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Critical success factors for implementation of supply chain management in Indian small and medium enterprises and their impact on performance

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KEYWORDS

Supply chain management; Performance; Critical success factors; Small and medium enterprises Abstract Globalization of the economy, e-business, and introduction of new technologies pose new challenges to all organizations especially for small and medium enterprises (SMEs). In this scenario, successful implementation of supply chain management (SCM) can give SMEs an edge over their competitors. However, SMEs in India and other developing countries face problems in SCM implementation due to lack of resources and direction. Against this backdrop, this paper identified 13 critical success factors (CSFs) for implementation of SCM in SMEs and studied their impact on performance of Indian SMEs. Top management commitment, long—term vision, focus on core strengths, devoted resources for supply chain, and development of effective SCM strategy emerged as the most pertinent CSFs. To measure improvement in performance, the authors considered different measures related to customer service and satisfaction, innovation and growth, financial performance, and internal business. Results are analysed by testing research propositions using standard statistical tools.

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Introduction

* Corresponding author. Tel.: +91 9868387251. *E-mail address*: ravi_1_kumar@yahoo.com (R. Kumar). Peer-review under responsibility of Indian Institute of Management Bangalore. To effectively compete in the global market, small scale organizations should focus on improving the effectiveness of operational functions with effective supply chain management (Singh, Garg, & Deshmukh, 2010). Prior to the 1990s, Indian organizations operated in a protected environment.

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There was little competition even among domestic players. Business was driven by almost monopolistic strategies. However the deregulation of the Indian economy in the 1990s has attracted global players in every industrial sector and has unleashed a new competitive spirit in Indian organizations (Saxena & Sahay, 2000). Statistics reveal that India, the fifth largest country in terms of gross national product (GNP) and purchasing power parity (PPP) (World Bank, 1999) and a consumer base of over a billion (CMIE, 2000), constitutes one of the fastest growing markets in the world. India is also counted among the richest with regard to cheap skilled labour, scientific and technological resources and entrepreneurial talents. However, Indian small and medium enterprises (SMEs) find global competition very challenging (Singh, Garg, & Deshmukh, 2008a) To face competition in global markets, SMEs should have effective collaboration with their customers and suppliers, and should be competitive in terms of cost, guality, innovation, and delivery. Successful implementation of supply chain management (SCM) can play a significant role in meeting these challenges and SMEs should have an effective supply chain strategy. Critical success factors (CSFs) of SCM represent a wide variety of strategies devoted to improving operational efficiency and competitiveness of SMEs. In this paper, the authors have identified 13 CSFs for SCM from literature (Table 1). The authors have further attempted to study the effects of the SCM initiatives taken by Indian SMEs on their performance. For this study, issues of performance have been considered based on the balanced score card method. The performance measures included are customer service and satisfaction, innovation and growth, financial performance, and internal business. Previous studies have not analysed the impact of CSFs on different performance measures in a holistic manner like the present study does. This paper has been organised as follows: The second section discusses the literature review and identification of CSFs. The third section discusses research objectives and methodology. The fourth section discusses the findings from the guestionnaire-based survey. The fifth section discusses correlation and regression analysis for testing of research propositions. Finally, the sixth section discusses concluding remarks.

Table 1	Assessment of critical success factors in literature.	
S.No.	Critical success factors (CSFs)	References
1.	Top management commitment	Fisher (1997), Shin, Collier, and Wilson (2000), Arshinder, Kanda, and Deshmukh (2008), Singh et al. (2008c), Stanley et al. (2009), Sandberg and Abrahamsson (2010), Singh (2011), Singh (2013)
2.	Development of effective SCM strategy	Lee (2000), Cao, Zhang, To, and Ng (2008), Soroor, Tarokh, and Shemshadi (2009), Singh et al. (2010), Singh et al. (2012), Kumar, Singh, and Shankar (2014)
3.	Devoted resources for supply chain	Shin et al. (2000), Gunasekaran, Mcneil, Mcgaughey, and Ajasa (2001), Singh et al. (2010), Singh (2013)
4.	Logistics synchronization	Bowersox (1990), Simatupang, Wright, and Sridharan (2002), Thakkar, Kanda, and Deshmukh (2008), Singh et al. (2012), Kumar, Singh, and Shankar (2013), Kumar, Singh, and Shankar (2015)
5.	Use of modern technologies	Lee, Padmanabhan, and Whang (1997), Arshinder et al. (2008), Thakkar et al. (2008), Singh (2013)
6.	Information sharing with SC members	Ramdas and Spekman (2000), Ozer (2003), Stanley et al. (2009), Singh et al. (2012)
7.	Forecasting of demand on point of sale (POS)	Francesca et al. (2008), Arshinder et al. (2008), Marek and Malyszek (2008)
8.	Trust development in SC partners	Anderson and Narus (1990), Morgan and Hunt (1994), Sahay (2003), Bianchi and Saleh (2010), Singh (2013), Tejpal, Garg, and Sachdeva (2013)
9.	Developing just in time (JIT) capabilities in system	Grittel and Weiss (2004), Arshinder, Kanda, and Deshmukh (2007), Othman and Ghani (2008), Singh (2013)
10.	Development of reliable suppliers	Olorunniwo and Hartfield (2001), Petersen, Handfield, and Ragatz (2005), Othman and Ghani (2008), Singh, Garg, and Deshmukh (2008c), He, Zhao, Zhao, and He (2009), Kumar et al. (2013), Kumar et al. (2015)
11.	Higher flexibility in production system	Das (2001), Olhager and West (2002), Arshinder et al. (2007), Singh (2013)
12.	Focus on core strengths	Singh, Garg, and Deshmukh (2008b), Thakkar et al. (2008), Kumar, Singh, and Shankar (2012), Kumar et al. (2014)
13.	Long-term vision for survival and growth	Ganesan (1994), Morgan and hunt (1994), Thakkar et al. (2008), Singh et al. (2012), Kumar et al. (2013)

Literature review and identification of CSFs

To effectively compete in the global market, SMEs must have effective supply chain management. Conflicting objectives and lack of coordination between supply chain partners may cause uncertainties in supply and demand. Therefore effective SCM is required to streamline the supply chain of SMEs. A number of studies have attempted to identify the CSFs of SCM, Electronic Data Interchange (EDI), and Enterprise Resource Planning (ERP) systems. Bauer (2000) suggested that there are four CSFs in e-business for the automotive industry - understanding and working with diverse social and business cultures around the globe, physical internet infrastructure, understanding the state of the physical infrastructure of the suppliers, and the changing internal management processes and points of view. Power, Sohal, and Rahman (2001) examined the critical factors that influence the agility of organizations in managing their supply chains; in their study, the authors determined seven CSFs in agile SCM using factor analysis. Umble, Haft, and Umble (2003) identified the CSFs for the implementation of ERP systems. Angeles, Corritore, Choton Basu, and Nath (2001) reported 13 EDI implementation success factors that are considered relevant in implementing an inter-organizational system.

The importance of effective strategy for improving competitiveness of SMEs has been stressed in the literature (Singh et al. 2008a). Singh et al. (2008a) further observed that SMEs in general are not able to implement SCM to its full extent, mainly because they depend on bigger customers and follow the norms stipulated by them. Arend and Winser (2005) stated that larger companies consider SMEs as being easy to replace and buyers are reluctant to form partnerships with them. There are significant differences between SMEs and large companies in terms of systems, tools, supply chain and methods of electronic interface adoption. Wagner, Fillis, and Johansson (2003) observed that larger companies have the resources and technical budgets to implement e-business and e-supply strategies but SMEs continue to be challenged by resource limitations.

In SMEs, decisions are generally centrally governed by top management. Resources such as money, time, technology, manpower, and material are controlled and managed by top management. According to Ganesan and Saumen (2005) top management support is very much necessary for cross-functional training, integration of departments within the organization and vendor development for a responsive supply chain.

Studies have observed the importance of top management commitment in areas such as the successful implementation of EDI (Angeles et al. 2001), information systems (IS) (Bruwer, 1984) and ERP systems (Umble et al. 2003). The primary responsibility of the top management is to provide sufficient financial support and adequate resources for building a successful system. Further, the support of the top management will ensure that SCM implementation has high priority within the organization and that it will receive the required resources and attention. Apart from such primary support, psychological or behavioural support is also important for the smooth implementation of SCM, especially if there is significant resistance from the staff involved. Use of information technology such as internet, intranet, software applications packages and decision support systems can be applied to facilitate the information flow within the supply chain, between the members (Stanley, Cynthia, Chad, & Gregory, 2009).

Trust among supply chain partners is another important aspect for improving coordination between the partners. Anderson and Narus (1990) stated that trust is a favourable attitude that exists when one supply chain member has confidence in other supply chain members. Trust is required for flow of information in the supply chain. Risk and reward sharing influence an individual supply chain member's behaviour and his interaction with other supply chain members. Conflicts of interest are likely to occur when one supply chain member gets more benefits when compared to other members from an existing risk and reward sharing process (Cachon & Lariviere, 2005). Bianchi and Saleh (2010) stated that trust and commitment are essential for enhancing importer performance in developing countries. Arshinder, Kanda, and Deshmukh (2006) posit that conflicts in vision and goals of supply chain members result in the individual's profit maximization in place of profit maximization of all the supply chain members.

Mehrjerdi (2009) stressed long-term orientation which was expected to have three specific outcomes i.e. increased relational behaviour, decreased conflicts, and increased satisfaction. Collaborative decision making by supply chain members results in better forecasting of demand, trust between the supply chain members, and flow of information. According to Francesca, Bianco, and Mauro (2008) availability of point of sales (POS) data is important for a responsive supply chain. Since SMEs are under intense pressure to reduce cost, an appropriate inventory management system at every node of the supply chain minimizes the inventory at supply chain nodes (Marek & Malyszek, 2008). Singh, Kumar, and Shankar (2012) observed that effectiveness of Indian construction SMEs can be improved if they focus on product customization, waste reduction, housekeeping, and IT applications to reduce time lag in various processes. Ozer (2003) observed that information sharing is sharing of the inventory data, demand data, and product quality data. Periodic ordering in large batches between the manufacturer and retailer could distort original demand information due to large variance (Ozer, 2003).

Information technology (IT) has gained a lot of importance in SCM implementation in recent years. Increasingly, supply chain operations are changing from electronic data interchange systems and enterprise resource planning systems to internet/intranet to support SCM (Pant, Sethi, & Bhandari, 2003). Lancioni, Smith, and Oliva (2000) observed that use of modern technologies in SCM can lead to advantages such as cost saving, quality improvement, delivery and support, and greater competitive advantage.

Ngai, Cheng, and Ho (2004) observed that the successful implementation of web-based SCM system often requires a substantial amount of investment and intensive research. The need for such research to support a supply chain has not been fully recognized by industry practitioners. This may be due to a lack of awareness of the technologies and their benefits, and of the kind of support that a web based SCM system can provide.

Research objectives and methodology

This paper is an empirical study for identification of CSFs for implementation of SCM and focusses on their effects on the performance of Indian SMEs. Thirteen CSFs are identified from extensive literature review and experts' opinions, (see Table 1) and their effect has been studied on different categories of performance measures; these categories are customer service and satisfaction, innovation and growth, financial performance, and internal business of Indian SMEs. Based on this, the study has attempted to test the following four research propositions:

P1: There is a significant relationship between CSFs and SME performance in terms of customer service and satisfaction.

P2: There is a significant relationship between CSFs and SME performance in terms of innovation and growth.

P3: There is a significant relationship between CSFs and SME performance in terms of financial performance.

P4: There is a significant relationship between CSFs and SME performance in terms of internal business parameters.

To study the effect of different CSFs on performance of Indian SMEs, the authors studied different frameworks from literature but found none that were perfectly related. So the authors developed the following framework and tried to validate it in the current study. As the balanced score card (BSC) approach is the most prevalent, in this study the BSC model was taken as the base while developing the framework (Fig. 1). According to this framework, CSFs of SCM implementation leads to performance improvement of Indian SMEs on different categories based on the BSC approach.

In order to test research propositions and for analysis of different issues related to SCM and performance, a survey instrument was developed. The survey was conducted among Indian SMEs from the auto component, plastic, light engineering and electronics sectors from December 2010 to December 2012. Most of the SMEs were located in semiurban areas. All of them had investments in plant and machinery as per the definition of SMEs in India. Out of the total responding SMEs. 76% were located in urban areas. 14% in semi-urban areas and 10% in rural areas. Sector wise distribution shows that out of the total responding SMEs, 34% were from the auto-sector, 40% were from light engineering/others sector, 17% from the plastic sector and 9% from the electronic/electrical sector. The authors conducted a pilot survey of 40 SMEs from different sectors to finalize the guestionnaire; of the SMEs, in, 20 were from the auto component sector, 5 from the plastic sector, 10 from light engineering, and 5 from the electronics sector. Although the questionnaire was sent by post or e-mail for the final survey, most of the SMEs for the pilot survey were contacted on a personal basis for interview (through office meeting and plant visit) by making an appointment with the management. Most of the responses to the detailed survey were collected by the authors on personal visits to the SME plants since all the SMEs did not respond within the specified time limit,. An annexure was given at the end of questionnaire which contained guidelines for responses and terminology to avoid unknown biases. Most of the respondents were at the level of production manager or business head. At the end of the survey questionnaire, respondents were requested to fill their profile details, but it was optional.

The questionnaire contained two sections: Section A focussed on CSFs for implementation of SCM in Indian SMEs and Section B focussed on performance improvement (on criteria of balanced score card approach) in the past three years on the basis of different initiatives taken towards SCM implementation by Indian SMEs.

In this study, executives were asked to rate the intensity of each attribute for their respective organization on a fivepoint Likert scale (1 – lowest, 5 – highest). About 1500 SMEs from all parts of India were contacted for collecting responses. These organizations were selected from directories available at Confederation of Indian Industries



Figure 1 Framework for the study.

(CII), Auto Component Manufacturers Association, Federation of Indian Chambers of Commerce and Industries and Directorate of Industries (Government of NCT Delhi). For this study, respondents were selected based on criteria for SMEs and those belonging to manufacturing and engineering sectors. A total of 251 complete responses were obtained. SPSS 17 software has been used to analyse the collected responses. Of the 251 responding SMEs, 80% did not have a separate SCM department. Issues related to SCM were handled by top management in collaboration with the purchase and the marketing departments. Ten percent of SMEs had a separate SCM department and dedicated team to handle different supply chain issues. The remaining 10% of SMEs had little awareness of SCM,. About 30-40% of the SMEs were aware of the micro, small and medium enterprises development Act (MSMED Act, 2006) and. they were availing the benefits of all Government policies and schemes for MSME. Responses from the rest of the SMEs revealed very little knowledge about the act. The authors observed that either they were not aware of the MSMED Act and the policies and schemes intended for them or they were not in a situation to take advantage of them in the current market situation.

Findings from questionnaire-based survey

Inter-item analysis was used to check the scales for internal consistency or reliability. Cronbach's coefficient was calculated for each scale, as recommended for empirical research in operations management (Flynn, Sakakibara, Schroeder, Bates, & Flynn, 1990). The coefficients of Cronbach's α for all constructs were in the range of 0.854–0.896. These values exceed the minimum requirements of 0.5 for an exploratory study such as this one (Nunnally, 1978). Data acquired from the survey of Indian SMEs were analysed by statistical tests such as one sample t-test, correlation and regression analysis.

CSFs for SCM implementation

Bullen and Rockart (1986) observed that CSFs are few key areas where things must go right for the business to flourish

and for the manager's goals to be attained. On the basis of a literature review and a pilot survey, 13 CSFs were identified for Indian SMEs to focus on during implementation of SCM. These are top management commitment, development of effective SCM strategy, devoted resources for supply chain, logistics synchronization, use of modern technologies, information sharing with supply chain members, forecasting of demand based on point of sales (POS), trust development in supply chain partners, developing just in time (JIT) capabilities in the system, development of reliable suppliers, higher flexibility in production system, focus on core strengths, and long-term vision for survival and growth. The results of this study for various CSFs for SCM implementation by Indian SMEs on a Likert scale of five (1 - lowest, 5 - highest) are shown in Table 2. It is observed that the most important factor is top management commitment with mean values of (4.2430), followed by long term vision for survival and growth (4.1355), focus on core strengths (3.9960) and devoted resources for supply chain (3.9402). These results suggest that in Indian SMEs major decisions are taken by the top management.

Sandberg and Abrahamsson (2010) also stated that top management commitment is a key enabler for effective supply chain management. Implementation of SCM proves to be very useful for long term survival. But SCM implementation requires committed management and devoted resources. Usually it is observed that SMEs do not have the time, knowledge or resources to conduct detailed analysis for implementing SCM. In the absence of a plan for long term growth, SMEs often do not understand the full implications of SCM to the organization. The other important CSFs that emerged are development of effective SCM strategy (3.8606), development of reliable suppliers (3.6414), information sharing with supply chain members (3.4343) and logistics synchronisation (3.3745). Usually SMEs work in isolation and involve middlemen in their supply chain, often losing benefits to them. . By establishing close partnerships with their suppliers and customers, SMEs could better achieve product, process and technology innovations. To improve coordination and responsiveness of the supply chain, information sharing with all members of the chain is very important. Supply chain coordination relies on the availability of prompt and accurate information

 Table 2
 Critical success factors for SCM implementation by Indian SMEs.

S.No	Critical success factors	Mean	Rank	S.D.	t-values	p-values	Cronbach's Alpha
1.	Top management commitment	4.2430	1	.90813	21.685	.000	.896
2.	Long-term vision for survival and growth	4.1355	2	.72497	24.814	.000	
3.	Focus on core strengths	3.9960	3	.80746	19.543	.000	
4.	Devoted resources for supply chain	3.9402	4	.79020	18.851	.000	
5.	Development of effective SCM strategy	3.8606	5	.83455	16.337	.000	
6.	Development of reliable suppliers	3.6414	6	.75823	13.403	.000	
7.	Information sharing with SC members	3.4343	7	.74744	9.205	.000	
8.	Logistics synchronization	3.3745	8	.79195	7.492	.000	
9.	Use of modern technologies	3.3108	9	.71487	6.887	.000	
10.	Higher flexibility in production system	3.2789	10	.82092	5.382	.000	
11.	Forecasting of demand on point of sale (POS)	3.1520	11	.65315	3.680	.000	
12.	Trust development in SC partners	3.1275	12	.66909	3.019	.003	
13.	Developing JIT capabilities in system	3.1116	13	.71239	2.481	.014	

that is visible to all actors in the supply chain. Coordination improves by close partnership with customers and suppliers and helps in joint development of new products, joint effort in reducing purchase lead-time, and cross training of workforces. Coordination also helps in reducing late change of design and orders, which subsequently affects the delivery/logistics performance of the companies. Coordination and responsiveness will not only benefit the suppliers and the customers, but will improve the profits of the overall supply chain.

Logistics synchronisation will help SMEs in optimising their transportation and warehousing costs. Customers' orders and the services of the organization can be effectively connected by a good logistics system.

The other CSFs that emerged in the study are use of modern technologies (3.3108), higher flexibility in production system (3.2789), forecasting of demand based on point of sales data (3.1520), trust development in supply chain partners (3.1275) and developing JIT capabilities in the system (3.1116). Use of modern technologies such as internet, electronic data interchanges, web sites, radio frequency identification (RFID) technologies and ERP helps in better management of information. Accurate, timely, and easily accessible information can improve decision making and forecasting in supply chain. Forecasting of demand based on point of sales data helps in making more accurate forecasts of customer requirements. In the context of SCM, a supplier is able to better match inventory with demand when accurate information is available about the buyer's inventory status. Flexibility in production system (3.2789) helps in dealing with changing product design and demand of customers. From the coordination point of view, trust development in supply chain partners (3.1275) is also very important. Due to a perceived lack of security, a trust deficit exists between SMEs and their partners. Developing JIT capabilities in the system ensures better utilization of resources or helps in reducing waste in different forms.

CSFs for SCM implementation (sector wise observations) During the study, the authors observed that in the auto and light engineering sectors, the most preferred CSF while implementing SCM was top management commitment with a mean of (4.52) and (4.28) respectively. On the other hand, the plastic sector stressed on devoted resources for supply chain (4.00), and the electronic sector on long term vision for survival and growth (4.00). These results imply that while implementing SCM, different SME sectors have different preferences. . Results of the study show that Indian SMEs in the plastic sector are more concerned with resources for supply chain while making policies for SCM, while SMEs of the electronic/electrical sector pay more attention to long term vision for survival and growth. In the auto and light engineering sectors, top management commitment assumes more importance. The top five CSFs of each sector are shown in Table 3.

Further, the authors observed that in the auto sector the other significant CSFs are long-term vision for survival and growth (4.01), devoted resources for supply chain (3.88), and development of effective SCM strategy (3.81). The least preferred CSF for auto sector is forecasting of demand on point of sale (3.22). This implies that SMEs should consider the actual demand of customers according to sale data while doing forecasting of demand.

In the plastic sector, the authors observed that other important CSFs are development of effective SCM strategy (3.96), development of reliable suppliers, and focus on core strength. The least preferred CSF for the plastic sector is trust development in supply chain partners (3.15). This implies that Indian SMEs in the plastic sector should focus on trust development among its customers and suppliers to excel in the current scenario.

Sectors	S.No.	Top five CSFs	Mean
Auto sector	1.	Top management commitment	4.52
	2.	Long-term vision for survival and growth	4.01
	3.	Devoted resources for supply chain	3.88
	4.	Development of effective SCM strategy	3.81
	5.	Information sharing with SC members/Development of reliable suppliers	3.75
Plastic	1.	Devoted resources for supply chain	4.00
	2.	Development of effective SCM strategy	3.96
	3.	Top management commitment	3.93
	4.	Long-term vision for survival and growth	3.87
	5.	Logistics synchronization	3.75
Electronic/Electrical	1.	Long-term vision for survival and growth	4.00
	2.	Focus on core strengths	3.90
	3.	Development of effective SCM strategy/Devoted resources for supply chain	3.75
	4.	Development of reliable suppliers	3.45
	5.	Information sharing with SC members	3.30
Light engineering/Other	1.	Top management commitments	4.28
	2.	Development of effective SCM strategy	4.07
	3.	Devoted resources for supply chain	4.05
	4.	Long-term vision for survival and growth/Focus on core strengths	4.00
	5.	Logistics synchronization	3.41

In the electronic and electrical sector, other important CSFs are focus on core strengths and top management commitment (3.90). The authors opine that this sector should pay more attention towards the development of JIT capabilities in the system and forecasting of demand on point of sale (POS).

In the light engineering sector, the other CSFs are development of effective SCM strategy and long term vision for survival and growth. The authors opine that SMEs of light engineering sector should pay more attention toward developing JIT capabilities in the system.

Performance measures

Performance measurement can be defined as the process of quantifying the effectiveness of various processes being followed by the organization. Performance measurement provides the information necessary for decision makers to plan, control, and direct the activities of the organization. Performance measures allow managers to measure performance, to signal and educate employees (and suppliers) on the important dimensions of performance, and to direct improvement activities by identifying deviations from standards. Based on the balanced score card approach, this study has selected the performance measures customer service and satisfaction, innovation and growth, financial performance, and internal business parameters for assessment of performance.

Average improvement in performance in the past three years was measured on a Likert scale of five (1 - lowest, 5 - highest). This scale took care of decreasing, constant, as well as increasing percentage changes (Singh, Garg, & Deshmukh, 2006).

Performance improvement in terms of customer service and satisfaction

On the basis of extensive literature review and expert opinion, 10 parameters of customer service and satisfaction are identified. These parameters are: ability to resolve customer complaints, ability to deliver product on time, ability to follow up customer enquiries, ability to determine future expectations of customer, improvement of order fill rate, ability to reduce customer response time, ability to reduce shipping error, ability to reduce cost continuously, ability to customize the product, and application of ethical standards. In this section, respondents were asked to mention the level of improvement on performance measures related to customer service and satisfaction in the last three years for Indian SMEs on a Likert scale of five (1 lowest, 5 -highest). Results are shown in Fig. 2. From the analysis of surveyed data it is observed that in the past three years highest improvement has been observed in ability to resolve customer complaints (with mean value of 3.7052). This is followed by ability to deliver product on time (3.6295), ability to follow up customer enquiries (3.6016), and ability to determine future expectations of customer (3.4382). The market is now more customer oriented and in order to satisfy customers, it is important to resolve their complaints, follow enquiries, and predict future demands. Further analysis yielded improvement in order fill rate (3.4343), ability to reduce customer response time (3.3386), ability to reduce shipping error (3.1155), ability to reduce cost continuously (3.0916), ability to customise the product (3.0797) and application of ethical standards (2.7769). To make a supply chain responsive it is advisable for SMEs to have a higher order fill rate with quicker response to customer orders. Delivery of the right product to the right customer at the right time is very important for achieving coordination and responsiveness in the supply chain. Small and medium enterprises have to reduce shipping error for smooth functioning of supply chain processes. For customization of products, the production system of the organization should be adequately flexible. On the other hand there is continuous pressure for cost reduction on SMEs by other members of the supply chain. So, SMEs need to develop expertise in which a balance can be maintained between customer service and cost.

Performance improvement in terms of innovation and growth parameters

In the present study, eight innovation and growth parameters have been identified. Respondents were asked to mention the level of improvement of performance in the past three years in their organization on a Likert scale of five (1 - very low, 5 - very high). Results are shown in Fig. 3. It is observed that ability to implement new technologies (4.2430) has highest improvement, followed by ability to respond well to customer demand for new features (3.9402) and ability to compete based on quality (3.8606). To beat the intense competition from global competitors, Indian SMEs have to implement new technology in all fields; they



Figure 2 Performance improvement in terms of customer service and satisfaction.



Figure 3 Performance improvement in terms of innovation and growth parameters.

have to improve quality and cut costs. This is also borne out by our study. The authors further observed improvement in ability to offer lower prices than competitors (3.4343), ability to offer reliable products (3.3745), reduce product design and development cycle time (3.3108), identify new customers (3.1520) and ability to introduce new facilities (3.1275). Changing facilities with time and adopting new technology will help SMEs adapt to changing business environments. Offering new products with improved design at cheaper cost will also help them to sustain amidst global competition.

Performance improvement in terms of financial parameters

Financial parameters were measured in terms of average percentage change in the past three years on market share, sales turnover, reduction of inventory cost, export, and return on investment on a Likert scale of five (1 - lowest, 5 - highest). In this study, nine financial parameters have been identified. Results are shown in Fig. 4.

Net profit (3.9004) has the highest improvement followed by return on investment (3.8845) and revenue growth (3.8765). Export share (3.1037) of Indian SMEs has improved least among all measures. These findings imply that performance of Indian SMEs has improved least in term of exports. This may be due to various constraints mentioned in the literature, and which also emerge in this study. The authors observed that without sufficient resources, trained and qualified manpower, and state-of-the-art technology, Indian SMEs could not compete with their counterparts in developed countries, or, especially, with emerging and newly industrializing economies such as Singapore, Hong Kong, South Korea, Taiwan, Mexico and Malaysia. These challenges have forced a majority of the SMEs to focus on local markets and have rendered them unable to compete successfully in the global market. Therefore, a major challenge for Indian SMEs is to broaden their product range and work towards world class quality.

Performance improvement in terms of internal business parameters

On the basis of literature review and pilot survey of the market, eight internal business parameters have been identified. These parameters were measured in terms of average percentage change in the past three years on a Likert scale of five (1 - lowest, 5 - highest). The parameters are: level of teamwork and coordination among internal departments, use of modern quality control techniques, development of cross functional team, ability to reduce the product cycle time, improvement in labour productivity, ability to reduce wastage, ability to reduce inventory, and reduction in breakdown of machines. Results are shown in Fig. 5. To face challenges of global competition, SMEs should have internally and externally coordinated supply chains. This study observed that teamwork and coordination among departments (with mean value of 3.4781) have highest improvement followed by modern quality control techniques (3.3386) and development of cross functional team (3.3068). Forming cross functional teams with members from different departments and different fields makes problem solving easy and more effective. Further in this study it is observed that performance of Indian SMEs has not



Figure 4 Performance improvement in terms of financial performance measures.



Figure 5 Performance improvement in terms of internal business parameters.

improved significantly on the parameters ability to reduce product cycle time (3.1833), improvement in labour productivity (3.1673), reducing wastage (3.1673), reducing inventory (3.1514) and reduction in breakdown of machines (3.0199). These findings imply that SMEs have to make concerted efforts for improvement in areas of inventory management, maintenance, and productivity.

Correlation and regression analysis for testing of research propositions

In earlier sections, the study has tried to address issues related to critical success factors and business performance of Indian SMEs. The main research propositions in the present study are concerned with the relationship between CSFs and improvement in performance on different categories. For testing of research propositions made in this study, correlation and regression analysis has been carried out in this section. The results are given in Table 4. Some of the observations on the basis of this analysis are as follows:

- Critical success factors for supply chain implementation have significant correlation with performance in terms of customer service and satisfaction, thereby supporting the first proposition. This implies that CSFs for supply chain, if taken into consideration while implementing SCM, can significantly improve performance of Indian SMEs.
- Critical success factors for supply chain implementation have significant correlation with performance in terms of innovation and growth, thereby supporting the second proposition. It means CSFs help in performance improvement in terms of innovation and growth.
- Critical success factors are significantly correlated with financial performance, thereby supporting the third proposition. It means CSFs play an important role in improving financial performance of SMEs.
- Critical success factors for supply chain implementation have significant correlation with performance in terms of internal business, thereby supporting the fourth proposition.

Table 4	Correlation and regression analysis of CSFs with performance issues.							
S.No.	CSFs	Correlation coefficient for Perfm.1	Correlation coefficient for Perfm.2	Correlation coefficient for Perfm.3	Correlation coefficient for Perfm.			
1	Top management commitment	.353**	.483**	.607**	.264**			
2	Development of effective SCM strategy	.296**	.461**	.564**	.051			
3	Devoted resources for supply chain	.294**	.490**	.591**	.113			
4	Logistics synchronization	.326**	.536**	.579**	.184**			
5	Use of modern technologies	.419**	.441**	.456**	.480**			
6	Information sharing with SC members	.484**	.418**	.395**	.363**			
7	Forecasting of demand on point of sale (POS)	.544**	.380**	.320**	.429**			
8	Trust development in SC partners	.480**	.363**	.253**	.453**			
9	Developing JIT capabilities in system	.455**	.415**	.279**	.454**			
10	Development of reliable suppliers	.389**	.343**	.231**	.265**			
11	Higher flexibility in production system	.402**	.428**	.414**	.304**			
12	Focus on core strengths	.298**	.597**	.556**	.173**			
13	Long-term vision for survival and growth	.460**	.617**	.543**	.195**			
14	Average/overall value of CSFs	0.591**	.693**	.680**	.418**			
	-	(R2 = 0.349)	(R2 = 0.480)	(R2 = 0.462)	(R2 = 0.174)			

Notes: Correlation is significant at the 0.01 level (2-tailed); CSFs-Critical success factors; Perfm.1-Performance in terms of customer service and satisfaction; Perfm.2- Performance in terms of innovation and growth criterion; Perfm.3- Performance in terms of financial performance; Perfm.4- Performance in terms of internal business parameters.

Significance levels show you how likely a pattern in your data is due to chance. For example, a value of ".01" means that there is a 99% (1-.01 = .99) chance of it being true.

- Detailed analysis of correlation of different CSFs with different performance issues is shown in Table 4. Top management commitment has significant correlation with all issues related to performance, while CSFs such as development of effective SCM strategy and devoted resources for supply chain do not have significant correlation with performance parameters of internal business. It implies that performance of Indian SMEs can be improved on all issues such as customer service and satisfaction, innovation and growth, and financial and internal business parameters if the management commits to implement SCM. On the other hand, management must pay attention to strategy development for SCM and enough resources should be devoted to it.
- Regression analysis of CSFs as independent variable and performance in terms of customer service and satisfaction as dependent variable ($R^2 = 0.349$) explains 34.9 percent of variability of performance of Indian SMEs. This means that in addition to these independent variables, other factors related to supply chain implementation play a significant role in performance improvement in terms of customer service and satisfaction in the Indian scenario. During analysis and survey, the authors observed that for Indian SMEs cost reduction, quality improvement and on time delivery of goods have more influence on performance. The authors opine that to utilize resources effectively and to maximize benefits of SCM, SMEs should take help from professionals and consultants.
- Regression analysis of CSFs as independent variable and performance in terms of innovation and growth as dependent variable ($R^2 = 0.480$) explains 48 percent of variability of performance of Indian SMEs. This implies that in addition to these independent variables, other factors related to supply chain implementation play a significant role in performance improvement of Indian SMEs in terms of innovation and growth.
- Regression analysis of CSFs as independent variable and performance in terms of finance as dependent variable $(R^2 = 0.462)$ explains 46.2 percent of variability of performance of Indian SMEs. This means that in addition to these independent variables, other factors related to supply chain implementation play a significant role in improvement of performance of SMEs in terms of finance. The authors opine that Indian SMEs should take help of professionals and consultants for this.
- Regression analysis of CSFs as independent variable and performance in terms of internal business as dependent variable ($R^2 = 0.174$) explains 17.4 percent of variability of performance of Indian SMEs. It implies that in addition to these independent variables, other factors related to supply chain implementation, play a significant role in performance improvement of Indian SMEs, in terms of internal parameters.

Sector wise correlation and regression analysis

In this section, the authors have tried to analyse the relationship between different CSFs and performance of Indian SMEs of different sectors such as auto, plastic, electronic/ electrical, and light engineering. Some of the observations on the basis of this analysis are as follows:

- During sector wise correlation and regression analysis of CSFs with performance, the authors observed that different factors have different effect on performance in different sectors. For instance, in the auto sector top management commitment shows a significant correlation for performance improvement in terms of innovation and growth criterion, financial performance and internal business parameters, but is not significant in terms of customer service and satisfaction (Table 5). This implies that top management of Indian SMEs in the auto sector should focus more on customer service and satisfaction.
- In the plastic sector, top management commitment shows significant correlation for performance improvement in terms of customer service and satisfaction, innovation and growth and financial performance, but is not significant in terms of internal business parameters. It implies that top management of SMEs of the plastic sector should pay more attention to improving internal business standards.
- In the auto sector, developing JIT capabilities in system has significant correlation with all the performance criteria (Table 5), while in the plastic sector this CSF has significant correlation with performance in terms of customer service and satisfaction only. It does not show significant correlation with other criteria of performance. This implies that SMEs of the plastic sector should focus more on developing JIT capabilities to improve their performance.

Limitations of the study

This research is subject to the normal limitations of survey research. The study uses perceptual data provided by production managers or quality managers and business heads, which may not provide clear measures of performance. Continued scepticism within SMEs about the impact of CSFs for SCM on performance is one of the fundamental limitations this research faces. Indian SMEs are, therefore, not very willing to provide useful and timely information and data, for further investigations.

Concluding remarks

The objective of this study was to identify the impact of CSFs for SCM on the performance of Indian SMEs in the context of emerging global market. From this study it is observed that the critical success factors (CSFs) have positive impact on different categories of performance such as customer service and satisfaction, innovation and growth, financial performance, and internal business of Indian SMEs. Further, when analysed sector wise, different CSFs show different impacts on different performance criteria in different sectors. It is also observed that to face the challenges of a global market, SMEs in India are now recognizing the importance of SCM implementation on a larger scale.

On the basis of this study, some of the concluding observations are as follows:

 Table 5
 Sector wise correlation and regression analysis of CSFs with performance.

S.No.	CSFs	Sectors	Correlation	Correlation	Correlation	Correlation
			coefficient	coefficient	coefficient	coefficient
			for Perfm.1	for Perfm.2	for Perfm.3	for Perfm.4
1	Top management commitment	Auto	.140	.458**	.586**	.326*
		Plastic	.490**	.600**	.619**	.150
		Electronic/Electrical	.116	.627**	.612**	.196
		Light engg./Others	.126	.439**	.588**	.339*
2	Development of effective SCM strategy	Auto	.221	.444**	.595**	.150
		Plastic	.186	.463**	.521**	274
		Electronic/Electrical	.176	.572**	.734**	.289
		Light engg./Others	.140	.431**	.589**	.231
3	Devoted resources for supply chain	Auto	.104	.425**	.634**	.175
		Plastic	.082	.286	.401*	258
		Electronic/Electrical	.106	.604**	.734**	.319
		Light engg./Others	.042	.381**	.530**	.202
4	Logistics synchronization	Auto	.193	.484**	.630**	.255
		Plastic	.183	.968**	.860**	070
		Electronic/Electrical	.269	.325	.555*	.545*
		Light engg./Others	.463**	.529**	.630**	.681**
5	Use of modern technologies	Auto	.146	.525**	.568**	.500**
		Plastic	.408*	.121	.105	.009
		Electronic/Electrical	.547*	.555*	.699**	.789**
		Light engg./Others	.370**	.315*	.338*	.646**
6	Information sharing with SC members	Auto	.203	.517**	.489**	.413**
		Plastic	.541**	.199	.282	035
		Electronic/Electrical	.603**	.386	.544*	.753**
		Light engg./Others	.290*	.262	.345*	.386**
7	Forecasting of demand on point of sale	Auto	.579**	.499**	.273*	.521**
	(POS)	Plastic	.832**	.062	035	.348
		Electronic/Electrical	.613**	.595**	.660**	.507*
		Light engg./Others	.740**	.305*	.383**	.701**
8	Trust development in SC partners	Auto	.413**	.594**	.296*	.584**
		Plastic	.661**	.394*	.315	.058
		Electronic/Electrical	.410	.168	.296	.505*
		Light engg./Others	.576**	.101	.284*	.459**
9	Developing JIT capabilities in system	Auto	.656**	.437**	.289*	.612**
		Plastic	.391*	.093	.034	093
		Electronic/Electrical	.057	.307	.022	.268
		Light engg./Others	.619**	.261	.316*	.562**
10	Development of reliable suppliers	Auto	.311*	.517**	.292*	.325*
		Plastic	.186	.463**	.521**	274
		Electronic/Electrical	.117	261	195	.198
		Light engg./Others	.628**	.065	.298*	.600**
11	Higher flexibility in production system	Auto	.295*	.400**	.354**	.356**
		Plastic	.407*	.224	.255	093
		Electronic/Electrical	.234	.363	.227	068
		Light engg./Others	.379**	.277*	.467**	.576**
12	Focus on core strengths	Auto	.296*	.580**	.264	.195
		Plastic	.496**	.559**	.602**	.208
		Electronic/Electrical	.273	.663**	.772**	.164
		Light engg./Others	.306*	.758**	.792**	.531**
13	Long-term vision for survival and growth	Auto	.232	.506**	.368**	.284*
		Plastic	.394*	.802**	.740**	090
		Electronic/Electrical	.297	.554*	.428	.148
		Light engg./Others	.529**	.639**	.655**	.562**

Notes: **. Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed); CSFs-Critical success factors; Perfm.1-Performance improvement in terms of customer service and satisfaction; Perfm.2- Performance improvement in terms of innovation and growth criterion; Perfm.3- Performance improvement in terms of financial performance; Perfm.4-Performance improvement in terms of internal business parameters.

- Top management commitment, long-term vision for survival and growth, focus on core strengths, devoted resources for supply chain and development of effective SCM strategy are the main CSFs for implementation of SCM in Indian SMEs.
- In the auto sector, the main CSFs for implementation of SCM are top management commitment, long-term vision for survival and growth, devoted resources for supply chain, and development of effective SCM strategy.
- In the plastic sector, the main CSFs for implementation of SCM are devoted resources for supply chain, development of effective SCM strategy, development of reliable suppliers, and focus on core strength.
- In the electronic/electrical sector, main CSFs for implementation of SCM are long term vision for survival and growth, focus on core strengths, and top management commitment.
- In the light engineering sector, main CSFs for implementation of SCM are top management commitment, development of effective SCM strategy, and long-term vision for survival and growth.
- In customer service and satisfaction category of performance, in the last three years improvement has been observed in terms of ability to resolve customer complaints, ability to deliver product on time, ability to follow up customer enquiries and ability to determine future expectations of customers.
- In innovation and growth category of performance, in the last three years improvement has been observed in terms of ability to implement new technology, ability to respond well to customer demand for new features, ability to compete based on quality, and ability to offer lower prices than competitors.
- Indian SMEs have performed better in the last three years in terms of net profit, return on investment, and revenue growth.
- In the internal business perspective of performance, in the last three years improvement has been observed in terms of teamwork and coordination among internal departments, use of modern quality control techniques, development of cross functional team and ability to reduce the product cycle time.

Findings of the study have many crucial implications for SMEs while implementing SCM, and for academia as well. A major implication is that SMEs should develop their supply chain strategies effectively after analysing the business environment and their future plans. While developing strategies for implementation of SCM in SMEs, they should give due importance to CSFs and keep them in mind while deciding their priorities.

This study can be further extended for comparing SMEs with larger enterprises in terms of different supply chain practices and performance. The findings from this study may be beneficial for SMEs outside India as well.

References

Anderson, J. C., & Narus, J. A. (1990). A model of distributor firm and manufacturer firm working partnerships. *Journal of Marketing*, 54, 42–58.

- Angeles, R., Corritore, C. L., Choton Basu, S., & Nath, R. (2001). Success factors for domestic and international electronic data interchange (EDI) implementation for US firms. *International Journal of Information Management*, 21, 329–347.
- Arend, R. J., & Winser, J. D. (2005). Small business and supply chain management: is there a fit? *Journal of Business Venturing*, 20, 403–436.
- Arshinder, Kanda, A., & Deshmukh, S. G. (2008). Supply chain coordination: perspectives, empirical studies and research directions. *International Journal of Production Economics*, 115, 316–335.
- Arshinder, K., Kanda, A., & Deshmukh, S. G. (2006). A graph theoretic approach to evaluate supply chain coordination. *International Journal of Logistics and Systems Management*, 2(4), 329–341.
- Arshinder, Kanda, A., & Deshmukh, S. G. (2007). Supply chain coordination issues: an SAP-LAP framework. Asia Pacific Journal of Marketing and Logistics, 19(3), 240–264.
- Bauer, M. J. (2000). The effect of the Internet on supply chain & logistics. *World Trade*, 13, 71–78.
- Bianchi, C., & Saleh, A. (2010). On importer trust and commitment: a comparative study of two developing countries. *International Marketing Review*, 27(1), 55–86.
- Bowersox, D. J. (1990). The strategic benefits of logistics alliances. Harvard Business Review, 68(4), 36–43.
- Bruwer, P. J. S. (1984). A descriptive model of success for computer-based information systems. *Information & Management*, 7, 63–67.
- Bullen, C. V., & Rockart, J. F. (1986). A primer on critical success factors. In C. V. Bullen, & J. F. Rockart (Eds.), The rise of managerial computing: the best of the Center for Information System Research (383–423). Homewood, Illinois: Dow Jones-Irwin.
- Cachon, G. P., & Lariviere, M. A. (2005). Supply chain coordination with revenue sharing contracts: strengths and limitation. *Management Science*, 51(1), 30–44.
- Cao, N., Zhang, Z., To, K. M., & Ng, K. P. (2008). How are supply chains coordinated? An empirical observation in textile-apparel business. *Journal of Fashion Marketing & Management*, 12(3), 384–397.
- Center for Monitoring Indian Economy (CMIE). (2000). CMIE: Economic overview 2000. New Delhi: CMIE.
- Das, A. (2001). Towards theory building in manufacturing flexibility. International Journal of Production Research, 39(18), 4153–4177.
- Fisher, M. (1997). What is the right supply chain for your product? *Harvard Business Review*, 75(2), 105–116.
- Flynn, B. B., Sakakibara, S., Schroeder, R. G., Bates, K. A., & Flynn, J. B. (1990). Empirical research methods in operations management. *Journal of Operations Management*, 9, 250–284.
- Francesca, M., Bianco, F., & Mauro, C. (2008). Internet and supply chain management: adoption modalities for Italian firms. *Management Research News*, 31(5), 359–374.
- Ganesan, S. (1994). Determinants of long-term orientation in buyer-supplier relationships. *Journal of Marketing*, *58*, 1–19.
- Ganesan, K., & Saumen, B. (2005). Corporate turnaround through effective supply chain management: the case of a leading jewellery manufacturer in India. *Supply Chain Management: An International Journal*, *10*(5), 340–348.
- Grittell, J. H., & Weiss, L. (2004). Coordination networks within and across organizations: a multi-level framework. *Journal of Management Studies*, 41(1), 127–153.
- Gunasekaran, A., Mcneil, R., Mcgaughey, R., & Ajasa, T. (2001). Experience of small to medium size enterprise in the design and implementation of manufacturing cells. *International Journal* of Computer Integrated Manufacturing, 14(2), 212–223.

- He, Y., Zhao, X., Zhao, L., & He, J. (2009). Coordinating a supply chain with effort and price dependent stochastic demand. *Applied Mathematical Modeling*, *33*, 2777–2790.
- Kumar, R., Singh, R. K., & Shankar, R. (2012). Supply chain management issues in an Indian SME: a Sap-Lap analysis. *Journal of* Supply Chain Management Systems, 1(2), 34–44.
- Kumar, R., Singh, R. K., & Shankar, R. (2013). Study on coordination issues for flexibility in Supply chain of SMEs: a case study. *Global Journal of Flexible Systems Management*, 14(2), 81–92.
- Kumar, R., Singh, R. K., & Shankar, R. (2014). Strategy development by Indian SMEs for improving coordination in supply chain: an empirical study. *Competitiveness Review*, 24(5), 414–432.
- Kumar, R., Singh, R. K., & Shankar, R. (2015). Study on collaboration and information sharing practices for SCM in Indian SMEs. International Journal of Business Information Systems (in press).
- Lancioni, R. A., Smith, M. F., & Oliva, T. A. (2000). The role of the Internet in supply chain management. *Industrial Marketing Management*, 29, 45–56.
- Lee, H. L. (2000). Creating value through supply chain integration. Supply Chain Management Review, 4(4), 30–36.
- Lee, H. L., Padmanabhan, V., & Whang, S. (1997). The bullwhip effect in supply chain. Sloan Management Review, 38(3), 93–102.
- Marek, P., & Malyszek, E. (2008). A local collaboration as the most successful co-ordination scenario in the supply chain. *Industrial Management & Data Systems*, 108(1), 22–42.
- Mehrjerdi, Y. Z. (2009). Excellent supply chain management. Assembly Automation Journal, 29(1), 52-60.
- Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20–38.
- MSMED Act. (2006). *Micro,small and medium enterprises development Act No.27, Ministry of Law and Justice*. Government of India.
- Ngai, E. W. T., Cheng, T. C. E., & Ho, S. S. M. (2004). Critical success factors of web-based supply chain management system using exploratory factor analysis. *Production, Planning & Control*, 5(6), 622–630.
- Nunnally, J. C. (1978). Psychometric methods. New York, NY: McGraw-Hill.
- Olhager, J., & West, B. M. (2002). The house of flexibility: using the QFD approach to deploy manufacturing flexibility. *International Journal of Operations & Production Management*, 22(1), 50–79.
- Olorunniwo, F. O., & Hartfield, T. (2001). Strategic partnering when supply base is limited — a case study. *Industrial Management & Data Systems*, 101(1), 47–52.
- Othman, R., & Ghani, R. A. (2008). Supply chain management and suppliers' HRM practice. Supply Chain Management: An International Journal, 13(4), 259–262.
- Ozer, O. (2003). Replenishment strategies for distribution system under advanced demand information. *Management Science*, 49(3), 255–272.
- Pant, S., Sethi, R., & Bhandari, M. (2003). Making sense of the e-supply chain landscape: an implementation framework. International Journal of Information Management, 23, 201–221.
- Petersen, K. J., Handfield, R. B., & Ragatz, G. L. (2005). Supplier integration into new product development: coordinating product, process and supply chain design. *Journal of Operations Management*, 23(3/4), 371–388.
- Power, D. J., Sohal, A. S., & Rahman, S. U. (2001). Critical success factors in agile supply chain management. *International Journal* of Physical Distribution & Logistics Management, 31, 247–265.
- Ramdas, K., & Spekman, R. E. (2000). Chain or shackles? Understanding what drives supply chain performance. *Interface*, *30*(4), 3–21.

- Sahay, B. S. (2003). Understanding trust in supply chain relationships. Industrial Management & Data Systems, 103(8), 553-563.
- Sandberg, E., & Abrahamsson, M. (2010). The role of top management in supply chain management practices. *International Journal of Retail & Distribution Management*, 38(1), 57–69.
- Saxena, K. B. C., & Sahay, B. S. (2000). Managing IT for world class manufacturing: the Indian scenario. International Journal of Information Management, 20, 29–57.
- Shin, H., Collier, D. A., & Wilson, D. D. (2000). Supply management orientation and supplier/buyer performance. *Journal of Operations Management*, 18(3), 317–333.
- Simatupang, T. M., Wright, Alan C., & Sridharan, R. (2002). The knowledge of coordination of supply chain integration. Business Process Management Journal, 8(3), 289–308.
- Singh, R. K. (2011). Developing the framework for coordination in supply chain of SMEs. Business Process Management Journal, 17(4), 619-638.
- Singh, R. K. (2013). Prioritizing the factors for coordinated supply chain using analytic hierarchy process (AHP). *Measuring Business Excellence*, 17(1), 80–98.
- Singh, R. K., Garg, S. K., & Deshmukh, S. G. (2006). Strategy development by Indian SMEs in plastic sector: an empirical study. Singapore Management Review, 28(2), 65–83.
- Singh, R. K., Garg, S. K., & Deshmukh, S. G. (2008a). Challenges and strategies for competitiveness of SMEs: a case study. International Journal for Services and Operations Management, 4(2), 181–200.
- Singh, R. K., Garg, S. K., & Deshmukh, S. G. (2008b). Competency and performance analysis of Indian SMEs and large organizations: an exploratory study. *Competitiveness Review: An International Business Journal*, 18(4), 308–321.
- Singh, R. K., Garg, S. K., & Deshmukh, S. G. (2008c). Strategy development by SMEs for competitiveness: a review. Benchmarking: An International Journal, 15(5), 525–547.
- Singh, R. K., Garg, S. K., & Deshmukh, S. G. (2010). Strategy development by Indian SSIs. Industrial Management & Data Systems, 110(7), 1073–1093.
- Singh, R. K., Kumar, R., & Shankar, R. (2012). Supply chain management in SMEs: a case study. International Journal of Manufacturing Research, 7(2), 165–180.
- Soroor, J., Tarokh, J. M., & Shemshadi, A. (2009). Theoretical and practical study of supply chain Coordination. *Journal of Busi*ness and Industrial Marketing, 24(2), 131–142.
- Stanley, E. F., Cynthia, W., Chad, A., & Gregory, M. (2009). Supply chain information-sharing: benchmarking a proven path. *Benchmarking: An International Journal*, 16(2), 222–246.
- Tejpal, G., Garg, R. K., & Sachdeva, A. (2013). Trust among supply chain partners: a review. *Measuring Business Excellence*, *17*(1), 51–71.
- Thakkar, J., Kanda, A., & Deshmukh, S. G. (2008). A conceptual role interaction model for supply chain management in SMEs. *Journal of Small Business and Enterprise Development*, 15(1), 74–95.
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: implementation procedures and critical success factors. *European Journal of Operational Research*, 146, 241–257.
- Wagner, B. A., Fillis, I., & Johansson, U. (2003). E-business and e-supply in small and medium sized businesses. Supply Chain Management: An International Journal, 8(4), 343–354.
- World Bank. (1999). World bank economic review. Oxford: Oxford University Press.