

Testing the Effect of the Supply Chain Management Implementation on Business Performance: An Empirical Study

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Abstract

Nowadays, Business is more challenging. Many of the companies increase their focus on creating the best value to the targeted customer. The center of business concern is to provide valuable product or services which can meet the customer need. The main purpose of this research is evaluating the business performance through SCM implementation in Malaysia manufacturing industry. A total of 248 respondents were selected by using purposive sampling. The data were analyzed to find the relationship between business performance and the implementation of supply chain management. Reliability and validity tests also employed. The research findings indicate significant correlation between SCM implementation and business performance. Based on the findings, strategic recommendations are proposed to implement the SCM for the manufacturing industry in Malaysia.

Keywords: supply chain management implementation, business performance, manufacturing industry

1. Introduction

Business today has become very sophisticated than it has been in the past. The process of modern business is characterized by such more interconnected and interdependent, short product life cycles, a new fast product introduction and complicated customer. Individual firm's future success depends greatly on the ability of managers to integrate the firm's network and relationships with other business partners. When a firm finds itself struggling to maintain profit margins, a strategy that focuses on the supply chain management implementation become more important (Sahay & Mohan, 2003). Towil and Christopher, (cited in Thatte, 2007), stated that one of the factor influencing success or failure business activity today is the implementation of supply chains management. They suggested that to improve competitive advantage and survival, company need to get the right product, price and time to customer.

Many researchers have explored the supply chain management implementation in various perspectives, such as Tan et al. (2002) and Tan (2002) identified 24 SCM implementation from previous studies and formed six constructs: (1) supply chain integration, (2) information sharing, (3) supply chain characteristic, customer service management, (5) geographical proximity and (6) JIT capability (Jabbour, 2011). Furthermore, (Li et al., 2006), identified that the concept of supply chain management implementation encompasses (1) firm-supplier partnership, firm-customer relationship and sharing of information, (2) The responsiveness of supply chain that consists of the responsiveness of operation system, process logistic, and network of suppliers, (3) company's competitive advantage. The implementation of Supply chain management is a various-dimensional construct that consists of up and downstream of supply chain (Li et al., 2006). Donlon (1996) argue that outsourcing, firm-supplier partnership, sharing of information, cycle time, compression and continuous process flow, as a part of the implementation of supply chain management. Furthermore, Tan et al. (1998) represented the implementation of supply chain management in term of quality, purchasing, and firm-customer partnership. Alvarado and Kotzab, focused on the implementation of supply chain management on inter-organizational system used, core competences, and elimination of excess in inventory through postponement. The key aspect of implementation supply chain management according to Tan et al. (2002) were integration of supply chain, sharing information with business partners, managing customer service, geographic proximity, and JIT capabilities. Lee (2004) focused on five elements in supply chain level namely a key to create the performance of business. They include outsourcing, strategic firm-supplier relationship, firm-customer relationship, and sharing information. We define that the manufacturing industry is the manufacture based on fabrication, processing from

raw material and commodities. This includes all foods, chemical, textile, machines and equipment, lumber, wood and pulp product. However, this research only focuses on food processing industry, and also this research only focus on supply chain management implementation in terms of internal firm relationship, firm-supplier relationship and firm-customer relationship) and its impact on business performance.

2. Literature Review and Hypotheses

2.1 SCM Implementation

Many scholars have been focused on SCM implementation in various perspectives. However, in this study try to explore the SCM implementation in three components namely; Internal firm relationship (IFR), firm-supplier relationship (FSR) and firm-customer relationship (FCR).

2.1.1 Internal-firm Relationship

One of the issues faced by any business is the need to integrate functions within the firm (Pagell, 2004). Stevens (1989) stated that an internal firm relationship includes; comprehensive integrated planning and control systems that regulate flow of goods and services from suppliers of raw materials into the company for processing into finished goods in and out of the organization to customers. Stevens (1989) describes the internal relationship is a significant step that must be completed before the external firm relationship can be achieved. Internal firm relationship, as suggested by anecdotal evidence, is the first step to achieving business performance (Handfield & Monczka, 1998; Rosenzweig et al., 2003; Stevens, 1989).

Internal firm relationship consists of: (a) the existence of database integration to the production unit, logistics and distribution of products and information of supplier, (b) easy access to key operational data, (c) information system which links a high integrated with various internal departments within the company, (d) an evaluation of inventory information, (e) getting the status of inventories at the right time, (f) use the planning system both computer-based marketing and production, (g) the level of system integration of high information on the production process (Lee, et al., 2007).

2.1.2 Supplier-firm Relationship and Customer-firm Relationship

External relationship is the integration to key customers or key suppliers. (Lambert et al., 1998; Lambert et al., 1996) has done in empiric studies that a high correlation between relationship practices with customers and suppliers with the company's performance (Westbrook Frohlich, 2001; Rosenzweig et al., 2003). The existence of a growing understanding that the organization of individual companies cannot compete in the long term without applying supply chain practices (Chandrashekar, 1999; Christopher, 2000).

The main objectives of firm-supplier relationship are achieving of products and services quality that matching with customer needs. Sometimes, suppliers do not have enough necessary abilities to deal with standards quality required by target market. Hence, it is important to develop firm-supplier partnership. (Krause & Ellram, 1997; Monczka et al., 1998).

Firm-supplier relationships are viewed as business partnership. It's become more integrated business problem solving, a new development product and in working groups with key representatives buyer. (Harland et al., 1999; Stuart & McCutcheon, 2000; Shin et al., 2000; Ragatz et al., 1997; Wynstra & Pierick, 2000; Stanley & Wisner, 2001). Firm-supplier relationship is a part of partnership and is valuable to the company than can be competitive weapon and source of firm's competitive advantage. Many researches indicate that the ultimate success or failure of a supply chain alliance is greatly depends on the level of corporate commitment, business trust and collaboration among members (Monczka et al., 1998; Handfield & Nichols, 1999; Walter et al., 2003). Thus, each of business participation must be aware of others and should be align its business expectations and particular objectives with its partners' expectations and goals (Stuart & McCutcheon, 2000; Spekman et al., 1998).

According to (Lee, et al., 2007), firm-supplier relationship consist of (a) strategic collaboration with main suppliers, (b) involve of main suppliers in product development, (c) the planning of production and management inventory, (d) developing supplier response for ordering processing system (e) Developing business network that guarantee the trust among partners, and (f) exchanging the business information between firm and suppliers.

Firm-customer relationship as an integral part of the supply chain partners. Therefore, managing customer relationship (CRM) is not only focused on internal-customer relationship but also on external-customer relationship in SCM. Firm-customer relationship is related to the firm's ability to communicate to the delivery of suitable products and services to target customers. Firm-customer partnership especially sharing information of product with valuable customers, receiving orders from customers, integrate with key customers to create

demand, placing the system order, sharing the orders status with valuable customers on scheduling orders, and product delivery stages (Lee, et al., 2007).

2.2 Business Performance

Business performance has been reported as the result of organizational goals achieved through the effectiveness of strategy or techniques. Most of the firms measure financial and non-financial performances that are related to certain aspects of strategy and operations in SCM (Gunasekaran et al., 2004). Kaplan and Norton (1992); DonHee Lee (2011) stated that some firms and researchers have focused on financial performance, while others concentrated on operational performance.

Measurements of business performance indicate how effective strategies or operational decisions are carried out (Bowersox et al., 1999; Soosay & Chapman, 2006). Business performance has been measured in several types of SCM measurements such as production, distribution, inventory, delivery, and customer satisfaction based on types of industries. Shin et al. (2000) has been identified two main performance indicators; the performance of supplier is measured by business cost, lead time, quality product and services, reliability delivery, and no delay delivery; and performance of buyer is measured by several indicators like reliability, conformance, product features, and durability of the product. Lin et al. (2005) argued that organizational performance is as quality of product, the position of business competition and customer care. Chow et al. (2008) proposed business performance to evaluate the SCM effect using quality product, market competitive position either leader, follower or niche, and customer service quality (DonHee Lee, 2011).

Based on the above literature review, we proposed a conceptual model of the relationship between SCM implementation and firm performance (see Figure 1).

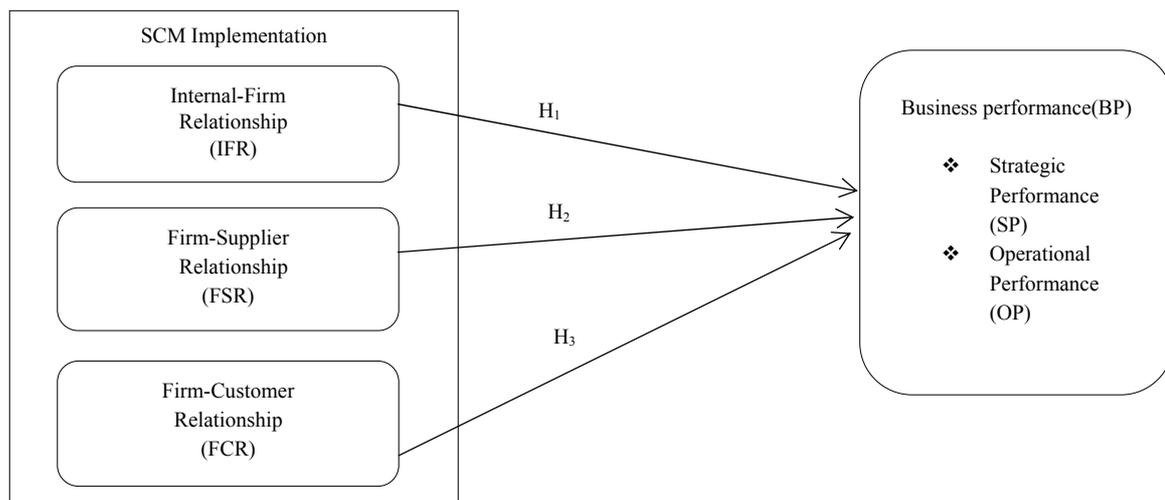


Figure 1. Proposed Research Framework

Based on the above figure, SCM implementation encompass internal-firm relationship (IFR), firm-supplier relationship (FSR) and firm-customer relationship (FCR)) are significantly related to business performance. Therefore, the following hypotheses will be tested:

H1a: IFR is positively related to SP

H1b: IFR is positively related to OP

H2a: FSR is positively related SP

H2b: FSR is positively related OP

H3a: FCR is relatively related SP

H3b: FCR is relatively related OP

3. Research Methodology

3.1 Data Collection Sampling

The research conducted based on the perspective of managers or business practitioners in manufacturing industry in Malaysia. Data were gathered by using questionnaire survey which was employed to a 248 respondents. The

respondents were asked to indicate on a Likert scale of 1 (strongly disagree) to 5 (strongly agree) on the extent to which business performance, and the implementation of supply chain management. Several quantitative statistical technique methods have been employed in this research. Reliability analysis is used to measure Cronbach's coefficient alpha. Descriptive statistic and inferential statistic such as correlation and multiple regression analyses were used to test the hypotheses.

3.2 Sampling and Sample Size

This sampling method used in this research is purposive sampling because the sample of this study is part of a particular person is owner, president / CEO, vice presidents, directors, managers and senior staff. Researchers select 50 companies out of 179 manufacturing companies in Malaysia.

To obtain sample size, the following formula suggested by Easterby-Smith et al., cited in Ammar, 2009) is used.

$$n = \frac{Z^2 pq}{e^2}$$

Which is valid where n is the sample size, z^2 is the abscissa of the normal curve that cut off the area α at the tails ($1 - \alpha$ equal to the desired confidence level, e.g., 90%), $e = 5$ is the desired level of precision, p is the estimate proportion of an attribute that is present in the population, when the population is large but we do not know in variability in the proportion that will adopt the practice; therefore, assume $p = 5$ (maximum variability) and q is $1 - p$, the value for Z is found in statistical calculation which content the area under the normal curve ($Z = 1.96$ with 90% confident level as follow (Sekaran, 1992, cited in Ammar, 2009).

$$n = \frac{(1.96)^2 (0.5)(0.5)}{0.05^2}$$

$$n = \frac{(3.8416)(0.25)}{0.0025}$$

$$n = 384$$

Based on above calculation, the minimum appropriate sample should be 384. However, to obtain a representative sample, the sample with convenience sampling was considered. To get high response rate and more accurate result, the questionnaire survey had been distributed to 400 respondents, and only 248 were considered as usable with 60% response rate.

3.3 Reliability and Validity Analysis

This measure was conducted for reliability and validity, besides the Cronbach's alpha coefficient for internal-consistency reliability of the survey questionnaire.

3.3.1 Reliability Analysis

Cronbach's alpha is a popular measurement of consistency internal, a minimum value of 0.70 is considered acceptable for existing scales and a value of 0.60 is deemed appropriate for newly developed scales (Nunnally, 1978). When Cronbach's α range 0.35 - 0.70, the measurement of reliability is medium. But when it is more than 0.70, is high. If it is less than 0.35, it indicated the low reliability and the instrument should be rejected.

According to the result of completed data, Kaiser, Meyer-Olkin (KMO) measure of sampling adequacy which show the proportion of variance in the variables are caused by underlying factor thus allowing for the application of factor analysis. This is supported by Barlett's Test of Sphericity value of 0.000 that is less than 0.05 thus proving that the analysis is significant. IFR (0.78), FSR (0.72), FCR (0.88), SP (0.87), OP (0.76) which are higher than 0.7 and the Barlett's Test of Sphericity shows to be significant with value less than 0.05 which mean that the sample is adequate and the data is suitability for factor analysis. See detail in Table 1.

Table 1. Kaiser-Meyer-Olkin and Barlett's Test

	KMO of Sampling	Barlett's Test of Sphericity		
		Approx. Chi-Square	df	sig
IFR	0.78	391.434	21	0.000
FSR	0.72	265.956	15	0.000
FCR	0.88	784.150	21	0.000
SP	0.87	763.861	45	0.000
OP	0.76	662.296	28	0.000

After completing the factor analysis on SCM implementation, the researcher extracted three individual factors from twenty questions. Each question's component loading variance was higher than 0.5. There were IFR, FSR and FCR. The first factors, IFR, a) the existence of database integration to the production unit, logistics and distribution of products and information of supplier, (b) easy access to key operational data, (c) information system which links a high integrated with various internal departments within the company, (d) an evaluation of inventory information, (e) getting the status of inventories at the right time, (f) use the planning system both computer-based marketing and production, (g) the level of system integration of high information on the production process. The Cronbach's α of these questions = 0.77. The second factor, FSR, composed of: (a) strategic collaboration with main suppliers, (b) involve of main suppliers in product development, (c) the planning of production and management inventory, (d) developing supplier response for ordering processing system (e) Developing business network that guarantee the trust among partners, and (f) exchanging the business information between firm and suppliers and the Cronbach's α of these questions score 0.70. The third factor, FCR, composed: sharing information of product with valuable customers, receiving orders from customers, integrate with key customers to create demand, placing the system order, sharing the orders status with valuable customers on scheduling orders, and product delivery stages and the Cronbach's α of these questions score 0.87. All these factors of SCM implementation proof good reliability and were in accordance with the internal factors. See Table 2.

Table 2. Summary for factor analysis of SCM practices

Factors	Items	Factor loading	Cronbach's α
IFR	Integrated database	0.388	0.7733
	Easy access to database	0.612	
	Integrated information system	0.556	
	Access to inventory system	0.572	
	Retrieving inventory status	0.711	
	Computer based planning system	0.702	
	Integrated product system	0.713	
FSR	Supplier linkage in SCM	0.693	0.7035
	Supplier linkage in SCM	0.586	
	Production/inventory management	0.546	
	Rapid response system	0.566	
	Reliable delivery system	0.753	
	Integration information technology	0.662	
FCR	Product information sharing	0.789	0.8707
	Electronic data system	0.804	
	Interactive demand forecasting	0.811	
	Fast and easy ordering system	0.805	
	Order schedule information sharing	0.805	
	Order process information sharing	0.667	
	Order delivery information sharing	0.560	

Table 3 shows the factor analysis of business performance. The first factor, strategic performance, composed of three questions: Overall our leadership is higher, overall our strategy plan is better, and the overall competitive position of our suppliers is higher. Cronbach's α of these questions = 0.85.

The second factor, operational performance, composed of three questions: Overall product quality of suppliers is higher, overall our total cost on supply chain is lower, the overall level of services of our suppliers is higher. The Cronbach's α of these score questions 0.82.

Table 3. Summary for factor analysis of firm's performance

Factors	Items	Factor loading	Cronbach's α
Strategic Performance	Overall our leadership is higher	0.58	0.85
	Overall our strategy plan is better	0.62	
	The overall competitive position of our suppliers is higher	0.65	
Operational Performance	Overall product quality of suppliers is higher	0.72	0.82
	Overall our total cost on supply chain is lower	0.63	
	The overall level of services of our suppliers is higher	0.79	

4. Results

4.1 The Profiles of Survey Respondents

Table 4 shows the organizational units where the respondents have managerial responsibility. The majority of survey respondents (48.1%) are in the strategic business unit (SBU) division level and 45% hold other positions. While 6.42% were at corporate level. Table 4 also shows 70% of respondents are managers, 18.5% hold other positions, and 10% as directors, 1% of respondents are vice president. With respect to the number of years the respondents have been in the firm, 135 (54.44%) respondents have worked between 5 to 10 years, 105 (42.33%) respondents have worked between 11 to 20 years. The rest (3.23%) have been working with the firms for less than five years.

Table 4 also shows years of respondents have held their current position. The majority of respondents (67.3%) have held their current position between 1 to 2 years, 35 of respondents (14.11%) less than one years, 25 of respondents (10.08%) between 2.1 to 3 years, 5.24% of respondent have held their current position between 3.1 to 4 years, and the rest of respondent (3.22%) have held their current position between 4.1 years to 5 years.

Table 4. Respondent's profiles

Statement	Category	Frequency	Percentage (%)
Organizational unit	Corporate level	16	6.42
	Strategy business unit	120	48.19
	Others	112	45
Years with the firms	Less than 5 years	8	3.23
	Between 5-10 years	135	54.44
	Between 1-20 years	105	42.33
	More than 20 years	0	0
Current position	Owner	0	0
	President/CEO	0	0
	Vice president	3	1
	Director	19	10
	managers	180	70
	others	46	18.5
Years with current position	Less than 1 years	35	14.11
	Between 1-2 years	167	67.39
	Between 2.1-3 years	125	10.08
	Between 3.1-4 years	13	5.24
	Between 4.1-5 years	8	3.22
	More than 5 years	0	0

4.2 Profiles of the Firms

Table 5 shows years of the companies have been established. More than half of firms (61.8%) have been in business for more than 20 years. 34.9% firms have been in business 11 to 20 years and only 3 (1.2%) of the firms are between 5 to 10 years old. As for the ownership of the firms, 100% of the firms are public traded firms.

Table 5. Firm's Profile

Statement	Category	Frequency	Percentage (%)
Number of years the firms have been established	Less than 5 years	0	0
	Between 5-10 years	3	1.2
	Between 11-20 years	87	34.93
	More than 20 years	154	61.85
Please indicate your company is	A private company	0	0
	A public company	248	100

Table 6 shows the number of employees in the firms. 130 (52.2%) of the firms employs more than 500 people, while 36.1% have employees between 301 and 500 employees, 11.2% of the firm have employees between 101 and 300 employees.

Table 6. Numbers of employees and average annual gross sales

Items	Category	Frequency	Percentage (%)
Number of employees	Less than 24 employees	0	0
	Between 26 – 50 employees	0	0
	Between 51 – 100 employees	0	0
	Between 101 – 300 employees	28	11.2
	Between 301 – 500 employees	90	36.1
	More than 500 employees	130	52.2
Average annual gross sales	Less than 99 million	0	0
	Between 100-250 million	0	0
	Between 251-500 million	0	0
	Between 501-1000 million	19	7.63
	Between 1001-1500 million	112	44.98
	More than 1.500 million	117	46.98

Table 7 shows the types of primary products offered by the firms. 150 of the firms (60.48%) offered make to stock (MTS) product, 20.16 % of the firm offered make to order (MTO) product and only 19.35% offered other product.

Table 7 also shows the types of primary customers served by the firms. 231 of the firm (92.77%) are retailer as their primary customers. Only 17 of the firm (6.82%) have individual end user as their primary customers.

Table 7. Primary Product Offered and customer serve

Items	Category	Frequency	Percentage (%)
Primary product	Make to stock	150	60.48
	Assembly to stock	0	0
	Make to order	50	20.16
	Engineer to order	0	0
	Others	48	19.35
Primary Customer	Industrial customer	0	0
	Corporate end user	0	0
	Individual end user	17	6.82
	Retailer	231	97.77
	Internal customer	0	0
	Others	0	0

4.3 Measurement Result for Research Variable

The research contained ten essential variables. Three of the variables are independent variables namely; IFR (7 items), FSR (6 items), FCR (7 items), firm performance as independent variables that contained 2sub variables namely; SP (3 items), OP (3 items). Five Likert-Scales range from 1= minimum to 5=maximum score, the standard deviation and mean were used to measure of central tendencies and dispersion.

4.3.1 Respondent's Response of IFR

Table 8 shows the distribution of means of respondent's perception of IFR based on scale of 1= strong disagree to 5=strong agree. The highest mean among the items for IFR is integrated information system with mean score 3.98 and followed by integrated database with mean score 3.89 and the lowest mean of computer based planning system with score mean 3.55. The average of the respondent's response of IFR items range between 3.50–4.99, the results seem to indicate that the respondents have positive response on IFR items. The average standard deviation for IFR found to be high that indicates that there is a lot of variation in the respondent's answer.

Rating used to interpret the results of IFR is: 1.00 – 1.49 strongly disagree, 1.50 – 2.49 somewhat disagree, 2.50 – 3.49 neutral, 3.50 -4.49 somewhat agree, and 4.50 – 5.00 strongly agree.

Table 8. Respondent's response of IFR (n=248)

Items	Strongly disagree (1)	Somewhat disagree (2)	Neutral (3)	Somewhat agree (4)	Strongly agree (5)	Mean	S.D
Integrated database	5 (2%)	21 (8.4%)	72 (28.9%)	114 (45.8%)	36 (14.5%)	3.89	0.90
Easy access to database	1 (0.4%)	26 (10.4%)	63 (25.3%)	129 (51.8%)	29 (11.6%)	3.64	0.83
Integrated information system	0 (0%)	9 (3.6%)	79 (31.7%)	120 (44.2%)	40 (16.1%)	3.98	0.75
Access to inventory system	1 (0.4%)	11 (4.4%)	43 (17.3%)	128 (51.4%)	65 (26.1%)	3.77	0.80
Retrieving inventory status	0 (0%)	14 (5.6%)	52 (20.9%)	128 (51.4%)	54 (21.7%)	3.89	0.80
Computer based planning system	9 (3.6%)	34 (13.7%)	50 (20.1%)	120 (48.2%)	35 (14.1%)	3.55	0.81
Integrated product system	0 (0%)	12 (4.8%)	62 (24.9%)	128 (51.4)	46 (18.5%)	3.83	0.77

4.3.2 Respondent's Response of FSR

Table 9 shows that respondents tend to perceived higher level of agreement on in the measurement of items of integration information technology with mean score 4.83 and followed by reliable delivery system with mean score 4.00 in a point scale range 1= strong disagree to 5= strong disagree. The respondents tend to response lower level of agreement on the measurement items supplier linkage in SCM with mean score 3.37, but the average of respondent's response of FSR items range between 3.50 – 4.99, it mean that the respondents have positive response on FSR items. The average standard deviation for FSR found to be high that indicates that there is a lot of variation in the respondent's answer.

Table 9. Respondent's response of FSR (n= 248)

Items	Strongly disagree (1)	Somewhat disagree (2)	Neutral (3)	Somewhat agree (4)	Strongly agree (5)	Mean	S.D
Supplier linkage in SCM	3 (1.2%)	13 (5.2%)	74 (20.7%)	123 (49.4%)	35 (14.1%)	3.37	0.81
New product design involvement	0 (0%)	28 (11.2%)	57 (22.9%)	130 (52.2%)	33 (13.3%)	3.67	0.84
Production/inventory management	1 (0.4%)	15 (6%)	62 (24.9%)	126 (50.6%)	44 (17.7%)	3.79	0.81
Rapid response system	0 (0%)	6 (2.4%)	42 (16.9%)	145 (58.2%)	55 (22.1%)	4.00	0.69
Reliable delivery system	0 (0%)	9 (3.6%)	50 (20.1%)	119 (47.8%)	70 (28.1%)	4.00	0.79
Integration information technology	6 (2.4%)	21 (8.4%)	43 (17.3%)	116 (46.8%)	62 (24.9%)	4.83	0.97

4.3.3 Respondent's Response of FCR

Table 10 shows the distribution of means of respondent's perception of FCR based on scale of 1= strong disagree to 5=strong agree. The highest mean among the items for firm-customer relationship is fast and easy ordering system with mean score 3.97 and the lowest mean 3.74 for the order process information sharing and the average mean of FCR range between 3.50 – 4.99, it mean that the respondents have positive response on FCR items. The average standard deviation for FCR found to be high that indicates that there is a lot of variation in the respondent's answer.

Rating used to interpret the results of FCR is: 1.00 – 1.49 strongly disagree, 1.50 – 2.49 somewhat disagree, 2.50 – 3.49 neutral, 3.50 -4.49 somewhat agree, and 4.50 – 5.00 strongly agree.

Table 10. Respondent's response of FCR (n=248)

Items	Strongly disagree (1)	Somewhat disagree (2)	Neutral (3)	Somewhat agree (4)	Strongly agree (5)	Mean	S.D
Product information sharing	2 (0.8%)	8 (3.2%)	70 (28.1%)	118 (47.4%)	50 (20.1%)	3.83	0.81
Electronic data system	0 (0%)	12 (4.8%)	61 (24.5%)	127 (51%)	48 (19.3%)	3.85	0.78
Interactive demand forecasting	1 (0.4%)	4 (1.6%)	65 (26.1%)	123 (49.4%)	55 (22.1%)	3.91	0.76
Fast and easy ordering system	1 (0.4%)	6 (2.4%)	56 (22.5%)	119 (47.8%)	66 (26.5%)	3.97	0.79
Order schedule information sharing	1 (0.4%)	6 (2.4%)	58 (23.3%)	132 (53%)	51 (20.5%)	3.91	0.75
Order process information sharing	3 (1.2%)	14 (5.6%)	64 (25.7%)	130 (52.2%)	37 (14.9%)	3.74	0.82
Order delivery information sharing	0 (0%)	6 (2.4%)	74 (29.7%)	132 (53%)	36 (14.5%)	3.79	0.70

4.4 Descriptive Statistics and Correlations

The descriptive statistics for each of the variables are shown in Table 11, including their mean, standard deviation, minimum and maximum value and the correlation. Mean for the three composite independent variables are 26.3 for IFR, 22.9 for FSR, and 27.1 FCR, respectively, with corresponding standard deviation (SD) of 3.85, 3.19, and 4.09 respectively. Means of two FP are 37.5, and 29.8 respectively.

Factors that influence the variance (VIF) were calculated to determine whether there are levels of multicollinearity. The VIF in this model has IFR (1.22), FSR (1.05) FCR (1.23). Relatively low inter-correlations between independent variables that indicated that no serious multicollinearity.

Correlation techniques are used to explore the relationship and prove the relationship hypothetical two or more variables when the data forming the second variable interval or ratio, and source of data from two or more variables is the same. Correlation between independent variable (SCM implementation) and dependent variable (FP) is calculated and linier regression analysis is used in order to verify the correlation.

In this research, Pearson's Product Moment of Coefficient Correlation, and simple correlation are applied to examine correlation and predict degree of SCM implementation and FP The value of r should range between -1.0 and 1.0 and determines the extent and type of correlation between the variable. A value close to extremities indicates a high correlation and indicates whether the correlation is negative or positive. A close to zero value indicates no correlation and a value in between indicate the existence of correlation to some moderate degree depending on the value.

Table 11. Descriptive statistics of independent and dependent variables

	N	Min	Max	Mean	S.D
IFR	248	13	35	26.3	3.85
SFR	248	15	30	22.9	3.19
CFR	248	13	35	27.1	4.09
SP	248	15	34	28.2	3.81
OP	248	14	35	37.5	29.8

Table 12 showed the correlation between independent variables (IFR, FSR and FCR) and dependent variable (FP) was positive. IFR had a correlation of 0.322, $p < 0.01$ with BP, SFR had a correlation of 0.35, $p < 0.01$ with BP, and FCR had a correlation of 0.37, $p < 0.01$ with BP. Which mean that the respondents are more likely to evaluate SCM implementation positively when FP rated positively.

Table 12. The correlation between independent and dependent variables

	Correlation			
	1	2	3	4
IFR	1			
SFR	0.198**	1		
CFR	0.406***	0.202**	1	
BP	0.322	0.35	0.37	1

Note: * P<0.1, ** p<0.05, *** p<0.001.

4.5 Regression Analysis

Multiple linear regression analyses are employed to develop models relating the two measures of independent variables (IFR, FSR and FCR) and dependent variables (SP and OP). Table 13 showed the coefficients correlation of each model. In the first model, the dependent variable is FP overall, the model seem to be reliable (p-value for F<0.01 and adjusted R-square of 0.130. The Model indicated that 13% of FP is related to IFR, FSR, and FCR. The second model SP is as dependent variable. Once again, the model also seems to be reliable (p-value for F<0.01 and adjusted R-square of 0.09. The Model showed that 9% of SP is related to (IFR, FSR, and FCR). FCR is the most important determinant in SP with p-value for t<0.01, followed by IFR with p-value of t<0.05, while FSR is not significant with p-value of t>0.05. Results in model 2 appear to confirm H1a, H2a and H3a. The third model, dependent variable is OP. The model seem to be reliable (p-value for F<0.01) and adjusted R-square of 0.085. The Model showed that 8.5% of OP is related to (IFR, FSR, and FCR). Once again, FCR is the most important effect in OP with p-value for t<0.01, followed by IFR with p-value of t<0.05, while FSR is not significant with p-value of t>0.05. Results in model 3 appear to confirm H1b, H2b and H3b.

Table 13. Model parameter estimates of FP (t-value in parenthesis)

	Model 1 Dependent variable = overall FP	Model 2 Dependent variable = SP	Model 3 Dependent variable = OP
Constant	116.211(7.422)**	22.099 (7.095)**	16.214(5.812)**
IFR	0.949(2.066)*	0.206 (2.257)*	0.172(2.101)*
FSR	1.021(1.989)*	0.109(1.072)	0.107(1.172)
FCR	1.524(3.513)**	0.277(3.208)**	0.224(2.901)**
Adj R2	0.130	0.099	0.085
F-value	12.253**	10.000**	8.643**

Note: * p value <0.05, ** p value <0.01.

5. Research Contribution

The purpose of this study presented on this paper was to adding to the knowledge on SCM implementation by investigating the linkage between SCM implementation and business performance. By developing and testing a research framework of SCM implementation- business performance and conducting an analysis a number of manufacturing firms in Malaysia, this research finding indicate one of the investigate the linkage between IFR-BP, FSR-BP, FCR-BP. Overall, this research contributes to the knowledge of SCM field. *First*, it proposed a theoretical SCM implementation that identified IFR, FSR, FCR, and BP. *Second*, this research provides suggestion tool for SC managers to evaluate SCM implementation. For example, the SCM implementation could be used to assess the level of business performance achieved. *Third*, this research provides conceptual framework and literature regarding SCM implementation and business performance. *Fourth*, the research finding showed support to the hypotheses that higher level of SCM implementation generate to higher levels of business performance. Managers find to improved business performance through SCM implementation. The research finding analysis failed to show evidence the linkage between IFR and business performance.

6. Research Limitation

There are a number of limitations that influence the generalizability of this study. *First*, this study limited only on manufacturing industry in Malaysia. One of the limitations of this single-sector study is that the conclusions may not be generalizable to other sectors. Future studies replicating this research across multiple industries and sector would increase the understanding of supply chain implementation. *Second*, the sample selection was based on a convenience sample, which is often used for exploratory work (Zikmund, 2003), rather than a random probability sample. Additional research could be conducted using a random probability sample. *Third*, the

sample represented a limited number of companies in limited industry. *Fourth*, the study is based on a self-reported questionnaire. Therefore, there is a possibility of respondents answering questions in a way that is perceived to be more desirable or acceptable than what is actually experienced or believed. Thus, the results of this study should be considered indicative rather than definitive based on these limitations.

7. Recommendation and Future Research

One of contribution of this research adds to the knowledge on supply chain management by exploring the link between SCM implementation and business performance. The scales established provided reliable and valid measurement of these constructs, and their component dimensions. The scales were developed with the objective to enable research in supply chain management areas that have received pragmatic attention across food processing industry. However, certain industry practices may not be applicable. Future research could utilize confirmatory factor analysis to substantiate the generalizability of the proposed scales across industry types. In a similar vein, future studies could test the generalizability of the instrument in regards to such demographic variables like firm size, level of sales, the position of the respondent in the company, the presence/absence of unions, etc.

This research has exploration properties. The scales developed to study the proposed relationships between SCM implementation and business performance were developed using an exploratory factor analysis. In order to complete the two step research cycle for developing standardized scales, future research should conduct confirmatory factor analysis to test the hypothesized measurement scales against new sample data from the same referent population of companies. This factor is an important issue, since a minimal amount of confirmatory research in firm integration exists. This lack of confirmatory studies presents a major obstacle for consensus on the use of instruments. Future research could more rigorous and systematic test of alternative factor structures by using confirmatory factor analysis.

More in depth knowledge could be attained by examining the relationship between specific dimensions of SCM implementation and business performance. Figures 1 above displayed the research models which could be submitted to multiple regression analysis. The scales which have been developed for IFR, FSR and FCR can lead high business performance. Future research should examine the effect of specific supply chain management implementation on business performance.

One of the ultimate goals of supply chain management is enhancing business performance in form of financial and non-financial performance. One of non- financial performance of the firm is customer satisfaction. Supply chain management adherents claim that a robust integrated supply chain management generate more satisfied customer (Kamel, 2007). More satisfied customers are most likely to do repeat business performance, and customer satisfaction should be reflected in business performance. The ability of the firm to satisfy customers in a unique way is also dependent upon its supply chain orientation practices. However, this present research did not measure the relationship between firm integration and customer satisfaction. By measuring this variable, future research may find significant relationship between firm integration practices and customer satisfaction.

In assessing performance, (Hult, et al., 2008) respond to call to consider broader sets of outcome performance criteria than has been customary (Kaplan & Norton, 1996). In particular, (Hult, et al., 2008) examine whether or not a supply chain management is related to the four dimension of the Balance Scorecard: customer performance, financial performance, and innovation and learning performance (Kaplan & Norton, 1996; Maiga & Jacobs, 2003). Where the performance of internal processes (i.e., speed, quality, cost and flexibility of a particular supply chain process (Hult et al., 2004) is directly tied to supply chains, the other three dimensions reflect broader issues that may or may not be closely tied to supply chain practices. However, this present research did not measure the relationship between supply chain management and balance scorecard. By measuring this variable, future research may find significant relationship between supply chain management and balance scorecard.

8. Summary and Conclusion

Questionnaires were distributed to 248 respondents from manufacturing industry in Malaysia. Results shows that supply chain management implementation scale were reliable and valid for measuring relationship with firm performance. The results also show that statistically significant positive relationship between IFR and BP and OP. These results suggest that SCM implementation has the ability to increase BP.

In this study, the following finding was provided: (a) The regression correlation analysis indicated that (1) IFR is related to SP and OP, and (2) FCR is predictor of the SP and OP. This research demonstrated a positive relationship between IFR and BP and OP, but FSR does not relate to BP and OP.

For hypothesis 1, this research indicates a significant linkage between IFR and SP and OP. While second hypothesis assessed the correlation between FSR and SP and OP; shows not significant linkage. The third hypothesis assessed the link between FCR and SP and OP and statistical testing showed that a significant correlation between FCR and business performance.

According to the research finding demonstrated that FCR was the strongest effect of business performance, followed by IFR respectively. We found that FCR has strong effect on business performance than IFR and FSR. Therefore, the higher FCR, the higher business performance was. From these evident, managers should improve FCR effectively in order to improve business performance.

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