REVIEW OF LITERATURE

Introduction

This chapter deals with theoretical and descriptive literature related to the area of the study. The methodology and important findings of the existing studies in the area of firm’s performance, environmental performance and barriers of GSCM practices, descriptive studies are summarized in respective area. This review of literature was performed in order to understand the nature and scope of past research work and also to determine the research gaps for further potential exploration. The following sections were tried to provide a brief outline of past studies along with major findings of respective research work.

Sunil Luthra, Vinod Kumar, Sanjay Kumar and Abid Haleem attempt to develop a structural model of the barriers to implementation of GSCM in Indian automobile industry (Sunil, Vinod, Sanjay, & Abid, 2011). They identify some barriers and contextual relationships among the identified barriers. They classify the barriers according to the dependence and driving power with the help of MICMAC analysis. Further, they suggest a structural model of barriers to implementation of GSCM in the Indian automobile industry using Interpretive Structural Modelling (ISM) technique.

Green supply chain management has emerged as an important organizational philosophy to minimise environmental risks, argue the researchers (Diabat & Govindan, 2011). They design a model of the drivers affecting the implementation of green supply chain management. They use an Interpretive Structural Modelling (ISM) framework for the purpose. They identify the various drivers of the green supply chain management (GSCM) by using the GSM literature and consulting industry experts. They validate the model on a case study involving a manufacturing unit.

The researchers remind that manufacturing industries began to focus on green concept in their supply chain management only lately (Govindan, Kaliyan, Kannan, & Haq, 2014). The intention was to focus on environmental issues. All the same, they have a tough time identifying barriers that hinder the implementation of green supply
chain management. The researchers focus on identifying the barriers in the backdrop of effectiveness of procurement. They identify 47 barriers after perusing literature and interacting with industry experts. They supplemented their efforts by conducting a questionnaire-based survey of various sectors of the industry. They identify critical barriers by resorting to an analytic hierarchy process. They top it off with a sensitivity analysis to examine priority ranking stability.

There is a growing need for integrating environmentally sound choices into supply-chain management research and practice, argues the researcher (Srivastava, 2007). Upon studying the literature on the topic, the researcher is convinced that a broad frame of reference for green supply-chain management (GSCM) is yet to emerge. This inadequacy also affects the ability of the regulatory bodies to regulate in such a way as to address the societal and ecological concerns of the business and the economy. A precise and concise classification to help the academics, researchers and practitioners in understanding the integrated GSCM from a broader perspective is amiss. Incidentally, adequate literature is available to warrant such classification. Hence the researcher takes a holistic and fresh look into the area of GSCM.

The researchers seek to provide an overview of the various issues related to environmental (green) supply chain management performance measurement (Hervani, Helms, & Sarkis, 2005). Their work relies on experiences, case studies and other literature related to performance measurement in environmental supply chains. The researchers seek to integrate works in supply chain management, environmental management and performance management into one framework. They eventually succeed in providing an integrative framework for study, design and evaluation of green supply chain management performance tools. They also identify a number of issues that still need to be addressed.

Owing to the ever-rising scarcity of natural resources and increasing concern in the market for 'green' products and processes, decisions concerning environmental issues have turned crucial for managements of manufacturing organisations (Mudgal, Shankar, Talib, & Raj, 2010). Green business practices are not easy to adopt and implement, no thanks to the presence of numerous barriers. The researchers set out to
identify and analyse the said barriers. The researchers undertook a survey to rank these barriers.

With customers becoming more environmental conscious and governments getting stricter with environmental regulations, industries have to minimise the environmental impact of their supply chain (Mathiyazhagan, Govindan, Noorul Haq, & Geng, 2013). Indian auto component manufacturing industries, especially SMEs (Small and Medium Enterprises) are committed to cleaner production by implementing Green Supply Chain Management (GSCM) in their businesses. But they find the going tough. The researchers analyze the barriers to implementation of the GSCM concept. They view the GSCM exercise in two phases: identification of barriers and qualitative analysis. The study has used three different research phases: identification of barriers from the literature, interviews with various department managers and a survey of auto component manufacturing industries. The researchers seek to identify the most important barrier to adoption of green supply chain management. They conclude that in GSCM implementation, especially for maintaining the environmental awareness, the supplier barrier is the most crucial one.

While establishing themselves as major manufacturers of prowess, the Chinese industry has been facing increasing ecological pressures from a variety of institutional entities and the authorities (Zhu & Sarkis, 2007). This includes the market, the government and competitive sources. As a result, some manufacturers have initiated green supply chain management (GSCM) practices. A moderated hierarchical regression analysis of data provided by 341 Chinese manufacturer respondents was undertaken by the researchers to examine the relationship obtaining between GSCM practice, environmental and economic performance, incorporating three moderating factors, namely, market, regulatory, and competitive institutional pressures. Their analysis revealed that: the Chinese manufacturers have been experiencing increasing environmental pressure to implement GSCM practices; market (normative) and regulatory (coercive) pressures have been leading manufacturers to scale up environmental performance, especially when these pressures drove them to adopt eco-design and green purchasing practices; manufacturers facing a higher level of regulatory pressure showed a marked inclination to implement green purchasing and investment recovery measures; competitive pressure marked improved economic
benefits from adoption of a number of GSCM practices with no harmful influence on environmental performance; none of the institutional pressures contributed to “win-win” situations for the organizations.

The researchers seek to identify and rank the major strategies that help in successful implementation of Green Supply Chain Management (GSCM) in the Indian manufacturing industry (Luthra, Garg, & Haleem, 2013). Towards this end, they identified strategies to implement GSCM through extensive literature review. They sought experts’ advice for categorizing them into four representative dimensions which they then ranked, using Analytic Hierarchy Process (AHP). They categorized the GSCM implementation strategies into four dimensions: non-members of supply chain, downward stream supply chain members, organizational members of supply chain and upward stream supply chain members. These dimensions, according to the researchers, play an important role in greening the supply chains, thus helping the practising firms achieve superior levels of operational performance.

Academic and corporate interest in sustainable supply chain management has risen considerably lately, claim the researchers (Stefan & Martin, 2008). This is demonstrated by the number of papers published and in particular, by journal special issues. Hence the researchers set out to offer a literature review on sustainable supply chain management taking 191 papers published from 1994 to 2007 into account. Secondly, they set out to offer a conceptual framework to summarize the research in this field. It is comprised of three parts. They identify the related triggers to get going. This allows them to propose two distinct strategies, namely, supplier management for risks and performance, and supply chain management for sustainable products. According to the researchers, research is still dominated by green/environmental issues. Social aspects as well as the integration of the three dimensions of sustainability are still hard to come by. The output of the researchers may be found useful by both practitioners in companies as well as academics given that it outlines major lines of research in the field. Further, the output analyses the specific features of sustainable supply chains as well as the limitations of the existing research on the topic. According to the researchers, this should stimulate further research.
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Thanks to growing awareness about environment protection, firms are obliged to implement environmental practices and raise their green image, argue the researchers (Mathiyazhagan, Govindan, & Noorul Haq, 2014). Lately, academicians and practitioners have evinced interest in green marketing and green supply chain management (GSCM) practices. Pressure on the environment has been rising by the day and a higher level of accountability, financial outlays and supply chain strategies are sought by the stakeholders. The researchers identify 65 such pressure points and place those under six heads. Eventually they prioritize the essential pressures by using the analytic hierarchy process.

With almost 22 percent of aggregate industry stuck in inventories in the entire supply chain network, something must be wrong with the country’s industry, according the researchers (Sahay, Cavale, & Mohan, 2003). The researchers wonder whether the configuration of Indian supply chains has hobbled their attempts to achieve global standards. The researchers infer that though some Indian businesses
are hastening the improvement of their supply chain efficiencies, they are far from exploiting the green supply chain for the improvement of their bottom lines.

Although green supply chain management (GSCM) or sustainable supply chain management (SSCM) has been analysed for developed and developing countries, not much information is available about the adoption of GSCM/SSCM practices in India, maintain the researchers (Mitra & Datta, 2014). The researchers find that the adoption of GSCM practices by Indian firms is yet to pick up steam. The awareness level of environmental sustainability is pathetically low among consumers. The regulatory regime is not adequately equipped to promote environmental sustainability. Their analysis shows that supplier collaboration for environmental sustainability is positively correlated with environmentally sustainable product design and logistics. The latter are positively correlated with the competitiveness and financial performance of the business concerned.

Environmental sustainability and green environmental issues have been increasingly gaining the attention of researchers and supply chain practitioners, according to the researchers (Luthra, Garg, & Haleem, 2014). The researchers attempt an analysis of green supply chain management (GSCM) practices in the Indian automobile industry. They identify six main GSCM practices (with 37 sub practices) and four expected performance outcomes (with 16 performances) accruing from the implementation of GSCM practices after reviewing the literature on the subject. They infer that environmental, economic, social and operational performances improve once the GSCM practices are implemented.

The researchers in their empirical study of green supply chain management (GSCM) practices in the micro, small and medium enterprises (MSMEs) in India, remark that the literature on the subject does not explain why green practices are yet to figure prominently in supply chain management although external and internal pressures obtain (Mohanty & Prakash, 2014). These MSMEs have been associated with green supply chain practices only to a limited extent – limited by the role they play – like suppliers and distributors. The researchers conclude that Indian MSMEs face a higher level of pressure from external stakeholders to adhere to GSCM
practices. As for internal pressures, the researchers cite that on-the-job training forces MSMEs in India to adopt GSCM practices.

The researchers describe a green supply chain (GSC) performance measurement framework. They use an intra-organisational collaborative decision-making (CDM) approach for the purpose (Bhattacharya, et al., 2014). They also use a fuzzy analytic network process (ANP)-based green-balanced scorecard (GrBSc) within the CDM approach to help in arriving at a consistent, accurate and timely data flow across all cross-functional areas of a business. They establish a green causal relationship and link it to the fuzzy ANP approach. The causal relationship embraces organisational commitment, eco-design, GSC process, social performance and sustainable performance constructs. They identify sub-constructs and sub-sub-constructs and link them to the causal relationship to constitute a network. They implement the CDM approach in a UK-based carpet-manufacturing firm. The performance measurement approach also helps in the firm’s decision-making with regard to the overall organisational goals. The implemented approach helps the firm in identifying further requirements of the collaborative data across the supply-chain and information about customers and markets. They conclude that the CDM-based GrBSc approach helps managers in deciding if the suppliers’ performances meet the industry and environment standards with effective human resource.

The researchers seek to investigate the green supply chain management practices likely to be adopted by manufacturers of electrical and electronics products in India (Kumar, Chattopadhyaya, & Sharma, 2012). The approach of the present research includes a literature review, in depth interviews and questionnaire surveys. The researchers examine the relationship between green supply chain management practices and environmental performance. They sample the electrical and electronics product units in India for the empirical study. The researchers analyse the data using “mean score”. Their findings reveal the outcome of eco procurement, eco accounting, eco logistics design, eco product design, eco manufacturing, and economic performance practices in response to the current wave of national and international green issues.
Dubey, R and Ali, S.S examine the antecedents of Indian firms into green manufacturing practices and their impact on the performance of the extended supply chain (Dubey & Ali, 2015). The output of the factor analysis they undertook validates the findings they gleaned from literature review. The factor analysis output indicates that total quality management (TQM), supplier relationship management (SRM), R & D and technology and lean manufacturing practices are vital determinants of Indian firms into green manufacturing practices that impact the extended supply chain performance. The output proves that TQM and R & D and technology are vital determinants of the performance of the extended supply chain. However, their investigation does not support SRM and lean manufacturing practices from the perspective of the respondents.

The researchers explain that because of the present-day environmental requirements that affect manufacturing operations and transportation systems, the focus on the development of environment management strategies for supply chains has been intensifying (Bhool & Narwal, 2013). A green supply chain seeks to confine the wastes within the industrial system in order to conserve energy and prevent the release of harmful chemicals into the environment. Often research on drivers of green supply chain management is viewed cynically for its inadequate perspective and for the absence of industrial relevance. Thus arises the need to introduce superior processes for implementation of green practices and green image in manufacturing industries, argue the researchers. The researchers seek to examine the green practices obtaining in select Indian manufacturing companies.

Supply chain management has emerged as an indicator of operational excellence for businesses in India, maintain the researchers (Jayaram, Dixit, & Motwani, 2014). Indian business is dominated by small and medium sized enterprises (SME). Their scale of operations is modest and their access to scarce resources is even more modest. Naturally, their supply chain management (SCM) capabilities are relatively low. SMEs are by and large owned and run by families in the Indian context. Owners take strategic decisions, control and manage operations. Hence their view vis-a-vis growth, risk appetite and professionalism influences their business significantly. The researchers, in this backdrop, examine the supply chain management capabilities of family-owned small and medium enterprises (SMEs).
They undertake a within-case interpretive analysis of six manufacturing companies from different sectors to identify the major constructs that characterize family-owned businesses and their supply-chain management.

The researchers seek to define performance measures respecting the green manufacturing practices that obtain in the Indian manufacturers (Digalwar, Tagalpallewar, & Sunnapwar, 2013). They drafted a survey questionnaire with 128 items / variables for the purpose. They identified the items / variables after reviewing the literature on the topic and interviewing nine experts on the green practices obtaining in the manufacturing sector. They culled the data to isolate the following 12 performance measures of green manufacturing: top management commitment, knowledge management, employee training, green product and process design, employee empowerment, environmental health and safety, suppliers and materials management, production planning and control, quality, cost, customer environment performance requirement, customer responsiveness and company growth. They are convinced that the performance measures developed by them would help decision makers to assess the perception of green manufacturing in their business thereby helping them to prioritize their green marketing efforts.

The researchers claim that few of their fellow-researchers have tried to classify studies on supply-chain management (Subramanian & Gunasekaran, 2015). For example, there are studies on processes centred on supply-chain use; there are also studies centred on products and technology that facilitate cleaner supply-chain management (CSCM). The researchers dwell on the in-depth reviews of published studies on cleaner practices that crop up at various stages of the supply chain. They include strategic planning, product and service design and development, purchases, production, distribution, information technology / information systems, and human resources in two well known production-related multidisciplinary journals over the course of a decade. By suggesting a CSCM framework of practices and performance, analyzing the importance of cleaner methods, and devising performance indicators for various supply-chain stages, the researchers propose future topics on cleaner management.
The researchers bring to the fore the supply chain issues one finds in small and medium scale enterprises (SMEs) (Thakkar, Kanda, & Deshmukh, 2013). They use the facts they collected from select Indian SMEs into manufacturing, for the purpose. They consider 10 SMEs for the purpose. They consider a set of critical success factors and evaluate six critical research questions that contribute to success in supply chain planning and management in SMEs. They assert that their findings will help SMEs to assess their supply chain function more effectively. They use a case study approach for the purpose.

Supply chain practices (SCPs) have been acknowledged as the most important strategy for medium and large organizations, assert the researchers (Gorane & Kant, 2014). The practices have become indispensable for achieving success in the global market. SCPs engender competitive advantage and enhanced organisational competitiveness. The researchers collected various SCPs from literature and designed a conceptual framework that could be developed in future. From the existing literature, they culled 15 SCPs along with the relevant constructs and implemented them in small, medium and large organisations. Their findings will lead to a better understanding of SCPs. The framework they developed can help in the successful implementation of SCPs leading to improved customer satisfaction and organisational performance.

Green manufacturing (GM) places emphasis on minimising parts, rationalising materials and reusing components so the products can be manufactured more efficiently, argue the researchers (Rehman & Shrivastava, 2013). The researchers undertook a survey in 2009 to assess the level of awareness and the extent of implementation of GM practices in various manufacturing units in the Vidharba region of Maharashtra, India. In this discourse, they try to design an instrument that can gauge the status of awareness and implementation of GM in the region. Further, the instrument would validate the performance metrics for GM in the Indian context. The instrument could be used by manufacturers to assess and fine-tune their green manufacturing performance. The researchers however admit that adoption of GM by industries is at a nascent stage. A lot needs to be done to raise awareness levels and to convince the manufacturers as to the benefits that could accrue from GM.
Parmar, V and Shah, H. G identify the barriers to supply chain management (SCM) one comes across in manufacturing organizations (Parmar & Shah, 2016). They took up a systematic review of literature of the past decade and identified the most critical barriers that hobbled the performance of the supply chain in the organisations, for the purpose. They identified 23 key SCM barriers which could help experts in optimising SCM implementation. They remark that nowadays supply chains are used as a proxy for assessing the performance of manufacturing organizations. Effective supply chain management practices help organizations to stay in the reckoning in the present-day competitive environment, conclude the researchers.

The researchers argue that the advent of major global auto companies has prodded the domestic automotive sector to embrace supply chain best practices (Bhattacharya, Mukhopadhyay, & Giri, 2014). This has raised competition leading to a quantum growth in exports. However, the Indian automotive industry has to survive in a unique environment that complicates the already complex automobile supply chain. In the circumstances, an ongoing examination of supply chain practices obtaining in the sector from a contemporary, practitioner’s viewpoint is indispensable. In the process, key factors of differentiation that eventually lend a competitive advantage will come to the fore. The researchers make an effort to understand the current status, complexities and challenges characterising the Indian automobile sector. They analyse trends like visibility and innovation, collaboration and supply networks and the evolving leadership roles that influence supply chain effectiveness. They suggest strategies for meeting the challenges.

As managers become more adept at addressing recurrent risks, they pay less attention to designing supply chains that mitigate the impact of disruptive risks, argues the researcher, citing the article “Three Strategies to Safeguard Your Global Supply Chain” contributed by Sunil Chopra and ManMohan S. Sodhi and published by Industry Week (University Alliance, 2016). The latter maintain that the potential for labour strikes, political unrest, regulatory shifts and natural disasters could have severe and lasting repercussions on operations. According to them, the manufacturers would do well to devise strategies that alleviate this risk. The challenge for
manufacturers, they add, is to prepare for disruptive risks while maintaining the gains made to improve supply chain efficiency.

The exposure of companies to turbulence, uncertainty, and vulnerability in their supply chain leads to supply chain disruption, reminds the researcher (Jonathan, 2015). He estimates that each supply chain disruption costs USD 10 million. The following three main themes emerged from his research:

- supply chain design, planning, and forecasting
- flexible and multiple supplier base;
- resource allocation and demand management.

The implications for positive social change include the potential of reducing supply chain risk. Such a reduction could lead to lower prices of products for consumers, increased stakeholder satisfaction, and a higher standard of living, concludes the researcher.

To compete successfully in the present-day supply chain space, manufacturers need to adopt a supply chain management strategy that requires the integration and coordination of key external processes. Purchasing, selling, and logistics with supply chain partners may be mentioned by way of examples (Green Jr, Whitten, & Inman, 2008). When manufacturers embark upon improving the logistics processes, they support their organization’s supply chain strategy. This in turn improves the performance of the overall supply chain and ultimately the manufacturing organizations. The researchers indicate that supply chain focus enhances the logistics performance of an organization and that the upshot of implementing both logistics performance and supply chain management on the marketing performance of a company is clearly positive. This in turn leads to improved financial performance. But the researchers clarify that the financial performance of an organization is not directly affected either by its supply chain management strategy or its performance in the logistics space. Thus, they advise organizational managers to focus on supply chain functions such as logistics to bolster the competitiveness of the supply chains in which their organizations are integral partners.
When a supply chain initiative is taken up by a firm, a number of issues come up during implementation. Important issues related to SCM implementation lie in the areas of logistics, outsourcing/partnerships, and environment (Varma, Wadhwa, & Deshmukh, 2006). Apart from these issues, a prerequisite for implementation is formulation of a strategy while the final step in the exercise is performance evaluation. These two activities need to be handled carefully too. Therefore, the researchers suggest strategic formulation, identification of areas for improving material flow, identifying issues in these areas, and finally performance evaluation in order to determine how well the supply chain initiative has been implemented. Subsequently, they also follow this framework step by step. In the process, they identify the issues likely to arise during SCM implementation and suggest how these issues can be handled effectively.

In the present-day scenario, industries face tremendous pressure from the customer’s environmental awareness and stricter environmental regulations to incorporate ethical and environmental considerations in all facets of traditional supply chain management (TSCM). This is where green supply chain management (GSCM) comes into play (Mathiyazhagan & Haq, Analysis of the Influential Pressures for Green Supply Chain Management Adoption - An Indian Perspective using Interpretive Structural Modelling, 2013). GSCM is a well-known and established concept to incorporate ethical and environmental considerations in TSCM that satisfy the needs of environmental policies and customers and restrict hazards. This has led the researchers to identify the key pressure points that provide the most motivation to GSCM practices and to identify the pressures that do not motivate enough to engage GSCM in traditional activities, especially to maintain environmental regulation policies. They identify five levels of influential pressures, from the recommended 25 pressures appropriated from a review of various pieces of literature, based on the impact. In sum, they infer that Indian auto component manufacturing industries have been facing pressure from the government and the regulators.

Green supply chain management (GSCM) integrates ecological concepts with those of supply chain management in order to minimize energy and material usage and to reduce adverse impacts of supply chain activities on the environment (Muduli,
Govindan, Barve, Kannan, & Geng, 2013). GSCM implementation in mining industries depends largely upon certain factors which are influenced by human behaviour. Human behaviour is dynamic in nature and the relationships between them continuously evolve and change. In this ever-changing context, therefore, identifying and ranking the behavioural factors that affect GSCM implementation becomes essential. Therefore, the researchers have attempted to explore the various behavioural factors affecting GCSM practices and their interactions which help fulfil the green-enabled needs, employing interpretive structural modelling (ISM) to extract the interrelationships among the identified behavioural factors. They advocate that the decision makers consider these factors while deciding the hierarchy of action necessary for effective implementation of green practices in mining supply chains.

With the emergence of the concept of lean and agile paradigms for supply chains, organizations have little idea as to which model suits them based on the their supply chain's ability to counter risks and take on the challenges of the fast changing customer preferences (Faisal, Banwet, & Shankar, 2006). The researchers propose a model by using which organizations can select a suitable supply chain strategy based on customer sensitivity and risk alleviation, competency dimension and the transition required in tune with the requirements of the market in which they operate. They can also use it to easily delineate the areas which could do with some improvement from the perspective of risk alleviation, competency or customer sensitivity.

The pressure on manufacturing organizations to adopt benign processes and to develop greener products has increased significantly over the last decade (Vachon, 2007). As such, several manufacturing organizations have turned to their suppliers and customers to find innovative solutions to environmental issues. Using the data from a survey of the Canadian and United States package printing industry, the researchers have tried to examine the linkage between green supply chain practices and the selection of environmental technologies. They focus on green interactions between organizations in the supply chain and specifically explore the possible relationship obtaining between environmental collaboration and environmental monitoring in the supply chain. They also focus on the form of environmental investment characterized by three categories: pollution prevention, pollution control, and management systems. The results they arrived at suggest that environmental
collaboration with customers had no impact whatsoever on the adoption and the implementation of pollution prevention technologies. In contrast, environmental collaboration with suppliers was positively associated with fewer investments in management systems and greater investments in pollution prevention technologies.

The ‘collaborative paradigm’ in supply chain management regards strategic collaboration as a crucial source of competitive advantage. Collaboration is even more essential when supply chains aim at ensuring simultaneously economic, environmental and social performance on a product’s total life-cycle basis (Sustainable Supply Chain Management and Inter-Organizational Resources: A Literature Review, 2010). Inter-firm resources and capabilities emerging from supply-chain-wide collaboration are prone to become sources of sustained inter-firm competitive advantage, since they are socially complex, causally ambiguous and historically grown and hence particularly difficult to imitate, by competitors. Therefore the researchers explore the role of sustainable supply chain management as a catalyst for generating valuable inter-organizational resources, on the basis of a content analysis, and thus possible sustained inter-firm competitive advantage through collaboration on environmental and social issues. Drawing on the resource-based view and its extension, the relational view, they try to highlight that partner-focused supply management capabilities evolve to corporate core competences as competition shifts from an inter-firm to an inter-supply-chain level.

Environmental pressures have caused green supply chain management (GSCM) to emerge as an important corporate environmental strategy for manufacturing enterprises (Zhu, Sarkis, & Lai, 2012). For manufacturers to fully realise the performance potential of GSCM, they need to integrate internal GSCM practices emphasising functional coordination with external GSCM practices such as cooperation with suppliers and customers in the implementation. Using coordination theory, the researchers examine three models used to evaluate the mediation relationships between the external and internal practices of GSCM with respect to environmental, economic, and operational performance. They posit that the strategic stance of manufacturing enterprises in improving their overall performance and competitive position requires a joint coordination of internal and external GSCM practices. Survey data collected from 396 Chinese manufacturing enterprises was
used to validate their arguments by testing the mediation effects of two categories of GSCM practices. Their empirical results showed support for the mediation effects, which indicates the importance for manufacturers to coordinate between the internal and external aspects of implementing GSCM practices to reap the performance benefits. Coordinating internal and external GSCM practices to seek performance improvements is an important aspect of the manufacturing operations strategy.

Improved supply chain efficiency would help Indian organisations to maintain competitiveness in a rapidly globalising economy (Sahay, Gupta, & Mohan, 2006). Therefore, in an effort to analyse and assess the current state of supply chain management practices followed by Indian organisations and identifying important areas that need to be addressed therein, and in order to help increase their competitiveness, the researchers test a framework for evaluating the supply chain strategy of an organisation along three key dimensions – supply chain objectives, supply chain processes, and management focus on supply chain activities. The findings revealed that most of the Indian organisations have aligned their supply chain objectives with their business objectives. They are now on the course of aligning their processes and management focus. The researchers claim that this supply chain alignment model provides a framework for realising true supply chain efficiency and competitiveness. The researchers recommend individual organisations to align their objectives, processes and management focus according to the focal areas of their organisation, and depending on their capabilities and market situation. However, the need to act fast to capitalise on these opportunities to be competitive with the world market applies evenly to all Indian organizations.

Supply chain risk management assumes importance in the wake of organizations understanding that their risk susceptibility is dependent on other constituents of their supply chain (Faisal, Banwet, & Shankar, Supply Chain Risk Mitigation: Modeling the Enablers, 2006). The researchers seek to present an approach to effective supply chain risk mitigation by understanding the dynamics between the various enablers that help to mitigate risk in a supply chain. The research shows that there exists a group of enablers having a high driving power and low dependence requiring maximum attention and of strategic importance. Another group consists of those variables which have high dependence and represent the resultant
actions. This classification provides a useful tool to supply chain managers to differentiate between independent and dependent variables and their mutual relationships which would help them to focus on those key variables that are most important for effective risk minimization in a supply chain.

Although firms have been taking green supply chain management (GSCM) initiatives, it is not known whether they create value for firms (Bose & Pal, 2012). Therefore, in an effort to determine the same, the researchers analyse 104 announcements related to GSCM using an event study and determine what causes statistically significant gains in stock prices for these firms. They found that manufacturing firms, firms with high R&D expenses, and early adopters showed a strong increase in stock prices on the day of the announcement. At the same time, small firms, firms not well-known for taking green initiatives, as well as firms that were low in growth potential, considerably surprised the market when they made such announcements.

While academic debates and practical approaches to green marketing have matured over the past few decades, one central conundrum that has remained unresolved has been the trade-off between the higher prices of green products and the objectives of environmental sustainability (Sharma & Iyer, 2012). In general, it has been observed that green products are priced at a premium to account for their environmentally friendly consumption and use. The researchers argue that resource-constrained product development approaches (alternatively labelled jugaad) that are observed in emerging countries such as China and India have the potential to change the traditional models of green product development. In addition to the competitive advantage that resource-constrained product development approaches provide, they note that these practices have sustainability and supply chain benefits. The researchers prove that the innovation process relies primarily on frugal engineering that reduces material use (thereby reducing the burden on supply chain) and meets green marketing objectives at much lower, and therefore, more affordable prices.

The researchers set out to identify and analyse the key factors behind the successful achievement of environment sustainability in the Indian automobile industry supply chains (Luthra, Gurg, & Haleem, 2015). To this end, they identify six
critical success factors (CSFs) to implement GSCM for achieving sustainability and four expected performance measures of green supply chain management (GSCM) practices implementation. They employ interpretive ranking process (IRP) modelling approach to examine the contextual relationships among CSFs and to rank them with respect to performance measures. The IRP model they developed for the purpose showed that ‘competitiveness’ is the most important CSF for achieving sustainability in the Indian automobile industry through GSCM practices. The framework developed by the researchers provides a comprehensive perspective for assessing the synergistic impact of CSFs on GSCM performance and could act as a ready reckoner for practitioners.

The researchers emphasize the application of supply chain management. They add the ‘green’ component to it so as to stress upon the need for environment friendly systems (Kumar & Chandrakar, 2012). The growing importance of GSCM is driven mainly by the escalating deterioration of environment. The waste and emissions caused by the supply chain have become one of the main sources of serious environmental problems including global warming and acid rain. One of the key aspects of green supply chains is to improve economic and environmental performance simultaneously throughout the chains by establishing long-term buyer-supplier relationships. Therefore the researchers have made an effort to study the supply chain of the systems with focus on its optimization and implementation.

Anthropogenic emissions are likely pose a serious threat to the stability of our environment and immediate actions are required to change the way the earth’s resources are consumed, argue the researchers (Gupta & Palsule-Desai, 2011). Among the many approaches to mitigation of environmental deterioration being considered, the processes for designing, sourcing, producing and distributing products in global markets play a central role. Considerable research effort is being devoted to understanding how organisational initiatives and government policies can be structured to facilitate incorporation of sustainability into the design and management of the entire supply chain. The researchers review the current state of academic research in sustainable supply chain management, and discuss future direction and research opportunities in this field. They develop an integrative framework summarising the existing literature under four broad categories: (i) strategic
considerations; (ii) decisions at functional interfaces; (iii) regulation and government policies; and (iv) integrative models and decision support tools. They seek to provide managers and industry practitioners with a nuanced understanding of issues and trade-offs involved in making decisions related to sustainable supply chain management. They conclude their research by discussing environmental initiatives in India and the relevance of sustainability discussions in the context of the Indian economy.

Greening supply chains has become a necessity as environmental concerns have remained at the forefront of the debate on global and local social interests (Sarkis, 2012). Managing the green (environmentally sustainable) supply chain is an important issue for industry. To this end the researchers provide a framework to understand and appreciate the relationships of various research streams and topics in this field. Utilizing this framework, emergent research directions to advance the field have also been presented. The research literature can be integrated into these comprehensive multidimensional frameworks, which also can serve the purpose of future research. Research directions are described utilizing the framework presented in the research paper. Their work presents a potential set of frameworks. Insights relating to other potential frameworks are additional areas of investigation and not presented in their study. The literature reviewed in their paper focuses on peer reviewed journals. Emergent research in this area may also appear in books and conference papers. The frameworks provide guidance for various research streams. The frameworks and review would also provide an opportunity for managers and organizations to more comprehensively understand issues underlying green supply chain management. The comprehensive boundaries and flows framework could be valuable for identifying barriers to study and implement the interdisciplinary green supply chain management based on literature published recently. They also provide insights into research streams and practice. The research questions provide some further direction to those desiring to investigate this field.