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Literature Review and Future Directions in SCM Research

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Abstract

Supply Chain Management (SCM) is a well recognized area of academic debate. Scholars have argued that SCM research has not reached a level where it has a sufficiently significant body of knowledge to call itself a discipline. However, there has been a marked increase in top practitioner and academic publications, conferences, professional development programs and university courses in the area. The aim of this paper is to analyze how research in this area has evolved during the last few years (2003 to 2007) and identify some lines of further research. To do this a literature review in five prestigious academic journals in Operations Management and SCM.

Keywords
Supply Chain Management, Literature Review, Future Research Directions.

1. Introduction
Supply Chain Management (SCM) is "the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole" (Christopher, 1998, p. 18). Christopher's (1998) definition is more customer-focused whereas Lambert et al's (1998) definition includes most business activities: "Supply chain management is the integration of key business processes from end users to original suppliers that provides products, services and information that add value form customers and other stakeholders" [1, 2].

Today SCM is a well recognized area of academic debate having an international presence. However, SCM still appears to suffer from an underlying frustration or perception of being largely ignored. Anecdotal evidences state that, there are organizations that continuously ignore SCM people where as they feel to have a great deal of value to add. On the other hand, SCM attracted scholars across a range of academic disciplines, including operations management, management science, strategy, marketing, psychology, and economics to contribute to the field. So, scholars of SCM whilst advancing research into theory and practice have been calling for SCM to have its own "theory" from which to build research [3]. Although it would seem apparent that there is a general problem domain called SCM [4], scholars have argued that SCM research has not reached a level where it has a sufficiently significant body of knowledge to call itself a discipline [5]. However, Harland et al (2006) on their way to explore SCM as a discipline give an indication that the quality of the research in SCM is improving in spite of the top management journals are not yet engaged. This is evidenced by marked increases in top practitioner and academic publications, conferences, professional development programs and university courses in the area. Our aim through this study is to capture the overall picture of the SCM researches carried by the scholars in recent years and therefore, to identify potential research directions for them to work on.

There have been some review-articles published recently, which can be criticized of addressing conceptual issues partially and not addressing research methodology issues at all. For example, Lummus et al. (2001) and Mentzer et al. (2001) focus exclusively on the definition of SCM [6, 7]. Ho et al. (2002) only emphasizes on the empirical researches on SCM [8], and Giannakis and Croom (2004) take a strategic management perspective to conceptualize the supply chain problem domain [9]. Moreover, some of the reviews have been narrowly based along functional lines; for example, Larson and Halldorsson's (2002) review is based on the purchasing literature [10]. Burgees et al (2006) came up with a structured literature review on SCM to provide implications for further research [11]. However, their work is based on a total of 100 randomly selected articles. In our view, given the huge number of SCM related articles published in the refereed journals, the sample size in Burgees et al (2006) is too small to

constructively conclude the implications, although statistical justification has been provided. Therefore, the objective of our article is twofold,

- To conduct a literature review on the SCM literature in recent years (we have considered a time span of five years)
- To contribute to the development of a potential supply chain management paradigm through providing an outline for future research.

2. Methodology

In order to fulfill our objective of capturing the overall picture of the SCM researches in recent years we address issue of journal selection, time horizon, article selection and analysis.

2.1 Journal Selection

As supply chain management evolved under the shades of operations management, we have looked for OM journals that have been known to publish SCM studies. We first selected *Journal of Operations Management* (JOM) and *Management Science* (MS) because previous studies have consistently ranked these two journals in the upper echelon. Saladin (1985) has ranked JOM and MS as the topmost journal with respect to the quality of the journal and appropriateness [12]. JOM and MS are also highly rated in the ranking provided by Barman (1991) [13]. The other three journals in our review and evaluation are *International Journal of Operations and Production Management* (IJOPM), *Manufacturing and Service Operations Management* (MSOM) and *Production and Operations Management* (POM). According to Goh et al (1997) IJOPM falls under the same 'Elite' status as JOM and MS [14]. POM is included because it is generally regarded as a most important emerging journal for OM research. Barman et al (2001) has ranked POM as second after JOM in terms of relevance in OM research [15]. As the flagship journal on operations management, MSOM also regarded as a highly ranked journal and seeks to publish high-quality manuscripts that are of interest and importance to academic and industry researchers in OM and practitioners working at the interface of OM research and implementation.

Questions may arise that, we have emphasized more on OM journals rather than looking for specialized SCM journals. It was considered that most of the top scholars still prefer to publish their researches on SCM in highly ranked OM journals. Also, it has been found that these OM journals are increasingly interested in publishing SCM researches [16].

2.2 Time Horizon

We have chosen to consider a time horizon of 5 years, a period between 2003 and 2007. We have stated earlier that there is a growing trend of publishing in the area of SCM, and therefore, we believe that a 5 year span would be enough to retrieve a sufficient number of articles to form a base on which we can conclude.

2.3 Article Selection

The selected articles should address problem or an issue that falls under the SCM research agenda, since all the five journals publish researches that fall even outside OM. For example, JOM publishes researches on operations strategy, quality management, and management of technology etc. Also, MS publishes researches on finance, organizational theory, information systems etc. We did not consider a number of articles that merely described the extent of usage of SCM concepts and techniques. A basic keyword search for articles containing the exact phrase of "supply chain" (limited to abstracts of selected journals) was the basic strategy to identify the articles needed for the analysis. However, a number of articles were manually identified to be within scope of this research, though they got excluded during the keyword search. The search was conducted on the December, 2007. Our sample consisted of 214 articles.

2.4 Analysis

Our purpose in this paper is not conducive to statistical methodologies for deductive hypothesis testing. Rather, we tend to be descriptive and inductive in our approach. We engaged in even qualitative analysis besides using descriptive ones to identify potential areas of research. We present these analytical results in the form of tables and graphs. Four key dimensions relating to SCM conceptualization and research methodological issue were defined such as, constructs of SCM that is being measured, discipline bases, and research methods applied. All the articles were then classified within these dimensions.

3. Results

An analysis of the years in which the 214 selected articles were published show that over the last few years scholars have been consistently publishing SCM related research in these journals. Following figure shows the year wise distribution of the articles of our sample. The 214 articles were reviewed to identify the journals, as well as the number of articles published in each journal. This analysis showed that JOM, IJOPM, and MS together accounted for approximately 74% of the published articles. MSOM and POM were equal in their contribution to our sample.

3.1 Constructs of SCM

Constructs are higher order abstract variables that are not directly measurable, but provide more rounded definition of the concepts [17]. Many authors (e.g. Babbar and Prasad, 1998) therefore, have highlighted the need for clearly defined constructs and conceptual frameworks for the advancement of the SCM research [18]. A number of studies have been conducted by the scholars to come up with significant constructs in the field of SCM such as Ho et al. (2002), Chen and Paulraj (2004), Min and Menzter (2004), and Tracey et al (2004) [8, 3, 19, 20]. However, reviewing these literatures it seems that agreement on a common set of constructs does not appear to exist. So, following Burgees et al (2006) we decided to consolidate to a reasonable list of proposed constructs by focusing on the commonalities amongst the aforementioned studies. Therefore, we have a set of seven constructs: leadership (capturing the need for senior management team to be proactively involved); intra- and inter-organizational relationships (focusing on the nature and type of social and economic relationships between stakeholders both within and between organizations); logistics (describing the concerns related to the movement of materials within and between the elements in a supply chain; process improvement (focusing on the process related arrangements that assists the interactions within and between organizations, with a view of improvement); information systems (describing the aspects of communication both within and between organizations); and, performance measures (capturing performance related outcomes that organizations realize by adopting SCM orientation). These constructs can be separated into two broad groups – the "soft" people-focused constructs (leadership, and intra- and inter-organizational relationships) and the "hard" system-dominated constructs (logistics, process improvement, information system, and performance measures). While 214 articles were reviewed, some articles involved more than one construct and were, therefore, placed in multiple categories. Therefore the analysis involved 245 frequencies. Following figure shows the classification of the articles based on these seven constructs.

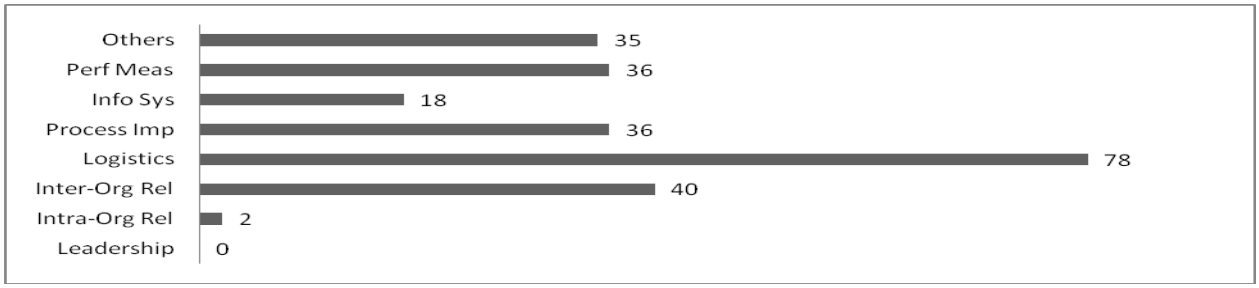

Figure 1: Classification based on constructs

As can be seen from the figure that the "hard" constructs have been the principle focus of the research – logistics being the most investigated one. However, the other hard constructs are more of less strongly researched. It is quite odd that information systems have gained the least attention of the hard constructs, whilst it is quite often cited to be one of the main drivers of better supply chain performance. On the other hand, of the three "soft" constructs, inter-organizational relationship has been the most researched construct. However, the majority of the articles classified under this construct looked at the buyer-supplier relationships. There was little or sometimes no mention of people-related issues. Leadership and intra-organizational constructs have been totally neglected in recent SCM studies.

3.2 Discipline Bases

The term "discipline" is related to doctrine; it has religious nuances and is contentious [21]. The nature of discipline necessarily forces debates at the margin, on what is "in" and "out" of the discipline boundary. In our review, we have considered a discipline to be a body of practice that is well supported by occupational groupings that identify with a defined territory of activity and this is very much in line with the criteria presented by Fabian (2000) [22]. A number of disciplines such as purchasing, logistics and transportation, operations management, marketing,

management information systems have contributed to the explosion of SCM literature [3]. We have classified the articles into discipline categories which, in our opinion, appear most relevant to SCM. The disciplines include marketing and service, logistics, purchasing, strategy, psychology and sociology, finance and economics, information and communications, operations management (defined as activities involved in transforming raw materials into goods and services but excluding logistics and purchasing functions), and an "others" category. The results of these classifications are shown in the following figure. While 214 articles were reviewed, some articles fell into more than one discipline, therefore, placed in multiple categories. Therefore the analysis involved 243 frequencies.

Figure 2: Classification based on discipline bases

Figure shows that the largest grouping of articles was based in the logistics discipline area (51%). Other discipline like Operations management, Purchasing, Information and Communications have also contributed in the SCM research as can be seen from the figure. The fact that SCM invariably crosses boundaries between operations and industrial economics, marketing, economic geography and industrial sociology [23] is quite observable from the results as 49% of the articles fall into different disciplinary areas other than the core area of logistics. Also, it was expected that there would be multidisciplinary perspectives in the articles. This issue is not representative of the results; however, this might be because of our cautiousness to place an article to a single discipline whenever possible.

3.3 Research Methods used

Researchers have a wide range of options in choosing research methods, depending on the nature of knowledge and the certainty with which it is presented [11]. We have divided the research methods into five categories – Conceptual (research that attempts to define, describe, and develop methods for the management of the supply chain analytically without using quantitative models); Mathematical (research that attempts to develop methods for the management of the supply chain using quantifiable mathematical models that includes optimization, simulation, stochastic models, and heuristics); Experimental (researches that attempts to perform experiments with sets of variables to control and measure); Empirical Survey (research that uses quantitative data collected by the researcher or another qualified source to aid in the management of the supply chain by hypothesis testing); and Case Study (research that works with small number of specific firms, gathers substantial amount of in-depth qualitative data and by analyzing them comes to conclusions). One article in our sample uses dual-method approach and therefore, we obtain 215 frequencies to analyze.

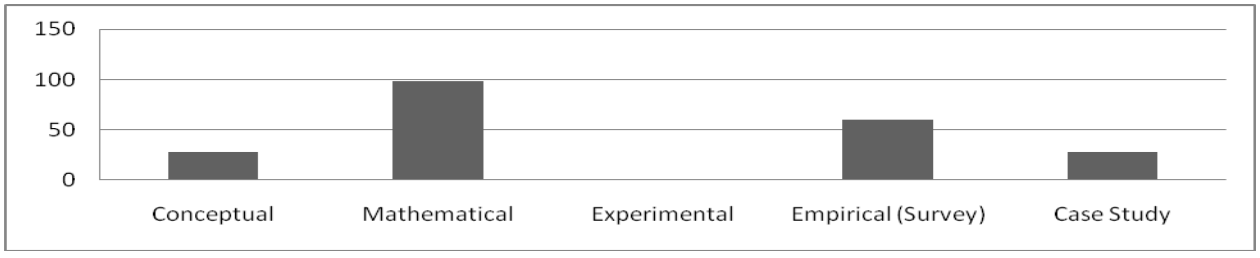

Figure 3: Classification based on research method used

About 45% of the articles in our sample used quantifiable mathematical models to approach the SCM problem. 28% of the articles were classified under the empirical survey method; conceptual and case studies accounted for 13% each. Only one article used experimental method.

4. Discussion and Future Directions

We have divided the SCM articles on the basis of broad SCM perspectives they hold – competitive strategy, firm focused tactics, and operational efficiencies. Traditionally, supply chain research, as the area evolved within the problem domain of material management, has been limited to an operational approach. However, without taking strategic and organizational issues into account supply chain research would be conventional i.e. operational efficiency focused and not very much different from the many already available. It has been argued by the SCM scholars that global competition triggers the need for reorganization of supply chains which can support the overall business strategy. Therefore, there is a growing need for researches that investigate the strategic perspective that would form the basis for SCM developing on a broad theoretical basis while simultaneously growing in importance to managers. In fact it was expected that strategic management and organizational theories would be incorporated into the SCM research. Contrastingly, this is not the case; rather, tactical and operational issues have continued to attain higher attention from the researchers. Some of the very few studies that have looked into strategic perspective in general are Croom (2005), Chatain and Zemsky (2007) and Rabinovich (2007).

Construct measurement development is at the core of theory building and therefore, based on seven previously defined constructs by the SCM scholars we have classified the articles in our study. The analysis replicates quite similar results as in previous studies (e.g. Burgess et al, 2006) [11]. Leadership and intra-organizational constructs have been the subject of very few studies. Inter-organizational relationship as SCM construct has attracted quite a number of scholars in recent years as our review reveals. Close relationships between two elements in a supply chain have different facets as argued by the literature such as knowledge sharing, communication modes, trust, culture, power etc. An in-depth analysis on the reviewed articles reveals that most of the studies looked only at some specific issues of overall performance improvement due to close relationships. This issue indicates that cooperation and partnership building has not yet been taken as a core element of supply chain in SCM research. In general, it can be said that "soft" people-centered aspects have not been investigated in any depth. In the case of "hard" systems-based constructs, the construct of logistics has been strongly researched, while the other constructs of process improvement and performance measures have been moderately researched areas. Interestingly, very few articles were found that looked at information systems as the construct although SCM research is argued to be dominated by IT (Information Technology) related researches [24]. The emphasis on logistics, process improvement and performance measures in a hard sense combined with a shallow amount of research on "soft" issues (even in the categories designed to capture such information) highlight that, the social aspects of SCM have been neglected both in the breadth and depth of research. This finding was not anticipated as SCM scholars have recognized the role of social factors in issues like successful collaboration [25]. Therefore, while the firms are thriving to achieve an efficient and integrated supply chain with collaborative upstream/downstream partners, these people-centered aspects should be explored in greater depth and breadth in the supply chain research.

The classification of the review articles based on the discipline bases demonstrates the dominance of the operations management/logistics/purchasing disciplines as shown in Figure 5. The explanation for this issue can go back to the historical origins of the field and therefore, was expected. However, the low representation of articles focusing on psycho-sociological research was unexpected. It has been quite a while that quite a number of books and journals have been published on organizational theory. Whilst it is not intended to bring in these streams of research and practice to SCM literature, these can be taken as a theoretical basis where a wide understanding of theory is assumed. Burgess (2006) has provided some possible explanation for this – SCM journals being in the narrow operations management domain that usually prefer "technical" papers, ahead of those based on social perspectives [11]. Also, despite SCM being and inherently multi-disciplinary area there is a dominance of single-discipline research. Researchers in other disciplines like sociology and psychology may be lacking the resources or the credibility to engage with the dominant disciplines in a meaningful and on-going manner. Overall, it appears the dominant disciplines which previously informed SCM may now have to give way to an ever-increasing range of other disciplines which are seeking to also contribute to SCM knowledge.

Logistics/purchasing/operations management is overwhelmingly the dominant discipline in SCM literature and it has been quite a while that this dominance is prevailing. Hence the possibility of saturation in these areas should

encourage the scholars to explore alternative integrative approaches of research such as exploring functional interfaces. SCM being multidisciplinary also fosters the likelihood. Therefore, it was logically expected that an integrated approach to the field will emerge. No strong trend emerged from the analysis, although there were indications of some multidisciplinary researches (some of the articles were placed in multiple categories). We also came across a comparatively newer research field called reverse logistics within the logistics discipline and the presence of this area in our review was quite identifiable. The articles on reverse logistics (14 in total) could be divided into two parts – waste handling and return handling. The first part treats more general supply chain aspects in an environmental perspective. Environmental considerations are related to the logistics flow. The other part treats the return of goods, in which there is a strong relationship with e-commerce. This trend is in line with the fact that changing environmental awareness (e.g. legal requirements or consumer pressure to reduce waste, green supply chain management to include waste treatment, reuse of materials and packaging, recovery of products etc) also influences supply chain management research [26].

The results from the classification based on research methods applied are not quite similar to that found in other studies (e.g. Burgess, 2006; Wacker, 1998) [11, 27]. We have found that mathematical modeling by far the popular methods to approach any supply chain problems. This result might be explained by the inclusion of two journals – MS and MSOM, which primarily focus on publishing mathematical modeling based articles. However, like other studies we identified that there is an absence of experimental design as a research method. According to Burgess et al (2006), such an absence is possibly explicable on two grounds; first, the multidisciplinary nature of SCM makes it difficult to distinguish, let alone control, all variables, particularly the social and cultural ones; and second, SCM usually forms part of large, expensive, mission-critical activities upon which organizations are reluctant to conduct experiments due to the high risk of adverse consequences [11]. The results also show that SCM literature is using empirical surveys and qualitative approach like case studies in handling a large domain of SCM problems. Scholars agree that logistics and SCM are steeped in the positivist paradigm and that past research is primarily normative and quantitative. However, they also argue that the business environment in which supply chain phenomena are located is becoming increasingly complex and less amenable to using just a quantitative approach; in order to understand, describe and explain these complex phenomena, research streams should include more studies using empirical surveys and qualitative case studies [28]. It would be a balanced approach if quantitative and qualitative research methods could applied together to triangulate each others results [27], because quantitative methods will maximize the generalizability, while qualitative methods maximize realism. However, it was an issue of concern that there is a lack of mixed methods being used, which could have an adverse impact on the development of the field. However, recognizing that the selection of methods depends heavily on the nature of the problem, there is a need for a more balanced approach to SCM research using inductive research methods (Survey and Case studies) in addition to the deductive methods which are typically mathematical.

5. Conclusions

We recognize that many other frameworks as well as extensive review works have been developed and presented in SCM literature. However, the value of our study is as a tool to help the scholars to synthesize the volume and breadth of being accomplished on SCM. This article provides useful future directions for research by analyzing a substantial number of SCM related articles published in five highly ranked journals over five years. Supply chain management has always been cross-functional and boundary spanning. With the increasing development, implementation and complexity since its evolution the need for supply chain scholars has never been more vital. Researches published in the journals by the scholars are the responses to this need for integrating multiple functions, processes and perspectives. We expect that the discussions presented and therefore, future directions provided in this paper would provide useful insights into SCM body of knowledge that will help the scholars for its further development.

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