The Role of Communication as Mediator of the Commitment Effect on the Marine Fish Supply Chain Performance at Bangliau in Bagansiapiapi Riau, Indonesia

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Abstract. This survey study aims to analyse the role of communication as a mediator of the commitment effect on the marine fish supply chain performance to bangliau (distributors’ fish landing site) in Bagansiapiapi, Riau Province, Indonesia. The unit of analysis for this study was 40 units bangliau, namely a place of collection, distribution, and marketing of fish. Respondents were 40 bangliau owners/managers who were taken by the census method. The data was collected using a closed questionnaire, containing several statements measured by a 5-point Likert scale. The data collected includes communication (language, clarity of message content, communication frequency, decision without pressure, and communicates honesty); commitment (affective, avoiding opportunists, normative, continuous improvement, goal oriented, confidence); and supply chain performance (the smoothness of the goods flow, money flow, and information flow). There were two hypotheses proposed in this study: commitment has a positive and significant effect on the marine fish supply chain performance in bangliau ($H_1$); and commitment mediated by communication has a positive and significant effect on the marine fish supply chain performance in bangliau ($H_{1a}$). The data were analysed using the Structural Equation Model (SEM) method, using the Smart Partial Least Square (SmartPLS) software version 3.0. The results show that commitment has a significant effect on the marine fish supply chain performance, but the role of communication as a mediator can further increase the commitment effect. The reason is that communication can increase understanding and help equalize perceptions of the marine fish supply chain among the entities involved.

1. Introduction
Bagansiapiapi in Riau Province is one of the most important centres of the fishing industry in western Indonesia. Fish production in this area is distributed to North Sumatra, parts of Java island, and exported to Malaysia. Fish distributors in Bagansiapiapi are known as tauke (fish collectors/distributors), who buy fish from indigenous Malay fishermen. Tauke accommodates fish supplied by fishermen in bangliau, namely a place to unload, distribute and market fish. Tauke and bangliau are of Chinese origin language, referring to the ethnicity of the distributors, all of whom are Indonesian citizens of Chinese descent [1].
In Bagansiapiapi there are 40 units of bangliau[2]. The tauke always maintains good relations with fishermen to ensure the supply of fish to bangliau. The tauke-fishermen relationship is known as a patron-client relationship. According to [3], tauke as a patron acts like a socio-economic institution in the area, namely regulating the process of fish production and distribution, and fishermen's consumption. They lend money without collateral for the cost of fishing. Meanwhile, fishermen (clients) sell their fish, only to the tauke (owner of bangliau) at a price determined by the tauke.

Patron-client relationships occur on the basis of trust. Trust is defined as an attitude that the needs of one party will be met in the future by the actions of the other party [4], and [5]. Therefore, a person who has believed, will ignore whatever actions the person he has trusted will take [6]. In an economic context, trust is a willingness to take risks, and is dependent on an exchange partner. Trust refers to the extent to which supply chain partners perceive each other as credible and trustworthy partners [7]. Trust is an important factor for a commitment or promise. Commitment is the motivation to maintain and extend the relationship. The higher the commitment built on trust, the higher the quality of the channel relationship between suppliers and distributors of a product or service. Commitment can be measured through indicators consisting of affective, avoiding opportunists, normative, continuous improvement, goal-oriented, and confident [8]. The trust and commitment built by supply chain entities (the parties involved), usually affects the performance of supply chain management (SCM). SCM is an integration of business processes, starting from receiving raw materials, managing each chain of production activities until they are ready for use by users. The supply chain process involves major producers, suppliers, manufacturers, retailers, and consumers. The main objective of any supply chain is to meet consumer needs and generate profits across all entities. SCM, measured by the smoothness of goods flow, money flow, and information flow [9].

Given that information is one of the indicators of SCM, communication is an important factor in the supply chain system. According to [10], communication is the process of exchanging information among participants (people involved in communication), at a certain time, with the aim of equalizing perceptions. Communication indicators include language, message clarity, frequency of communication, decisions without pressure, and honest communication [11]. Communication can have a direct effect on supply chain performance, or simply act as a mediator variable in the effect of commitment on that performance. However, the extent to which communication plays a role in mediating the effect of commitment on marine fish supply chain performance at bungalows in Bagansiapiapi is not known for certain. Therefore this research needs to be done. The conceptual framework for this research is as illustrated in Figure 1. Based on these reasons, two hypotheses were proposed in this study:

- \( H_1 = \) Commitment has a positive and significant effect on the marine fish supply chain performance
- \( H_{1a} = \) Commitment mediated by communication has a positive and significant effect on the marine fish supply chain performance
2. Research Methods

2.1 Population and respondents

This research was conducted in December 2020 in Bagansiapiapi, a marine fish distribution centre in Rokan Hilir Regency, Riau Province (see Figure 2). The research subjects were all 40 bangliau in the area. Respondents were set at 40 people, namely the owner or manager of bangliau. This is done because the population is small (<100). Thus, according to the opinion of [12], the respondent was taken using the census method, which made the entire population as respondents.

Data were collected using closed questionnaires distributes to respondents [14]. There were two types of data collected: primary data, and secondary data. The primary data covers commitment, communication, and supply chain performance. Meanwhile, secondary data was obtained from books and other written documentation published by related institutions/agencies.
\begin{quote}
\textit{Statistical analysis}

The data analysis was carried out in two stages: the instrument testing, and the hypotheses testing. The SPSS (Statistical Package for Social Science) software version 25.0, was used for instrument testing [14]. While the hypotheses testing was used the SEM-PLS (Structural Equation Modeling - Partial Least Square) method with the SmartPLS version 3.2.8 software. The PLS analysis was carried out in two stages, namely the Evaluation of the Measurement Model (External Model), and the Structural Model Evaluation (Inner Model). The external model was used to obtain the validity and reliability of the research construct, while the inner model is used to answer the hypotheses. Hypotheses testing of the bootstrap procedure was used to obtain the t-statistic value for each path relationship. Furthermore, the t-statistic value was compared with the t-table value using a 95% confidence level ($\alpha = 0.05$). If the t-statistic > t-table, the hypothesis is accepted, and vice versa [15].

\section{Results and Discussion}

\subsection{Statistical analysis}

A total of 40 respondents returned the questionnaire (100%), and all questionnaires could be processed data. Furthermore, validity and reliability tests were carried out to ensure all statements in the questionnaire were valid and reliable [15]. The data validity test results shown that there were four not-valid statements in the questionnaire: three statements on the commitment variable, and one statement on the communication variable. These statements are eliminated so that the data can be processed. The validity test results after data eliminated are shown in Table 1.

\begin{table}[h]
\centering
\caption{Variable validity test results}
\begin{tabular}{|l|l|l|l|l|l|}
\hline
Variable & Code & Indicator & r-statistic & r-table & Conclusion \\
\hline
Commitment & COMIT1 & Affective & 0.570 & 0.312 & Valid \\
 & COMIT2 & Avoiding opportunists & 0.445 & 0.312 & Valid \\
 & COMIT3 & Normative & 0.353 & 0.312 & Valid \\
 & COMIT4 & Continuous improvement & 0.596 & 0.312 & Valid \\
 & COMIT5 & Goal oriented & 0.509 & 0.312 & Valid \\
 & COMIT6 & Confidence & 0.565 & 0.312 & Valid \\
\hline
Communication & COMUN1 & Language & 0.626 & 0.312 & Valid \\
 & COMUN2 & Clarity of message content & 0.778 & 0.312 & Valid \\
 & COMUN3 & Communication frequency & 0.607 & 0.312 & Valid \\
 & COMUN4 & Decision without pressure & 0.812 & 0.312 & Valid \\
 & COMUN5 & Communication honesty & 0.735 & 0.312 & Valid \\
\hline
Supply Chain Performance & SCPER1 & Smoothness of goods & 0.473 & 0.312 & Valid \\
 & SCPER2 & Smoothness of money & 0.612 & 0.312 & Valid \\
 & SCPER3 & Smoothness of information & 0.726 & 0.312 & Valid \\
\hline
\end{tabular}
\end{table}

\textbf{Note:} COMMIT=Commitment; COMMUN=Communication; and SCPER=Supply Chain Performance

Meanwhile, the reliability test results show that the Cronbach Alpha value for the three variables is > 0.6, as shown in Table 2. According to [14], if the Cronbach Alpha value > 0.6 then the questionnaire used is reliable.

\begin{table}[h]
\centering
\caption{Variable reliability test results}
\begin{tabular}{|l|l|l|}
\hline
Variable & Cronbach Alpha & Conclusion \\
\hline
Commitment & 0.749 & > 0.6 & Reliable \\
Communication & 0.760 & > 0.6 & Reliable \\
Supply Chain Performance & 0.753 & > 0.6 & Reliable \\
\hline
\end{tabular}
\end{table}
3.2 Evaluation of measurement model (outer model)

The evaluation of the measurement model aims to ensure that each indicator that describes the construct-variable (latent) is valid. The indicator is considered valid if the loading factor value is > 0.70 [16]. The results of the convergent validity test show that the loading factor value of several indicators is < 0.70, as shown in Table 3. These indicators must be dropped so that the research model can be used for further analysis.

Table 3. Convergent validity test results

| Code  | Latent Variable (Konstruk) | Commitment | Communication | Supply Chain Performance |
|-------|-----------------------------|-------------|----------------|--------------------------|
| COMIT1|                             | 0.742       | 0.605          | 0.434                    |
| COMIT2|                             | 0.795       | 0.556          | 0.628                    |
| COMIT3|                             | 0.375*      | 0.312          | 0.043                    |
| COMIT4|                             | 0.817       | 0.695          | 0.645                    |
| COMIT5|                             | 0.769       | 0.628          | 0.696                    |
| COMIT6|                             | 0.569*      | 0.747          | 0.404                    |
| COMUN1|                             | 0.569       | 0.747          | 0.404                    |
| COMUN2|                             | 0.680       | 0.855          | 0.505                    |
| COMUN3|                             | 0.439       | 0.630*         | 0.507                    |
| COMUN4|                             | 0.871       | 0.906          | 0.669                    |
| COMUN5|                             | 0.821       | 0.828          | 0.573                    |
| SCPER1|                             | 0.530       | 0.463          | **0.852**                |
| SCPER2|                             | 0.680       | 0.526          | **0.889**                |
| SCPER3|                             | 0.717       | 0.598          | **0.851**                |

Note: * Loading factor value of construct < 0.70

Next, the construct reliability test was carried out. A construct is considered reliable if it has Composite Reliability and Cronbach Alpha values are > 0.60, and Average Variance Extracted (AVE) values are > 0.50 [15]. The analysis results show that all constructs are reliable because they meet the required standard values, as shown in Table 4.

Table 4. Construct reliability test results

| Indicator               | Commitment | Communication | Supply Chain Performance |
|-------------------------|------------|---------------|--------------------------|
| Composite reliability   | 0.886      | 0.909         | 0.899                    |
| Cronbach Alpha          | 0.829      | 0.869         | 0.831                    |
| AVE                     | 0.660      | 0.714         | 0.747                    |

3.3 Evaluation of structural model (inner model)

Evaluation of the structural model is done by looking at the coefficient of determination ($R^2$), t-statistic, and P-value. The $R^2$ value is needed to measure how much the dependent variable (endogenous construct) can explain the independent variable (exogenous construct). The model is declared strong if the $R^2$ value is 0.75, moderate (0.50), and weak (0.25). Meanwhile, t-statistic and P-value were used to test the hypothesis. The hypothesis is accepted if the t-statistic > t-table and P-value > 0.05 [14]. The results of the determination coefficient test show that the $R^2$ value of commitment and communication, respectively > 0.6 (strong), as shown in Table 5.
Table 5. R-square ($R^2$) analysis results

| Variable                        | R-square |
|---------------------------------|----------|
| Commitment                      | 0.652    |
| Communication                   | 0.623    |
| Supply Chain Performance        | 0.623    |

Table 5 also shows that the commitment variable can explain the variance that occurs in communication by 0.652 or 65.2%. The rest (34.8%) was explained by other factors not included in this model. The commitment and communication variables can explain the variance that occurs in supply chain performance by 0.623 or 62.3%. The rest (37.7%) was explained by other factors not included in this research model.

Furthermore, path coefficient analysis was conducted to measure the magnitude of the direct and indirect effect of the commitment variable on the marine fish supply chain performance through communication. The full analysis of the PLS model produces a structural model output as illustrated in Figure 3.

Figure 3. Structural model output

Figure 3 shows the t-statistical value magnitude of the relationship between latent variables. According to [14], if the t-statistic value is > 1.960, and the P-value is < 0.05, it means that the latent variable has a positive and significant effect on other variables. The t-statistic value of the commitment to performance is 2.187, and to performance through communication is 3.666. Both values are > 1.960. This means that commitment has a positive and significant effect on supply chain performance, either directly or through communication mediation. This effect can also be seen from the results of the bootstrap analysis, as shown in Table 6.

Table 6. Bootstrap analysis results

|                                      | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T-statistics (O/STDEV) | P-value |
|--------------------------------------|---------------------|----------------|---------------------------|------------------------|---------|
| Commitment → Supply Chain Performance| 0.365               | 0.365          | 0.167                     | 2.187                  | 0.014   |
| Commitment → Communication → Supply Chain Management | 0.670               | 0.637          | 0.183                     | 3.666                  | 0.000   |
Thus, the two hypotheses proposed in this study are accepted, namely: commitment has a positive and significant effect on the marine fish supply chain performance at bangliau in Bagansiapiapi (H₁); and commitment mediated by communication, has a positive and significant effect on the performance of the marine fish supply chain at bangliau in Bagansiapiapi (H₂).

The study results confirm that the commitments fulfilled by fishermen to take and vice versa, are proven to be able to improve the marine fish supply chain performance. Fishermen fulfill their commitment, namely selling their fish only to the owner (not to others), with the type and amount of fish, as well as the agreed time. The fishermen did that because the tauke had lent them money earlier, for the cost of catching fish, for the family's needs. Fishermen do not mind even though the selling price of fish is set by the tauke. According to [3], this can happen because there is a patron-client relationship between the tauke and the fisherman. On the other hand, the tauke fulfills its commitment, buy all the fisherman fish and paying it on time. The tauke also lends money to fishermen if he needed it. In addition, if the fishermen's fishing gear is damaged, very easy for them to get a replacement from the tauke. The existence of mutual efforts to maintain this commitment, causus communication between the fishermen-tauke to go well. For example, fishermen always get information from tauke about the fish current price or the fish number needed. On the other hand, the tauke also received information from fishermen about the number of fish caught, or the obstacles faced when catching fish. This is in line with the opinion [17], that in marine fish production centres, tauke play a very important role in the fish production process.

The smooth supply of fish from the fishermen to the tauke, the payment of fish from the tauke to the fishermen, and the sharing of information between them, can happen because so far, the communication that has been built between the tauke and the fishermen is quite good. The fishermen in Bagansiapiapi are generally Malay, and the tauke come from the Chinese ethnic group. However, the ‘cross-cultural’ communication process between them went smoothly. The fishermen in Bagansiapiapi are generally Malay, and the tauke comes from the Chinese ethnic. However, the cross-cultural communication process between them went smoothly. The tauke communicates in the Indonesian, even though it is in a Chinese dialect, but fishermen understand some terms in Chinese that are often used by tauke. Both parties try to understand each other about the topic they are communicating, so that their perception of the topic becomes the same. According to [18], the purpose of communication is to equalize perception. The existence of good communication between fishermen and the tauke, has improved the marine fish supply chain performance to bangliau.

4. Conclusion
This study concludes that commitment has a positive and significant effect on the fish supply chain performance at Bangliau in Bagansiapiapi, both directly and through communication mediation. Communication plays a role in increasing the effect of commitment on marine fish supply chain performance. Therefore, these two factors must be attention for fostering the fishermen in Bagansiapiapi.

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