

The Impact of SCM on Business performance: A Case Study in Tehran Stock Exchange Market

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Abstract

In today's global market, managing the entire supply chain becomes a key factor for measuring the successful business performance and the performance evaluation remains one of the biggest challenges for today's companies. The main purpose of this paper is to study the relationship between Supply Chain Management and business performance in Tehran Stock Exchange Market. To assess this, a model with 6 latent variables has been presented, which each of the variables is measured by some other indicators. To measure the indicators of the model, a questionnaire was prepared and distributed among 94 experts. The model was examined using PLS Path Modeling Technique. According to the results, there is a significant relationship between Supply Chain Management and business performance.

Keywords

Supply chain management (SCM) , business performance , Partial Least Square (PLS)

1. Introduction

Performance is very essential to management as it is an outcome which has been achieved by an individual or a group of individuals in an organization related to its authority and responsibility in achieving the goal legally, not against law, and conforming to the morale and ethic (Iswati and Anshori, 2007). Performance is the function of the ability of an organization to gain and manage the resources in several different ways to develop competitive advantage. There are two kinds of performance, financial performance and non-financial performance (Hansen and Mowen, 2005). Financial performance emphasizes on variables related directly to financial report. Company's performance is evaluated in three dimensions. The first dimension is company's productivity, or processing input into output efficiently. The second is profitability dimension, or the level of which company's earning is bigger than its cost. The third dimension is market premium, or the level of which company's market value is exceeding its book value (Walker, 2001). The apparent linkages between SCM strategies and practices raise two questions yet to be addressed, namely which elements of SCM strategies are consistent with each other, and how do they in business performance. The objective of this study is to answer these questions. The remainder of this paper is organized as follows. The next section summarizes the literature on SCM with particular reference to their effect on performance. Survey methodology and statistical analysis are then presented, followed by discussion of the results and their implications.

2. Literature Review

2.1- Supply Chain Management

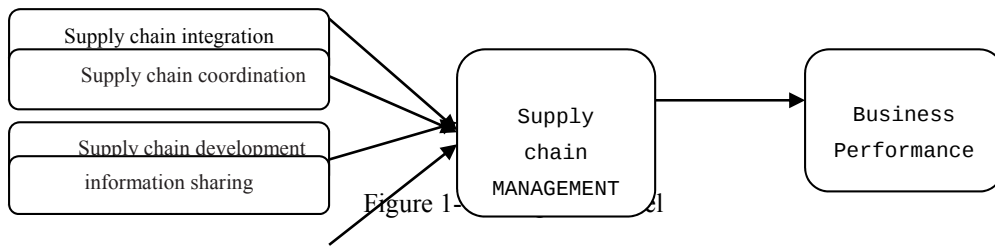
To compete in today's global markets, organizations strive to deliver their products and services in both an efficient and effective manner. A critical component in this effort is the design and coordination of the supply and distribution networks-supply chain management¹ (Sengupta, et al., 2006). SCM is defined as the coordination of resources and the optimization of activities across the value chain to obtain competitive advantages (Gunasekaran, et al., 2008). SCM has evolved over the last decade, due to a dramatic increase in the publication of SCM theories and practices (Theeranuphattana, Tang, 2008). Along with the evolution of supply chain management practice, some large enterprise would like to strengthen collaboration level between its upper providers and lower distributors. These important enterprises would become the information, management, control, and harmony center of the whole supply chain. Along with the continuous and improving collaborations between these enterprises, the supply chain would evolve into integrated supply chain (Wu, Song, 2005). A supply chain is an integrated process wherein raw materials are manufactured into final products, then delivered to customers (via distribution, retail, or both) and is a set of facilities, supplies, design agencies, commissioning teams and customers, products and methods of controlling inventory, purchasing, and distribution linked together via the feed forward flow of materials and products and the feedback flow of information (Evans, et al., 1999; Sabri, Beaman, 2000; Wu, Song, 2005). Integration in the context of SCM is defined as 'interaction and collaboration between departments and organizations to achieve shared supply chain goals'. The main goal of providing products and services of value to customers is facilitated through integration of the supply chain (Tan, Tracey, 2007).

2.2. Introduction to PLS Path Modeling

Partial least square (PLS) method, which is among conceptual approaches, is one of the multivariate statistical techniques using which, despite some limitations such as unknown response variable distribution, low number of observations and existence of serious correlation between independent variables, one can model one to several dependent variables simultaneously using several independent variables. This method determines coefficients in such a way that the resulting model enjoys maximum interpretation and explanation power. In addition, PLS technique assesses all the mutual effects among latent variables (endogenous coefficients) and the weight of all measurable indices related to latent variables per case (exogenous coefficients).

3. Methodology

The research method is a description of correlation branch. In addition, the research is an applied research as far as goal is concerned. To achieve the objectives of this study, a structured questionnaire was used to have participants respond. The questionnaire included 60 expressions in the organization in which the respondents were asked to comment on each expression by selecting a score between 1 to 5 (1 means "I completely disagree" and 5 means "I completely agree"). In this questionnaire, SCM and business performance were measured by 16, and 4 question, respectively (Appendix 1). These indicated the absence of non-response bias. To ensure that items used to operationalize SCM, and performance measured the corresponding construct consistently, and were free of measurement error, reliability analysis was carried out using Cronbach's alpha. While analysis did suggest that some items be dropped, values of α in excess of 0.70 for the resulting scales indicated that they were reliable. A conceptual model for our work is shown in Figure 1.



based on the conceptual model, five hypotheses is defined as follow:

- There is significant relationship between SCM and Business Performance
- There is significant relationship between Supply chain integration and SCM
- There is significant relationship between Supply chain coordination and SCM
- There is significant relationship between Supply chain development and SCM
- There is significant relationship between information sharing and SCM

4. Research Findings

In this section, with respect to the model, presented in the previous section, the model has been estimated and its validity was examined using PLS Path Modeling Technique. First, after extracting the answers, manifest variables were normalized as follows. The original items Y_i , scaled from 1 to 5, are transformed into new normalized variables $X_i = 100(Y_i - 1)/4$. The minimum possible value of X_i is 0 and its maximum possible value is equal to 100. If there are missing data for variable X_i , they are replaced by the mean of this variable. After specifying the relationship between the variables of the model, using PLS Path Modeling Technique, all the coefficients and parameters were estimated. For this purpose, vpls1.04 software was used to estimate the relationship between the latent variables of the problem. An estimated model is shown in Figure 2.

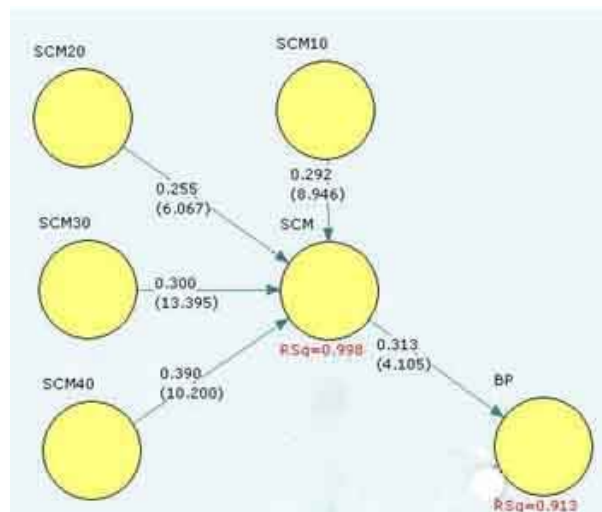


Figure 2- Estimated model using VPLS

We know that a PLS path model, consists of a structural model and a measurement model. Then, the validation of a PLS path model requires the analysis and interpretation of both the structural and the measurement model. This validation can be considered as a two-stage process: the assessment of the measurement model, and the assessment of the structural model (Henseler et al, 2009).

4.1. Assessing the Structural Model

According to Chin's theory, R^2 , that is just measured for endogenous variables and shows the variance of endogenous latent variables, can be interpreted as noticeable, average and weak for values of 0.67, 0.67-0.33 and less than 0.19 respectively. Also, in a specific model including endogenous latent variables with only one or two exogenous latent variable(s), average amount of R^2 is acceptable (Trujillo, 2009). In this study, R^2 value is equal to 0.938. Therefore, R^2 value of the model is acceptable, (Trujillo, 2009). Also, average Redundancy of the model was estimated to be 0.63. High redundancy means high ability to predict (Trujillo, 2009).

4.2. Assessing Measurement Models

In this section, we must evaluate three aspects of reflective measures

- Unidimensionality of the indicators
- Check that indicators are well explained by its latent variable
- Assess the degree to which a given construct is different from other constructs

4.2.1. Unidimensionality of the indicators

Some recent tools have been proposed to evaluate unidimensionality of PLS-PM reflective blocks (Shamir et al, 2005), but the most common methods employed for this purpose are the following three indicators:

- Check the first eigenvalue of the MVs correlation matrix
- Calculate the Cronbach's alpha
- Calculate the Dillon-Goldstein's

In this paper, Unidimensionality of the indicators was measured using Cronbach's alpha coefficient. If the coefficient is more than 0.7 the reliability of the model is high and if the coefficient is smaller than 0.6, the model has low reliability (Henseler et al, 2009). The average of Cronbach's α coefficients of the model is higher than 0.7, showing that the reliability of the model is confirmed in general.

4.2.2. Check that indicators are well explained by its latent variable

In this case, we check it by means of three tools:

- Communality: Communality is calculated with the purpose to check that indicators in a block are well explained by its latent variable (Trujillo, 2009). In this research, the mean communality of the model was estimated 0.6189 which is the average of all the block communalities.
- Composite Reliability: Composite Reliability is the criterion of the model reliability. For this criterion, value less than 0.6, indicating a lack of reliability (Henseler et al, 2009). The value of this criterion in this study is much more than 0.6, which shows the high reliability of the model.
- AVE: To calculate the convergent validity, Fornell and Larcker suggested AVE. AVE should be larger than 0.50 which means that 50% or more variance of the indicators should be accounted for (Henseler et al, 2009). The AVE of the model is higher than 0.5; so the convergent validity of the model is confirmed.

Table 1- Reliability and AVE

Construct	Composite Reliability	AVE	Cronbach Alpha
SCM	0.883	0.657	0.822
BP	0.844	0.580	0.701
SCM10	0.904	0.659	0.861
SCM20	0.838	0.635	0.710
SCM30	0.771	0.628	0.609
SCM40	0.747	0.596	0.619
Average			

4.2.3. Assess the degree to which a given construct is different from the others

We evaluate the extent to which a given construct differentiates from the others. This is done by verifying that the shared variance between a construct and its indicators is larger than the shared variance with other constructs. In other words, no indicator should load higher on another construct than it does on the construct it intends to measure. We calculate the correlations between a construct and other indicator besides its own block. If an indicator loads higher with other constructs than the one it is intended to measure, we might consider its appropriateness because it is not clear which construct or constructs it is actually reflecting (Henseler et al, 2009). On this basis, U3, P2 have not been identified as appropriate indicators for latent variables and were excluded from the model; however the other indicators of the model were confirmed.

Table 2- Factor Structure Matrix of Loadings and Cross-Loadings

Scale Items	SCM	BP	SCM10	SCM20	SCM30	SCM40
SCM1	0.7245	0.5739	1.0161	0.2393	0.3750	0.6026
SCM2	0.9116	0.6751	0.4453	0.9689	0.5533	0.8745
SCM3	0.7383	0.7142	0.3900	0.4733	1.0175	0.4455
SCM4	0.9150	0.5477	0.5971	0.7575	0.4533	1.0174
BP11	0.2626	0.7271	0.1202	0.1941	0.4624	0.0488
BP12	0.2868	0.6379	0.3017	0.1881	0.2838	0.1438
BP13	0.6218	0.9423	0.4302	0.5284	0.5686	0.3827
BP14	1.0196	0.7710	0.7630	0.7576	0.7274	0.9206
SCM11	0.4547	0.4810	0.6150	0.2595	0.1969	0.3047
SCM12	0.5115	0.4496	0.7602	0.1818	0.2691	0.3817
SCM13	0.5371	0.4229	0.9040	0.0341	0.3028	0.4163
SCM14	0.7457	0.5161	0.9449	0.3113	0.4124	0.6576
SCM15	0.6767	0.4323	0.8759	0.1728	0.3361	0.6818

SCM22	0.7079	0.4308	0.2440	0.9010	0.3215	0.7875
SCM23	0.5567	0.5764	0.2056	0.7453	0.3886	0.3972
SCM24	0.5796	0.4519	0.1184	0.7866	0.4579	0.4865
SCM31	0.6275	0.4277	0.2720	0.4353	0.8413	0.4683
SCM32	0.5458	0.6972	0.3445	0.3185	0.7749	0.2443
SCM41	0.7098	0.4165	0.7259	0.2082	0.3867	0.7889
SCM42	0.7079	0.4308	0.2440	0.9010	0.3215	0.7875

On the other hand, regarding that the weight of the manifest variables of the model are all positive, all measurement indicators have explained their own Latent variable correctly.

Table 3- Structural Model

	Entire Sample estimate	Mean of Subsamples	Standard error	T-Statistic
SCM->BP	0.3130	0.3051	0.0763	4.1049
SCM10->SCM	0.2920	0.2992	0.0326	8.9458
SCM20->SCM	0.2550	0.2551	0.0420	6.0665
SCM30->SCM	0.3000	0.2910	0.0224	13.3947
SCM40->SCM	0.3900	0.3849	0.0382	10.1997

5. Conclusion

Based on the presented model, the relationship between the Supply Chain Management and business performance at confidence level of 95% was investigated. However, the Supply Chain Management has been mostly affected by the SCM40 (0.39) and SCM30 (0.30). In addition, the effect of variables SCM20 and SCM10 on the Supply Chain Management has been negligible as compared with other variables. One of the limitations of this study was the lack of access to samples that can be done with little difficulty. This Research can be used for assessing the impact of SCM on performance in the other organizations. The influence of other factors such as TQM on performance can be examined in another study.

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Biography

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