An Empirical Study of the Effect of SCM Practice on Corporate Performance (Based Specifically on the Chinese Manufacturing Industry)

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Abstract. Few empirical studies on the practical effectiveness of supply chain management (SCM) in Chinese corporations have been conducted. Given this situation, using the Chinese industry as the research target, the current status of SCM practice and its practical effectiveness in China are investigated herein based on the data analysis of well-designed questionnaires. The contribution level of SCM practice to corporate business performance is examined through the construction and estimation of structure equation models. The results of this empirical study could be used as a guidance for the SCM practice in the Chinese manufacturing industry in the future.

Keywords: Supply chain management (SCM) · Strategic supplier partnership (SSP) · Customer relationship (CR) · Information sharing (IS) · Lean production system (LPS) · Corporate performance (CP) · Structure equation models (SEM)

1 Introduction

In recent decades, economic globalization has boomed, leading to fierce competition among enterprises, deregulation, and the rapid advancement of information technology. Under these circumstances, companies strive to achieve optimal integrated management in the supply chain, from source suppliers to terminal consumers (with the exception of the inner optimization of some individual companies). Supply Chain Management (SCM) is often proposed as a solution. In particular, the successful application of SCM in companies such as Dell Computer, Inc., Wal-Mart, Inc., and Hewlett-Packard Company speaks for itself. However, the effect of SCM on Chinese companies is little understood thus far.

Due to the traditional planned economy that prevailed in past decades in China, which has been hailed the "world's factory," Chinese distribution systems were restricted and, therefore, remained underdeveloped. Recently, the situation has changed drastically. Owing to the transition from a seller's market to a buyer's market due to the competitive situation, the optimization of logistics management – namely, reducing the cost of logistics, improving CS, and optimizing efficiency in terms of transportation lead time for stock – becomes a great challenge that needs urgently to be conquered by

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Chinese companies. SCM is thus becoming increasingly important for Chinese corporations in such competitive market circumstances.

However, many people and organizations remain doubtful about the validity of SCM. Such skepticism is based mainly on the experiences of particular companies that have found reasons to question the effectiveness of SCM. This uncertainty is related to the question of whether or not SCM is as valid in the Chinese context as it is for European companies. As previous empirical studies on SCM are lacking, it is necessary to conduct further research, therefore, into the effectiveness of SCM.

Based on the above-mentioned background, the purpose of this study is to assess the conditions for the application of SCM in the Chinese manufacturing industry and thus to clarify the relationship between SCM and business performance.

2 Literature Review

A comprehensive literature review of the topic indicates that the effective use of SCM is an important method for improving corporate performance (CP). Some researchers have split SCM into several components before studying the effect of these components on CP. Frohlich and Westbrook (2001), for example, have analyzed how the integration of suppliers and customers affects CP [1]. Eriksson (2010) brings the idea of "lean thinking" into his study of the relationship between SCM and CP, using a case-study method for his research [2]. Tan et al. (1998) focus on the effects of suppliers and customers, which are the two key components of SCM, on CP [3]. Kim et al. (2014) show that the coordination and cooperation of supply chain integration and diversification strategies have a significant effect on both the whole SCM performance and the firm's performance through simultaneous equation analysis on the proposed model representing structural relationships among four constructs by employing LISREL [4].

Other researchers divide the concept of CP into several parts, examining the impact of SCM practice upon them separately. Chan et al. (1997) point out that SCM could be used with information systems to influence many aspects of CP, such as the performance of the information systems themselves, which might lead to a competitive advantage for companies [5]. McLaren et al. (2004) have used path analysis to look at sales volumes in order to specify and measure CP. They found that effective SCM practice performed by a corporation can have a strong effect on corporate market performance [6]. The use of a Lean System involves the practice of driving out all unnecessary costs, time, and other waste from the entire supply chain. Here, Mason and Towill (1997) have found that lean thinking and practice has become a very important dimension for the successful implementation of SCM [7]. Arlbjorn et al. (2011) outline a model that illustrates under which conditions lean is deemed most appropriate according to the type of service delivered [8].

Compared with the research conducted abroad, quantitative research into the relationship between SCM and CP began late in China; in the main, it has been carried out only in the last few years. Wang and Lyu (2010) have studied the relationship between financial SCM and CP in terms of the financial supply chain. They divided

their samples between the physical and the financial supply chain by adopting the quantitative method, before assessing the relationship between SCM and CP via a linear regression. The results showed that physical SCM has no obvious effect on CP, whereas financial SCM has a direct influence [9].

Wang and Zhang (2007) have studied financial indices, such as "return on investment," "return on equity," and "return on assets," for listed corporations. In all the listed corporations targeted by this study, an Enterprise Resource Planning (ERP) system has been implemented. The researchers' results indicated that the ERP system has a clear effect on CP, especially in small corporations. They also found that the influence on CP is more apparent in non-production corporations [10]. Zhang and Huang (2012) show that corporate governance has a positive moderating effect on the relationship between ERP investments and firm performance, and that firms with a higher level of diversification perform worse utter ERP implementation based on the empirical study on the samples of 137 listed companies in the US from 1998 to 2007 [11].

Feng (2012) discusses the relationship between SCM strategy, information system strategy, and CP in his Master's thesis. He studied the relationships between these three factors quantitatively by issuing questionnaires and analyzing the returned sample datasets using structural equation model estimation. The results showed that, in environments where full information systems are used, CP can be improved significantly through the adoption of a hybrid supply chain [12].

Ye (2009) has conducted an in-depth study into the relationship between four factors: trust between supply chain partners, relationship commitment, information sharing, and operation performance. The results indicated that trust between supply chain partners has positive effect on the other three factors, whereas relationship commitment had almost no effect. Further, the quality and level of information sharing was found to have an effect on operation performance [13]. Ding et al. (2014) applied stepwise multiple regression analysis in their study to test the hypothesized relationships based on a survey questionnaire to 600 Australian beef processors. And the findings show that strategic alliance, information quality and trust and commitment are significantly related to food quality. In particular, the standardized coefficient shows that information quality has a significant positive relationship with food quality [14].

Chen (2007) focuses on the effects of supply chain integration levels on CP within production corporations, which is an important component of SCM. The study was conducted using quantitative analysis methods, such as exploratory factor analysis and linear regression. The research results showed that there is a positive relationship between supply chain integration and CP [15]. Supply chain integration is a multi-dimensional construct, including the four dimensions strength, scope, duration, and depth of integration. Eriksson (2015) conducted a multiple case study of four engineering projects in their study and the empirical findings indicate that these four dimensions are critical when conceptualizing and implementing partnering in engineering projects. The results show that there are strong interdependencies among the four dimensions, suggesting that it is crucial to manage them simultaneously and systemically rather than in isolation [16].

3 Proposed Hypothesis SEM Models

Structural Equation Modelling (SEM), or path analysis, is a very powerful multivariate technique that enables researchers to measure direct and indirect effects. SEM is often used to perform test models with multiple dependent variables and also when utilizing several regression equations simultaneously.

The main purpose of this study is to reveal the effects of SCM practice on CP in the Chinese manufacturing industry. Based on this purpose and on the arguments listed in the above literature review, two hypotheses are proposed. First, Hypothesis H1 is proposed and will be tested using Hypothesis SEM Model 1.

Hypothesis H1: Supply Chain Management (SCM) practice has a significant effect on CP.

It is easier to estimate the role of SCM practice by examining 4 dimensions separately, which allows the degree of their contributions to CP to be analyzed. Therefore, in order to decompose SCM practice into four dimensions, the following four sub-hypotheses (Hypotheses 2–5) are proposed, which will be tested using Hypothesis SEM Model 2.

Hypothesis H2: The customer relationship (CR) has a significant effect on CP.
Hypothesis H3: Information Sharing (IS) has a significant effect on CP.
Hypothesis H4: Strategic Supplier Partnerships (SSP) have a significant effect on CP.
Hypothesis H5: Lean Production Systems (LPS) have a significant effect on CP.

The hypotheses listed above are elaborated further in Figs. 1 and 2, in which the following notation is used:

- ξ represents latent exogenous variables and X represents their observable indicators.
- Y represents the indicators of the latent endogenous variables, which are symbolized by η.
- The measurement errors associated with the endogenous indicators are represented by ε, while δ represents measurement errors in the exogenous indicators, and ζ is used for structural disturbances.

The structural and measurement sub-models are formulated as follows:

$$\boldsymbol{\eta} = \mathbf{B}\boldsymbol{\eta} + \boldsymbol{\Gamma}\boldsymbol{\xi} + \boldsymbol{\zeta}$$
$$\mathbf{Y} = \boldsymbol{\Lambda}_{\mathbf{Y}}\boldsymbol{\eta} + \boldsymbol{\varepsilon}$$
$$\mathbf{X} = \boldsymbol{\Lambda}_{\mathbf{X}}\boldsymbol{\xi} + \boldsymbol{\delta},$$

where $\boldsymbol{\eta}$ is the latent endogenous variables vector, $\boldsymbol{\xi}$ is the latent exogenous variables vector, $\mathbf{Y}$ is the indicators vector for latent endogenous variables, $\mathbf{X}$ is the indicators vector for latent exogenous variables, $\boldsymbol{\varepsilon}$ represents the measurement errors in endogenous indicators, $\boldsymbol{\delta}$ represents the measurement errors in exogenous indicators, $\boldsymbol{\zeta}$ is the structural disturbances vector, $\mathbf{B}$ is the structural parameters matrix for latent

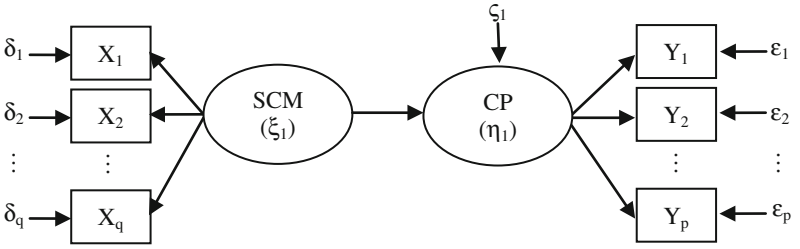

Fig. 1. Hypothesis SEM model 1

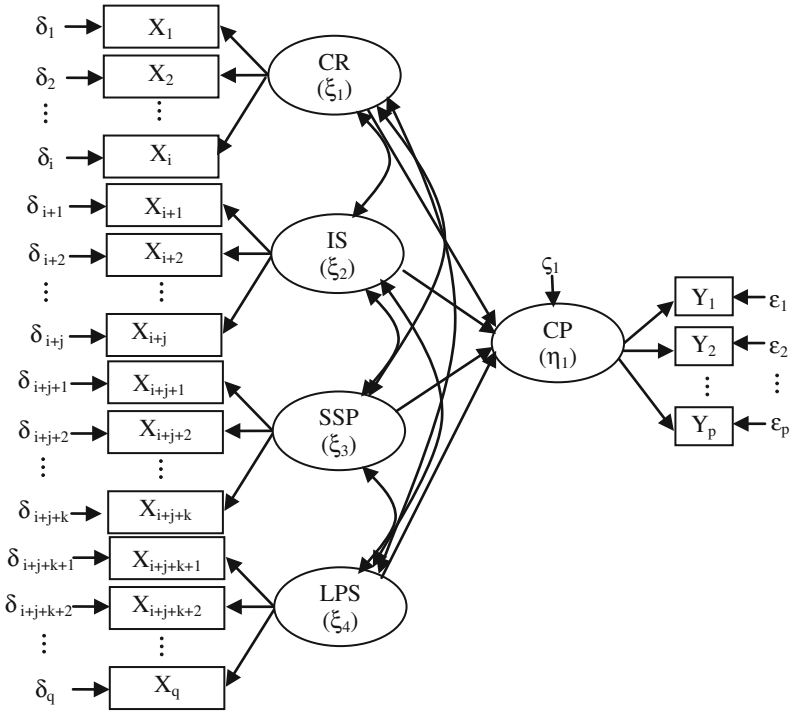

Fig. 2. Hypothesis SEM model 2

endogenous variables, $\mathbf{\Gamma}$ is the structural parameters matrix that relates latent endogenous to exogenous variables, and $\mathbf{\Lambda_X}$ and $\mathbf{\Lambda_Y}$ are factor loadings matrices relating indicators to latent variables.

In order to compile the model, some of the parameters in $\mathbf{B}$, $\mathbf{\Gamma}$, $\mathbf{\Lambda_X}$, and $\mathbf{\Lambda_Y}$ must be constrained, which is achieved typically by setting the parameters to 1 (as is the case here). In this study, the process of Structural Equation Modelling was performed using the statistical software SPSS Amos. The estimation details will be described in the next section.

4 Empirical Study

4.1 Study Approach and Variables Selection

In this study, the hypothesis model is verified using structural equation modelling based on the data collected from questionnaire surveys. The questionnaire survey is an important method for evaluating current SCM level within corporations. In our study, to avoid the names and private information of corporations being leaked externally, confidentiality agreements were signed before any data was collected. Additionally, the corporations participating in the questionnaire surveys were offered feedback on the results as an incentive. In February 2014, the questionnaire surveys were given to the China Logistics Association [17] and were then issued to the corporations belonging to the association so that a mass of data could be collected for the study.

In terms of questionnaire design, the questions were modeled in part on those that have been used in survey questionnaires by Li (2002), which comprise three main components [18]:

(1) **Face Sheet:** this sheet gives basic information about the corporation participating in the survey, such as the corporation name, business division, industry type, volume of business, and number of employees
(2) **SCM Practice:** this element involves 4 main items: (1) The customer relationship, (2) Information Sharing, Strategic Supplier Partnership, Lean Production System. For our study, these items were divided into sets of 5, 4, 3, and 3 sub-items respectively, thus totally 15 evaluation items.
(3) **CP:** this element includes four evaluation items: (1) investment income, (2) increment rate of investment income, (3) Market shares, (4) increment rate of market shares. These items were adopted as the CP variables in our study to allow measurement of the effectiveness of SCM practice. The participating corporations were asked to rate their CP in relation to other corporations in the same type of industry in terms of the 4 evaluation items above. A 5 point scale was used: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree. The questionnaires were issued to the participant corporations in two ways: either by a web version posted on a specific web page or a paper version sent in the mail.

In addition, this study restricted the survey targets to production corporations in China because high-level SCM practices can usually be found in the Chinese manufacturing industry.

4.2 Reliability, Validity Test and Factor Analysis

For the pilot study, 160 questionnaire sheets were issued, with 92 sheets being returned ultimately. Reliability and validity tests were performed for the 92 questionnaires using the SPSS statistical package (version 21). Based on these evaluation criteria, the questionnaire sheets were modified and final versions were created for the main, formal survey, which was conducted in across 600 corporations. 250 questionnaire sheets were

returned (the response rate was about 42 %), of which 240 sheets were valid. The results of the analysis using SPSS 21 are shown in Tables 1 and 2.

Table 1. Factor loading matrix after varimax rotation

Evaluation Items	Factors			
	CR	IS	SSP	LPS
1-1) We frequently measure and evaluate customer satisfaction	.863	.229	.137	-.087
1-2) We periodically evaluate the importance of our relationship with our customers	.817	.065	.240	-.021
1-3) We frequently determine future customer expectations	.767	-.011	.114	.124
1-4) We frequently evaluate the formal and informal complaints of our customers	.739	.291	.231	-.125
1-5) We frequently interact with customers to set reliability, responsiveness, and other standards	.732	.246	.124	.181
2-1)We share our business units' proprietary information with trading partners	.131	.858	.176	.047
2-2) We inform trading partners in advance of changing needs	.181	.828	-.064	.144
2-3) Our trading partners share proprietary information with us	.147	.812	.176	.142
2-4) Our trading partners keep us fully informed about issues that affect our business	.121	.749	-.081	.098
3-1) We consider quality as our number one criterion in selecting suppliers	.247	-.100	.822	-.026
3-2) We regularly solve problems jointly with our suppliers	.406	.045	.805	-.010
3-3) We include our key suppliers in our planning and goal-setting activities	.078	.176	.588	.141
4-1) Our firm uses a "Pull" production system	.028	.118	.122	.822
4-2) We involve our customers in process/product design	.075	.113	-.163	.737
4-3) Our firm reduces set-up times	-.042	.095	.149	.705
Cronbach's Alpha	0.875	0.850	0.703	0.666
Eigen Value	3.408	2.922	1.964	1.861
Cumulative Contribution Ratio (%)	22.719	42.198	55.291	67.694

Table 2. Factor analysis for CP

Evaluation items	Corporate performance	Cronbach's alpha	Eigen value	Cumulative contribution ratio (%)
1-1) Investment income	.854	0.856	2.843	71.084
1-2) Increment rate of investment income	.932			
1-3) Market share	.827			
1-4) Increment rate of market share	.749			

First, the reliability of the questionnaire was tested by assessing its internal consistency, which was measured using Cronbach's alpha measure. Internal consistency refers to the degree of correlation between the items on a scale. It is expected that the items in each of the domains of the questionnaire should correlate moderately with each other, but should also contribute independently to the overall score for the domain. A perfect correlation of 1.0 suggests that questions are being used to measure almost identical constructs, which results in item redundancy, whereas a poor correlation

suggests that the items may be testing for a number of different traits. It has been suggested by Nunnally (1978) that an alpha value of ≥0.7 is acceptable [19], although Carmines and Zeller (1979) [20] recommend values >0.8. As the test results given in Table 1 show, the internal consistency for our questionnaire (tested using Cronbach's alpha) exceeds the minimum requirement of 0.7 for reliability across all the domains, except LPS, which is slightly lower than 0.7. These results demonstrate that the internal consistency of the questionnaire is acceptable.

Next, factor analysis was conducted in order to test the validity of the questionnaire. Before the factor analysis, Kaiser-Meyer-Olkin's (KMO) Test of Sample Validity and Bartlett's Test of Sphericity were performed. The KMO value of a questionnaire should be ≥0.7, with a very minimum of ≥0.5. In statistics, Bartlett's Test of Sphericity checks whether the observed correlation matrix for the evaluation items diverges significantly from the identity matrix (theoretical matrix under H0: the variables are orthogonal). Factor analysis can compress the available information only if we reject the null hypothesis ($p < 5$ %). According to the results of the analysis for the sample dataset, the KMO index was 0.714. We rejected the null hypothesis at the 5 % level (p-value = 0.000). It was determined, therefore, that we could perform a factor analysis effectively using our dataset.

The factor analysis results show that the first four factors represent 67.694 % of the available variance across 15 items. These four factors indicate that we have an accurate picture of the information available within our dataset. A varimax rotation was used to maximize the sum of the variances of the squared loadings (squared correlations between variables and factors). The calculation on the sample dataset converged after 5 iterations. Most of the factor loadings after rotation were >0.7, which means the convergent and divergent validity of the adopted questionnaire is acceptable.

4.3 Model Fit Test for SEM

The model fit indices determine how well a priori SEM model fits the sample data and demonstrate which proposed model is most suitable [21]. These measures provide a fundamental indication of how well the proposed theory suits the data. The calculations do not rely on comparisons with a baseline model; instead, they measure how well the model fits in comparison with having no model at all [22]. The 4 frequently used indices and the corresponding criteria are listed in Table 3.

Table 3. Model fit indices and criteria [23]

Index	Possible range	Acceptable range	Unacceptable range
Chi-square	≥0	Judged by p value	Judged by p value
χ^2/df	<2	1 ~ 2	–
RMSEA	RMSEA ≥ 0	<0.05	>0.1
GFI	GFI ≤ 1	>0.90	<0.9
CFI	0 ≤ CFI ≤ 1	>0.90	<0.9

In this study, Structural Equation Modelling was performed using the statistical software SPSS Amos (version 21) and the estimation results are shown in Figs. 3 and 4. An annotated fit summary is displayed in Table 4. For Hypothesized Model 1, the χ^2/df value is 1.928 (between 1 and 2). This indicates that Hypothesized Model 1 cannot be rejected. The CFI index is close to 1, which indicates that the model is an excellent fit. Similarly, the GFI index is also nearly 1, again suggesting an excellent fit. The RMSEA value is 0.032, which is smaller than the conventional 0.05 value for an acceptable fit. Similarly, for Hypothesized Model 2, according to the criteria listed in Table 3, all the model fit indices are quite satisfactory, which shows that Hypothesized Model 2 also represents the sample data very well and can be used, therefore, for testing the hypotheses in the following step.

Table 4. Results for model fit indices

	χ^2/df	CFI	GFI	RMSEA
Model 1	1.928	0.968	0.925	0.032
Model 2	1.725	0.918	0.885	0.041

4.4 Hypothesis Tests

The path diagram for Hypothesis Model 1, as estimated using SEM, is shown in Fig. 3. The same is shown for Hypothesis Model 2 in Fig. 4. The hypothesis test results are displayed in Table 5. For hypothesis H1, CP had a path coefficient of 0.778 from the factor of SCM practice, and the corresponding T value was 4.764. The T value of the estimations is larger than the conventional value of 1.96 for accepting a 0.05 significance level. This indicates that hypothesis H1 cannot be rejected at a 0.05 significance level. It is clear that the factor of SCM practice had a strong effect on the indicator of CP, for the path coefficient of 0.778 is quite large.

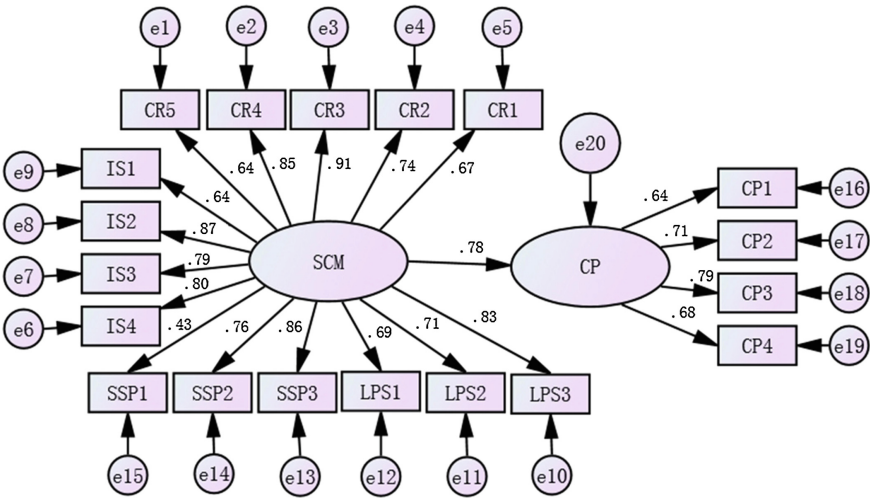

Fig. 3. Path diagram for Hypothesis model 1

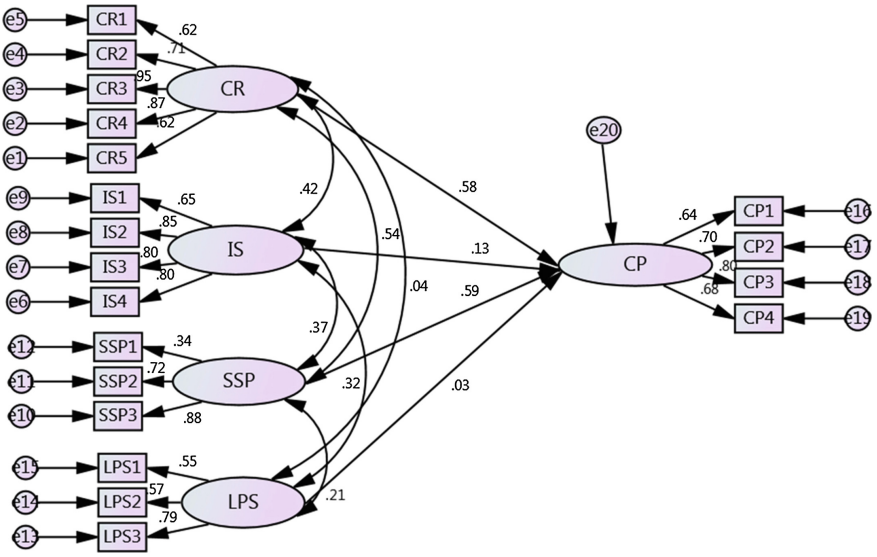

Fig. 4. Path diagram for Hypothesis model 2

Table 5. Hypothesis test results

Hypothesis	Standardized path coefficient	T value	Test result
H1 SCM→CP	0.778	4.764	Not rejected
H2 CR→CP	0.577	5.406	Not rejected
H3 IS→CP	0.134	0.698	Rejected
H4 SSP→CP	0.589	2.529	Not rejected
H5 LPS→CP	0.029	0.375	Rejected

Similarly, for hypothesis H2, CP had a path coefficient of 0.577 from the factor of the customer relationship (CR), and the corresponding T value was 5.406. For hypothesis H4, CP had a path coefficient of 0.589 from the factor of Strategic Supplier Partnership (SSP), and the corresponding T value was 2.529. These T values larger than 1.96 indicate that hypotheses H2 and H4 cannot be rejected at a 0.05 significance level. The path coefficients show that the factors of customer relationship (CR) and Strategic Supplier Partnership (SSP) have a strong impact on the indicator of CP. On the contrary, for hypotheses H3 and H5, CP had a path coefficient of 0.134 from the factor of Information Sharing (IS) and 0.029 from the factor of the Lean Production System (LPS), with corresponding T values of 0.698 and 0.375 respectively. The low T values indicate that hypotheses H3 and H5 can be rejected. This means that the factors of Information Sharing (IS) and the Lean Production System (LPS) have no clear effect on CP.

5 Conclusions

The results of the hypothesis test show that there is a correlation between SCM practice and CP, as shown in Fig. 3.

The estimation results for hypothesis test H1 show that it cannot be rejected. This indicates that SCM has a positive influence on CP in the manufacturing industry. It also demonstrates that the 4 measurement dimensions selected for the study (Strategic Supplier Partnership, the customer relationship, Information Sharing, and the Lean Production System) are appropriate measurement dimensions for SCM practice. Indeed, the results suggest that the SCM practice formed by these four dimensions is able to have a positive effect on CP.

Firstly, a SSP aims to build a long-term, cooperative relationship, involving coordination and collaborative problem solving with core suppliers. Suppliers are an important aspect of the competitive advantages that a company can gain. There are many advantages in building strategic partnerships with suppliers in the manufacturing industry. For instance, the launch time for products can be shortened significantly, the quality of the products can be enhanced, and the market share and customer satisfaction can increase.

Secondly, customer relationship management is intended to improve customer satisfaction, which allows harmonious relationships to be created and maintained with customers. If a company can keep close and long-term relationships with customers, their market risks will be reduced greatly, and customer satisfaction and loyalty will grow. Moreover, the profits of the company will therefore increase.

Thirdly, Information Sharing (IS) involves the mutual sharing and transfer of information between SC members. It is possible to suppress the bullwhip effect by integrating management systems with distribution; for example, required information should be shared between teams and an inventory management system should be created. Furthermore, to improve the performance of the SC overall, it is necessary to build a mechanism for solving problems internally by sharing information mutually.

Finally, the Lean Production System (LPS) aims to eliminate the waste in the manufacturing process. In particular, Japanese automotive companies use lean manufacturing and development to reduce the total costs of production systematically in an attempt to establish the nation as a world-class player in the industry. The advantages of this system lie in productivity, manufacturing quality, development productivity and speed, product competitiveness, cost, and quality, which contribute significantly to the competitive advantage of a company and its profits.

Thus, in the process of SCM practice, a focus should be placed on the effective use of these 4 factors, which can help to improve the market performance and financial performance of a corporation. This study has also shown that the research methods for studies of SCM practice in Europe and the USA are also suitable for use in relation to Chinese corporations.

The estimation results show that hypothesis tests H2 and H4 cannot be rejected, either, as shown in Fig. 4. This indicates that the customer relationship and a Strategic Supplier Partnership have a positive effect on CP in SCM practice.

Contrastingly, the estimation results in Fig. 4 indicate that hypothesis test H3 and H5 can be rejected. Numerous literatures have shown that IS and LPS are the key

elements that are essential to the SCM practices. Normally the higher performance of IS and LPS should have a positive correlation with CP. However, the results of this empirical study show that there is no clear correlation between IS, LPS and CP in Chinese companies. It means the implementations of IS and LPS are invalid for improving the CP of Chinese companies in the SCM practice.

Now we will firstly try to give some explanations to the invalidity of IS in Chinese companies. For the sake of reducing the total lead time, IS in SCM should optimize and improve the efficiency of the entire business process, rather than a single company, including all the shareholders outside the company, such as logistic suppliers and retailers, etc. It is essential to share information throughout the supply chain. Sharing information among enterprises in China has been recognized as an important factor of SCM, however, it is believed that information sharing among companies cannot get a clear effect on CP for the low level of the enterprise management. In addition, most of the Chinese companies started to pay attention to the company information in the 1990s, but many of them still don't have a clear intention to information sharing yet. Without a good understanding of the significance of information sharing between companies, most of the Chinese companies only followed the trend, and created a large number of invalid systems which cannot be used at all. Thus, in SCM practice information sharing cannot make much contribution to the corporate performance.

On the other hand, discussions with some of the corporations' managers revealed that cooperation between different corporations in a supply chain is mainly established on the basis of contract. Both parties involved keep closely to the contract, communicating and transferring information based on their respective needs only. In other words, all the information that is shared is selective and asymmetric. In addition, although a mass transfer of information may occur, little feedback is given or received, which leads to information distortion. In the process of SCM practice, therefore, corporations should intensify the extent of Information Sharing with supplier partners, transferring information in a timely manner and avoiding sharing vague, unnecessary information. In this way, the quality and effectiveness of Information Sharing between production corporations and supplier partners would be improved.

Finally, we consider the reason why LPS has no significant effect on the corporate performance in Chinese companies. Generally speaking, big problems may be existing in the following three aspects: concept revolution of top management in the organization, basic understanding of LPS technique, and the change of enterprise culture. The literature review shows that the success of LPS implementation requires the following three key points managed simultaneously and systemically.

The first key point is unyielding commitment to the top revolution. Just-in-time (JIT) and "Automation" are considered to be the two pillars of LPS. Strictly speaking, the automation start first followed by the development of JIT. JIT is the final goal, and automation is the means to achieve this goal. The implementation of JIT requires the concept revolution of top management in the organization.

The second key point is the basic understanding of LPS techniques. For the companies promoting to introduce LPS into their SCM system, it is really necessary for them to accurately understand the LPS techniques and their relationship between each other. In general, LPS techniques can be summarized as following: Kanban system, levelling (small-lot), automation, multi-functionalization, standardization (continuously

improving work standards), improvement of layout, and the single setup. For stabilizing LPS, all the above mentioned techniques should be accurately understood and mastered. Particularly in many of the Chinese companies, those techniques have not been understood and mastered well so far.

The final key point is "continuous improvement" and "learning organization". As described above, to introduce and implement TPS, the first condition is the concept revolution related to the ultimate goal of top management, and the unyielding determination and declaration to run this revolution. And the second condition is the accurate understanding of the various techniques of LPS, as well as the relationships between them. However, it is insufficient for stabilizing the LPS to meet only these two conditions. The third condition is the change of enterprise culture. Specifically, it is necessary to construct a enterprise culture with a character of "continuous improvement" and "learning organization". After the three conditions mentioned above are all satisfied, it is necessary to begin to shorten the production period. For stabilizing the introduction and implementation, the production period should be shortened at a breakthrough level, yet no turning back must also be guaranteed as a mechanism.

When you look into the conditions described above and consider the present situation of China, without the three preconditions — unyielding commitment to the concept revolution of top management in the organization, basic understanding of LPS techniques, "continuous improvement" and "learning organization", the implementation of LPS does not go well in Chinese enterprises at the present situation.

Considering the present situation of Chinese enterprises specifically, the invalidity of the Lean Production System in Chinese enterprises may be due to two reasons: first, corporations may fail to understand and implement the Lean Production System systematically and practically; second, corporations may lack the ability to combine the Lean Production System organically with management mechanisms. Its implementation may also be affected by personnel capability. The ultimate purpose of production management is to realize the balanced development of five key goals: safety, quality, cost, delivery, and people. Traditional lean production theory offers a set of principled frames and common tools, which corporations should adopt and adapt to their own conditions, designing a Lean Production System with production management specifically in mind. Each corporation has its own strategic focuses, special production contents, and production condition limitations, and so lean production methods should be designed flexibly, according to a company's own strategy, environment, and personnel, instead of the general lean tools and methods being imitated indiscriminately or the practices of other corporations being utilized.

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