A STUDY OF THE DETERMINANTS OF SUPPLY CHAIN COMMITMENT AND BUSINESS PROCESS INTEGRATION

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ABSTRACT

Purpose of this paper *- Despite intense research interest in supply chain management (SCM) for two decades there is still uncertainty as what SCM is and how the behavioral determinants impact a supply chain. Hence, the purpose of this study is to explore the linkages between behavioral and marketing determinants of supply chains and their impact on commitment and process integration. This paper empirically examines these linkages and their impact.*

Design/Methodology/Approach *- Descriptive to Causal Research with survey, and tested via Structural Equation Modeling.*

Findings *- This study empirically justified the significance of behavioral dimensions in supply chain management and the impact of behavioral dimensions on supply chain commitment and process integration.*

Originality/Value of Paper *- This paper contributes towards fulfilling the gap in understanding the behavioral/soft determinants in managing supply chains, particularly in Asia.*

Research Limitations/Implications *- Data of the study was drawn from one single industry; hence the findings are indicative but not representative of all supply chains. Also, the results are not applicable to all countries across all industries. But this study will act as a fertile ground for developing future research on this area.*

Practical Implications *- This study will enable supply chain managers in their understanding of the importance of behavioral factors in managing supply chains in developing commitment of supply chain members.*

Keywords: Behavioral Determinants of Supply Chain, Marketing Determinants of Supply Chain, Supply Chain Commitment, Business Process Integration, and Structural Equation Modeling.

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INTRODUCTION

Many previous studies have been conducted to study the use of information technology to improve the effectiveness of SCM (Holland, 1995; Hill and Scudder, 2002; Lancioni *et al.*, 2000; Roberts and Mackay, 1998; Sahay and Gupta, 2003; Murillo, 2001); while only a few studies have concentrated on a behavioral perspective to identify the impact of the characteristics of buyer-seller relationships on SCM in terms of inter-business integration or to identify the determinants of supply chain integration. One such study by Wann-Yi Wu *et al.* (2004) explored the relationship between commitment and business integration on supply chain management. The study revealed that different management determinants, marketing and behavioral determinants influence the SCM commitment, and SCM business integration. Business process integration is one of three elements (*Cooper et al.*, 1998) in the framework of SCM and it is essential for a firm to understand how to operate and integrate these elements in the better way.

As such this is one of few study attempts to explain the behavioral perspectives of SCM in an Asian context. Most past research focused on technological, marketing, and/or financial performance but very few were dedicated to understand the behavioral aspects of SCM. Cooper et al. (1997) has mentioned three elements in the SCM Framework - supply chain structure, management components, and business processes. In order to achieve a better SCM performance, a firm needs to learn how to operate and integrate these elements in a more effective way. Hence, the current research attempts to answer the research question: "What is the impact of behavioral and marketing determinants on supply chain commitment, and business process integration?"

The paper is organized as follows: first, paradigms from supply chain commitment and business process integration are used to delineate a conceptual framework to link marketing and behavioral determinants. Next, the researcher applied the conceptual framework to the specific setting of supply chain commitment and business process integration such that a clear supply chain identity in the broader supply chain arena is established to provide guidance and development in the discipline. The framework posits testable hypotheses, and these were tested using the structural equation modeling (SEM). Finally, the researcher drew implications and conclusions for future research and teaching.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

Supply Chain Management (SCM)

Supply chain management encompasses more than the activities of any individual corporate function. SCM encompasses the planning and management of all activities involved in sourcing

and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies (CSCMP, 2006). Wisner and Tan (2000) argued that SCM includes all value-adding activities from the extraction of raw materials through the transformation processes and through delivery to the end-user. Based on their perspective, the SCM has a broader goal, managing inventory and relationships to achieve a higher level of customer service rather than accomplishing specific marketing objectives. Second, the SCM approach attempts to manage both upstream and downstream processes within the supply chain, while marketing process tend to focus on only downstream processes. Thus, how to augment the supply chain members' commitment to enlarge the integration in SCM is becoming an even greater issue.

Business process integration in SCM

Cooper *et al.* (1997) pointed out three elements in the framework of SCM - supply chain structure, management components, and business processes. To achieve superior SCM performance, a firm has to understand how to operate and integrate these elements in a better way. Many business processes, which proceed and coordinate within a company, are, by nature, or in some way, involved in supply chain relationships with other companies (Cooper *et al.* 1997). Concerning the business process integration in SCM, it needs many considerations of how many functions or activities should be included in SCM. It is strongly believed that it needs to include information systems integration, as well as planning and controlling activities. Bowersox (1997) includes cooperative efforts among supply chain members in such areas as marketing research, sales promotion, research and development, product design, and total value analysis. In an exploratory study involving successful supply chain redesign practitioners, Hewitt (1992) finds that most companies have identified that two most commonly identifiable processes are order fulfillment and product development. In this research, we adopt customer relationship management (CRM), demand management, and new product development as the viewpoints of business processes, which are proposed by the members of The Global Supply Chain Forum. Each process is as follows:

Customer Relationship Management involves identifying key customer target markets and then developing and implementing programs with key customers. This process also provides the customer with product information (www.ssaglobal.com, 2005). The generally accepted purpose of Customer Relationship Management (CRM) is to enable organizations to better manage their customers through the introduction of reliable systems, processes and procedures for interacting with those customers (www.winkipedia.com 2005).

Demand management recognizes that the flow of materials and products is intertwined with customer demand. Forecasting and reducing variability are key concerns of this process (www.ssaglobal.com, 2005).

New product development is a critical part of the firm's success, and key customers and suppliers are integrated into the development process to reduce time to market (www.ssaglobal.com, 2005).

Drawing on previous studies (Wann-Yi Wu *et al.*, 2004), there are three different categories of factors that are most influential on business process integration in SCM. They include SCM commitment, marketing determinants of SCM, and behavioral determinants of SCM.

Supply Chain Commitment

SCM commitment is a promise or agreement to do something in the future in the supply chain relations. Commitment was defined as the desire by each party to a business relationship to maintain and strengthen that relationship (Morgan and Hunt, 1994). The understanding that commitment is crucial to the long-term success of a business relationship provides one of the core concepts in the understanding of organizational success (Scheer and Stern, 1994 and Andaleeb, 1996). Commitment plays a significant role in inter-firm relationships. The nature of commitment in inter-organizational, intra-organizational, and interpersonal relationships is stability and sacrifice (Anderson and Weitz, 1992). In other words, it means members are willing to make short-term sacrifices to maintain their long-term and stable relationship. According to Allen and Meyer (1990), commitment is a multi-faceted construct and should be viewed from three aspects:

1) Affective commitment;
2) Normative commitment; and
3) Continuance commitment

Affective commitment refers to the feeling of belonging and the sense of attachment to the organization. Affective organizational commitment is defined as "active relationships with the organization such that individuals are willing to give something of themselves in order to contribute to the organization's well-being" (Mowday, Steers and Porter, 1979, p.226). An alternative definition by Allen and Meyer (1990, p.2) states: "An affective or emotional attachment to the organization such that the strongly committed individual identifies with, is involved in, and enjoys membership in the organization."

Normative commitment is concerned with the obligation that members feel to remain with an organization and build on generalized cultural expectations. This is based on initial work by Wiener (1982) who had argued that individuals also are committed to organizations because of strong ethical or moral obligations.
However, normative commitment seems to involve expectations and, more considerably, ideals. We tend to drop this variable out of the study as this may result in the contamination of the expectations rather than show the actual findings of the study.

Continuance commitment relates to the perceived cost of leaving, both the financial and non-financial aspects, and is perceived as caused by a lack of alternatives. Employees whose primary link to the organization is based on continuance commitment remain because they need to do so.

In summary, commitment provides the basis for a cooperative spirit in marketing channel relationships and leads to an overall stronger partnership (Anderson and Weitz, 1992).

Practically, the trends of many international firms are moving towards a business partnership strategy with all their supply chain partners so as to achieve long term competitiveness which aims to build up win-win results or mutual benefits to all parties in a fast moving global competitiveness. One of the important factors that are always being discussed is the business commitment. Once commitment between the supply chain partners is established, it normally creates co-operations among the firms. For example, in commodities, business firms with commitment will honor what they agreed earlier though price may be fluctuating in the market. This would benefit the other parties when price has gone up but, at the same time the supplier would likely in turn benefit in a vice versa case. Also they frequently share market information so as to update one another in order to make sure that each partner would be able to plan for themselves beforehand, sometimes to catch opportunities or to prevent future negative outcomes. Hence, the following hypothesis is stated as follows:

H1. SCM commitment will directly impact the integration of the SCM business process.

The Marketing Determinants of SCM

In compliance with the study of Goodman and Dion (2001), this study includes three marketing determinants to explore how the following factors affect the business process integration in SCM. They are idiosyncratic investment, product salability, and dependence.

Idiosyncratic investments refer to the investments specific to a channel relationship. At the same time also they are expenditures of time, effort, or funds directed mainly at marketing initiatives for a specific manufacturer's product offering. Williamson (1985) suggested that idiosyncratic investments stabilize relationships by adjusting the firm's own incentive structure. In order to make idiosyncratic investments in a relationship, a channel member creates an incentive to maintain the relationship. Once committed, idiosyncratic investments are of substantially less value outside the particular trading relationship.

Idiosyncratic investment also constitutes a "pledge" (Anderson and Weitz, 1992) or "credible commitment" (Williamson, 1985) which signals a firm's sincerity (Anderson and Weitz, 1992; Ganesan, 1994; Provan and Gassenheimer, 1994). Recent empirical studies on channel relationships (Anderson and Weitz, 1992; Ganesan, 1994; Provan and Gassenheimer, 1994) have found that investment in a relationship by one side serves to signal sincerity to the other and long term intentions (Gundlach *et al.*, 1995). Over time, idiosyncratic investment transforms an economic exchange into a socially embedded relationship (Galaskiewicz and Shatin,

1981; Granovetter, 1985; Ring and Van de Ven, 1994). Goodman and Dion (2001), and Anderson and Weitz (1992) described how idiosyncratic investments are investments specific within a channel relationship. Because idiosyncratic investments are essential to certain channel relationships or are difficult or impossible to redeploy to another channel relationship. Some examples of idiosyncratic investments in channel relationships are training or dedicating personnel for servicing a specific manufacturer's products, adopting a common order processing system, and building specialized facilities to handle a specific manufacturer's product line. The investments are a necessary part of achieving strategic outcomes because they enhance efficiencies in coordination (Williamson, 1984) and have several important relationship-stabilizing properties. They facilitate expectations of continued exchange into the future (Heide & John, 1990) and represent credible commitments to the relationship that are useful in minimizing opportunistic behavior.

Product salability is defined as the downstream firm's perception of the product as having value, being useful, well serviced, and good quality (Goodman & Dion, 2001). Generally the distributor would be able to access the salability of the product. The distributor would assess whether it is more technically advanced than a fellow competitor's, is more valuable to customers for the price paid, is useful to the customers, is of high quality, and is accompanied with good supplier service. The core purpose of the existence of the distributor-manufacturer partnership is to sell the manufacturer's product. Thus, the salability of the product would be a major concern in the development of commitment in the partnership.

Dependence in marketing channels has been pointed out by Emerson (1962) and viewed as the extent to which a partner provides their valuable resources in case there are few alternative sources of supply. The willingness of middlemen to accept supplier authority is mainly dependent upon the number and value of alternatives the former holds (Bucklin, 1973). Goodman and Dion (2001) claimed that dependence is the degree of difficulty that distributors would encounter if they did not have access to the supplier's product. Skarmeas and Katsikeas (2001) defined that dependence is the extent to which a trade partner provides important and critical resources for which there are few alternative sources of supply. Dependence exists because trade partners offer resources that enable the firm to cope more effectively with critical contingencies (Hickson *et al.*, 1971).

Hibbard *et al.* (2001) describe how as total dependence increases; both channel members have greater stakes in the relationship. Higher levels of total dependence enhance the dealer's awareness of the supplier's need to keep the relationship intact. In addition, higher total dependence means that the dealer also needs the supplier, because disengagement is not an attractive option as there are few, if any, valued alternatives. Also, dealers that are relatively dependent on their supplier believe they need to maintain the relationship to achieve their goals (Frazier, 1983). They are unlikely to use responses that may result in escalation or, ultimately, the dissolution of the relationship (Kumar *et al.*, 1995). Therefore, relatively dependent dealers may have little recourse but to respond more passively, hoping that conditions improve

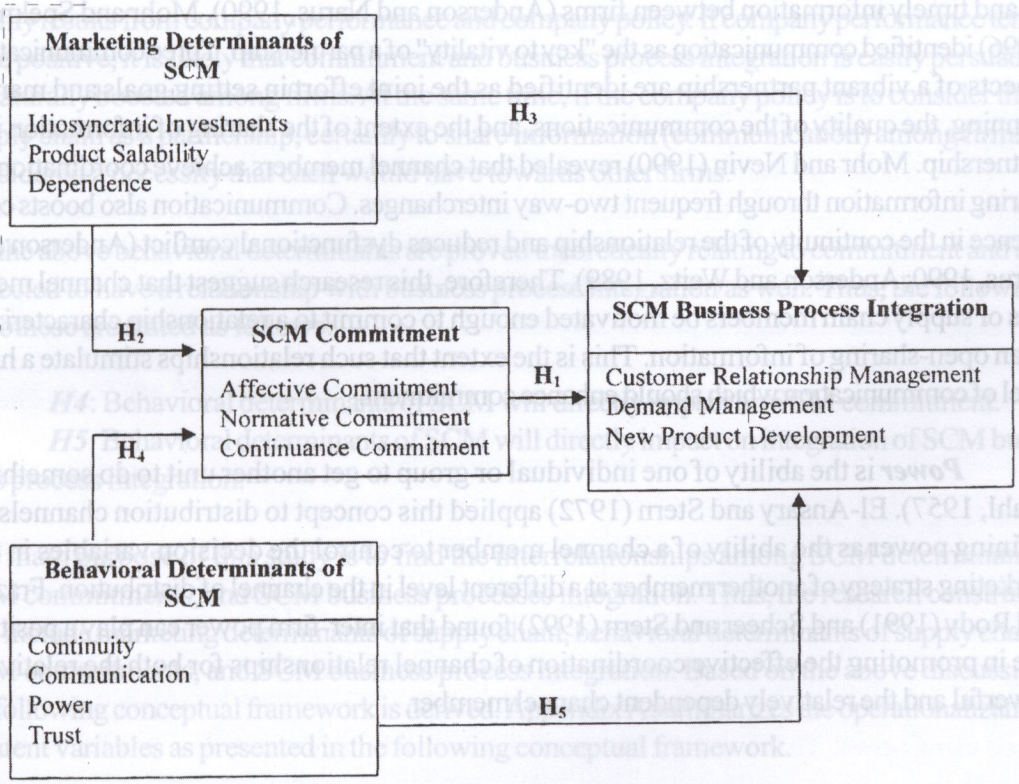
(Frazier *et al.*, 1989). Geyskens *et al.* (1996) argued that the effects of trust and interdependence on relationship commitment are more complex than revealed by previous findings. Geyskens et al (1996) examined the joint impact of the dealer's perceptions of the channel interdependence structure and its trust in the supplier on affective and calculative commitment. Their research found that deepening interdependence within a channel relationship will tend to increase the calculative commitment for both parties. Andaleeb (1996) claimed that if a distributor perceives itself to be dependent on a particular manufacturer, it will display a greater level of commitment to that manufacturer's products and programs.

All the above marketing determinants are proved theoretically in relation to the commitments and are expected to have a relation with business integration as well. Thus, the following hypothesis is stated as follows:

H2: Marketing determinants of SCM will directly impact SCM commitment.

H3: Marketing determinants of SCM will directly impact the integration of SCM business process.

Figure 1: Conceptual Framework



The Behavioral Determinants of SCM

A review of relevant literature shows that there are four behavioral factors that are found to be most influential on business process integration in SCM. They are:

1) Continuity,
2) Communication,
3) Power,
4) Trust.

Continuity is defined as the perception of bilateral expectation of future interaction (Heide and John, 1990). It is proved that many partnerships, identified with higher levels of commitment, will have a corresponding elevating continuity. Long-term relationships are more likely to promote strategic integration from an inter-firm relationship for several reasons. Older relationships have passed through and have survived phases of adjustment and accommodation (Anderson and Weitz, 1989). Partner firms far more familiar with relationships of longer duration are more comfortable operating within the historical context of an older relationship (Doney and Cannon, 1997). By virtue of their survival, longer relationships provide a stable situation for strategic integration.

Communication (both Informal and/ or formal) is defined as the sharing of meaningful and timely information between firms (Anderson and Narus, 1990). Mohr and Spekman (1996) identified communication as the "key to vitality" of a partnership. Three communication aspects of a vibrant partnership are identified as the joint effort in setting goals and market planning, the quality of the communications, and the extent of the sharing of information in a partnership. Mohr and Nevin (1990) revealed that channel members achieve coordination by sharing information through frequent two-way interchanges. Communication also boosts confidence in the continuity of the relationship and reduces dysfunctional conflict (Anderson and Narus, 1990; Anderson and Weitz, 1989). Therefore, this research suggest that channel members or supply chain members be motivated enough to commit to a relationship characterized by an open-sharing of information. This is the extent that such relationships stimulate a high level of communication which should enhance commitment.

Power is the ability of one individual or group to get another unit to do something (Dahl, 1957). El-Ansary and Stern (1972) applied this concept to distribution channels by defining power as the ability of a channel member to control the decision variables in the marketing strategy of another member at a different level in the channel of distribution. Frazier and Rody (1991) and Scheer and Stern (1992) found that inter-firm power can play a positive role in promoting the effective coordination of channel relationships for both the relatively powerful and the relatively dependent channel member.

Trust is defined as the willingness to rely on an exchange partner in whom one has confidence due to the ability of that partner to provide expertise, dependability, and direction (Moorman et al., 1993). Trust is a critical component in the present day distributor-manufacturing partnership and most likely will last long into the future (Dwyer, Schurr and Oh, 1987 and Schurr, Paul and Ozanne, 1985). Trust reduces the likelihood that the other party will act opportunistically (Bradach and Eccles, 1989). This is because through trust, trading partners develop confidence that over the long-term, short-term inequities will be corrected to yield long-term benefit (Alvesson and Lindkvist, 1993). While trust can substitute for contracts in many exchanges and serve as an alternative control mechanism (Bradach and Eccles, 1989), Driscoll (1978) and Scott (1980) found that only specific situational trust predicts organizational outcomes. This is in keeping with previous empirical work (Gulati, 1995; Morgan and Hunt, 1994) on trust and commitment which suggests that when managers perceive mutual trust between themselves and their trading partners, they are more likely to commit to a partnership. Other studies suggest that the confidence on the part of the trusting party results from the firm's belief that the trustworthy party is reliable and has high integrity. Both are associated with such qualities as consistency, competence, honesty, fairness, responsibility, helpfulness, and benevolence (Dwyer and LaGace, 1986; Larzelere and Huston, 1980; So and Sculli, 2002).

Behavioral determinants involve the behavioral traits firms would have while dealing with one another. Sometimes we could say that it is the company position in the market. This mainly results from company performance and company policy. If company performance tends to be positive, it is likely that commitment and business process integration is easily persuaded or naturally boosted among firms. At the same time, if the company policy is to consider their supply chain as a partnership, certainly to share information (communication) among firms is considered a necessity that each would have towards other firms.

All the above behavioral determinants are proved theoretically relating to commitment and are expected to have a relationship with business process integration as well. Thus, the following hypothese are stated as follows:

H4: Behavioral determinants of SCM will directly impact on SCM commitment.

H5: Behavioral determinants of SCM will directly impact on integration of SCM business process integration.

The main purpose of this study is to find the interrelationships among SCM determinants, SCM commitments, and SCM business processes integration. Thus, the research constructs will include marketing determinants of supply chain, behavioral determinants of supply chain, SCM commitments, and SCM business process integration. Based on the above discussion the following conceptual framework is derived. Appendix A summarizes the operationalization of latent variables as presented in the following conceptual framework.

METHODOLOGY

Sampling

A combination of mail, e-mail, and telephone survey was used for collecting the data. A draft questionnaire, based on measures identified in the literature, was translated into Thai by a bilingual research associate and refined and verified for its translation accuracy by two Logistics and Supply Chain professors. They were asked to review the questionnaire for readability and ambiguity (Dillman 2000). The Thai version was then examined by two Supply Chain managers for content and face validity, resulting in some minor modifications of the wordings of some survey items. This technique is frequently applied by management researchers (Matsumoto, 1994; Hwang, Yan, and Scherer, 1996).

Questionnaires (please refer to Appendix A) were mailed to the logistics and supply chain managers of 360 Thai companies in different industry sectors (e.g., Agriculture, Hunting and Forestry, Manufacturing, Wholesale and Retail Trade, Automotives, Personal and Household Goods) according to the sample size criteria suggested by Hair, et al (1998). Firms were randomly selected from the list of 1000 registered companies on Thailand Business Directory published by Teleinfo Media Public Co., Ltd., in 2005-2006.

As the information targeted was strategic in nature, the survey instrument was sent to the highest ranking officials within targeted firms. This is supported by a study by Phillips (1981) that indicates high ranking informants tend to be more reliable sources of information than low ranking. Respondents were asked to evaluate the extent, on a 7-point Likert scale, of how their firms practice the various constructs in this study. Owing to the need for a relatively large sample size while keeping the research costs down, this study relied upon the data collected from either logistics or supply chain managers, depending on their availability. Although the use of single informants may result in method variances as well as informant biases, the Logistics and Supply Chain manager is presumably the most knowledgeable informant about the issue (Huber and Power, 1985). Subsequently, 285 effective responses (79 percent) were collected. The response rate of 79 percent is reasonably acceptable when compared to that of recent studies in operations management (Tan, 2001).

Non-Response Biases

Careful non-response analyses were applied to ensure the absence of non-response biases. Specifically, 30 of the survey items used for analysis were randomly selected. The data set was split into two groups based on return time, which consisted of 56 from the early waves of return and 53 from the late waves of return. The mean scores of the data groups were compared using t-tests. The results yielded no differences among the questionnaire items, which strengthen the validity of this study (Tan, 2001). In addition, respondents and non-respondent

corporations were compared for annual sales and company assets to test for non-response bias. No difference between respondents and non-respondents for annual sales ($t = 0.179$, $p>0.05$), for company assets ($t = 0.435$, $p>0.05$) was found. Thus, the tests show that non-response bias was not a problem in this study.

Reliability and Validity Test

Reliability and validity tests were then conducted on the constructs with multivariate measures. Cronbach's alpha reliability estimate was used to measure the internal consistency of these multivariate scales (Nunnally, 1978). In this study, the Cronbach's Alpha of all the constructs were greater than 0.7 as presented in table 1, which reveals that there was good reliability of the survey instrument (Cuieford, 1965). Meanwhile, to ensure that the instrument had reasonable construct validity, convergent and discriminant validity was analyzed following Campbell and Fiske's (1959) criteria. The results show that the correlations are all higher than zero and large enough to proceed with discriminant validity. Furthermore, discriminant validity was examined by counting the number of times an item correlates higher with items of other variables than with items of its own variable (Aldawani and Palvai, 2002). Campbell and Fiske's (1959) suggest this number should be less than 50 percent. The results also show adequate discriminant validity. Jointly, these constructs exhibit both convergent and discriminant validity in this study.

Structural Equation Model Approach

The structural equation modeling approach is a multivariate statistical technique for testing structural theory (Tan, 2001). This approach incorporates both observed and latent variables and is usually separated into measurement models and a structural model. A two-step modeling approach was conducted in the present study. The measurement models (or confirmatory factor models) were tested prior to the structural model. The maximum likelihood estimation method was employed (Bagozzi and Yi, 1988).

Analysis of the Measurement Models

Although the present Cronbach's Alpha and item-to-total correlations have shown the satisfactory reliability and validity of each construct, the independence among the factors of each construct still required examination and verification. Hence, confirmatory factor analysis was performed, as suggested by Byrne (1998), to assess the measurement models of Marketing Determinants, Behavioral Determinants, Supply Chain Commitment and Business Process Integration (Tan, 2001). To establish the scale for each latent variable in the model, the first regression path in each measurement model was fixed at 1 (Maruyama, 1998). The results of confirmatory factor analysis for each dimension are shown in Table 1, which reveal that all parameter estimates of the factors for each dimension are rather large and statistically signifi-

cant and with t-values greater than 1.96. Hence, the models fit the sample data well for all dimensions.

Table 1: Construct Measurement Summary: Confirmatory Factor Analysis

Latent Constructs	Items	Standardized Loadings	*t*-value	Reliability	Mean Score	Standard Deviation
Marketing Determinants	MD1	0.17	5.05	0.72	5.26	0.60
	MD2	0.19	8.04	0.90		
	MD3	0.24	5.05	0.70		
Behavioral Determinants	BD1	0.08	8.79	0.78	5.23	0.78
	BD2	0.05	17.37	0.71		
	BD3	0.07	17.37	0.85		
	BD4	0.07	17.12	0.88		
SCM Commitment	SC1	0.21	9.25	0.86	4.87	0.55
	SC2	0.06	9.25	0.75		
Business Process Integration	SB1	0.14	9.88	0.91	5.04	0.71
	SB2	0.12	10.23	0.85		
	SB3	0.08	10.23	0.85		

Notes: Based on a seven-point Likert scale ranging from "Extremely Low" (1) to "Extremely High" (7); Fit statistics for measurement model are as follows: ($\chi^2_{28} = 338.85$, $p < 0.05$; RMSEA = 0.057; RMR = 0.045; GFI = 0.921; AGFI = 0.909; IFI D = 0.924; CFI = 0.922.

Analysis of the Structural Model

After incorporating the modifications prompted by the analysis of the measurement models described above, the structural equation modeling approach was applied to test the proposed hypotheses. The scale items of each measure were aggregated into a composite scale by averaging the items. The research model was then constructed, as shown in Figure 2. The absolute indexes (GFI = 0.921; AGFI = 0.909; IFI = 0.924; CFI = 0.922; RMSEA = 0.057; and RMR = 0.045) indicate that the results of the analysis of the structural model reveal a satisfactory fit for the sample data. It is reasonable to conclude that the proposed model has good construct validity. As the Figure 2 shows, of the five hypothesized relationships, three were statistically significant ($P > 0.05$; one-tailed test).

FINDINGS

Sample Profile

From Table 2, the finding indicates that 35% of the participant firms were between 5-15 years old and their business was on average represented by three industries: agricultural, hunting & forestry (32%), manufacturing (36%) and wholesale & retail trade (32%). Their main business objectives were the responsiveness to the competitive pressure (mean = 3.47) and profitability (mean = 3.33) while the pressure of the business was mainly impacted by the competitive intensity (mean = 3.47) and buyer power (mean = 3.35). On average, almost half of the participant firms were small and medium size enterprises (SMEs) (43%) and the rest (57%) are large firms. Almost 35% of the participant companies had the size of 11-100 Million Baht[1] annual turnover.

Table 2: Sample Profile

Characteristic	Frequency (n = 285)	Percentage (%)
Business Activity		
Agriculture, Hunting & Forestry	90	32
Manufacturing	104	36
Wholesale & Retail Trade	91	32
Company Size		
<= 200	122	43
201-500	50	18
501-2,500	95	33
2,500-10,000	15	5
>10,000	3	1
Age of Business		
<5 years	77	27
5-15 years	100	35
16-35 years	56	20
36-70 years	24	8
over 70 years	28	10
Size of Business		
< Million Baht 10/year	10	4
Million Baht 11-100/year	99	35
Million Baht 101-250/year	29	10
Million Baht 251-500/year	8	3
Million Baht 501-1,000/year	61	21
Over 1 Billion Baht /year	78	27

[1]Approximately $US 1 = 38 Baht.

DISCUSSION

The hypotheses were tested using a structural equation modeling (SEM). SEM is an appropriate statistical technique for testing a model that is hypothesized a priori and which assesses the relationships among latent constructs that are measured by multiple scale items, where at least one construct is both a dependent and independent variable (Hair et al., 1995). Additionally, it allows researchers to estimate the strength of relationships among scale items and latent constructs, while giving the researcher an indication of overall model fit.

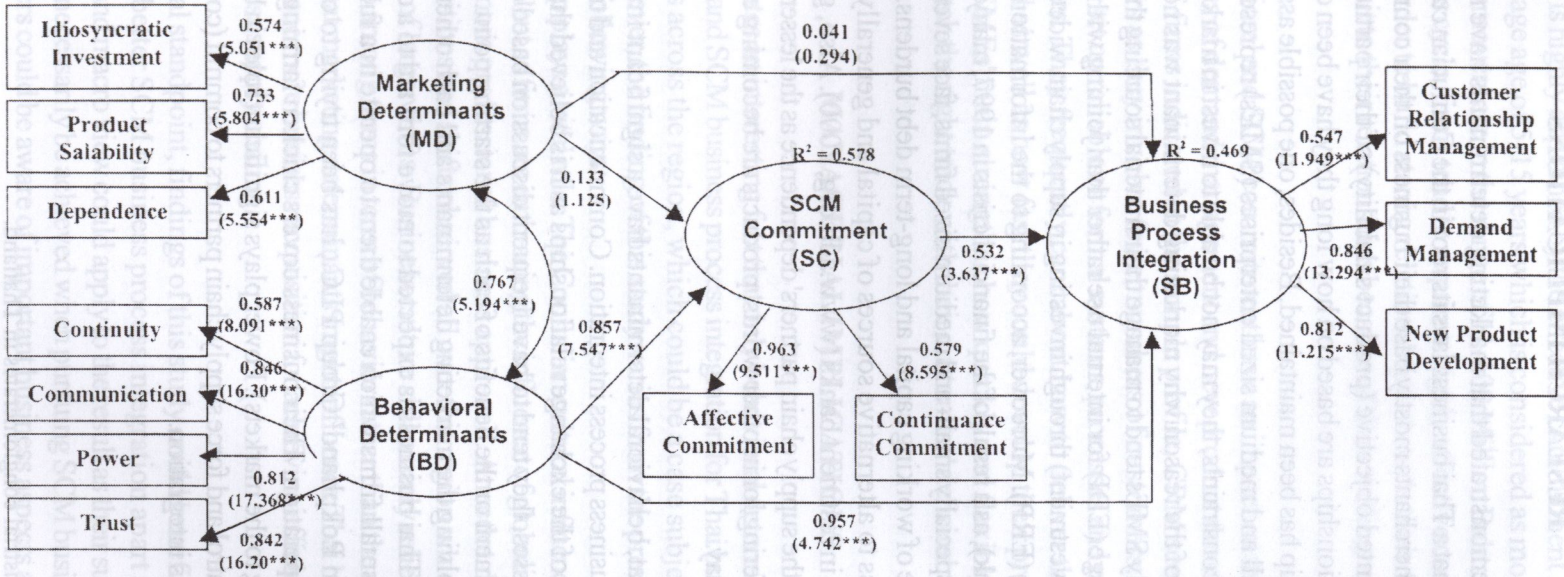
It is necessary that the model's overall fit must be established before we access the study's hypotheses (Bollen and Long, 1993). The results of the structural model's estimation are shown in Figure 2. The model's chi-square statistic was significant (28 = 338.85; p = 0.05). However, the chi-square estimate has been shown to be oversensitive to small model discrepancies when sample size can be achieved with only 285 respondents, rather than 380 respondents. Therefore, the researcher used other indices to justify the model fit; e.g., GFI, AGFI, RMSEA, etc., shown in the previous section, and already concluded that the model is well fit.

The hypothesized model permits an examination of the direct effects of marketing (MD) and behavioral determinants (BD) on SCM commitment (SC) and SCM business process integration (SB) as well as the indirect effect of MD and BD as mediated by SC on SCM business process integration (SB). Thus, the test of the proposed hypotheses is based on the direct and indirect effects in the structural model. All measures are presented in their standardized forms.

The standardized path coefficients, together with the corresponding t-values of the structural model, are presented in Figure 2. Out of the total five hypothesized paths, three were supported and in the expected direction, while two were not supported. The R2-value indicates direct paths between Marketing Determinants and Behavioral Determinants on Supply Chain Commitment explained 57.8% of the variance. On the other hand, the direct paths between Marketing Determinants, Behavioral Determinants, and Supply Chain Commitment explained 46.9% variance. Results in Figure 2 suggest, Behavioral determinant (BD) has a direct influence on both Supply Chain Commitment (H4) and Business Process Integration (H5). Also, Behavioral determinant (BD) has an indirect effect on Business Process Integration which is mediated through supply chain commitment. Marketing determinant (MD) neither has a direct effect (H2) on Supply Chain Commitment nor Business Process Integration (H3). Also, Marketing determinant does not have any indirect effect on Business Process Integration. Finally, Supply Chain Commitment does have a significant direct effect on Business Process Integration (H1).

Figure 2: Path Coefficients and t-Values for the Structural Model

(*The Impact of Marketing and Behavioral determinants on SCM Commitment and SCM Business Process Integration*)



Notes: Based on a seven-point Likert scale ranging from "Extremely Low" (1) to "Extremely High" (7)
Fit statistics for measurement model are as follows: ($\chi^2_{28} = 338.85$, $p < 0.05$; GFI = 0.921; AGFI = 0.909; IFI = 0.924; CFI = 0.922; RMSEA = 0.057; and RMR = 0.045; *** $p < 0.05$. Path loadings or coefficients, and t-values (in parentheses) are shown in the diagram.

RESEARCH IMPLICATIONS

The current study has demonstrated that marketing determinants have no impact on SCM commitment, implying that a Thai business lays its root in the Confucian culture of conducting business. Chinese-Thai merchants mostly base their business on their connections rather than on the performance-oriented objective (product salability) of their partners. Anecdotal evidence suggests that relationships are based on how long they have been doing business and how well their relationship has been maintained. Besides, one possible assumption would be the size of business: small and medium sized enterprises (SMEs) represent 43% of the total sample. Due to resource constraints, they may not be able to invest in marketing determinants. Hence, that may be part of the reason why marketing determinant was not supported. Most Thai companies especially SMEs tend to manage their material sourcing through systems e.g., electronic data interchange (EDI) for internal use rather than joining with their supply chain partners (Idiosyncratic Investment) through investing in supply chain wide systems e.g., Enterprise Resource Planning (ERP). Moreover, according to the information provided by ADB (Asian Development Bank), as a result of the financial crisis in 1997, many intrinsically sound companies in Thailand, especially small- and medium-sized firms, face severe financial difficulties, including a shortage of working capital and long-term debt burdens. Those companies have limited or no access to alternative sources of capital and generally cannot afford the services of international investment banks (www.adb.org, 2000). Also, global competition could significantly affect the supply chain partners' dependence as the lesser difficulty of securing a suitable product offering; or in other words, products are becoming easier to be sourced in the digital world of today.

It is interesting to note that, behavioral determinants have a significant impact on both SCM commitment and SCM business process integration. Communication and trust are very critical to the behavioral aspects of the exchange relationships as it is believed that with the connections among Thai businesses, they tend to have frequent discussion based on their trust rather than on the formal agreement or the benefits of each as the starting point. They often tend to open up discussions involving the marketing determinants and each other's business performance. Contradictorily, Thai business is expected to move forward to a capitalist economy where big firms acquire small firms which enable them to operate in a full scheme business cycle. (For e.g., Charoen Pokphand[2] Group PLC., has been trying to operate its chicken farms with their indoor operation. Their business covers chicken farming starting with their own supplies until selling to the markets). Power plays significant roles in business nowadays where big firms could control and force supply chain partners to commit (continuance commitment) and join the process integration.

[2] One of the largest industrial conglomerates in Thailand.

SCM commitment is highly explained by the affective commitment in this study. The sample represents the average age of 5-15 years which is considered as moderately new to the market and the firms' turnovers are in the range of 11-100 Million Bahts. It is assumed that at this stage of the business cycle, firms tend to require a highly affective commitment among supply chain partners in order to build strong relationships towards their firm co-operations. Thai firms tend to commit to their relationships because of their willingness rather than the hidden cost of leaving.

Finally, both behavioral and SCM commitment have an impact on the SCM business integration, mainly in terms of demand management and new product development. Due to the high percentage of SME firms indicated in the sample profile, CRM seems to be less affected by the prior two factors as they involve fewer numbers of customers. Therefore, it is not very popular for firms to set up reliable or formal systems, processes and procedures for interacting with their customers. They frequently care about how to deliver the products according to customers' demand as well as how fast they could develop their products and could launch into the markets. SMEs' main strength is how quickly and flexibly they could attack their competitors and reach the right track with their customers' demand.

MANAGERIAL IMPLICATIONS

This research validates an interesting fact that only behavioral determinants have an impact on SCM commitment and SCM business process integration for Thai business. This might be the case for businesses across the region, which could be a case subject for investigation and confirmation. However, the finding of this study varies from the previous study mentioned in the literature in the following ways:

1) Relationship plays a vital role. The Confucian cultural influence within Thai businesses is still prevalent as firms are embracing the influence of globalization and hence, shifting towards a more professional business approach. Anecdotal evidence suggests economic transitions and shifts observed all over this region which might be driven by the acquisition of larger firms. Business culture still mainly relies on the connections and relationship among firms in term of behavior rather than the marketing aspects.
2) It is likely that marketing determinants might influence Thai businesses in the long-run as firms pursue more business acquisition for achieving efficient business process integration across supply chains.

From the managerial standpoint, findings of this study could benefit various parties with an interest to achieve better SCM business process integration apart from those quantitative measures. A micro and macro view could apply to the result as their supporting ideas on which determinants could necessarily be achieved when pursuing SCM business process integration. Supply chain partners could be aware of important business aspects and support these factors

through their policies in order to achieve a better supply chain performance. At the same time, they need to focus on marketing determinants which would likely improve their SCM commitment and SCM business process integration. The need to focus on marketing aspects will be critical to improve business process integration which is likely to have a significant impact on future supply chains.

At the macro level, the government or associations involved in SCM at a national level must be aware of the important behavioral aspects and provide right and necessary guidance with plans to achieve efficient business process integration.

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

This study's results are opposed to or ignored by prior studies. The results imply that Behavioral determinants play a pivotal role in achieving Supply chain commitment and business process integration. This demonstrates the strategic importance of behavioral aspects in dealing with suppliers and customers in a supply chain system. The Behavioral dimensions proved to be critical in linking external market requirements with internal considerations, such as organizational and technological resources, capacities and competitiveness. In order to enhance a supply chain's customer satisfaction and performance, it is imperative for the executives to be engaged in understanding behavioral underpinnings, which is a method that is used for planning the supply chain business process.

Even though the present empirical results largely support the current model, this study has several limitations. Firstly, since the empirical data were provided by individual informants, the existence of possible biases cannot be discounted. Second, the facilitating factors of behavioral determinants employed in this study, particularly the internally aligned factors (e.g., continuity, communication, power, and trust), are by no means exhaustive, even if they have been identified as critical ones in the literature available. Finally, the current data were collected in Thailand, and the distribution of the scale of the firms surveyed may be quite different from that in other countries. Thus, it should not be assumed that the present results represent the wider case. However, it may be a useful reference for the firms located in other countries whose circumstances are similar to those in Thailand.

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