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The Application of PLS & SEM in Determining the Antecedents of Supplier-Manufacturer Relationship

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Abstract. The purpose of this study was to examine the antecedent to supplier-manufacturer relationship. There are three dimensions of antecedents of a relational-oriented exchange which are dependence, trust, and communication behavior that has been measured the impact on strategic relationship. This study used the partial least squares (PLS) and structural equation modeling (SEM) tool to test the hypotheses. The result indicated that dependence and communication behavior were positively related to the strategic relationship. This study also found that communication behavior was the most significant predictor of extent of strategic relationship followed by dependence.

Keywords: Dependence, Trust, Communication Behavior, Strategic Relationship, Relational-Oriented Exchange, Malaysia

1. Introduction

There has been a major directional change in marketing theory and practiced over the last 10 years [1]. [2] argues that the traditional model of confrontation between buyer and seller has been replaced by a close and long-term relationships based on cooperation and joint action for mutual benefit and satisfaction. This study aimed to apply the concept of closeness to supplier-manufacturer relationship. [3] argued that marketing industry is characterized by a stable and interactive long-term relationship rather than by change. A new practice in management has emerged on securing strategic relationship with a minimum number of suppliers with common objectives for securing competitive advantages. Research in this area has made great advances. Further to that marketing research has provided new insights into relation-oriented exchange: determinant factors [4] [5] [6] [7] [8] dimensions [9] and performance outcomes [10] [11]. The paper aimed to explain of the development and sustenance of long-term supplier-manufacturer relationships within Malaysia context of close and long-lasting relationship. With this aim in view, we propose a conceptual model which offers an integrative explanation of the determinant factors of long-term relationships. More specifically this study pursues one objective, to examine the antecedents to supplier-manufacturer relationship.

2. Research Context and Research Model

2.1. Antecedents of Relational-Oriented Exchange

In this study, antecedent of a relational-oriented exchange (ROE) is defined as a motivation of supplier-manufacturer relationship formation. In line with the definition of antecedents of ROE by [12], this study defines antecedents of ROE as "the extent of the motivation or underlying causes that lead to development of relationship between supplier and manufacturer". There are three dimensions of antecedents of a ROE – dependence, trust, and communication behavior.

2.2. Dependence

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Dependence has been widely studied as a critical determinant of inter-firm relationship performance in terms of financial outcomes, cooperation, and conflict [13] [6]. Based on the definition of antecedent of ROE and previous scholars [14] [15] definition, this study defines dependence as "the extent to which a target firm needs the source firm to achieve its goals". (H1: Higher level of dependence has a significant positive impact on relational-oriented exchange)

2.3. Trust

In this study, trust refers to one's belief about the motives or intent of other party. Following previous scholars [9] [8], this study defines trust as "the extent to belief that another company will perform actions that will result in positive outcome for a firm, as well as not take actions that would result in negative outcomes for the firm". (H2: Higher level of trust has a significant positive impact on relational-oriented exchange)

2.4. Communication Behavior

In this study, communication refers to transmitting, receiving, and processing information. Following previous scholar [16] [17] [18] [19], this study defines communication behavior as "the extent of communication among alliance members plays an essential role in creating and sustaining successful supplier-manufacturer relationship to achieve the maximum benefits of collaboration". (H3: Higher level of communication behavior has a significant positive impact on relational-oriented exchange)

2.5. Relational-Oriented Exchange

In this study, relational exchange refers to durable relationships in terms of principles and norms which govern the behavior of two parties. Following previous scholars [20] [21], this study defines relational-oriented exchange as "the extent of long-term supplier-manufacturer relationship of electrical and electronic industry that managed primarily by relational norms and ethical principles". The norms and principles are as means of relationship control and coordination. The definition differs from other types of relationships such vertical integration, power hegemony or a market relationship. This is because of the co-existence of understood continuity agreements, cooperation norms and action procedures.

3. Research Method

3.1. Data Collection

A total postal survey is sent out to 865 respondents in two waves during the months of September to November 2011 and from December 2011 to January 2012. A total of 218 were received and used to analysis which translates to about 25.2% response rate. The first wave yields 147 responses and the second wave yielded 71 responses.

3.2. Goodness of Measures

Overall the questionnaire has been categorized into four sections: general information about the organization, factor as the antecedents of supplier-manufacturer relationship, the relational orientation of the exchange in that it enhances the relational orientation by supplier, and respondent's profile. A questionnaire using a seven-point Likert scale was used to gather data for each construct of the research model. All instruments were adapted from previous literatures and were modified to measure the performance. Questionnaires were designed based on a multiple item measurement scale adapted from previous research namely [15] [1] [18] and [10].

3.3. Construct Validity

Construct validity testifies to how well the results obtained from the use of the measure fit the theories around which the test is designed [22]. The question here is does the instrument tap the concept as theorized? This can be assessed through convergent and discriminant validity. First we looked at the respective loadings and cross loadings if there are problems with any particular items. We used a cutoff value for loadings at 0.5 as significant . As such, any item which has a loading of higher than 0.5 on 2 or more factors then it will be deemed to be having significant cross loadings.

3.4. Convergent Validity

Next we tested the convergent validity which is the degree to which multiple items to measure the same concept are in agreement. We used the factor loadings, composite reliability and average variance extracted to assess convergence validity [23]. The loadings for all items exceeded the recommended value of 0.5 [23]. The average variance extracted (AVE) measures the variance captured by the indicators relative to measurement error, and it should be greater than 0.50 to justify using a construct . The average variance extracted, were in the range of 0.699 and 0.842. Composite reliability values, which depict the degree to which the construct indicators indicate the latent, construct ranged from 0.928 to 0.977 which exceeded the recommended value of 0.7 [23].

3.5. Discriminant Validity

Next we proceeded to test the discriminant validity. The discriminant validity of the measures (the degree to which items differentiate among constructs or measure distinct concepts) was assessed by examining the correlations between the measures of potentially overlapping constructs. Items should load more strongly on their own constructs in the model, and the squared average variance between each construct and its measures should be greater than the variance shared between the construct and other constructs . As shown in Table 1, the correlations for each construct is less than the squared average variance extracted by the indicators measuring that construct indicating adequate discriminant validity. In total, the measurement model demonstrated adequate convergent validity and discriminant validity.

Table 1 Discriminant validity of construct

	Communication Behavior	Dependence	ROE	Trust
Communication Behavior	**0.818**			
Dependence	0.379	**0.874**		
ROE	0.563	0.531	**0.918**	
Trust	0.672	0.330	0.404	**0.891**

Diagonals (in bold) represent the squared average variance extracted while the other entries represent the correlation

3.6. Reliability Analysis

Table 2 Result of reliability test

Construct	Measurement items	Cronbach's Alpha	Loading range	Number of items[a]
Dependence	DP2, DP3, DP4, DP5	0.894	0.751-0.939	4 (4)
Trust	TS8, TS9, TS10, TS11, TS12	0.935	0.801-0.937	5 (5)
Communication Behavior	IP18, IP19, IP20, IP21, IP22, IQ15, IQ16, IQ17, IS23, IS24, IS25, IS26, IS27, rev_IS28	0.962	0.725-0.890	14 (15)
ROE	RO63, RO64, RO65, RO66,RO67, RO68, RO69, RO70	0.973	0.891-0.939	8 (8)

[a] Final items numbers (initial numbers)

We used the Cronbach's alpha coefficient to assess the inter item consistency of our measurement items. Table 2 summarizes the loadings and alpha values. As can be seen from Table 2, all alpha values are above 0.6 as suggested by Nunnally and Bernstein . The composite reliability values also ranged from 0.928 to 0.977. Interpreted like a Cronbach's alpha for internal consistency reliability estimate, a composite reliability of 0.70 or greater is considered acceptable. As such we can conclude that the measurements are reliable.

3.7. Hypothesis Testing

Next we proceeded with the path analysis to test the three hypotheses generated. Figure 2 and Table 3 present the results. The R^2 value was 0.435 suggesting that 43.5% of the variance in extent of strategic relationship can be explained by dependence, trust and communication behavior. A close look shows that Dependence was positively related ($\beta = 0.371$, $p< 0.01$) to extent of strategic relationship and so was Communication behavior ($\beta = 0.425$, $p< 0.01$) whereas trust was not a significant predictor of extent of strategic relationship. Thus H1 and H3 of this study were supported whereas H2 was not supported. In this

study it was found that communication behavior was the most significant predictor of extent of strategic relationship followed by dependence.

Table 3 Path coefficients and hypothesis testing

Hypothesis		Beta	Std Error	*t* value	Decision
H1	Dependence -> ROE	0.371	0.064	5.828	Supported
H2	Trust -> ROE	-0.004	0.069	0.059	Not Supported
H3	Communication Behavior -> ROE	0.425	0.072	5.940	Supported

*p<0.05

4. Discussion and Conclusion

This section discusses the results for the hypotheses tested. We found support for suggesting a positive main effect of dependence and communication behavior on the relational orientation of the exchange. Our findings permit us to point to a negative effect of the manufacturer's trust on the relationship as perceived by the supplier. Results are not different from those which have analyzed the effect on the relationship of being more dependent or less dependent. For example, [7] found that the more dependent party sought long-term relationship. Similarly, [15] stated when the firm is more dependent the calculative commitment increase and when the firm is less dependent the calculative commitment decrease. [6] even went so far as to state that dependence has a positive influence on relationship quality. Based on the data, when the supplier depends significantly on the manufacturer, the supplier inclined to maintain the relationship.

This study adds credibility to the conception that low level of communication behavior is associated with a failure of strategic relationship [24] [25]. With communication problem, the success of the relationship is at risk. The need of communication becomes importance in triggering future intentions. These findings are in-line with [26] who found the mutual participation was associated with resources allocation among channel members.

5. References

[1] Morgan, R. M., and S.D. Hunt, *The commitment-trust theory of relationship marketing.* Journal of Marketing, 1994. **58**(3): p. 20.

[2] Heide, J.B., *Interorganizational governance in marketing channels.* Journal of Marketing, 1994. **58**(1): p. 71.

[3] Hakansson, H., ed., *International Marketing and Purchasing of Industrial Goods: An Interaction Approach*. 1982, New York: Wiley.

[4] Heide, J.B. and G. John, *Alliances in Industrial Purchasing: The Determinants of Joint Action in Buyer-Supplier Relationships.* Journal of Marketing Research, 1990. **XXVII**(February 1990): p. 24-36.

[5] Heide, J.B. and R.L. Stump, *Performance implications of buyer-supplier relationships in industrial markets: a transaction cost explanation.* Journal of Business Research, 1995. **32**: p. 57-66.

[6] Kumar, N., L. Scheer, and J.B. Steenkamp, *The effects of perceived interdependence on dealer attitudes.* Journal of Marketing Research, 1995. **32**(August): p. 348-356.

[7] Lusch, R.F. and J.R. Brown, *Interdependency, Contracting, and Relational Behavior in Marketing Channels.* The journal of Marketing, 1996. **60**(4): p. 19-38.

[8] Joshi, A.W. and R.L. Stump, *The contigent effect of specific asset investment on joint action in manufacturer supplier relationships: an emperical test of the moderating role of reciprocal asset investment, uncertainty and trust.* Journal of the Academy of Marketing Science, 1999. **27**(3): p. 291-305.

[9] Dwyer, R., P. Schurr, and S. Oh, *Developing buyer-seller relationships.* Journal of Marketing, 1987. **51**(April): p. 11-27.

[10] Noordewier, T.G., G. John, and J.R. Nevin, *Performance Outcomes of Purchasing Arrangements.* Journal of Marketing, 1990. **54**(4): p. 80-93.

[11] Dahlstrom, R., K.M. McNeilly, and T.W. Speh, *Buyer-seller relationships in the procurement of logistical services.* Academy of Marketing Science, 1996. **24**(2): p. 110.

[12] Oliver, C., *Determinant of interorganizational relationship: integration and future directions.* Academy of

Management Review, 1990. **15**(2): p. 241-265.

[13] Bucklin, L. and S. Sengupta, *Organizing successful co-marketing alliances.* Journal of Marketing, 1993. **57**(April): p. 32-46.

[14] Fichman, M. and P. Goodman, *Customer-supplier ties in interorganizational relations.* Research in Organizational Behavior, 1996. **8**: p. 285-329.

[15] Ganesan, S., *Determinants of long-term orientation in buyer-seller relationships.* Journal of Marketing, 1994. **58**(April): p. 1-19.

[16] Kauser, S. and V. Shaw, *The influence of behaviourial and organisational characteristics on the success of international strategic alliances.* International Marketing Review, 2004. **27**(1): p. 17-52.

[17] Large, R.O., *communication capability and attitudes toward external communication of purchasing managers in Germany.* International Journal of Physical Distribution & Logistics Management, 2005a. **35**(6): p. 426-444.

[18] Mohr, J. and R. pekman, *Characteristics of partnership success: patnership attributes, communication behavior, and conflict resolution techniques.* Strategic Management Journal, 1994. **15**: p. 135-152.

[19] Voss, K.E., et al., *Relational exchange in US-Japanese marketing strategic alliances.* International Maketing Review, 2006. **23**(6): p. 610-635.

[20] Lambe, C.J., R.E. Spekman, and S.D. Hunt, *Interimistic relational exchanges: conceptualization and propositional development.* Journal of the Academy of Marketing Science, 2000. **28**(2): p. 212-225.

[21] Macneil, I.R., *The new social contract: An inquiry into modern contractual relations*, in *New Haven: Yale University Press*. 1980.

[22] Sekaran U and Bougie R, *Research Methods for Business*. 2010, A Skill Building Approach. UK: John Wiley and Sons.

[23] Hair JF, et al., *Multivariate Data Analysis*. 2010, Upper Saddle River, NJ: Prentice-Hall.

[24] Mohr, J., *Communicating with industrial customers.* Marketing Science Institute (No. 89-112). Cambridge, MA, 1989.

[25] Sullivan, J. and R.B. Peterson, *Factors Associated with Trust in Japanese-American Joint Ventures.* Management International Review, 1982. **22**(2): p. 30-40.

[26] Anderson, E., L. Lodish, and B. Weitz, *Resource allocation behavior in conventional channels.* Journal of Marketing Research, February 1987. **24**(85-97).

Figure 1 Research Model

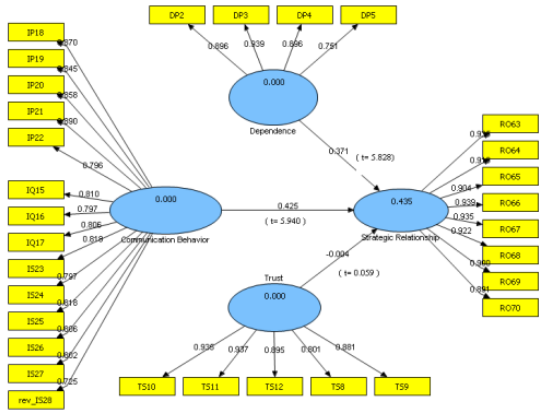

Figure 2 Results of the path analysis