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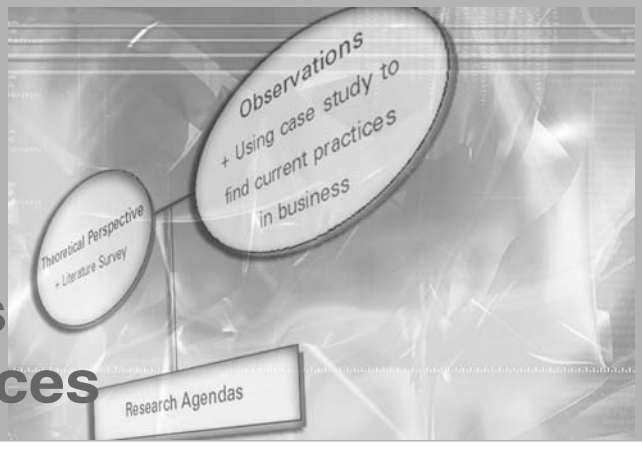
A Critical Review of Supply Chain Management Concept: an Exploratory of Links in Literature and Practices



[บทคัดย่อ]

แนวคิดด้านการบริหารซัพพลายเชนได้รับความสนใจเป็นอย่างยิ่งตั้งแต่ปี 1980 เป็นต้นมา โดยเฉพาะความสำคัญของการบริหารซัพพลายเชนที่มีต่อความสามารถในการแข่งขันขององค์กรอย่างต่อเนื่อง อย่างไรก็ตามแนวคิดด้านการบริหารซัพพลายเชนยังไม่สามารถหาข้อสรุปที่ชัดเจนได้ บทความวิจัยฉบับนี้มีวัตถุประสงค์เพื่อที่จะวิเคราะห์งานวิจัยหรือทบทวนวรรณกรรมในอดีตที่เกี่ยวข้องกับการบริหารซัพพลายเชน อีกทั้งยังแสดงถึงแนวปฏิบัติขององค์กรในประเทศไทยที่ได้นำแนวคิดการบริหารซัพพลายเชนไปประยุกต์ใช้จริงในโลกธุรกิจ ผลการวิจัยพบว่าการเชื่อมโยงกันของแนวปฏิบัติในปัจจุบันทางด้านการบริหารซัพพลายเชนและบทความวิชาการที่เกี่ยวข้องยังไม่มีความสอดคล้องกันมากนัก ดังนั้นจึงมีความจำเป็นที่จะต้องเพิ่มงานวิจัยที่เกี่ยวข้องกับการวิเคราะห์กระบวนการเพื่อพัฒนาความเข้าใจแนวปฏิบัติด้านการบริหารซัพพลายเชน รวมถึงการพัฒนาองค์ความรู้ใหม่ผ่านทางงานวิจัยเชิงคุณภาพ เพื่อทำให้ผู้ปฏิบัติเข้าใจกระบวนการนำแนวคิดการบริหารซัพพลายเชนไปใช้อย่างถูกต้อง

[ABSTRACT]

SUPPLY Chain Management (SCM) has become an interesting subject that affects competitiveness since the beginning of 1980s. Based on the definition, supply chain management (SCM) is a buyer and supplier integration process that facilitates companies to gain competitive advantage through process integration. However, despite the agreement about its benefit, SCM is still not fully understood. Definitions are not clear, and the link between SCM practices and theoretical domain remains to be further clarified. The purpose of this paper is not only to present an extensive literature review of the SCM concepts and practices, but also to explore practices of supply chain management in Thailand. Given the symmetry of actions and behaviors described in literature, the research question is posed, how does the gap of this links between literature and observation aid our understanding of the supply chain management research? The question is addressed by employing an observation methodology to create a case study of firms in Thai automotive industry. The finding shows that there is still an extensive gap between literature and observation in real world practices. This leads one to suggest that it may be useful to reconsider a research opportunity in SCM as analytical tools, focusing on understanding process, to create effective practices. This paper also indicates that more attention should emphasize on the theory-building research which is vital for enriching the understanding in the filed of SCM and logistics.

ความสำคัญ : *การบริหารซัพพลายเชน, การวิเคราะห์ทบทวนบทวรรณกรรม, กรณีศึกษา*

Keyword : *Supply chain management, literature review, case study*

Introduction

IN today's business, the increasing pressures for market with shorter product life cycle, faster technology changes, and higher quality are the examples of criteria that determine new concept in business environment. As a result, collaboration among business partners provides economies to the companies by keeping them competitive in the market. Fisher (1997) and Lee (2002) suggest that effective collaboration between units in a supply chain has come to play a role element in competitive advantages in terms of the innovation, flexibility, and speed, which are currently necessary for survival in global competition. Based on this strategy, the focus now is shifting towards effective supply chain management (SCM). Instead of doing business with other organizations one by one, companies need to manage an entire network of relationship to include logistics and other business processes from suppliers to end customers.

Although much research on SCM has consistently been claimed, little work has been carried out in reviewing the linkage between the real-world practices and theories. Therefore, it seems that closing the research gaps between SCM theories and current practices in business should have more focus. The purpose of this study is to develop and identify research opportunities for exploring supply chain management by using case study and previous literature survey. More specifically, a case study was used to explain areas of research direction. With a case study research, the use of SCM in an actual environment can be illustrated and then compared with the previous literature in this field. Subsequently, this study identifies themes and gaps within the literature base, and uses it to define future research.

This paper is organized into different parts as follows. In the first section, we provide the theoretical background and literature review in SCM and present various definitions of 'supply chain management'. The following section includes methodology used in this study. Then, the literature survey and results from the previous research in SCM are presented. After understanding the research trends, we introduce two case studies from top managements and their perceptions in SCM of an automotive industry in Thailand. The last section discusses the major recommendations and gaps for future research in each dimension with respect to both the previous literature as well as practices in the case study.

Theoretical Background

Supply Chain Management

One of the most critical changes in today business is that an individual firm no longer competes as solely entities anymore. It has become an era when the goal of a world-class business depends on the ability to integrate the relationship among business partners. As a result, supply chain management (SCM) has received the much more attention since 1980s. According to Lambert et al (1998), "Supply Chain Management is the integration of key business processes from end user through original suppliers which provides products, services, and information that add value for customers and other stakeholders". However, the management of supply chain can be given different meanings in different concepts (Harland, 1996; Mentzer, 2001; Croxton et al, 2001). For this reason, it is difficult to have a theory building in SCM because clear definitional constructs and frameworks are still not fully understood. Having reviewed a sample of definitions

found in the SCM literature, the approaches to SCM definition existing in the literature can be illustrated in Table 1.

The review can partially corroborate a statement that some common findings from the various SCM definitions shown as follows: 1) it involves inter-organizational coordination; 2) it potentially includes flow of materials and information within the chain; 3) it includes many organizations such as suppliers, distributors, and customers, which suggests that managing inter-organizational relationship is a core activity in the supply chain; and 4) the ultimate goal for SCM is to provide high customer satisfaction to customers (Cooper et al., 1997).

Table 1: A list of SCM definitions

Authors	Definitions
Cooper et al (1994)	A boundary-spanning channel focus where all the steps of a product's movement, regardless of corporate, political, or geographical boundaries from raw material supply through final delivery to ultimate user to satisfy a particular customer group.
Saunders (1995)	The total chain of exchange from original source of raw materials, through the various firms involved in extracting and processing raw materials, manufacturing, assembling, distributing and retailing to ultimate end customers.
Cox (1997)	The functions within and outside a company that enable the value chain to make products and provide services to the customer.
Lee and Ng (1997)	A network of entities that starts with the supplier's supplier and ends with the customers' custom the production and delivery of goods and services.
Lambert et al (1998)	An integrated manufacturing process wherein raw materials are converted into final products, then delivered to customer.
Tan et al (1998)	The integration of the key business process from end users through original suppliers that provides products, services, and information that add value for customer and other stakeholders SCM encompasses material/supply management from the supply of basic raw material to final product (and possible recycling and reuse) SCM focuses on how firms utilize their suppliers' processes, technology and capability to enhance competitive advantage. It is a management philosophy that extends traditional intra-enterprise activities by bringing trading partners together with the common goal of optimization and efficiency.

Review of Previous Studies

In analyzing SCM from a historical perspective, the literature review identifies various different taxonomies and frameworks, which attempt to explain the key factors in SCM research. For example, Babers et al (1998) provide the review and discussion for the literature on international purchasing, inventory, and logistics by suggesting that the research should focus far away from cost to other issues such as quality, flexibility and customer satisfaction. Moreover, in an adoption of many mathematical models and computers, Beamon (1998) and Giannocco (2001) propose a focused review of literature in multi-stage supply chain modeling that could facilitate the advancement knowledge in the area of supply chain analysis. A strong review for classifying SCM problem developed by Ganeshan et al. (1999) would also be provided not only the SCM taxonomy but also methodological-oriented criteria for understanding SCM research. Since 1990s, SCM research has relied on a variety research streams shown in Table 2 below.

Table 2: Variety research streams in SCM

Research Streams	Authors
SCM framework	Cooper et al, 1997; Lambert et al, 1998; Tan, 2001; Croom et al, 2000
SCM definition	Mentzer, 2001; Lummus and Vokurka, 1999
SCM business processes	Cooper et al, 1997; Croxton et al, 2001
Supply Network	Zheng et al, 2001
Inter-organization behavior	Harland, 1996
Supply chain measurement	Beamon, 1998; Holmberg, 2000; Lambert and Pohlen, 2001; Gunasekaran, et al, 2001
Manufacturing logistics	Wu, 1998

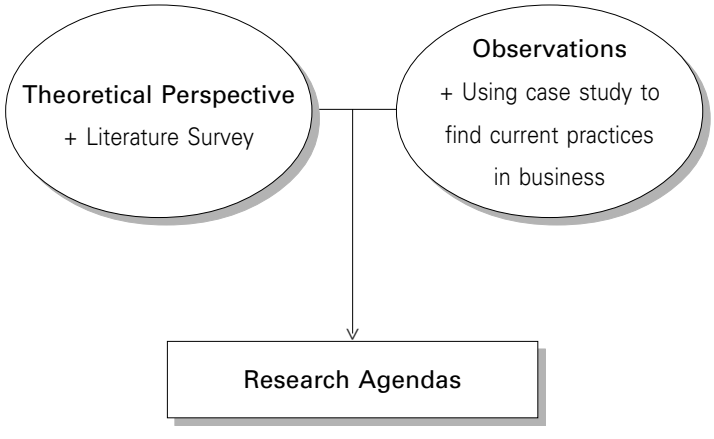
In analyzing through the SCM literature, Stock (1997) and Mentzer and Kahn (1995) have broadly observed the way in which other disciplines such as economics, engineering, and the business disciplines of marketing and management can be contributed throughout the SCM. For example, a number of economics concepts, including business cycle, theory of consumer demand, cost-benefit analysis, decision theory, demand theory, game theory, input-output analysis, linear programming, and queuing theory have been integrated to logistics and SCM. In an attempt to identify the contributions from various disciplines, Geneshan, et al (1999) also provide an example of antecedent literature for many different disciplines that originated outside the original SCM theory but are used throughout the SCM literature (i.e. marketing, economics/systems dynamics, operations research/management science, and operations management).

Research Methodology

As mentioned in the previous section, our aim in this study is to examine and compare SCM research between literature and real-world practices. In this situation, a case study seems to be an appropriate approach to gather qualitative data or real-world information. Yin (1994) states that a case study is desirable when "how" and "why" questions are being posed about the current practices. This is because a case study and in-depth interview provide an insight understanding, as well as a description about the current practices. Therefore, the real-world setting of this study is an automotive industry. Within this case study, the two first-tier suppliers had been involved in the promotion of supply chain management. The purpose of the case studies was to identify what SCM meant to the top managers and how was it applied in their organizations.

In order to accomplish this research purpose, a literature survey was also conducted to review and identify various different SCM research streams. In this study, there are two specific methodologies, namely 1) literature survey and 2) case studies. As illustrated below, Figure 1 provides the basic Schematic Methodologn used in this study.

Figure 1: The basic schematic methodology used in this study



Literature Survey

Survey Methodology

In particular, this review has focused mostly on major refereed journals in operations, logistics, and supply chain management: *International Journal of Physical Distribution and Logistics Management (IJPDLM), International Journal of Logistics Management (IJLM), Journal of Supply Chain Management, International Journal of Production and Operations Management (IJPOM), Journal of Supply Chain Management, Journal of Business Logistics (JBL), International Journal of Production Research (IJPR), Logistics Information Management and Journal of Operations Management (JOM).*

In an attempt to clarify the literature in SCM-related topics, this survey classifies all papers into two categories. Firstly, content-related issues literature addresses the SCM key business processes which include customer relationship management, customer service, demand management, order fulfillment, manufacturing flow management, the procurement processes, and product development and commercialization (Cooper et al, 1997). In addition, level of analysis-related issues involve a network of operations both upstream and downstream levels (Harland, 1996 and De Queiroz, 2002).

Secondly, to move towards the trend of methodology used in supply chain management research, this review has established a framework according to two dimensions-from conceptual to empirical, and qualitative to quantitative (see also Geneshan, et al, 1999; and Croom et al, 2000). The first dimension is classified between conceptual work which attempts to define, describe, or develop analytical concepts without using quantitative model and empirical work which uses both primary and

secondary data to report the practices in supply chain. The second aspect is between qualitative and quantitative work, representing the work on either explaining concepts to facilitate depth understanding of the concept or attempting to develop methods by using statistical techniques or quantifiable models.

Although we use a comprehensive review of literature to identify a research gap and provide an agenda for a further research in SCM, this paper will also use case studies in Thai automotive industry, which we describe next, to leverage our understanding and provide an evidence for us. We report the results of the perceptions of SCM from the management as well as the success factors in implementing SCM in the organizations. Findings and lessons learned from case studies are integrated into trends in current research in SCM.

Results of Literature Survey

The target populations of all the survey papers are listed in Table 3 using two main categories: (1) SCM business processes (Cooper et al., 1997 and Croxton et al, 2001) and (2) level of analysis.

Table 3: A summary of content analysis *[1]

SCM Business Processes	Upstream Level	Downstream Level	Total
Customer relationship management	-	3	3
Customer service	-	8	8
Demand management	6	9	15
Order fulfillment	7	7	14
Manufacturing flow management	8	2	10
The procurement processes	26	-	26
Product development and commercialization	7	-	7
Total	54	29	83

It is also important to note that a single research paper can deal with more than one element in SCM business process. In this survey, it can be classified in more than one column in the table.

Content analysis

In total, with respect to supply chain business process, the literature is very rich in studies on procurement process or supplier management, in part because this is a major subject in logistics and supply chain management. While this review of literature has highlighted a lot of contributions in the procurement process, there is a lower degree of research in customer relationship management and customer service. It is probably also because there is a lack of clear definition in supply chain management resulting in misunderstanding that the study can ignore the customer service and customer relationship management. There is a need for the integration of business processes in the supply chain that goes beyond supplier partnership or the

[1] *Due to the limited space in this paper, references reviewed in Table 1 are available upon request*

procurement process. Further, little literature has been considering issues with respect to manufacturing flow, as well as product development and commercialization.

In providing a classification concerning the level of analysis, supply chain research studies have been received a growing attention in upstream level (supply and purchasing perspectives), whereas the number of studies do not show a trend in particular in relation to downstream activities related to wholesalers, retailers, and final customers. To clarify this, it is important to note that this review is not so much concerned on the marketing literature that might include this aspect. However, since we know that wholesaling and retailing activities are one of the most important parts in supply chain management, one should not ignore this perspective in the field of logistics and supply chain management. This is not a new finding: Tan (2001) and Eloranta and Hameri (1991) have suggested that the perspective on supply chain management focuses primarily on inbound logistics and has little to do with the wholesaling and retailing activities.

Methodology used analysis

From the review, it can be concluded that the literature in this field is primary dominated by quantitative empirical studies. Little in the area of conceptual works has been developed. In particular, empirical work with qualitative approach has been also receiving a scare attention. Table 4 provides an overview of methodological classification within each of the four cells.

Table 4: A summary of methodological used*[2]

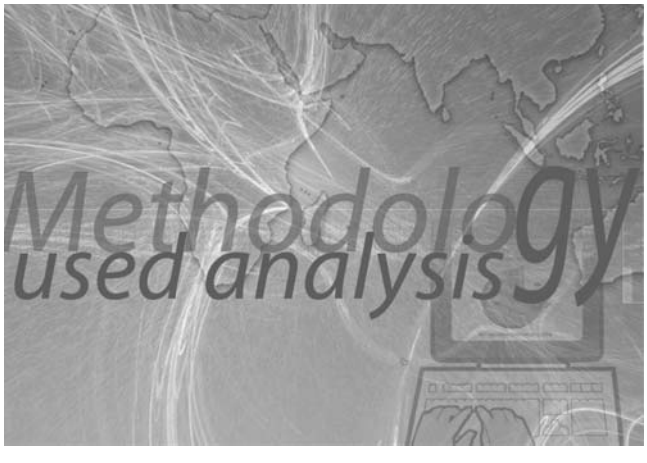
	Quantitative	Qualitative
Conceptual	3	14
Empirical	24	6

Observations by Case Studies

Company A (Large first-tier supplier)

Company A is part of Japanese firm manufacturing tire for all kind of automobiles. This company is a Thai-Japanese joint venture located in Rayong, a city in Eastern Thailand. Furthermore, its customers range can be divided into three groups, which include automaker, export, and replacement (spare parts). In terms of export, products are exported to different countries in Asia and Europe. For replacement sector, the company sells their products through dealers.

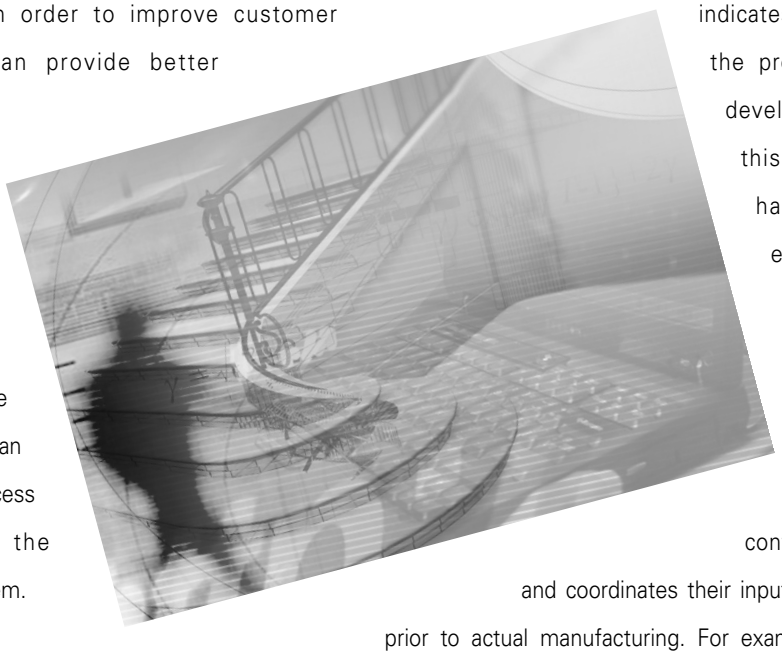
The management of this company indicated that the SCM in automotive market comprises a long, dynamic, and complex network which involves a lot of entities in the chain. Because the relationship between customers and suppliers is changing over time as competitive pressures pushing in the industry, they felt that the SCM encourages the making of a strong relationship not only to the suppliers but also customers. In addition, they suggested that companies in this industry should view SCM as a holistic view, not separated entities. For them, SCM means the integrated business processes starting from order-taking to order-fulfillment processes, and the ultimate goal for SCM is to



[2] *Due to the limited space in this paper, references reviewed in this table are available upon request*

provide high customer satisfaction. In other words, it is impossible for them to focus on only upstream processes. More specifically, in product development stage, they felt that part of the company's mission is to work closely with customers and potential customers (downstream processes) by understanding their needs, and to meet these needs in a timely manner.

It was also suggested that communication is vital to the relationship with its business partners. Nowadays, they are forced to implement information technology such as electronic data interchange (EDI) as the means to communicate with their customers (automakers) in order to improve customer responsiveness, which can provide better interaction with customers. In the same way, by giving importance to supplier communication, the company can reduce the change in production schedule with their suppliers due to the uncertainty. For example, EDI can help in tracking the work-in-process inventory and improves the warehouse management system.



In addition, Company A identified the main factors that lead them to implement SCM. Some factors depend on the type of existing environmental uncertainty companies faced. These factors can be seen as drivers to implement different levels of collaboration to both suppliers and customers. As far as the environmental uncertainty is concerned, the most significant drivers are demand and supply uncertainties. When the uncertainties with both demand and supply are high, they will continue to implement high level of collaboration.

According to business environment, Company A suggested that management should find the best way to design an appropriate SCM strategy under different types of products or business environmental uncertainty. A better understanding of the appropriate supply chain strategy is essential in improving firm competitive capabilities. There is impossible to have a "one-size-fits-all" in SCM implementation.

Company B (Medium-sized first- tier supplier)

Company B produces hydraulic cylinders for reach stackers and forklifts, mainly delivered to automakers in Thailand. This company has about 170 employees. Top management indicates that SCM begins in the product conception and development stage. Within this stage, the company has a core group of engineers that develops and designs products that help them to better serve their customers. The company also contacts various suppliers and coordinates their inputs into the design phase prior to actual manufacturing. For example, when Company B receives an order for a hydraulic cylinder, the design departments at both supplier and customer work together to get the component installed in the truck.

Based on the above example, management at Company B indicates that suppliers need to have people and financial commitments, production capabilities, sufficient infrastructure, appropriate technology, and more importantly, a high degree of trust. Without all of these requirements, they do not receive on-time delivery from their suppliers. Also, they cannot deliver products as scheduled. Furthermore, the management suggests that SCM is not completed without tight organizational

relationship among the members in the supply chain. It is not enough to merely maintain their relationship on either the suppliers or customers. Rather, SCM involves the flows of material, information, and finance in an entire network consisting of first supplier, distributors, and end customers.

In addition, one of the most important key elements for SCM includes people management, managerial and behavioral management, and organizational structure. These processes address depth of talent, strength of leadership, business environment, reward and cognition system, the recruiting processes, use of performance measurement, and so on. In other words, Company B perceived SCM as the big picture, extending from the operations perspective to business and management aspects. They also emphasize on implementing 'Total Quality Management' (TQM) to facilitate these processes. For instance, they provide training programs to all staff in different levels to create streamlined communication, same goals, and positive working relationships. In summary, they conceptualize SCM as a management philosophy.

Result of Case Studies

This case study examined the perceptions of SCM from the managers in two companies. A general agreement suggested that it is important for a company to form collaboration with not only suppliers but also customers. It is not enough for managers to emphasize only suppliers because SCM involves all business processes from end customers to original suppliers. In essence, collaboration implies long-term relationship, which requires an open line communication across the supply chain. As implied by the concept of collaboration, trust is claimed as the key element. In addition, successful SCM requires the implementation of information technology, which can facilitate the flow of material and information.

Based on the case study, the results also suggest that

SCM is indeed related to various disciplines beyond engineering or operations management. For example, Company B that uses Total Quality Management (TQM) approach providing training and communication at all levels in the company can differentiae performance. Furthermore, it appears that efforts should be made to categorize suppliers and customers into different sectors. As a result, a company can implement appropriate SCM strategies that fit specific group. In other words, SCM strategies depend on the specific organizational environments and conditions.

Recommendations for Future Research in SCM

In this paper, after reviewing some important issues in SCM literature and case studies, three main directions for further research have been identified as followed:

1) Integrate both upstream and downstream processes

A higher attention should be devoted to the research focused on the integration between upstream and downstream activities. More specifically, the researcher should magnify his/her scope from only upstream level (purchasing and supply perspectives) to all the value-activities in the entire chain,

including functions of the wholesaling and retailing activities and reversed logistics (Tan, 2001). However, it can be argued that this perspective should rely on marketing discipline, not in logistics and supply chain management perspective. This is not true because, in order to achieve an ultimate goal of integrated supply chain management, research in supply chain management requires understanding and integrating both upstream and downstream activities in the business chain. In addition, researchers should emphasize more on other processes in SCM beyond material management, supply and material management.

2) Focus on various SCM practices or factors

It seems that the research studies in this field tend to only examine the relationship between an individual SCM practice and a particular aspect of performance. Actually, based on case studies, there are various practices or factors (business relationship, information technology, customer and supplier involvement, and employee participation) related to the successful in implementing SCM. As an alternative, researchers should begin to focus on the relative strength of each practice influencing performance. Mathematically, that is Performance measures = f (practice 1,....., practice n). For example, a research question such as **"***What are the relative strength of three SCM practices, including supplier involvement, information technology, and technology utilization influencing specific performance?***"** should be developed and examined. More interestingly, there is a need for research to focus more on the areas such as customer service, customer relationship management, and product development because, based on the case studies, customer is one of the most important parts in the supply chain processes.

Another approach also includes not only the relative strength of SCM practices on the performance but also the study of the interaction effect among SCM practices and their impact on performance. This can be accomplished by identifying theoretical issues that can increase the understanding of the benefits of supply chain interactions or additional constructs such as independent, mediating, moderating, and dependent to enhance the current framework (Salvador et al, 2001). For example, the concept of process management might be included into the definition of **"**practices for supplier partnership**"** to identify relationship that might be impacted on supply chain performance measures. In addition, research studies in SCM should borrow the knowledge from outside the field to strengthen the current rationalization. For instance, the quality management view might reflect some insights to the impact on supply chain performance measures. Besides, there is a great deal of social aspects such as human resource research issues. In fact, it is important to understand how companies can collectively exploit their competitive advantages in terms of people from different links in the supply chain who work together as one to streamline supply chain processes.

3) Focus more on theory-driven research

There is also a need to develop a theory-driven empirical approach in supply chain management discipline. Indeed, theoretical development or conceptual work is critical to the development of supply chain management study, which relies to Ho, et al (2001)**'**s discussion on the future direction of SCM.

Specifically, there is a room for researchers to pay attention to a specific context under which SCM practices are implemented. For example, the research problems should include *how the implementation processes of SCM in situation X diverge from situation Y', and 'why it happens that way'*. Thus, research that develops a meaningful and insight understanding of SCM practices and implementations is needed.

Conclusion

As this paper demonstrates, it was a goal of this study to create a research agenda for a more understanding of SCM practices. The literature review that intersects the insights on practices supports the need for future research in this field. Overall, this study has proposed a set of three recommendations in SCM research. The first one is that combining upstream and downstream processes in the supply chain becomes very important for the current research because it is not enough to focus only on either supply or demand processes in the supply chain. The second one is the need to focus more on different factors or practices in SCM research. This is because SCM involves a big picture, which includes various social aspects such as human resource, marketing and so on. The last one relates to the needs to emphasize on the theory-driven or case study research. It is important to understand the questions such as 'how' and 'why' in SCM implementation.

Like other studies, this study also has its limitations. To generalize its findings, future study is required to replicate this study in other industries or contexts. In addition, the replication should be conducted with a multiple case study in order to obtain not only more evidence but also more understanding in SCM practices. More importantly, one should extend the scope of literature survey to include work in other disciplines such as marketing, economics, or engineering. In addition, we believe that the intersection of these finding from different disciplines will help in expending our research directions and knowledge of supply chain management.

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