

## **Competitive Advantage through Supply Chain Responsiveness and Supply Chain Integration**

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### **Abstract**

*In today's competitive business, most of the firms increased focus on delivering value to the customer. The focus on attention of businesses is providing products and services that are more valuable compared to its competitors. This forces supply chain to be more responsive and create competitive advantage. This research investigates the impact of supply chain integration on competitive advantage. The study also assesses the impact of supply chain responsiveness on firm competitive advantage. The data collection instrument used was a questionnaire which was administrated to a total sample of 400 managers in Malaysia manufacturing industry. The response rate was 62% while 50% was usable questionnaires. Sample selection was based on convenience sampling. The data were analyzed using mean, standard deviation and correlation between independent and dependent variables. The analyses involved statistical methods such as reliability and validity tests and multiple regressions. The research findings supported the hypotheses that supply chain integration positively impact supply chain responsiveness and competitive advantage. The finding also showed that supply chain responsiveness was positively associated with competitive advantage of a firm.*

### **Introduction**

In competitive business environment nowadays, the concept of competitive advantage has been discussed intensively in business strategy. Many scholars has defined the concept of competitive advantage, such as Li et al (2006) stated that competitive advantage is the capacity of an organization to create and maintenance defensible position over its competitors. Barney (2002) also suggested that competitive advantage obtained by the firm when its actions in an industry or market created economic value and few competing firms are engaging in similar actions. Furthermore, Tracey et al. (1999) argue that competitive advantage comprises of distinctive competencies that sets an organization apart from competitors, thus giving them an edge in the marketplace (Thatte, 2007). Traditionally, competitive advantage involved the particular choice regarding the market in which a firm would compete, depending on market share in clearly defined segment using price and product performance attribute (Day, 1994).

Many previous studies have been focus on supply chain responsiveness. It is widely argued that the successful of business organization are largely depends on managing across all of supply chain parties (Christopher, 1992; Li et al., 2005; Vastag et al., 1994; Christopher and Peck, 2004; Academic Alliance Forum, 1999; Pelton et al., 1997). Lummus and Vokurka (1999). It is therefore need to dept investigate the responsiveness of a group of organization working together that called as supply chain.

The field of study supply chain responsiveness is highly conceptual with little empirical research (Holweg, 2005; Storey et al., 2005). Most of study emphasizes the importance of supply chain integration (Frohlich and Westbrook, 2001; Clinton and Closs, 1997). By addressing supply chain management practices that can lead responsiveness, will make better understanding the scope and activities related with supply chain management practices that create enhanced level of supply chain responsiveness in today's competitive market place.

Supply chain integration is degree of all the activities within an organization, suppliers, and customers are integrated together (Stevens, 1990; Stock et al., 1998; Stock et al., 2000; Narasimhan and Jayaram, 1998). Supply chain integration involves effective communication among all supply chain members (Turner, 1993). Integration is the term used to describe the various relationships that exist between departments within one company or the relationship between various companies. For example, internally and externally, companies can integrate different activities within the operating company. This activity became apparent (such as product flow, finance, marketing, measurement, etc.) or intangible (such as relationships, information, etc.). Integration not only offers knowledge but also introduces many problems. Managers can design what kind of integration should be focused on, what action should be taken, when various types of overlapping of integration, and what procedures should be followed (Haozhe,2007). The level of supply chain integration will be able to generate competitive advantage of the firm. Mentzer *et al* (2001)

The aim of this research is to find out the effect of supply chain responsiveness on competitive advantage. This study also assess the effect of supply chain integration in term of internal firm integration, integration with suppliers and integration with customer on firm competitive advantage. The paper is organized as follows. Relevant literature is reviewed and synthesized first to develop a conceptual model, followed by research methodology. The results are then presented along with discussion.

### **Literature Review and Hypotheses**

To gain competitive advantage, the firm need to better customer responds against competitors. Williamson, 1991; Martin and Grbac, 2003; Ellinger, 2000 stated that competitive advantage accrues to those company who are responsive to the customer needs and want. Lummus et al. (2003) argued that in the future, supply chain compete with other supply chain. In order to responds, business organization should understand that supply chain responsiveness towards customer needs. Creating responsiveness of supply chain has been become a source of competitive advantage of the firm (Lau and Hurley, 2001).

Companies with more supply chain responsiveness will be more adaptive to demand fluctuation and can overcome the environment uncertainty at a lower cost due to the shorter lead time (Randall et al., 2003). Yusuf et al. (1999) stated that lean manufacturing compromises responsiveness over cost efficiency. However, agile manufacturing place equal importance on both cost and responsiveness. Gunasekaran and Yusuf (2002) argued that the firm need to responsiveness and effectiveness. Responsiveness without cost effectiveness is not a real competitive strategy. Thatte (2007) stated that supply chain responsiveness and

competitive advantage of the firm are positively related. Yusuf et al. (2003) found high correlation between the responsiveness and time to market, dependability, product innovation and quality.

Towill (2002) stated that the effective engineering of cycle time reduction will generate to significant improvements in manufacturing costs and productivity. Further he argued that reduction in lead times is the necessary condition for a responsive supply chain and which further reduces the time to market. Sharifi and Zhang (2001); Aitken et al. (2002), emphasize that responsiveness in the supply chain is a source of competitive advantage. (Allnoch, 1997) found that average companies required much more time to respond to changes in customer demand than did the leading manufacturers. In some cases, as much as eight times longer was required. Thatee, (2007) proposed that supply chain responsiveness shall reduce the costs, while leading to competitive advantage for firms on other dimensions as well.

In operational level, responsiveness will enable organizations to compete based on cost, quality, time to market, and delivery dependability; responsiveness of a firm’s logistics (transportation and distribution) process will enable organizations to introduce new products faster than major competitors and also lead to greater ability of a firm to provide on time the type and volume of product required by customers (i.e. increasing delivery dependability); responsiveness of a firm’s supplier network will improve - the ability of the firm to rapidly introduce new products and features in the market place (i.e. compete based on product innovation and time to market), as well as improve a firm’s ability to provide on time delivery (i.e. increase its delivery dependability) as these firms will be endowed with responsive suppliers. Li, (2002) proposed that a supply chain characterized by quick responsiveness to customer will competitive in term of time and quality.

A supply chain consists of all stages involved, either directly or indirectly, in fulfilling a customer request. A supply chain includes manufacturer, supplier, transporters, warehouses, retailer, third-party logistic provider, and customer. The objective of supply chain management is to maximize the overall value generated rather than profit generated in a particular supply chain (Chopra, and P, Meindl, 2001). Robert Sturim (1999) stated that achieving competitive advantage through supply chain integration. Further more he argued that responsiveness to customer need requires high degree of supply chain integration and information sharing between partners in supply chain.

Based on the above literature review, research framework can be drawn as follow:

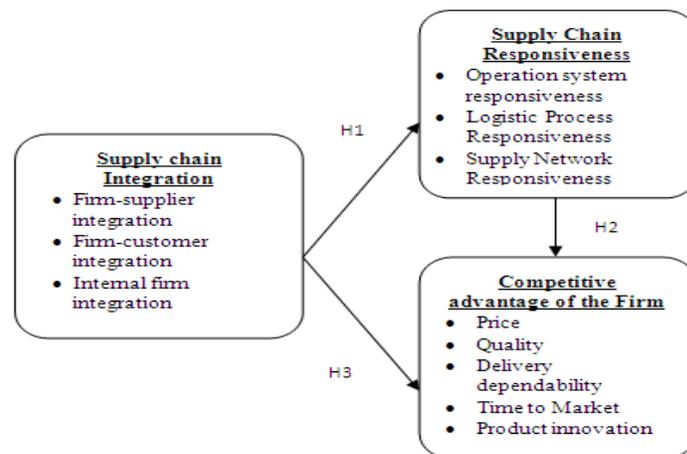


Figure 1: Proposed research framework

This study investigates the competitive advantage through supply chain responsiveness and supply chain integration. Based on the figure 1, supply chain integration encompasses internal firm integration (IFI), integration with supplier (IWS) and integration with customer (IWC) are significantly related to supply chain responsiveness. Hence, the following hypotheses will be tested:

*H1 : Supply chain integration is positively related to supply chain responsiveness*

*H1a : internal firm integration is positively related to supply chain responsiveness*

*H1b : Integration with supplier is positively related to supply chain responsiveness*

*H1c : Integration with customer is positively related to supply chain responsiveness*

Researchers proposed that supply chain responsiveness that consists of operation system responsiveness (OSR), logistic process responsiveness (LPR) and supply network responsiveness (SNR) are positive related to competitive advantage. Hence, the following hypotheses will be tested:

*H2 : Supply chain responsiveness are positively related to competitive advantage*

*H2a : Operation system responsiveness is positively related to competitive advantage*

*H2b : Logistic process responsiveness is positively related to competitive advantage*

*H2c : Supply network responsiveness is positively related to competitive advantage*

This research also examines the supply chain integration that encompasses internal firm integration; integration with supplier and integration with customer are positively related to competitive advantage. Hence the following hypotheses also will be tested:

*H3 : Supply chain integration are positively related to competitive advantage*

*H3a : internal firm integration is positively related to competitive advantage*

*H3b : Integration with supplier is positively related to competitive advantage*

*H 3c : Integration with customer is positively related to competitive advantage*

## **Research Methodology**

### **Sampling and data collection**

The study is based on the perspective of practitioners at Malaysia manufacturing industry with implementation of supply chain management. Data were collected using questionnaire survey which was administrated to a total sample of 200 managers are classified by job title and respondents are also classified by their job functions are corporate executive, purchasing, manufacturing/production, distribution/logistic, SCM, transportation, material, and operation from Malaysia manufacturing industry. The respondents were asked to indicate on a Likert scale of 1 (strongly disagree) to 5 (strongly agree) on the extent to which supply chain responsiveness, supply chain integration and competitive advantage. Several quantitative statistical technique methods have been used in this study. Cronbach's coefficient

alpha was used for reliability analysis, descriptive statistic and inferential statistic such as correlation and multiple regression analyses were used to test the hypotheses.

### **Reliability Analysis**

The Cronbach's alpha was conducted to assess the reliability of each scale. Alpha values over 0.7 indicate that all scales can be considered reliable (Nunally, 1978). For each of the item scales, factor analysis was used to reduce the total number of items to manageable factor. Principal components analysis is used to extract factors with eigenvalue greater than 1. Varimax rotation is used to facilitate interpretation of the factor matrix. Sampling adequacy measurement tests are also examined via the Kaiser-Meyer-Olkin statistics to validate use of factor analysis.

Factors analysis showed that KMO value of 0.82 indicate sampling adequacy. The factor model indicates three distinct factors loading without any misclassification: IFI, IWS and IWC. Among 20 items in the questionnaire, six items are deleted during the factor analysis. A total of 14 items were reduced to three underlying factors loadings. Four items are identified for internal firm integration (IFI), six items for integration with suppliers (IWS), and four items for integration with customers (IWC) respectively. These items are treated as independent factors. Cronbach's alphas among 14 items in the questionnaires are exceeded 0.7.

A similar factor analysis was applied to the supply chain responsiveness that included operation system responsiveness (OSR), logistic process responsiveness (LPR), supplier network responsiveness (SNR) and competitive advantage of the firm (CA). Among 40 items in the questionnaire, nine items are deleted during the factor analysis. A total of 31 items were reduced to four underlying factors loadings, depicted in Table 2. Cronbach's alphas among 31 items in the questionnaires are exceeded 0.7. Six items are identified for operation system responsiveness (OSR), five items for logistic process responsiveness LPR), six items for supplier network responsiveness (SNR), and fourteen items for competitive advantage of the firm (CA), respectively. These items are treated as dependent factors. The KMO value of 0.77 indicate sampling adequacy.

### **Correlation Analysis**

The correlation between independent and dependent variables: The Independent variables are (1) Supply chain integration that encompasses internal firm integration (IFI), integration with supplier (ICW) and integration with customer (IWC) (2) supply chain responsiveness that includes operation system responsiveness (OSR), logistic process responsiveness (LPR) and supply network responsiveness (SNR) and dependent variable is competitive advantage (CA) that encompasses price (P), Quality (Q), Delivery dependability (DD), time to market (TM) and product innovation (PI) were positive. IFI had a correlation of 0.24,  $p < 0.01$  with P, 0.35,  $p < 0.01$  Q, 0.25,  $p < 0.01$  DD, 0.26,  $p < 0.01$  TM, 0.26,  $p < 0.01$  PI which mean that the respondents are more likely to evaluate IFI was positive when CA is positive. IWS had a correlation of 0.31,  $p < 0.05$  with P, 0.22,  $p < 0.05$  Q, 0.31,  $p < 0.05$  DD, 0.30,  $p < 0.01$  TM, 0.24,  $p < 0.05$  PI. IWC has a correlation of 0.33,  $p < 0.01$  with P, 0.32,  $p < 0.01$  Q, 0.21  $p < 0.01$  DD, 0.31,  $p < 0.01$  TM. 0.34,  $p < 0.01$  PI. OSR had a correlation of 0.21,  $p < 0.01$  with P, 0.32,  $p < 0.01$  Q, 0.21,  $p < 0.01$  DD, 0.20,  $p < 0.01$  TM, 0.24,  $p < 0.01$  PI. LPR had a correlation of 0.22,  $p < 0.01$  with P, 0.32,  $p < 0.01$  Q, 0.22,  $p < 0.01$  DD, 0.21,  $p < 0.01$  TM, 0.23,  $p < 0.01$  PI. SNR had a correlation of 0.29,  $p < 0.01$  with P, 0.32,  $p < 0.01$  Q, 0.23,  $p < 0.01$  DD, 0.26,  $p < 0.01$  TM, 0.22,  $p < 0.01$  PI

**Regression Analysis**

The parameters of this model are estimated using multivariate regression analysis. Table 1 shows the regression between all independent variables SCI (IFI, IWS, and IWC) and SCR (OSR, LPR and SNR) to examine the relationship to Competitive advantage (CA). Table 1 also shows coefficients of each model along with corresponding test statistics. In Model 1 where the dependent variable is overall competitive advantage (CA), the model seem to be reliable (p-value for F<0.01 and adjusted R-square of 0.420).

Table 1 Model parameter estimates of supply chain responsiveness (t- Value in parenthesis)

Model 1: Dependent variable = overall CA	
Constant	116.211(7.422)**
IFI	0.949 (2.066)*
IWS	1.021 (1.989)*
IWC	1.524 (3.513)**
OSR	0.541 (2.345)**
LPR	0.324 (2.544)**
SNR	0.312 (2.423)**
Adj R2	0.420
F-value	12.253**

\*p value <0.05, \*\*p value <0.01

Table 2 shows the regression between all independent variables SCI (IFI, IWS, and IWC) to examine the relationship OSR, LPR and SNR. Table 1 also shows coefficients of each model along with corresponding test statistics. In Model 2 where the dependent variable is overall SCR. the model seem to be reliable (p-value for F<0.01 and adjusted R-square of 0.31).

Table 2 Model parameter estimates of supply chain responsiveness(t- Value in parenthesis)

	Model 2 Dependent variable = overall SCR	Model 3 Dependent variable = OSR	Model 4 Dependent variable = SCP	Model 5 Dependent variable = SCP
<b>Constant</b>	116.211(7.422)**	16.214 (5.812)**	18.194 (6.481)**	19.495 (6.299)**
IFI	0.949 (2.066)*	0.28 (2.201)**	0.282 (2.285)**	0.261 (1.906)**
IWS	1.021 (1.989)*	0.307 (1.275)**	0.310 (1.284)**	0.322 (2.733)**
IWC	1.524 (3.513)**	0.324 (2.901)**	0.142 (2.095)*	0.280 (3.268)**
Adj R2	0.310	0.25	0.17	0.23
F-value	12.253**	9.610**	8.510**	12.400**

## Results

In this study, the following outcomes were obtained: The correlation analysis showed that Supply chain integration in term IFI, IWC and ICS are related to supply chain responsiveness in term of OSR, LPR and SNR. Supply chain integration also related to competitive advantage of the firm in term of price, quality, delivery dependability, time to market and product innovation.

For hypothesis 1a, this study found a significant relationship between IFI and OSR, LPR and SNR. While hypothesis 1b assessed the relationship between IWC and OSR, LPR and SNR, finding show there is significant relationship. Hypothesis 1c, considered the relationship between IWS and OSR, LPR and SNR and testing found that there is a significant relationship. For hypothesis 2a, this study found a significant relationship between OSR and CA. While hypothesis 2b assessed the relationship between LPR and CA, finding show there is significant relationship. Hypothesis 2c, considered the relationship between SNR and CA and testing found that there is a significant relationship. For hypothesis 3a, this study found a significant relationship between IFI and CA. While hypothesis 3b assessed the relationship between IWC and CA, finding show there is significant relationship. Hypothesis 3c, considered the relationship between IWS and CA and testing found that there is a significant relationship.

## Discussion

The aim of the research presented in this research was to add to the knowledge on supply chain integration, supply chain responsiveness and competitive. By developing and testing a research framework of supply chain integration, competitive advantage and supply chain responsiveness constructs and conducting an analysis a number of manufacturing firm with valid and reliable instrument, this study represented one of the investigate the relationship between supply chain integration, supply chain responsiveness, and competitive advantage. Overall, this study contributes to the knowledge of the role of supply chain responsiveness and competitive advantage of the firm in supply chain management field. *First*, it proposed a theoretical supply chain responsiveness framework that identified OSR, LPR and SNR. *Second*, this study provides a practical and useful tool for supply chain managers to audit and assess supply chain management practices. *Third*, this study provides conceptual and prescriptive literature regarding supply chain responsiveness and competitive advantage of the firm. *Fourth*, the results lend support to the claim that better of supply chain management responsiveness lead to better competitive advantage of the firm. Managers seeking improved supply chain responsiveness and competitive advantage through supply chain integration.

The findings of this research have several important implications for practitioners. First, as today's business competition is moving from among organizations to between supply chains partners, organizations are increasingly adopting supply chain management practices, in the hope for generating supply chain responsiveness and competitive advantage of the firm. Research finding showed that 47% of the respondents indicated that their firm has not embarked upon a program aimed specially at implementing supply chain management. Of the remaining 53% of the respondents indicated that their firm has embarked on a supply chain management program for just two years or less. The findings of this research assure the practitioners that SCM is an effective way of competing, and the implementation of SCM practices does have a strong impact on supply chain responsiveness and competitive advantage of the firm.

Second, in today's fast paced global competition, organizations are in need of greater responsiveness, so as to rapidly meet customer needs. Moreover, responsiveness on all dimensions, namely, supply side, within the organization, and downstream is needed for total responsiveness of the firm. Supply chain

responsiveness has been poorly defined and there is a high degree of variability (ranging from flexibility to agility) in people's mind about its meaning. The findings demonstrate to the practitioners the vital components of responsiveness, and ways of achieving them.

Third, the study provides organizations a set of valid and reliable measurements for evaluating, benchmarking, and comparing supply chain responsiveness at different nodes within the supply chain (i.e. raw material supplier, component supplier, assembler, sub-assembler, manufacturer, distributor, wholesaler, and retailer). The measurements developed in this research can capture the different aspects of supply chain responsiveness, thus not only enabling use by practitioners to identify the immediate outcomes of it, but also to understand its impacts on organizational performance.

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