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EFFECTS OF SUPPLY CHAIN STRATEGIES AND PRACTICES ON FIRM PERFORMANCE

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ABSTRACT

A number of studies have looked at the impacts of supply chain strategies on firm performance. Yet, how different supply chain practices translate to firm performance remains unclear. Drawing from the resource based view, this study investigates the role of supply chain capabilities in mediating the relationships between supply chain practices and firm performance. A survey was conducted with 171 manufacturing firms in five Chinese cities to empirically validate the research model. Our findings suggest that, supply chain practices, as driven by supply chain strategies, create different supply chain capabilities and lead to firm performance. The findings shed some lights on the mechanism in which supply chain strategies and practices translate into firm performance.

Keywords: Resources Based View, Supply Chain Strategies, Supply Chain Practices

INTRODUCTION

Supply chain management (SCM) has become an essential prerequisite to staying in the competitive global race and to growing profitably [35] [42], the concept of SCM has got increasing attention from academicians, consultants, and business managers [12] [24] [33]. In academics, many research works have been conducted to examine the relationships of various SCM practices and firm performance [10] [48] [55].

While the relationships between supply chain strategies on firm performance have been examined extensively e.g., [16] [22], evidence of their impacts on firm performance through implementing different supply chain practices and developing different supply chain capabilities is limited and inconclusive [22]. The overall objective of this study is to investigate the impacts of different supply chain strategies on firm performance, through the implementation of different supply chain practices which lead to the development of different operations capabilities.

THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK

The resources based view of the firm is among the most widely used theoretical framework for studying the impacts of supply chain strategies on firm performance e.g., [9, p.11–13]. The resources based view complements traditional industrial organizational theory by recognizing the competitive value of resources/capabilities and how they together with strategies determine a firm's long term performance [4] [22].

In supply chain management, the relationships between supply chain strategies and practices on firm performance have been examined extensively [16] [37] [43]. Yet, the role of capability and its impact on firm performance is limited and inconclusive [22]. We propose that the impacts of supply chain strategies on firm performance can be explained by the supply chain practices as driven by the supply chain strategies, and the supply chain capabilities developed through the supply chain practices. The proposed framework is depicted in Figure 1.

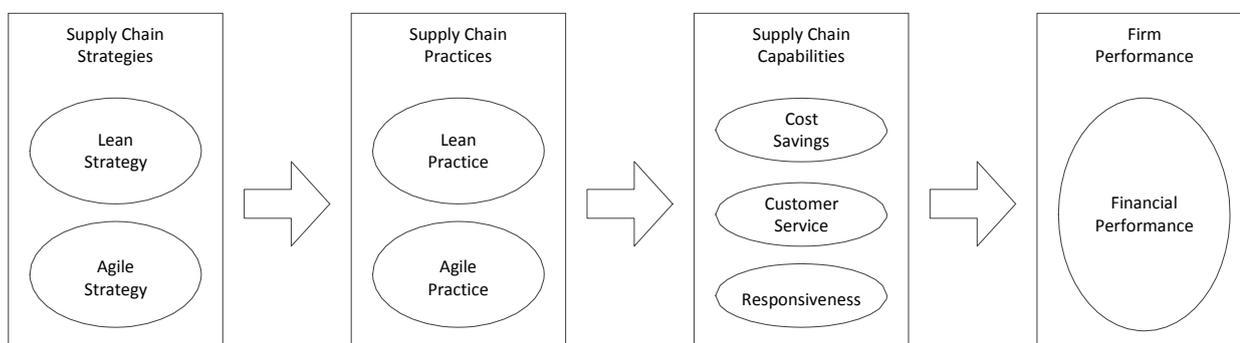


Figure 1 Conceptual Framework

Supply Chain Strategy, Practices, Capabilities, and Firm Performance

Fisher [17] proposed two fundamental supply chain strategies, labeled as physically efficient and market-responsive. Following his work, subsequent studies focused on two supply chain strategies – lean and agile. Lean supply chain strategy (roughly equivalent to Fisher's physically efficient strategy) focuses on reducing cost and enhancing efficiency through

elimination of wastes [43]. Such strategy is best matched with a relatively stable environment where demand and supply uncertainties are low. Under such environment, companies practice their best to eliminate the no-value-added activities and pursue scale economies, and they deploy optimization techniques to get the best capacity utilization in production and distribution [30].

Agile supply chain strategy (roughly equivalent to Fisher's market-responsive strategy), focuses on providing customer-driven products with unique features to the market quickly in order to maintain a competitive advantage in a rapidly changing environment [30] [43]. In a dynamic and turbulent environment, agility can help companies to respond to short-term changes quickly and manage the external disturbance easily [11] [30] [53].

The two fundamentally different supply chain strategies arguably lead to different supply chain practices [22]. Different supply chain practices, as driven by different strategies, impact overall firm performance through improving specific aspects of supply chain operations such as cost savings, product delivery, customer service [33] [43]. This is in line with the resource based view that links a firm strategy to performance through the development of firm-specific capabilities. Such capabilities refer to the tasks and activities at which firms must excel in support of corporate objectives [13] [22] [44].

HYPOTHESES DEVELOPMENT

Different types of supply chain strategies have different impacts on supply chain practices. SCM practices refer to the set of activities undertaken in an organization to promote effective management of its supply chain [33]. These practices cover both external and internal activities of the supply chain. For external SCM practices, supplier side (upstream) SCM practices include those activities related to deal with suppliers including purchasing management [3] [24] [29], supplier relationship [7] [14] [23] [33], supplier development [10] [27] [52], supplier involvement [8] [51] and supplier alliance [2] [34] [36] [56], whereas customer side (downstream) SCM practices include demand management, customer services management and customer relationship [24] [33], most of which are related to the activities in dealing with customers.

Internal SCM practices refer to the activities related to manufacturing and production processes including lean production [25] [31] [32] [40] [45] [55], agile manufacturing [6] [20] [28] [54], and other activities such as IT and information sharing [1] [8] [14], geographical proximity [48], postponement [15] [33] [41]. A company's internal SCM practices are heavily influenced by its supply chain strategies [38] [43] [48].

Lean supply chain strategy requires that manufacturers make cost reduction their first priority. Lean strategy leads to lean practices, defined as "the practices of eliminating waste (cost, time, etc.) in a manufacturing system, characterized by reduced set-up times, small lot sizes, and pull-production" [33]. Adopters of lean strategy implement lean practices such as mass production, just-in-time, and long-term supplier relationships to eliminate waste and achieve a lower cost [43].

Conversely, agile supply chain strategy emphasizes flexibility and responsiveness by creating more capability buffers to handle the market volatility [43]. Agile strategy leads to agile practices, defined as "the capability of surviving and prospering in a competitive environment of continuous and unpredictable change by reacting quickly and effectively to changing markets, driven by 'customer-defined' products and services" [9]. Adopters of agile strategy implement agile practices such as modularized techniques, concurrent production activities, empowerment of decision making, cross functional teamwork and multi-skill training [9] [19] [33]. Hence, we hypothesize that:

H1: Lean supply chain strategy has a positive association with the use of lean supply chain practice.

H2: Agile supply chain strategy has a positive association with the use of agile supply chain practice.

It was suggested that influence of different supply chain strategies, which lead to different supply chain practices, on firm performance was attained through enhancing different supply chain capabilities. Lean strategy, which leads to lean practices, enhances cost-related capabilities such as cost savings, whereas agile strategy, which leads to agile practices, enhances flexibility-related capabilities in terms of delivery [33] [43]. Furthermore, agile practices represent not only a kind of capability that can respond quickly and effectively to the changing market and changing customer needs but also it represents a kind of market (or customer) oriented management philosophy [19] [20] [26]. As a result, agile practices can help firms improve flexibility and customer service [43]. Bayraktar et al. [5] has found that, supply chain management practices, in general, have a positive impact on operational performance. Sukwadi, Wee, and Yang [47] has found that lean and agile supply chain practices leads to better supply chain performances, which include such dimensions as responsiveness and expenses. Hence, we hypothesize that:

H3: Lean supply chain practice has a positive impact on cost savings.

H4: Agile supply chain practice has a positive impact on (a) responsiveness and (b) customer service.

H5: Firm performance is positively associated with (a) cost savings, (b) responsiveness and (c) customer service.

RESEARCH SETTINGS

Following the suggestion of Qi et al.'s work that we select the target cities in which the manufacturing companies are relatively better developed and the SCM concepts are better established than other areas in China [43]. As a result, we chose five representative cities in Pearl River Delta regions, which are well known as global manufacturing. To make our sample be more representative, we mainly include electronics and telecommunications, electricity and machinery, appliance, garment and textile, automobiles, chemicals, foods and beverage as the main industries.

Data Collection

Based on these geographical and industrial criteria, we use a database provided by Guangdong Shikang Information Service Limited, who provides us a database of Guangdong Manufacturing Firms. As suggested by Li et al. [33], manufacturers with fewer than 100 employees seldom engage in sophisticated supply chain management. Still the sampling list is too large to manage if we set the edge of the numbers of employees in the companies; thus, we only include those companies with 200 or more employees to participate in our survey.

Data are collected via field visits. Following the contacts listed, 1780 companies were contacted by telephone or email and finally 212 agreed to do the survey. However, 22 of them have less than 200 employees. We exclude them from our analysis. Another 19 companies have not filled in all the necessary information. Therefore, we have 171 companies in our final sample.

The unit of analysis is the manufacturing firms in the five cities mentioned above. Supply chain manager, operations manager, CIO, general manager and experienced staff (who have more than 3 years working experience in the target company) were selected as potential respondents for this study. They are assumed to have good knowledge about their SCM practices. A significant problem with organizational-level research is that senior and executive-level managers receive many requests to participate and have very limited time [43] to participate in such kind of survey. To improve the quality of the data, we directly go to the targeting companies to interview the respondents instead of using email or fax.

Variable Operationalization

In this study, we employed literature in information systems, operations management and sociology as our references to develop proper measurements in the questionnaire. The review process provides us a basis for measurement development and reliability assurance of most of the variables used in the questionnaire. Measurements for variables were adapted from existing literature whenever possible, except for agile practices, which were newly developed. We follow the principles of agile manufacturing (including concurrent engineering, empowerment of decision making, multi-skilled workforce, cross-functional teams etc.) defined by Gunasekaran [19] and develop the measurement items for agile practices. Except those demographic questions like company size, ownership, numbers of employees, most measure are composed of multi-statements in which the respondents are required to rate their responses from 1 (strongly disagree) to 5 (strongly agree).

Supply chain strategies is defined as "the pattern of decisions related to sourcing products, capacity planning, conversion of raw materials, demand management, communication across the supply chain, and delivery of products and services" [38]. In this study, we adapt the measures from Qi et al.'s [43]. Measures for supply chain capabilities (i.e. cost savings, responsiveness, and customer service) are based on items adapted from Qi et al. [43] that measure the extent to which the company is better than its competitors in terms of these capabilities. Measures for financial performance are based on six items commonly used in the literature [21] [43] [50]. It measures the extent to which the company performs better than its competitors in terms of return of investment (ROI), return on assets (ROA), market share, growth in ROI, growth in ROA, and growth in market share.

Profiles of Surveyed Companies

In our survey, we only include those companies who had more than 200 employees. 46.2% of the responding companies had 200 to 499 employees, 19.9% had 500 to 999 employees, and 39.1% had over 1000 employees. The following table (Table 1) shows the industrial distribution of our sample.

Table 1 Industrial distributions of the samples

Industry	Sample	Percentage
Food, Beverage & Medicine	5	2.92
Textile, Garments, Footwear & Leather	26	15.20
Papermaking, Paper Products & Printing	13	7.60
Cultural, Educational and Sports Articles	7	4.09
Raw Chemical Materials and Chemical Products	5	2.92
Metal & Plastic Products	11	6.43

Transport Equipment	5	2.92
Electrical Machinery and Equipment	53	30.99
Communication Equipment, Computers and Others	46	26.90
Total	171	100

Assessing Reliability and Validity

Partial Least Square (PLS) was used to assess both the measurement model and to test the path model.

The measurement items are assessed in terms of reliability and construct validity. The composite reliability of the measurement scales range from .85 to .92 which is higher than the required level of 0.7. Construct validity is assessed using confirmatory factor analysis (CFA). Convergent validity is established if the average variance extracted (AVE) is over the edge value 0.5. Discriminant validity is established if the AVE of the factor is greater than the square of the correlation between that factor and other factors [18]. All AVE are higher than 0.5 and the square root of AVE of the factor is much lower than the correlation between the factors and other factors. This demonstrates the convergent and discriminant validity of the measurement scales.

RESULTS OF THE PATH MODEL AND DISCUSSION

The results of the PLS analysis of the path model are reported in Figure 2. Lean strategy was found to be positively associated with lean practice. Similarly, agile strategy was found to be positively associated with agile practice. Hence, both H1 and H2 are supported. However, our results suggest a positive association between lean strategy and agile practice. This is in line with the literature that lean and agile strategies are not mutually exclusive [11] [49]. In this case, companies pursuing primarily considered a lean supply chain strategy may also implement practices that are theoretically associated with an agile supply chain strategy. Yet, those practices may also provide benefits that are empirically associated with a lean supply chain strategy. In other words, supply chain practices that primarily enhance responsiveness and flexibility may enhance cost savings as well. Therefore, such practices may be implemented by companies pursuing a lean supply chain strategy.

Lean practice, as driven by lean strategy, was found to have a positive impact on cost savings, hence supporting H3. Agile practice, as driven by agile strategy, was found to have a positive impact on responsiveness, hence supporting H4a. However, the positive effect of agile practice on customer service was statistically insignificant. Hence, H4b is not supported. Upon further investigation, it was found that responsiveness has a significant impact on customer service, suggesting that the impact of agile practice on customer service is an indirect one through responsiveness.

The three supply chain capabilities, i.e. cost savings, responsiveness, and customer service, were hypothesized to have positive impacts on financial performance. Our results show significant impacts of cost savings and customer service on financial performance, hence supporting H5a and H5b. The impact of responsiveness of financial performance is insignificant, hence H5c is not support. However, with the direct impact of responsiveness on customer service described above, our results suggest an indirect impact of responsiveness on financial performance through customer service.

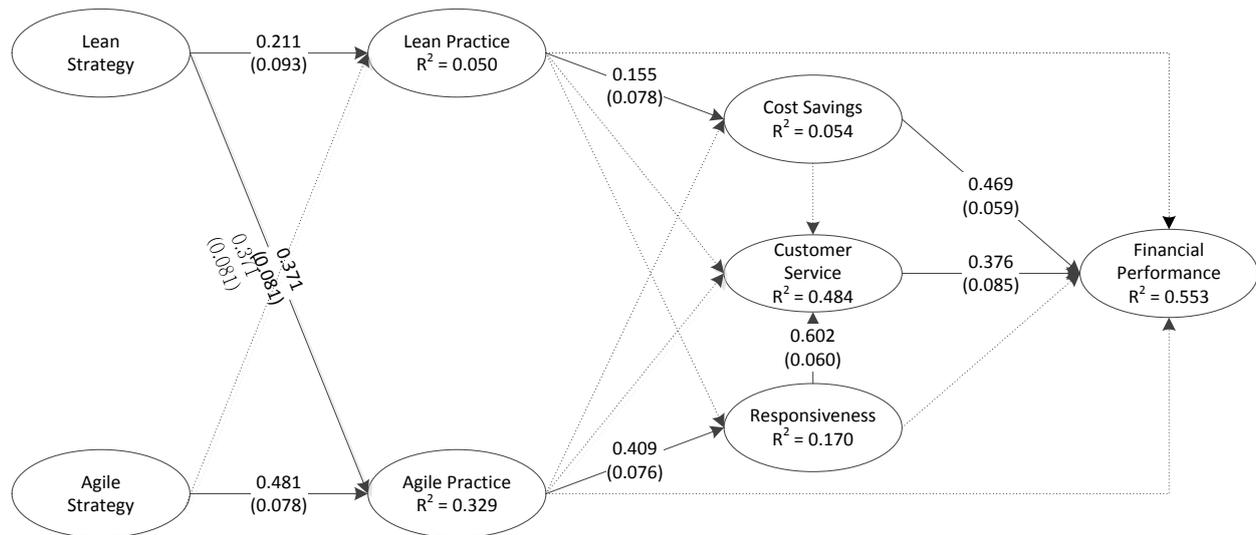


Figure 2 PLS Results

Consistent with the resource based view, our research model suggest that different supply chain practices, as driven by different supply chain strategies, influence firm performance through creating different supply chain capabilities.

Using resource based view as the theoretical foundation; this study contributes to the literature in terms of how different supply chain strategies and practices translate into firm performance. By understanding the supply chain capabilities developed by the implementation of different supply chain practices, companies would be able to better management their supply chain given the supply chain strategies pursued. Moreover, previous inconclusive results of the effect of SCM practices on firm's performance may due to the fact that the capability factors are not included in the analysis. As the SCM capability may be affected by other factors, excluding the capability may lead to inconclusive result.

The results of the study should be interpreted together with its limitations. The data used in this study was collected in China, and cultural factors may affect the generalizability of the findings to other countries. Also, the cross-sectional design of the study does not allow us to pinpoint the relationships among the supply chain strategies, practices, capabilities, and firm performance. Future studies are encouraged to replicate our findings to determine the generalizability of the findings to other countries.

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