,710 with the value of other goodness of fit index criteria, namely: RMSEA value of 0.062, CFI value of 0.921, IFI value of 0.925, GFI value of 0.863, AGFI value of 0.795 and PGFI value of 0.575, then overall this criterion meets the recommended standard. The evaluation of goodness of fit criteria on the overall model shows that there is no critical

Table 3. Interaction between variables significant with the strategy used

No	Interaction between variables/factors	Strategies
1	Condition of Fishing Ports (KPP) with Knowledge of Fishermen (PN), Facilities and infrastructure of Fishing Ports (X12)	Improving skills of human resources (managers/ crew/fishermen) with training and introduction of new technology packages implemented of Paotere Fishing Ports/Fisheries Management, academicians, improvement of infrastructure facilities and expansion of parking area implemented
2	Capacity of Capital (KP) with Income of Fisherman (PDN), Fund source of the capital itself (X21) and Fund source of entrepreneurs (Punggawa) (X23)	Development of partnership of fishery capture industrial and fishery marketing with the government, banking service or financial institution and fund aid from the government related to give capital to the fisherman. In order for fishermen to make an arrest effort without burdened with interest-bearing loans
3	Fish marketing system (SPI) with fisherman's welfare (KN), Sold through entrepreneurs/punggawa (X33) and Sold directly to consumers (X34)	A fish marketing system with an auction system that is supervised by Paotre managers and cooperative managers is required. Fishermen are expected to directly sell their fish harvest to the entrepreneurs without going through collecting merchants so that the profits can be maximized.
4	Knowledge of fishermen (PN) with Capacity of Capital (KP), Fishermen's welfare (KN)	It needs innovative, superior and competitive training services programs to produce productive human resources that can compete, this is implemented by companies engaged in the fishery industry in cooperation with the fisheries agency, so the fishermen are able to try independently
5	Fishermen's welfare (KN) with fishermen income	Fishermen should improve their capability of catching, handling, marketing, and thus not necessarily through fish collectors/entrepreneurs who will sell them to consumers
6	Fisherman's income (PDN) with revenue from profit sharing with shipowners (X62)	There needs to be an agreement between the fisherman and the manager or the owner of capital, so that the profit sharing is not solely beneficial to the owner / punggawa, but equally get a decent profit

value violation, so it can be argued that the model is relatively acceptable or has been in accordance with the data. Based on the analysis result, it is found that fisherman's welfare factor (KN) and income factor of fisherman (PDN) is greatly influenced by fish marketing system (SPI) with probability value is more than 0,05. This means that there needs to be a change of the fish marketing system from the indirect system from fishermen to cooperative/collector to the direct system ie the auction system. If the auction system is implemented, it is possible to increase fishermen's income, because fishermen directly sell their fish harvest to trader (Paggadeng), Entrepreneur of Fishery and Collector directly supervised by Officer Sell consist of; Manager of Fishing Port and Administrator of Fishing Ports, ore can be seen in Figure 4.

Development Strategy of Fish Harvest Marketing

The development strategy of the fish harvest marketing is formulated by taking into account the factors that interact based on the model analysis in the previous section. This strategy is expected to answer the interaction needs of these significant factors, so that the development of marketing model of fish harvest becomes more optimal. The fishery industry in Makassar City needs to develop innovative products favored by consumers or the market, this is one of the most effective strategies to increase the income of fishermen (Puspitasari, 2013). Related to port management the strategy to develop the marketing model of fish harvest is directed and prioritized on improving the quality of human resources management Paotere Fishing Port, as well as increased government support in capital assistance for increasing fishermen's income.

Conclusion

- The marketing system of fish harvest in Paotere Fishing Ports not through auction system, but sold to cooperative or to punggawa, so that fish price determined by cooperative or punggawa.
- Factors of fish marketing system significantly influence fishermen's welfare, fisherman's income, and capital capability, so it is necessary to sell fish harvest with auction system which is supervised by the manager of Paotere Fishing Port and cooperative management.
- The strategy to develop the marketing model of fish harvest is directed and prioritized on improving the quality of human resources management Paotere Fishing Port, as well as increased government support in capital assistance for increasing fishermen's income.

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