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Supply chain management in SMEs: development of constructs and propositions

Jitesh Thakkar
Mechanical Engineering Department, Vitthal Udyognagar, Gujarat, India, and
Arun Kanda and S.G. Deshmukh
IIT, New Delhi, India

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Abstract

Purpose – The purpose of this paper is to review the literature on supply chain management (SCM) practices in small and medium scale enterprises (SMEs) and outlines the key insights.
Design/methodology/approach – The paper describes a literature-based research that has sought understand the issues of SCM for SMEs. The methodology is based on critical review of 77 research papers from high-quality, international refereed journals. Mainly, issues are explored under three categories – supply chain integration, strategy and planning and implementation. This has supported the development of key constructs and propositions.
Findings – The research outcomes are three fold. Firstly, paper summarizes the reported literature and classifies it based on their nature of work and contributions. Second, paper demonstrates the overall approach towards the development of constructs, research questions, and investigative questions leading to key proposition for the further research. Lastly, paper outlines the key findings and insights gained.
Practical implications – Survival of SMEs will be determined first and foremost by their ability to provide/produce more, at less cost, in less time, with few "defects". The key to this is effective SCM. The issue is much explored in the context of large enterprises but less attention is paid to SMEs. Paper aims to surface out some facts for the same.
Originality/value The paper reports-classifies the literature and development of construct and propositions.

Keywords Supply chain management, Small to medium-sized enterprises, Large enterprises
Paper type Literature review

1. Introduction

Firms can no longer effectively compete in isolation of their suppliers and other entities in the supply chain (Lummus and Vokurka, 1999). As organizations seek to develop partnerships and more effective information links with trading partners, internal processes become interlinked and span the traditional boundaries of firms. Various views and definitions have been reported on supply chain management (SCM). For example,

- the functions within and outside a company that enable the value chain to make products and provide services to the customer (Cox *et al.*, 1995);
- SCM is defined as the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain, for the purposes of improving the long-term performance of the individual companies

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and the supply chain as a whole (Mentzer *et al.*, 2001);

- SCM is a melding of logistics (i.e. of distribution and production), procurement, industrial organization economics, marketing and strategy, which emerged as a distinct area of research in the mid-1980s (London and Kenley, 2001);
- SCM is the collaborative effort of multiple channel members to design, implement, and manage seamless value-added processes to meet the real needs of the end customer (Burt *et al.*, 2004).

The field of supply management is evolving, developing positively, and addressing discipline and theory issues (Harland *et al.*, 2006; Burgess *et al.*, 2006). Supply (chain) management is ultimately about influencing behaviour in particular directions and in particular ways (Storey *et al.*, 2006). Mainly, present focus of SCM research is found inclined to large-scale organizations where small businesses act as an ancillary/1st and 2nd tier suppliers in their supply chain. Specifically, fast moving consumer goods (FMCG) and the automobile industry have traditionally been dependent on small and medium scale enterprises (SMEs) where the latter constitute as first tier suppliers. In many of countries, under the regime of free trade and globalization, the state has withdrawn the protection it provided to small-scale business. Large organizations can now take-up products and services which till recently were reserved for the small-scale sector at products, Bio-engineering, Sports goods, Plastics products, Computer Software, etc. With a wish to minimize the system wide cost large organizations often expects various kinds of changes at the end of their SMEs supply chain partners. On the other side, SMEs are more likely to have a differentiation advantage than a cost advantage does, most often due to the existence of scale, scope and learning economies in the industry (Porter, 1980). Based on this, we offer a following concise definition of SCM for SMEs.

> Supply chain in SMEs is a set of business activities including purchase from open/spot market, manufacturing or processing of subcomponents/subassembly within the plant and delivery to large enterprises using hired transportation to enhance value of end product and in-turn to ensure long-term regular purchase orders

Superior features and quality, as well as superior customer service, are ways that SMEs often use to differentiate their products and services from those of the more commoditized LEs (Porter, 1985). Supply chain inefficiency is one of the most prevalent issues facing the small- to mid-size enterprise (Lewis, 2005). SCM appears to be a method for LEs to decommoditize their products to reap a price premium from the market and, as an unfortunate side effect, to shrink the differentiated product territory of smaller firms (Elmuti, 2002). Supply and process costs represent 30 per cent of an average manufacturing SME's budget and logistics cost incurs about 40 per cent of total supply spending (Jonh and Riley, 1985). On the other side, SMEs are now more and more taking part in the global business network participating in many interlinked supply chains (Hvolby and Trienekens, 2002). But sustainability and ability to meet changing needs for SMEs are questionable when they do not have much flexibility in setting prices being a supplier to large organizations and for this, streamlining of their supply chain activities becomes equally important. There is a dearth of literature around SMEs and SCM practices within them (Quayle, 2003). The research presented in this paper has therefore set out to understand the issue of SCM and SMEs in totality through a comprehensive review of the ideas and concepts currently provided in the

literature. Tentatively, at this stage initiated research aims to address the following issues.

RQ1. What is the present level of awareness or orientation/preparedness of SMEs towards SCM?

RQ2. What priorities are currently accorded to SCM within SMEs?

RQ3. How the SCM can differ for SMEs compare to large organizations?

RQ4. Can the existing knowledge or models of SCM be applied on a scale down approach to SMEs for improving their supply chain activities?

From a manufacturing strategy point of view, the key strengths of SMEs are flexibility, quick decision-making and co-operation from employees, while weaknesses are the lack of technical superiority, lack of infrastructural facilities and of financial resources (Dangayach and Deshmukh, 2001). There are three central aspects in which small firms are different to large firms: uncertainty, innovation and evolution. SME advantages tend to be behavioural, stressing qualitative differentiation and innovation (O'Gorman, 2001). The characteristics of processes and system at large are different for SMEs compare to LEs. SMEs are more cash focused, short term and instill better communications and incentives for exploiting internal knowledge (Brynjolfsson, 1994). Compared with LEs, SMEs have traditionally been modeled with some significant worse characteristics including having few products, few customers and low volume, lacking economies of experience and learning capacity, being bounded rational, having higher capital and transaction costs, having a reactive nature, being technologically focused with weak marketing skills, having limited resources and high strategic reliance on CEO perceptions of market forces and generally being more vulnerable (Coviello and McAuley, 1999; O'Gorman, 2001). The SMEs view of SCM seems to be the exertion of power by customers and consequently is seen by SMEs as a one-way process. Similarly, SMEs do not employ SCM; rather they are managed at arm's length by large customers (Quayle, 2003). Morrissey and Pittaway (2004) offers two reasons for the further research in the SCM issues of SMEs which include: (1) first, globalization has brought increased pressure on manufacturing SMEs who have to continually reduce prices against a backdrop of improving quality and services; (2) second, for many SMEs, the expenditure on goods and services account for a high production of turnover and it is influential in the achievement of business objectives. Based on these arguments, we consider SCM as a tool to improve the performance of SME. On this basis, research propositions defined are to

P1. SCM can help SMEs to improve their business performance.

P2. A weak SME will choose SCM to interact heavily with partners to create differentiation and to learn from them; it seeks to take value from the relationship.

P3. A strong SME will choose SCM to add and leverage its differentiation value while increasing its bargaining position in the network by having other partners rely on it for the value-adding differentiation.

The research has first set about defining the overall approach for capturing the key issues and constructs from the fragmented literature base of SCM in SMEs and well-researched areas of SCM and SMEs. Section 2 classifies the literature on SCM for SMEs

(total 77 papers) broadly based on a Wacker's (1998) framework for research methodology. Section 3 explores the views under three different categories – supply chain integration, strategy and planning and implementation. Section 4 synthesizes the leanings and reports the insights gained. Finally, section 5 ends the document by providing some useful conclusions and thoughts for future research.

2. Review methodology and results

As the purpose of this paper is to formulate the propositions based on underlying constructs and issues for SCM in SMEs, the intention of literature review was to collect information from a representative pool of research articles. Some select articles published in the recent time on the issue, for example, Arend and Winser (2004), Halley and Guilhon (1997), Higginson and Alam (1997), Holmund and Kock (1996), Huin *et al.* (2002, 2003), Quayle (2002, 2003), etc. have provided the adequate ground to begin with. Journal articles were sourced from three databases – Emerald, Proquest, and EBSCO. Mainly, search was carried out based on the key words – SCM and SMEs, SMEs, SCM and small business, etc. At the first instance (with reference to 7 September, 2006) 481 articles in Emerald, 35 articles in EBSCO and 85 articles in Proquest data base were reported. The complete search had resulted in total 601 papers. Out of which, further, few papers were found repeating. For example, out of 35 articles in EBSCO, 6-7 were already reviewed through Emerald database. As a summary, number of sourced articles from each database is given in Table I.

Many papers have contributed marginally or indirectly highlighted the benefits of proposed model/methodology or analysis towards the subject of present study. To make the review more comprehensive, further scrutiny is carried out based on the following questions.

(1) Does the paper explore utility of SCM and scope of various issues for SMEs?

(2) Does the paper develop/propose some methodology for improving supply chain functions of SMEs?

(3) Does the paper explore role of some enabling technologies like IT, e-commerce, internet, etc. for streamlining the supply chain flows of SMEs?

(4) Does the paper aim to outline strategic vision and planning related issues for the SCM in SMEs?

(5) Does the paper discuss buyer–supplier relationships from SMEs point of view?

As a result, ultimately 77 most relevant articles were chosen for the purpose of inclusion in the present paper. Research on factors affecting growth of SMEs has focused primarily on entrepreneurial personality, organization development, functional management skills and sector economics (Chaston, 1998; Wijewardena and Tibbits,

Data base	Keywords used	Initial search result
Emerald	SCM and SMEs	481
EBSCO	SCM and SMEs	35
Proquest	SCM and SMEs	85
Total no. of papers/articles		601

Table I.
Literature scanning

1999). Looking to the diversity of issues of both the fields – SMEs and SCM and limited number of published articles, we categorize the literature in three broader areas – supply chain integration, strategy and planning and implementation issues. This will help reader to develop a holistic view on the supply chain issues in SME sector. The research methodology of present paper is presented in Figure 1.

A comprehensive overview of selected papers is presented (in Table II) chronologically. Here we highlight the focus/contribution of paper and methodology used. We adopt Wacker's (1998) scheme for the classification of research methods. As per this, research methods could be broadly divided into two groups: analytical and empirical. Analytical methods are further categorized as conceptual, mathematical or statistical, and empirical methods include experimental design, statistical sampling or case studies. Besides, articles found purely explanation based are considered under the category "theoretical".

To provide a snapshot of reviewed papers, a 2×2 matrix (Table III) is developed which mainly segregates the literature based on their empirical/theoretical vs prescriptive/descriptive contributions. Further, a matrix (Figure 2) is developed to receive an overview about number of papers published under three categories – supply chain issues, methodology and group (integration, strategy and planning and implementation). Year-wise publications (from 1997 to 2006) in percentage are highlighted on a pie chart (Figure 3). The analysis of presented review and classification has led to following key insights.

- The present status of research is in exploratory stage (74 per cent papers are in descriptive category; Table III) and hence more thrust is found on development of case studies and conceptual model making. The surveys have been conducted for various industry sectors but the focus is mainly found on evaluating the feasibility of SCM practices for a sample of SMEs;

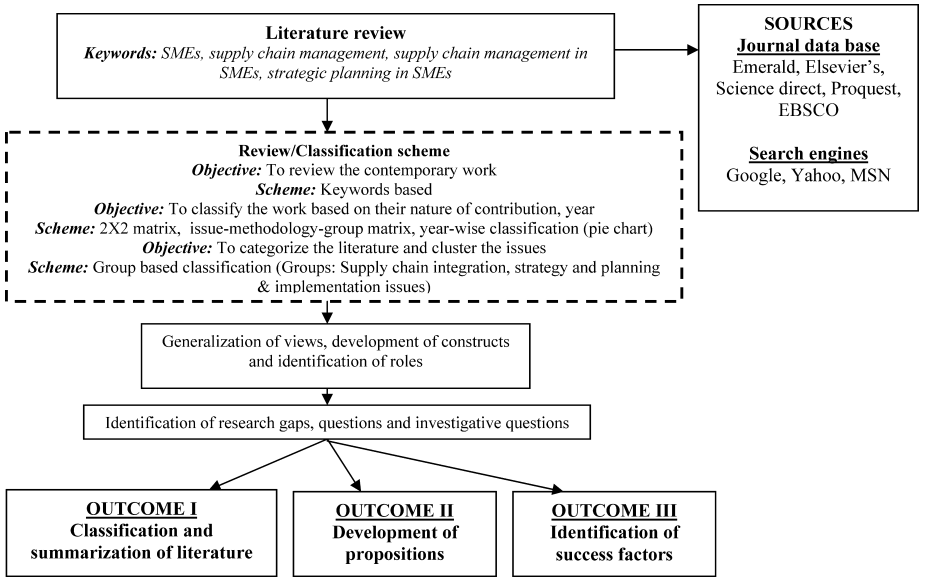


Figure 1.
Research methodology

S. no.	Reference	Focus/contribution	Method
1.	Halley and Guilhon (1997)	Explores the applicability of logistics strategy small enterprises. It supports the fit between logistics and SMEs by providing logical reasoning. Findings include: perception and experience of owner manager plays an important role in determining efficiency of logistics; small firms in the same sector use logistics as a tool to help them adapt to external changes, while other use it as a basis for their strategies at all levels of the organization; linkages of logistics strategy with the key components of small firms – i.e. the techno-organizational form, learning and the owner–manager's management style are subtle in determining its successful implementation	Survey
2.	Higginson and Alam (1997)	Reports a study of SCM techniques in medium-to-small manufacturing (MTSM) firms	Survey
3.	Appiah-Adu and Singh (1998)	Explores the impact of customer orientation approach on performance of SMEs for UK sample. Findings outlines positive relationships between Customer orientation and performance of SMEs Customer orientation and product quality Combination of involving customer orientation – innovation strategy and new product success	Survey
4.	Hseieh and Lin (1998)	Explores the potentialities of internet commerce for launching the sales programmes and implementing effective globalization strategies for SMEs	Theoretical
5.	Carson *et al.* (1998)	Explores the implications of price setting and their relative implications for SCM. Exploration is mainly from marketing point of view which includes various role factors like SME's owner, structure, competition, etc. in deciding the final prices	Theoretical
6.	Andersen *et al.* (1999)	Explores the scope of benchmarking for European manufacturing SMEs to develop the knowledge and know-how on SCM practices in industrial partners	Case study
7.	Chapman and Sloan (1999)	Identifies scope for continuous improvement in SMEs of Australia	Theoretical
8.	Oakes and Lee (1999)	Discusses the impact of rationalization on small component manufacturing firms of UK	Case study
9.	Chapman *et al.* (2000)	Provides five reasons for the fit between SCM and SMEs, which includes: (1) SMEs are the critical links and their own business decisions affects the competitiveness of whole supply chain (2) Many SMEs are new in business and difficulty in restructuring the business is very less (3) Opportunity for supply chain development with growth of organization exist	Theoretical

Table II.
Literature reported on SCM in SMEs

(*Continued*)

S. no.	Reference	Focus/contribution	Method
		(4) ERP business solutions are available (5) IT has forced the SMEs in global scenario	
10.	Ritchie and Brindley (2000)	Proposes amorphous supply chain model compare to linear one and emphasizes on flexible alliance kind of relationships using ICT	Conceptual
11.	Calabrese (2000)	Highlights the role of SMEs suppliers in the car industry and the support measures that carmakers can offer them to encourage innovation	Theoretical
12.	Gunasekaran *et al.* (2000)	Discusses the issues of productivity improvement in SMEs based on well know operations management practices MRP, JIT, etc. through a case study analysis	Case study
13.	Gonzalez–Benito and Spring (2000)	Reports empirical evidence of the implementation patterns of JIT purchasing	Survey
14.	Dewhurst *et al.* (2000)	Explores the limited but diverse multidisciplinary literature and the "theory/practice" gap in the area of SCM. Paper had explored the implication of Y2K problem for the supply chain of SMEs	Case study
15.	Briscoe *et al.* (2001)	Examines the skills requirements necessary for effective supply chain partnerships in the UK construction industry. It explores SME skills in terms of their relevance to developing more efficient supply networks	Theoretical
16.	Shinawatra (2001)	Briefs on new supply chain requirements for SMEs and role of alliances	Theoretical
17.	Dainty *et al.* (2001)	Presents the findings of research that focused on the role of SMEs (UK) in re-engineered construction supply chains. It was found that significant barriers exist to supplier integration within the construction sector, which stem from SME skepticism over the motives behind SCM practices. Determines lack of trust and negative attitudes towards SCM as main barriers. Realizes a need for "involvement climate" for successful SCM in SMEs	Survey
18.	Hingley (2001)	The focus is on relationship management and its implications for SME suppliers. Specific insights are provided into retailer–supplier relationships in the UK fresh produce (fruit and vegetable) market	Theoretical
19.	Valsamakis and Sprague (2001)	Explores basis behind the effective working relationships of small- to medium-sized manufacturers (SMMs) with customers	Survey
20.	Morrell and Ezingeard (2002)	Develops an inter organizational system (IOS) framework of key variables, which influence the adoption of inter-organizational and supply chain systems in the context of small businesses	Case study
21.	Petroni (2002)	Evaluates the elements for successful MRP implementation in SMEs	Survey
22.	Quayle (2002)	Explores awareness and level of implementation of e-commerce in UK SMEs	Survey

(*Continued*)

Table II.

S. no.	Reference	Focus/contribution	Method
23.	Hvolby and Trienekens (2002)	Investigates role of ICT and provides framework for supply chain planning. Narrates influence of internet on industry structure using Porters five force model	Conceptual
24.	Stefansson (2002)	Explores reasons behind the failure of SCM in SMEs	Theoretical
25.	Jeffcoate *et al.* (2002)	Identifies 11 CSFs relevant to the competitive performance of SMEs entering the e-commerce market. These are: content, control, convenience, interaction, community, price sensitivity, brand image, commitment, partnership, process improvement, and integration	Theoretical
26.	Huin *et al.* (2002)	Explores the scope of ERP deployment in M-SMEs. Highlights the organizational, operational and supply chain-related interdependencies impacting the planning and management of the internal supply chain. Indicates that M-SMEs have dual roles as they generate demands as well as provide supplies. This pull and push effect creates organizational and network interdependencies which affect coordination an planning implications	Survey
27.	Jutla *et al.* (2002)	Presents a conceptual model for the adoption of e-business with a specific focus on the needs of SMEs	Conceptual
28.	Stonehouse and Pemberton (2002)	Explores the scope and application of strategic thinking in SMEs	Survey
29.	Jun and Cai (2003)	Examines the obstacles to EDI implementation in US small manufacturing firms	Survey
30.	Schlenker and Crocker (2003)	Explores the scope and benefits of internet and e-commerce for SMEs	Case study
31.	Kovacs and Paganelli (2003)	Intends to give software solutions for design, planning and operation (management) of complex, networked organizations represented as nodes of networks to manage complex logistics flows of distributed SMEs	Theoretical
32.	Macpherson and Wilson (2003)	Supports the view of SCM implementation in SMEs for improving their competences. Research is based on the analysis of 39 manufacturing SMEs	Theoretical
33.	Wagner *et al.* (2003)	Investigates e-business and e-supply strategies in Scottish SMEs	Conceptual
34.	Quayle (2003)	Identifies SCM trends in UK industrial SMEs. Findings suggest: SMEs can improve on leadership, strategy, waste reduction and procurement using SCM Business to business e-commerce would help to transfer information to an SMEs advantage SMEs need to shift to collaboration	Survey
35.	Muscatelo *et al.* (2003)	Investigates ERP implementation issues through a multiple case study approach in small and midsize manufacturing firms in the US	Case study

Table II.

(*Continued*)

S. no.	Reference	Focus/contribution	Method
36.	Gunasekaran and Nagi (2003)	Reports a case study on a small third-party logistics (3PL) company in Hong Kong. Paper proposes a framework for the case company to develop its logistics operations as a full-pledged 3PL company	Case study
37.	Temtime *et al.* (2003)	Analyzes the strategic use of microcomputers and software packages in corporate planning and decision-making in SMEs (Republic of Botswan). Findings report: promotion of strategic planning precedes the use of IT in strategic planning; lack of resources such as credit, IT and strategic planning related expertise and skills are the barriers; use of IT can boost SMEs performance	Survey
38.	SubbaRao *et al.* (2003)	Presents an understanding on various development stages of e-commerce in SMEs and discusses the involved barriers and facilitators at each stage	Case study
39.	Sambrook (2003)	Explores employee perceptions and attitudes towards e-learning	Case study
40.	Huin (2004)	Explores scope of ERP in SMEs of South East Asia (SEA). Proposes a model of multi agent system, which includes – executing agents, planning agents, and coordinating agents.	Survey, conceptual
41.	Zheng *et al.* (2004)	Analyzes seven e-business models – Internet enabler co-ordination mechanism, portfolio model, IT-induced business reconfiguration model, e-business stages model, focus dominance model, transportation model and internet adoption model from SMEs point of view	Conceptual, case study
42.	Finch (2004)	Explore whether large companies increase their exposure to risk by having SMEs as partners in business critical positions in the supply chain. Findings determine: Large companies exposure to risk appeared to be increased by inter-organizational networking; SMEs increase their own exposure to risk by becoming partner in a supply chain.	Secondary data analysis, case study
43.	Stockdale and Standing (2004)	Paper examines the barriers and benefits of e-marketplace participation by SMEs. The nature of e-marketplaces is addressed and the benefits of participation are examined.	Theoretical
44.	Lajara and Lillo (2004)	Analyzes supplier partnerships for small Spanish manufacturing firms Findings report the following facts for improving the status of partnerships which include: possession of sufficient technical capacities to help suppliers, the suppliers dependence on the firm, and the chance of improving the quality of the components and raw materials; good supplier partnerships are attributed because of: frequent personal communication;	Survey

(*Continued*)

Table II.

S. no.	Reference	Focus/contribution	Method
		sharing of strategic information; providing information about the new development in the market to the partner; making specific investment in each other	
45.	Persona *et al.* (2004)	Proposes an integrated model of the order to delivery cycle in a VM environment for the needs of SMEs	Case study
46.	Morrissey and Pittaway (2004)	Analyses buyer–supplier relationships from the perspective of SMEs for biopharmaceuticals segment	Survey
47.	Gurau (2004)	Explores the issue of proper positioning of the company in sartorial value chain	Survey
48.	Adewole (2005)	Explores the scope of ICT for improving the supply chain function for the UK clothing industry	Case study
49.	Arend and Wisner (2005)	Explores the suitability of SCM for SMEs	Survey
50.	Hausen *et al.* (2005)	Shows that appropriately organized and embedded electronically supported transactions in complex SME market situations and supply chains can be more efficient than traditional transaction processes	Conceptual, experimental
51.	Larson *et al.* (2005)	Examines the issues on relational exchange and electronic communication media in supply chain involving small vs large suppliers	Survey
52.	Sharma and Bhagwat (2005)	Presents information system (IS) related practices going on in Indian SMEs	Case study
53.	Campbell and Sankaran (2005)	Proposes an inductive framework for enhancing supply chain integration through enhanced participation of SME suppliers and resellers in the supply chain	Case study
54.	Burca *et al.* (2005)	Examines how SMEs are responding to the challenge of harnessing ERP and internet technologies to enhance performance and improve competitiveness	Case study
55.	Breen and Crawford (2005)	Evaluates the application of e-commerce in hospital pharmacy. Paper justifies the use based on the analysis of success factors of e-commerce implementation in SMEs	Case study
56.	Kaynak *et al.* (2005)	Investigates the internet-based electronic commerce (EC) adoption profile of SMEs in Turkey as well as the factors affecting their willingness to adopt EC usage	Survey
57.	Koh and Simpson (2005)	Investigates how ERP systems could create a competitive advantage for SMEs	Survey
58.	Buonanno *et al.* (2005)	Explores the implications, benefits implementation challenges of ERP for small and large organizations	Survey
59.	Quayle (2005)	Discusses the implications of e-procurement for the supply chain of SMEs	Survey

Table II.

(*Continued*)

S. no.	Reference	Focus/contribution	Method
60.	Mendo and Fitzgerald (2005)	Explores the motivation behind the adoption e-business for SMEs	Conceptual
61.	Levenburg (2005)	Examines the implementation of e-business tools and technologies, particularly with respect to SCM in SMEs	Survey
62.	Chien-Liang (2005)	Provides insight on how SMEs adjust SCM in response to the introduction of ISs	Case study
63.	Barclay (2005)	Proposes a methodology for assessing and benchmarking SCM best practices for SMEs	Case study
64.	Lewis (2005)	Explains the importance of IT solutions for making SMEs competitive	Theoretical
65.	Dario *et al.* (2006)	Analyzes the scope of collaborative actions for SMEs	Theoretical
66.	Wadhwa *et al.* (2006)	Presents the web-based application on Decision Knowledge Sharing for improved business performance in supply chains for SMEs	Conceptual
67.	Hong and Jeong (2006)	Explores the issue of SMEs and their supply chain relationships	Theoretical
68.	Faisal *et al.* (2006)	Proposes a model to select suitable supply chain strategy based on customer sensitivity and risk alleviation competency dimensions	Conceptual
69.	Kross *et al.* (2006)	Examines the impact of the adoption of just-in-time (JIT) production systems by different equipment manufacturers (OEMs) on the inventory profiles of their suppliers	Survey
70.	Power (2006)	Explores supply chain technology related issues in SMEs	Survey
71.	Tan *et al.* (2006)	Highlights the underlying factors that contribute to the effective management of a global supply chain from the perspective of small- and medium-sized enterprises (SMEs)	Case study
72.	Charles (2006)	Focuses on selection of right supply chain strategy and mapping of relationships in the context of SMEs	Conceptual
73.	Patricia *et al.* (2006)	Discusses the present state of e-commerce development in small and medium-sized enterprises (SMEs) and outlines challenges faced by many SMEs	Conceptual
74.	Wagner *et al.* (2006)	Proposes a distribution strategy for improving the efficiency of SMEs supply chain	Case study
75.	Chanaron and Jean-Jacques (2006)	Presents the results of the evaluation of the experimental electronic-learning platform and courses by trainees, tutors, managers and directors who have been involved in the trial sessions for SMEs of automotive supply chain	Experimental
76.	Rosanna and Andrea (2006)	Describes a case study and proposes different services implemented in an Italian footwear district to support shoe producers in managing their temporary partnerships with supplier and customers through ICT applications	Case study
77.	Morrissey and Pittaway (2006)	Explores customer and supplier relationships from the perspective of SMEs	Survey

Table II.

- Only 8 per cent articles (under prescriptive category; Table III) have attempted to offer some focused recommendations which further indicates the lack of clarity on viability of SCM practices in SME sector;
- Investigation on use of IT and enabling technology is found more important to improve the present status of supply chain of SMEs (Figure 2). Attempts have been made to test various supply chain structures and propositions, for example,

	Descriptive	Prescriptive	Total
Theoretical	19 (22%)[b]	0 (0%)	16
Empirical	47 (58%)	4 (5%)	51
Analytical	11 (12%)	3 (3%)	14
Total	74	7	81[a]

Table III. Classification of literature based on nature/contribution

Notes: [a]While 77 papers were categorized, some papers fall in more than one category and were, therefore, placed in multiple categories; [b]percentages are determined based on total 81 papers

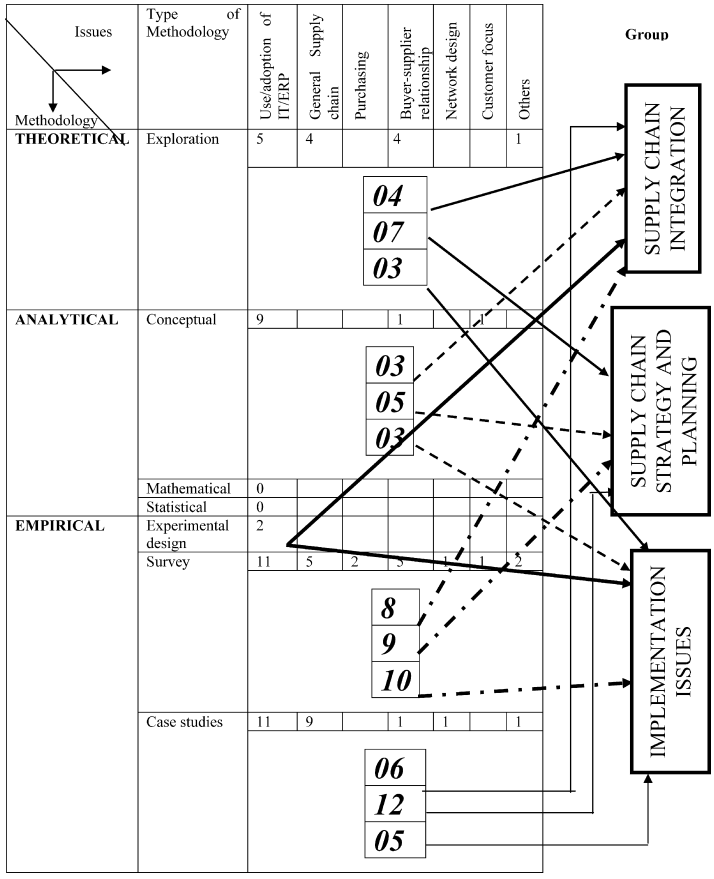


Figure 2. Classification of literature based on issue, methodology and category

Hseieh and Lin (1998), Ritchie and Brindley (2000), Quayle (2002), Hvolby and Trienekens (2002) for implementing information technology in SMEs;

- Research has focused more on investigating proper supply chain strategy and planning opportunities for SMEs (almost 33 papers) compare to supply chain integration which demands higher external focus (almost 21 papers) Figure 2);
- Recent research efforts have mainly gone in investigating implementation issues, for example, Muscatelo *et al.* (2003), Stockdale and Standing (2004), Breen and Crowford (2005), Levenburg (2005), Kross *et al.* (2006), Chanaron and Jean-Jacques (2006).

The percentage in Figure 3 indicates the growing importance of SCM practices for SMEs. From 3 per cent in 1997, percentage publications have increased significantly to 22 per cent in 2005 and 17 per cent up to July 2006 which is almost seven times and indicates the need for more research in this area. Further, a classification framework is structured (Table IV) to enable a holistic conceptual and issue based analysis of the chosen context. Category I aims to capture the understanding on supply chain integration decisions like alliances, collaborations, use of IT, implementation of integration, etc. Category II deals with the strategy and planning which focuses on formulation of strategy and linking of logistics strategy with business strategy. Category III explores the implementation issues like involvement of suppliers and customers (internal and external), identification of key risks, consistent communication, choice of information technology, etc.

3. SME-SCM issues – exploration

SCM is a systems approach which aims to make the organization/function more agile and cost effective by integrating the processes of various partners at all the three levels – strategic, tactical and operational. The profitability of the SME may well be critically determined by an ability to obtain supplies of the right quality, on time and at the most favored prices. Skills are needed in dealing with their own supply network to ensure that

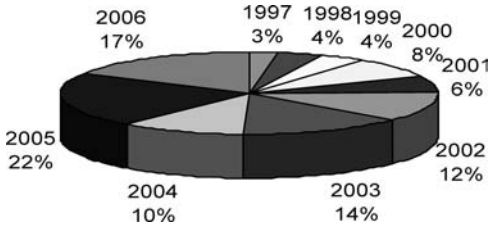


Figure 3.
Year-wise publications (in percentage)

Group no.	Group	Issues covered
Group I	Supply chain integration	Includes supply chain integration decisions like use of IT, partnering, collaboration, alliance, etc.
Group II	Strategy and planning	Includes strategy and planning issues of SMEs and their links with SCM
Group III	Implementation	Highlights implementation difficulties in SCM-based decisions like change in culture, need for IT solutions, competition, owner-manager's impact, buyers (OEM) expectations, etc.

Table IV.
Classification of issues

the SME partner can deliver to the required standard (Briscoe *et al.*, 2001). In forming the research objectives, we are mindful that the key SCM paradigms identified in previous sections are not exhaustive. Our approach has been to focus on broader and popular paradigms that are widely discussed, adopted and reported in the literature of SCM so as to acquire an in-depth understanding of the prevailing situation and strategies adopted by SMEs. For the purpose of this review, the three popular supply chain paradigms (supply chain integration, strategy and planning and implementation) are considered. On this basis, the research objectives defined are to:

Objective 1: Understand the scope of research in SCM for SMEs;

Objective 2: Present a comprehensive literature review to identify present stage of research and paradigms that are coming up;

Objective 3: Deliver a set of propositions for analyzing the issues as a part of further research.

3.1 Supply chain integration

Integration of internal process with external supply chain network could be improved through communication, partnerships, alliances and cooperation. Handfield and Nichols (1999) describe following factors as the drivers of supply chain integration:

- the information revolution;
- increased levels of global competition creating a more demanding customer and demand driven markets; and
- the emergence of new types of inter-organizational relationships.

The pillars of supply chain integration are cooperation, collaboration, information sharing, trust, partnerships, shared technology, and a fundamental shift away from managing individual functional processes, to managing integrated chains of processes (Akkermans *et al.*, 1999). The integration of logistics with other functional areas will help company to realize the full potential of its value-added activities and hence, to gain a significant competitive advantage (Gunasekaran and Ngai, 2003). It will also lead to a reduction in operational costs and an improvement in customer services (Richardson, 1995). Research has reported the shift from adversarial to collaborative relationships in buyer–supplier relationships and much work (Hines, 1994; Holmlund and Kock, 1996; Schmitz *et al.*, 1995) is published in the last few years. But this had mainly considered the large organizations in focal while same is not explored from SMEs point of view (Morrissey and Pittaway, 2004). In the real life where small companies are confronted with larger and more powerful suppliers it would be questionable if they could ever enforce such practices (Bates and Slack, 1998). Concept of collaboration and partnership includes many adversarial elements (Morrissey and Pittaway, 2004) for SMEs.

The lack of recognition seems to be given to the SMEs within the partnering literature (Notman, 1998). Partnering has been recommended as having the potential to enhance problem solving and to improve knowledge of the process by the participants (Reed, 1999; Himes, 1995) but majority of the time large enterprises remain the recipient of benefits because of their size and power dominance in supply chain. Leverick and Cooper (1998) in their study of UK automotive SMEs, identifies four issues important for developing long-standing partnering. This includes: compatibility of the respective collaborating organizations in terms of culture, procedures and working practices should be assessed; the need for frequent communication is identified as a requirement

for effective partnerships; information sharing between partners is found to be the most critical driver for the presence of trust between partners; need is identified for both manufacturer and supplier to keep track of technological and other developments occurring outside the relationship in question.

SMEs generate demand as well as provide supplies. This dual role position further makes the supply chain network complexities much higher. It is a belief that sharing of information among supply chain partners improves the effectiveness of supply chain. However, various obstacles for smooth information exchange among partners in a chain include – a source of conflict arises when companies need to share information, and they do not want to release commercially sensitive data (Webster, 1995). On the positive side, SCM and other SME alliance and network activity is supposed to help the SME overcome size and resource constraints through increased innovation and reduced costs and uncertainties (Lipparini and Sobrero, 1994; Coviello and McAuley, 1999), generally leading to higher survival rates (Gartner *et al.*, 1999). On the negative side, SMEs not only have higher transaction costs in such linkages, but also increase those costs to larger partners, to the point where the LEs may require compensation from the SMEs (Nooteboom, 1993). Additionally, SMEs are exposed to two further potential problems when they consider entering into long-term cooperative relationships with supply chain partners. This includes: (1) The first is that SMEs become potential acquisition targets of larger firms when the supply chain works well. It is likely that the larger firm will have an advantage in valuing the target better after SCM and, with its operations intertwined, make the target look less attractive to other buyers; all of which means a worse price for the SME (Bleeke and Ernst, 1995) and (2) The choice to do SCM may not be a fully voluntary one for the SME because it may be made as an ultimatum by a larger supplier or customer. This may be one method for a larger firm to bully a smaller partner into a closer relationship, where the larger firm can more easily exploit the smaller partner, e.g. by learning its innovative methods SMEs are most likely to differ in strategy than LEs do, and that difference is likely to have an effect on how SCM influences SME performance.

Buyers are reluctant to form partnerships with SMEs, although the benefits of aligning buyer and supplier aspirations are axiomatic (Olorunniwo and Hartfield, 2001). The question then remains why SMEs wish to engage in supply chain partnerships given that their strategies become less privately valuable in the SCM environment. One reason may be to use SCM as a substitute to obtain the differentiation advantage that is supposed to emerge from the firm itself (Gentry and Vellenga, 1996; Lee *et al.*, 1999), this is the weak SME assumption. Further, Quayle (2001) adds that the buyer–supplier relationships that exist tend to be in the traditional adversarial type as opposed to the collaborative type. Another reason may be to use the SCM to complement the differentiation advantage by giving it scale, efficiency and leverage through partner firms, this is the strong SME assumption. The synthesis of presented facts has helped to outline the following propositions.

P4. Strong buyer–supplier relationships between SMEs and LEs can help them to improve their SCM.

P5. Failure of buyer–supplier relationships can affect SMEs more than LEs.

3.2 Strategy and planning

With the growing complexity of SMEs business in size and scope, strategy formulation and planning needs have become crucial.

Hicks (1999) states that the goal of strategic supply chain planning is ". . . . to arrive at the most efficient, highly profitable supply chain system that serves customers in a market", and that decisions of this nature typically carry high expenditure and significant risk. He recommends four-steps for strategic planning which include:

(1) network optimization: design the least cost network focusing on customer demand;

(2) network simulation: test alternative models to predict supply chain behaviour;

(3) policy optimization: develop best operating rules (e.g. how much inventory to carry for each product line); and

(4) design for robustness: anticipate unforeseen circumstances and possibilities.

SMEs lack a strategic plan (Gunasekaran, 2003). If companies are to survive, they have to develop a long-term view for growth and survival. SME growth may be the consequence of the strategic choices of entrepreneurs (Hambrick and Manson, 1984); the ability to make structural adoptions to the growing organization (Hambrick and Crozier, 1985); the ability to overcome barriers to growth (Barber *et al.*, 1989); or the structural characteristics of the external environment (Aldrich and Fiol, 1994; Eishenhardt and Schoonhoven, 1990). Proponents of the "strategic choice" argue that SME growth is the result of the strategic and structural choices made by entrepreneurs (Hambrick and Crozier, 1985; Hambrick and Mason, 1984). Specifically, for example, Morrissey and Pittaway (2004) examines the behavioural aspects of SMEs and highlights how SME owner–managers' approaches to purchasing might differ from those of "professional" purchasing managers in large organizations.The "industry structure" explanation suggests that for many SMEs the principle determinant of growth is the structural characteristics of the industry (Aldrich and Fiol, 1994; Eishenhardt and Schoonhoven, 1990).

The choice of organization's environment (Carroll, 1984; Brittain and Freeman, 1980) is a driver to SME organization's growth (O'Gorman, 2001). SMEs grow by pursuing a differentiated strategy (Porter, 1980) and progressing through discrete stages of growth (Kazanjian, 1988) and consequently the ability of the entrepreneur to make structural and strategic changes may determine the growth prospects of business (O'Gorman, 2001). However, in SMEs the choice of environment is constrained by the entrepreneur's past experience and does not appear to be an active decision variable (Eishenhardt and Schoonhoven, 1990). Superior competitive strategies are essential if the SME is to achieve not only absolute growth rates but also growth relative to competitors and the market (O'Gorman, 2001). Huin *et al.* (2002), in their study, reported that SME CEOs are heavily involved in strategic as well as highly operational issues of logistics which include high-end (expensive items) purchase decisions, sales account management functions, etc. The closeness of SMEs management to their customers and suppliers helps to achieve higher reliability of supply chain. Shuman's (1975) empirical study of corporate planning in small companies outlines the few observations which include:

- Corporate planning is considered only as the responsibility of top management/ owner;
- Internal organization and organization mechanisms that effect corporate planning vary among SMEs;
- Definition of functions of planning group varies among companies;

- SMEs planning process varies in structure with respect to three key variables: success of past, planning efforts, current operating results and top managements' attitude towards change;
- Corporate planning is done only for short run, for one year;
- Owner/CEOs values, aspirations and desires affect the nature and structure of plan.

Proponents of strategic management in the small firms believe that the type of planning employed will be contingent upon its stage of development and that this activity will evolve and become more formal and sophisticated over the life cycle of the business (Robinson and Pearce, 1984). With the changing complexity of activities and supporting functional areas, SMEs need to switchover from simple financial plans and budgets to forecast based planning to externally-oriented planning where the owner-manager begins to think strategically, proactively planning the firms future rather than merely relatively responding to changes within the marketplace (Berry, 1998). Baker *et al.* (1993) propose four phases which mainly include: complete strategic plan; prepare business plan; communicate and implement business plan; complete formal review for the same. The long-term development of the business in later life cycle stages must be guided by a coherent growth strategy which has been formulated within the framework of identified environmental trends, competitive activity, market opportunities and the recognition of the existing skills, competencies and resource requirements of the firm (Berry, 1998). Growth opportunities frequently for the small firm raises greater organizational complexity, simply because the existing capacity of the organization is overtaxed; yet growth per se need not usher in a new stage of development (Mount *et al.*, 1993).

The SME managers, irrespective of whether they engage in international business or not, may find it more difficult to avoid the risks resulting from increased global competition in their home or local markets (Ritchie and Brindley, 2000). SCM provides an opportunity for SMEs to align supply chain objectives with business strategy; it is an opportunity to develop and maintain relationships and equally important, to identify skills and competences, thus allowing a focus on life-cycle costs (Quayle, 2003). Based on this discussion, following propositions are formulated.

P6. SMEs considering SCM as strategic choice for long-term growth can successfully improve their performance.

3.3 Implementation issues

Implementation of supply chain initiatives is highly dependent on organization's inter and intra linkages. This section aims to explore barriers and enablers related to implementation issues of SCM in SMEs. In general, the barriers to SMEs normal growth include finance (Cambridge Small Business Research Centre, 1992); industry factors such as the level of demand and the intensity of competition (Cambridge Small Business Research Centre, 1992); internal factors such as the managerial skills of the entrepreneur (El-Namaki, 1990); and the personality and managerial style of the entrepreneur (Baumback and Mancuso, 1993; El-Namaki, 1990). Size and budget constraints restrict SMEs from the adoption of technology and development of new skills and hence alliance is a necessary means for them to be able to compete (Gunasekaran, 2003). Strategy implementation depends upon organization-wide commitment to any new strategic direction. Gourley (1998) puts heavy thrust on involvement of supplier, distribution centers, and other stakeholders for the success. Tyndal *et al.* (2000) identify three critical factors that need to be assessed and balanced

to enhance chances of successful implementation which include – value (relationship between cost and benefit), risk (probability of success – dependent on time span for tangible results, and method (the approach adopted by the company to balance value and risk). Gunasekaran (2003) understands that employee empowerment is important for the success of SCM in SMEs.

Efficient SCM demands transparency for inventory and deliveries along the whole supply network. Material flow transparency, specifically the visibility to inventories and deliveries in the whole supply network, is considered an imperative requirement for successful SCM, and has been associated with significant supply chain efficiency improvements through long-terms buyer–supplier relationships (Gunasekaran and Ngai, 2004). What is questionable, however, is how the methods used to manage these relationships actually become operationalized in SMEs (Mudambi and Schrunder, 1996). Quayle (2000) proposes that for many SMEs purchasing seems to have received little attention from owner-managers, being ranked 14 out of a total 19 attributes valued by them when managing their firms. This indicates that SMEs treat the concept of collaboration with some cynicism (Mudambi and Schrunder, 1996). However, many a time under higher risk and uncertainty these adversarial approaches prove to be a better one for SMEs (Morrissey and Pittaway, 2004).

Due to the low number of hierarchies and overlapping of responsibilities between the management and planners, the information needs of manufacturing SMEs in planning their internal supply chains are different from the large organization (Huin *et al.*, 2002). In streamlining their internal processes and adoption of lean approach, some of the traditional approaches and methodologies (e.g. Kanban, JIT, etc.) may not be suitable for SMEs because they prefer logical reasoning approach over systematic planning approaches like aggregate production plans, production forecast, etc. However, this has proven to be a fallacy in actual situations (Huin *et al.*, 2002). SMEs business transactions suffer in absence of clearly defined departmental responsibilities and "blurred" departmental walls (Huin *et al.*, 2002). Parson (1983) reports two reasons behind poor fit between actual production and planned production for SMEs – (1) manufacturing challenge of shorter product life cycle; and (2) first and second tier companies are introducing newer versions and even altogether new products out to the market frequently. In addition to this, SMEs mainly find frequent changes to orders by their OEM or first and second tier buyers a biggest challenge (Huin *et al.*, 2002). SMEs are facing the pressures to produce the "best" product, at the cheapest price, and with the shortest manufacturing lead time. In absence of forward and advanced planning techniques and to avoid delays, SMEs need to carry extra safety stock but this further affects the next levels in the supply chain network.

SCM has both the positive and negative effects on the performance of SMEs. On one hand, SCM can provide quality, cost, customer service, leverage and even risk reduction benefits for the SMEs while on the other side, it exposes the SME to greater management and control hazards while reducing its private differentiation advantages (Arend and Winser, 2004). According to Lummus and Vokurka (1999) supply chain performance is limited by factors such as absence of frameworks to establish alliances among supply chain partners; lack of integrated information systems and electronic commerce firms; lack of trust inside and outside a company; lack of tools to measure the effectiveness of a supply chain alliance. The issues are more acute in case of SMEs, which are working under highly unorganized set up and limited bargaining power. Larger companies with resources and technical budgets are in a strong position to implement e-supply strategies and SMEs will continue to find this a challenge (Wagner

et al., 2003). SMEs do not have the means to conduct detailed analysis nor do they have the time or resources to take away from day-to-day business. Sometimes in absence of realization of long-term growth SMEs did not understand the full implications of e-businesses to their firms (Wagner *et al.*, 2003). The Internet presents opportunities for small and medium-sized enterprises (SMEs) to harness the benefits of information and communication technologies (ICT) in an affordable, simple way, and to reach new customers and suppliers (Zheng *et al.*, 2004). Among many initiatives, adoption of IT and supply chain can bring benefits for both the small and multinational companies in a way that it can bring the advantage of virtual trading for multinational companies while smaller companies can save time for searching vendors and export related information. Among many initiatives, adoption of IT and supply chain can bring the advantage of virtual trading for multinational companies while smaller companies can save time for searching vendors and export related information (Stefansson, 2002). Four distinct reasons for the low adoption of current transparency solutions by the SMEs can be identified from the literature: the available options mostly involve high investments, presuppose sophisticated internal systems, require IT expertise, and are applicable for communicating only with a single partner.

Most small businesses do not formally define or understand their competitive strategy, a factor that often serves to weaken their position in their chosen market (Jeffcoate *et al.*, 2002). Recent work has moved from observation and comment towards the provision of some sort of structure that can be used by the SMEs themselves to analyze their situation and take appropriate action (Jeffcoate *et al.*, 2002). Small firms tend not to have a life long learning culture or see a need for sustained improvement in organizational management (Lawless *et al.*, 2000). Despite all, Chapman *et al.* (2000) provides few reasons for the good fit between SCM and SMEs. These include:

- SMEs do not function as a collection of formal structured departments;
- small and medium firms which were earlier working as suppliers to large organizations have now become an important entity in decision making on their strength of innovation;
- the change from contractual relationship towards partnership induces the progressive integration of buyers and suppliers, which becomes evident in the institution of specific co-ordination mechanisms (co-design, self-certification, self-qualification, just in time, etc.) and the widespread use of information technology.

However, Arend and Winser (2004) indicate that SMEs implement SCM differently than the LEs and it has a significant association with SME performance. Authors offer following reasons for this difference:

- SMEs did not implement SCM with the same focus on physical proximity to partners on improving the chain's performance and on extending the chain;
- SMEs did not appear to implement SCM as deeply as LEs did;
- SMEs that did not place relatively high importance on strategic focus areas on new product development, quality and customer service were more likely to engage in SCM, yet, these same strategic focus areas were positively associated with SME performance.

Based on this exploration, we outline following propositions for the further investigation.

P7. SME implementation of SCM differs from that of LEs.

Based on the realistic evaluation of reported studies a comprehensive list of 25 critical success factors is developed for implementing SCM in SMEs. Further, the association of these factors with some key role player like owner, OEM, vendor, market, competencies, etc. of SMEs business is derived on a subjective basis as shown in Figure 4. A critical observation suggests that orientation of owner/leader, internal culture and IT enablers and kind relationships offered by OEMs play a key role in the success of SCM in SMEs. However, the issues are put under more rigorous analysis through case study development.

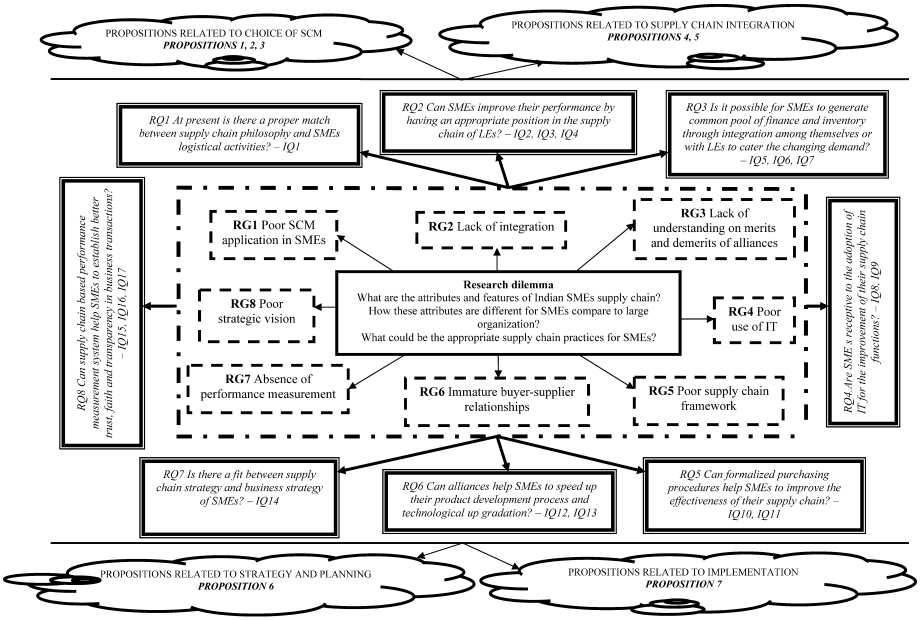
The overall process adopted for the development of constructs and propositions is presented in Figure 5. Mainly, it has kept research dilemma in core and then identification of research gaps are highlighted in second orbit. From the research gaps, research questions are formulated which are further made specific by enlisting investigative questions (Table V). Based on this, few propositions were formulated for further research. A list of investigative questions corresponding to each research question is given in Table V.

4. Insights into the reported facts

SMEs rely on a few main customers, face a limited number of competitors and stress the importance of qualitative competitive factors such as personalized service rather

S. No.	Factors	Emerging roles	Relevance
SCF1	Effective partnerships and information links with trading partners	***R1 role of owner/leadership***	Based on the past experience and educational background shapes the supply chain decisions
SCF2	Ability to create differentiation advantage than cost advantage		
SCF3	Perception and experience of owner/manager		
SCF4	Improved communication	***R2 Role of vendor***	Supports new product development and inventory management functions
SCF5	Alliance, partnerships among SME cluster and with OEM		
SCF6	Integration of logistics with other functional areas		
SCF7	Long-term view for survival and growth	***R3Role of oem/customers***	Decides risk/reward sharing mode and long-term business perspective with SMEs
SCF8	Considering SCM as business strategy		
SCF9	Strategic choices of entrepreneur		
SCF10	Structural characteristics of environment	***R4 Role of market and competiton***	Forces SMEs to enter into collaborative/alliance relationships or adopt cost v/s differentiations strategies
SCF11	Closeness of SME management to their customers and suppliers		
SCF12	Effective corporate planning		
SCF13	Involvement of suppliers, distribution centers and customers	***R5 Role of culture***	Decides the effectiveness of internal and external supply chain transactions
SCF14	Correct choice of IT		
SCF15	Proper use of third party service providers		
SCF16	Ability to manage/measure value, risk and method for balancing risk and value	***R6 Role of competitiveness***	Forces SMEs to decide their qualifying and winning factors and hence strategy to compete – cost v/s differentiation
SCF17	Employee empowerment		
SCF18	Collaborative buyer-supplier relationships		
SCF19	Effective production planning and control	***R7 Role of enablers***	IT, e-commerce, buyer-supplier relationships, culture etc. supports SME to improve their supply chain transparency and visibility
SCF20	Improved trust among supply chain partners		
SCF21	Availability of performance measurement tools/matrix		
SCF22	Proper understanding of competitive strategy	***R8 Role of policies and environment***	Under the environmental forces – threats and opportunities SMEs can reshape their supply chain decision like adoption of ERP, MRP, kind of relationships, supplier base etc.
SCF23	Equitable distribution of power in chain		
SCF24	Focus on demand than supply (pull based view)		
SCF25	Effective leadership		

Figure 4.
Critical success factors for implementing SCM in SMEs



Note: IQ – Investigative questions are enlisted in Table V

Figure 5.
Development of constructs and propositions

than cost and price factors which demands the effective planning and management of their supply chain activities. The key enablers for implementing SCM in SMEs include: greater degree of maneuverability, greater sense of responsibility in the owner and employee, personal contact with the employee and customers, greater flexibility to cater limited and fluctuating demands. On the other side, few obvious shortcomings are: less scope for the use of modern machineries, little scope for division of labor, disadvantage in the purchase of raw materials and other accessories, higher cost of rent, interest, advertisement, etc. per unit of output, inability to meet uncertainty, unutilized by-products. In a broader way, on a growth based approach SMEs may be divided into two main groups – growth-oriented (to grow and create the most valuable company) and quality-of-life (to provide an income for the owners). Some conflicting understandings on SCM for SMEs include:

- SME views SCM as exertion of power by customers and is perceived as one-way process.
- At one side concept of SCM is believed only to be more beneficial to large businesses because of their well-established organizational structure, ability to invest in IT and system development and culture of business. On the other side heavy investment in IT, system development software like ERP, single minded pursuit in the absence of defined responsibilities and higher dominance of owner are considered as few detriments to SCM in SMEs.
- Large enterprises manage SMEs at arm's length and if they want to continue in business they are expected to obey the norms.
- SME may lose the business with others by entering into long-term contract with particular contractor.

Research questions (RQ)	Corresponding investigative questions (IQ)
RQ1. At present is there a proper match between supply chain philosophy and SMEs logistical activities?	*IQ1*. Do SMEs consider SCM as part of their businesses strategy?
RQ2. Can SMEs improve their performance by having an appropriate position in the supply chain of LEs?	*IQ2*. Does LEs involve SMEs in their supply chain with right attitude? *IQ3*. What are the measures used by LEs to establish proper integration? IQ4. Are SMEs receptive to SCM philosophy of LEs?
RQ3. Is it possible for SMEs to generate common pool of finance and inventory through integration among themselves or with LEs to cater the changing demand?	IQ5. Is there a proper understanding, trust and transparency among SMEs? *IQ6*. What kind of alliance SMEs seek with LEs and vis-à-vis? *IQ7*. Is there a proper kind of value sharing model vis-à-vis profit sharing arrangement exist between SMEs and LEs or among SMEs?
RQ4. Are SMEs receptive to the adoption of IT for the improvement of their supply chain functions?	*IQ8*. What is the present status of IT implementation in SCM functions in SMEs? *IQ9*. What are barriers to the adoption of IT, e-commerce in SMEs?
RQ5. Can formalized purchasing procedures help SMEs to improve the effectiveness of their supply chain?	*IQ10*. What kind of problems SMEs are facing from their vendors? *IQ11*. At present, what kind of procedures SMEs are following for vendor selection, development and at large for (supplier relationship management SRM)?
RQ6. Can alliances help SMEs to speed up their product development process and technological up gradation?	*IQ12*. What kind of buyer–supplier relationships are needed among SMEs-LEs and SMEs-SMEs for improving the effectiveness of SME's supply chain? *IQ13*. How does large organization support and involve SME in their product development process?
RQ7. Is there a fit between supply chain strategy and business strategy of SMEs?	*IQ14*. What are the parameters SMEs consider while formulating their business strategy? What priority do they adhere to SCM?
RQ8. Can supply chain based performance measurement system help SMEs to establish better trust, faith and transparency in business transactions?	*IQ15*. On what parameters SMEs do their performance measurement? *IQ16*. Are the measures include supply chain based performance measures like lead time, inventory turn over ratio, fill rate, late delivery, customer satisfaction index etc.? *IQ17*. What are the new measures that should be included to improve the supply chain function of SMEs?

Table V.
List of investigative questions

- Failure by large company could disrupt the entire supply chain but, as SMEs are unique, if they fail they could easily be replaced (see for example, Karuppan and Karuppan, 1998; Rich and Hines, 1997).
- Under the high customer dominance with a strategic focus on efficiency and cost the survival of SMEs is dependent on their ability to provide/produce more, at less cost, in less time, with few "defects", using fewer resources.

S.No.	SMEs characteristics	Reasons to choose SCM
1.	Flat structure	Implementing and managing change is easier. Leaders on their own can develop supply chain matrices, modes of partnerships, performance indicators, and supply chain perspectives right from the beginning or if business is comparatively old then change in practices is easier Owner has the complete authority to take the decisions, less management levels and employee are more committed to growth of business hence managing change is not a big deal as it is found in case of large organizations
2.	Ability to innovate	Innovation and speedy development of new products reduces time and cost component of supply chain. SMEs are engaged by large organization for their inherent business characteristic to innovate faster and this provides the reason to adopt SCM as business strategies by SMEs
3.	Size and flexibility	Large organization lack in flexibility because of their bigger size and more number of managerial levels. They rely on SMEs to overcome this shortcoming by outsourcing their non-core activities. SMEs can improve the competitiveness of whole supply chain as well their own business by selling this advantage to other supply chain links
4.	Support of information system and infrastructure	Earlier solutions were only available for large businesses because of their capacity to invest but now a days IBM and other software giants have offered the economical ERP solutions for small businesses
5.	Low levels of organizational hierarchy	Easy decision making with increased flexibility of change at any stage
6.	CEO involvement in operational decisions	Ensures commitment of top management which is one of the requirements while considering SCM as strategic option
7.	"Blured" departmental walls	It is easier to take cross functional supply chain decisions
8.	Significant difference in actual demand and forecast	Use of IT and collaborative working can ensure better information sharing, trust and transparency in the system
9.	Frequent changes to orders	Better understanding and an alliance kind of relationship with customers specifically large organization can make the planning process more transparent
10.	Shorter manufacturing lead time	Provides better system flexibility and hence ability to cater higher product mix
11.	High staff turnover	SCM can help to streamline business function and hence improves working environment and culture
12.	Customers' special demands	Greater flexibility provides system both effectiveness and efficiency

Table VI.
Reasons to choose SCM by SMEs

- Huin *et al.* (2003) reported few supply chain interdependencies for ERP development in Asian M-SMEs which include: low levels of organizational hierarchy; CEO involvement in operational decisions; "blurred" departmental walls; production modes in M-SMEs; planned forecasts vs real forecasts; rate of

S. no.	Attributes	SCM by LEs	SCM by SMEs
C1	Competitive priorities	Market dominance through sustaining large market share	Market niches through sustaining profitable market position
C2	SCM view	Considers SCM as strategy to compete Focus is on the reduction of system wide cost to capture greater market segment of end customers Focus: High down stream, medium upstream	Considers SCM as operational level task Owner-led myopic and short term view to earn the profit for only immediate future Focus: High down stream, low upstream
C3	Complexity of supply chain objectives	Very high in the presence of complex supplier and customer network	Moderate in the case of limited supplier and customer base
C4	Key strategies	Exercise influence in supply chain mainly at upstream; strategic alliances with supplier and distributors	Focus on specialized market, build on unique competencies; effective customer/supplier management
C5	Kind of integration	Adopts both horizontal or vertical integration depending upon kind of corporate strategy	True vertical integration is generally not an option, it either uses spot market or network
C6	Inventory management	Aims to reduce system wise inventory cost to lower down overall supply chain cost, risk of obsolesce and lead time	Considers use of safety stock unavoidable to cater immediate demands of customer and in the absence of strong purchasing function and supplier relationships
C7	Key sourcing related activities	Supplier scoring and assessment, supplier selection and contract negotiation, design collaboration, procurement, sourcing planning and analysis	Evaluates supplier mainly on cost and quality criteria. Long-term view of collaborative design and responsiveness to fluctuating demands is missing
C8	Time frame and relationships	Most beneficial to have long-term design collaborations and relationships to reap the rewards of consistent quality, timely deliver, cost advantage, early design modifications etc.	Less likely to have the long-term time frame required to build and reap the rewards of relationships Becomes potential acquisition targets of larger firms when the supply chain works well
C9	Supply chain flows	Synchronized material, information, money and owner ship flows	Finds difficulty in managing material flow in case of disturbed money and information flows
C10	Product offerings	Standardized to achieve economies of scale	Customized to cater the changing needs of OEMs/larger buyers
C11	Managing supply	It is a function of production capacity and inventory. Time flexibility from workforce, use of seasonal workforce, use of subcontracting, use of dedicated and flexible facilities, use of common components across multiple products etc. help to vary supply of products based on market demands	Possibilities of manipulating capacity and inventory levers less and hence considers building inventory of high demand products as feasible strategy

Table VII.
Comparing attributes of SCM for large (LEs) vs small and medium enterprises (SMEs)

(*Continued*)

S. no.	Attributes	SCM by LEs	SCM by SMEs
C12	Managing demand	Uses pricing and promotions as the levers	Less scope in setting prices while working as an ancillary
C13	Use of third-party logistics (3PL) and fourth party logistics (4PL)	Very high to reduce the investment in fixed cost and reduce lead time	Mainly in single handed overall control and hence difficulty exist in managing cost and quality both
C14	Demand and forecast planning	Based on scientific use of tools and techniques with due consideration of uncertainties results in systematic production plans	Mainly governed by OEM schedules which often disturb their own production schedules. Absence of use of systematic approach
C15	External control structure	Decentralized, structured and highly specialized; multiple core competencies development	Centralized, semi-structured and moderately specialized; specific core competencies development
C16	Internal control structure	Command and control toward their small suppliers and distributors; collaborate with more dominant suppliers and distributors	Either accept command and control by OEM or 1st tier suppliers or utilize their negotiation strengths; pursue collaboration with other SMEs
C17	Coordination mechanisms	Well developed at inter and intra organizational level	Suffers even from internal coordination problems
C18	Transactional processes	Systematic and computer based	*Ad hoc* and paper based
C19	Use of IT and information	Part of business strategy	Still a buzz word
C20	Purchasing	Long-term view, collaborative or alliance relationships with few/single dedicated supplier(s)	Short-term view, adversarial relationship with many suppliers
C21	Customer relationship management	Considers customers as part of their business	Considers customers mainly OEMs as power exerting entities
C22	Goals of SCM processes	Operational effectiveness with multiple performance outcome requirements (e.g. cost, quality, delivery, time, customer value, and disposal) bigger scopes of information flows and product flows	Operational effectiveness with focused performance outcome requirements (e.g. specific definition of order qualifiers and order winners); smaller scopes of information flows and product flows
C23	Supply chain performance measures	Perfect delivery, order fill rate, inventory turn over, response rate, customer service level, system down time, order processing mistakes, delivery failures, system wide cost, etc.	Mainly internal failures, inventory costs, customer service level, cost of wastages, productivity

Table VII.

changes in orders; short lead-time in manufacturing; high staff turnover; and customers' special demands.

- Some of the factors which hinder SCM implementation in SME may include: lack of trust and sincerity; myopic view – focusing more on internal gains; outdated organization structure; focus on supply than demand; IT, considered as fashion and not as a part of business strategy; poor storage and warehousing functions;

the vulnerability inherent in the reliance on SCM partners for relation-based rents, especially for SMEs; the lack of modification of the underlying SCM theories to account for the effects of firm size; and the self-selection effects in the relevant strategy-choice, strategy-outcome link.

However, few relevant predictions supporting the SCM implementation in SMEs can be made as:

- SCM may help SMEs to improve some of the issues like leadership, strategy, waste reduction and procurement. SMEs are expected to change their focus to collaboration. This will allow the focus to be on added value.
- Practicing SCM may help SMEs to develop more clarity on their business strategy and core competence.
- SCM may give SME the ability to leverage its scalable competences (e.g. in product design and radical process innovation) in a cooperative network through fast and feasible access to complementary partner assets.
- SMEs, which are working as a separate business units, face both local and global competition and hence autonomy in decision-making and ability to differentiate may help them to SCM implementation in SMEs. We do offer some logical reasons for the adoption of SCM by SMEs as outlined in Table VI.

SMEs are not scaled-down replicas of large organization in experiences and business processes. The limited power and resources makes it difficult for SMEs to cope with the latest challenges such as mass customization which puts higher demands on the companies' ability to attune its production planning to customers' wishes and their suppliers. Based on the reviewed literature, we compare supply chain characteristics of SMEs with LEs as given in Table VII.

Survey-based findings of Grando and Belvedere (2005) for Italian SMEs point out that diffusion of SCM principles, which leads to a stronger emphasis on production planning ability and product quality, can make SMEs unreliable partners. Specifically, in the context of production networks, these weaknesses can result in a lower opportunity to participate in the best performing supply chains of multinationals or large organizations due to the lack of the main conditions necessary for quickly being integrated in a network (Olhager and Selldin, 2003). A summary of key issues in implementing SCM in SMEs is provided in Figure 6.

5. Conclusions and future directions

Paper has explored the contemporary literature on SCM issues in SME business. The research has brought together fragmented views on the practice of SCM in SMEs. The result is a classified literature under various categories like supply chain integration, implementation and strategy and planning. Paper also classifies the literature as per the Wacker's (1998) scheme to summarize the various techniques/research methodology adopted for the purpose of investigation. Paper highlights the growing importance of research area and need for further exploration. The underpinned research is in its infantry and hence qualitative case based research can help further to investigate issues in more depth within the strong social environment of SMEs. For the purpose, paper delivers a set of seven propositions. We consider the investigation of following questions important for future research.

Q1. What is the present orientation of SMEs for SCM?

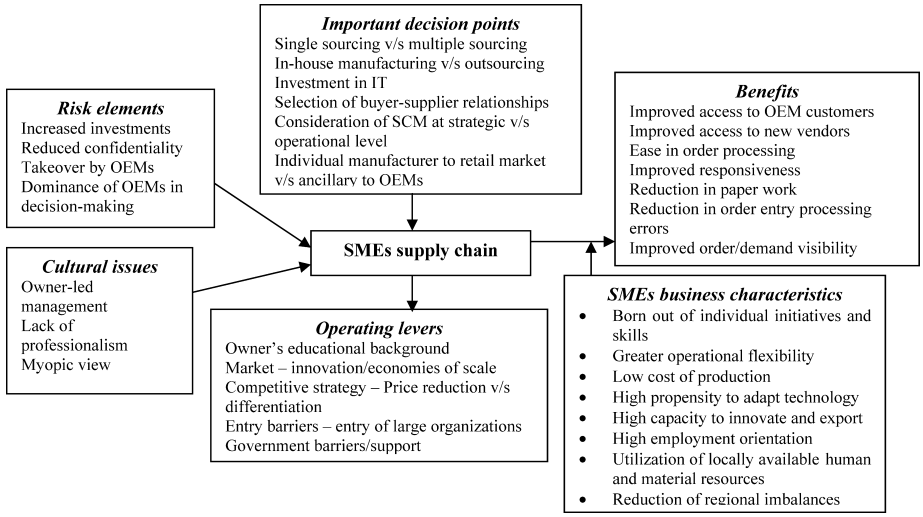


Figure 6.
Issues in supply chain in SMEs

Q2. Can true vertical integration is an option for the SME which generally uses the spot markets or the networks?;

Q3. Do SMEs need to consider antitrust implications in their alliances?;

Q4. What is the sensitivity of SME for holding specific assets and contract costs when they are usually in a worse bargaining position?;

Q5. What is the sensitivity of supply issues for SMEs?

The present state of literature uncovers both agreements and disagreements on the adoption of SCM practices in SMEs. The majority of work has focused on use or adoption of IT tools in SMEs. The majority of work is found mainly of exploratory kind. However, both case study and survey based approaches were adopted. The prime focus of work has remained pertinent to mainly the area of supply chain strategy and planning. Not much work is reported on network design and customer focus. This may be because of newness of concept for SMEs. The disagreements for the adoption of SCM in SMEs are primarily based on the reasons that these organizations are relatively opportunistic and in contact with relatively few rivals; more cash focused, short term and instill better communications and incentives for exploiting internal knowledge restricts the application of supply chain practices in SMEs. Despite of these, authors offers their agreements on adoption of SCM by SMEs based on following reasons:

- SMEs can consider SCM as strategic weapon to improve their performance in competitive market.
- SCM can help SMEs to establish better relationships with their OEM or large enterprises and hence derive the opportunity to improve their learning curve.
- Adoption of SCM by first-tier and second-tier SMEs can help to consolidate the component level requirements of their OEM customers at few stages and in turn it can help to boost the profit of their own and overall supply chain.

- Coordinated efforts can help to reduce waste and buffer inventories at SMEs factory and warehouses.
- SMEs generally face problems in meeting erratic demands of their OEM customers. SCM can help them to improve forecasts and hence purchasing schedules by streamlining inter and intra organizational activities.
- SCM can help SMEs to smoothen their financial flow and inventory flow by improving upon the supply chain relationships.

The greatest impact of this research will be to the academicians who intend to investigate the implications of SCM for SMEs. As highlighted in the review, SMEs work with conservative approach for local benefits which has limited their scope and growth of business. The presented review will provide a quick scan to the interested researchers of the SCM understanding in SMEs. Throughout, this review, the authors are mindful of the generalizations made in the analysis to rationalize the propositions. Further, case based exploration is therefore necessary to validate the propositions and outlined research questions. Our final thoughts on future work are that outlined propositions and theoretical constructs can be made more precise and focused from continued and cross-sectoral studies. These will help to ensure that the generalizations made are robust enough for industry-wide application. To this end, we will now go ahead with the case study developments for the more detailed analysis of propositions and subsequently, will refine and update our understanding. We also aim to analyze the case studies against presumed relationships among various role players (R1 to R8; Figure 4).

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Corresponding author

Jitesh Thakkar can be contacted at: thakkar_jitesh@yahoo.com