

## **Greening the Supply Chain: Identifying Barriers and Drivers for Small and Medium Enterprises in Nagpur**

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**Abstract** Nowadays, "green supply chain management" (GSCM) is a buzzword that means more and more important things. Most SMEs are setting up their own manufacturing facilities in order to compete in a highly competitive market. Public awareness, economic development, environmental concerns, and legislative shifts have all contributed to an increase in the demand for GSCM. In this context, this research seeks to identify the drivers and challenges encountered by small and medium-sized enterprises (SMEs) in Nagpur. Researchers have identified a number of drivers and obstacles in order to establish the contextual linkages between them. It was also suggested that the drivers of GSCM implementation in SMEs be identified utilising the Modification Strategy. After reviewing the literature and consulting with academics and businesspeople, six distinct types of relevant obstacles were identified. Three obstacles have been identified as part of the driver construct, three as part of the connection construct, and one as part of the dependant construct. Right now, we don't know of any barrier that can function independently. There is one barrier at the lowest level and three at the upper level. We thought of ways to get rid of these problems. A model of these obstacles was constructed based on the speculations of specialists. The findings may then be fine-tuned to address a practical problem.

**Keywords:** SME's, Nagpur, green supply chain management, Barriers, drivers

### **Introduction**

A company may convert its inputs into its outputs with the use of traditional supply chains, which consist of interconnected links. Timely and cost-effective commodity delivery was a problem in

earlier supply chain situations. But as urbanisation and globalisation accelerated, individuals began to see the traditional way of working differently. The present supply chain peaks are centred on the concept of "sustainability," which emphasises the need of accepting ecologically friendly practises and making effective use of resources related to people, materials, and money.

The present era's popular subject is supply chain management, which involves opening up new sites to economically match demand and supply designs. Also, researchers are starting to focus on this field to find new ways to improve supply chain efficiency. For supply chain to thrive in the current competitive environment and hold onto significant market shares, it has to undergo a review for the implementation of legislation pertaining to occupational policies. Academics and businesses are examining new solutions to address pressing demands as a result of these situations. As already stated by Silvestre (2015).

The Brundtland Report was the first source for the word "sustainability" prior to its 1987 US establishment by the Environmental Protection Agency. There are three primary components that make up the Triple Bottom Line (TBL), or the concept of sustainability: social, environmental, and economic. Elkingston (1998) has done a good job of identifying these strata. You can see all three of these goals in Figure 1, which depicts the 2005 World Summit on "Social Development".



**Figure 1.** Goals of sustainability

Since 1990, researchers have disseminated about 1800 exam articles that include terms such as "SSCM," "SCM," and "Supply chain." A few of Asian scholars have chipped in, but the bulk of the effort has come from European specialists. Roughly one-third of industries have not yet used SSCM. Researchers in underdeveloped nations have paid little attention to SSCM, despite the fact that it is a prominent study area right now. Consequently, further information about the plight of developing nations is lacking and a study vacuum must be filled. The supply chain, which didn't seem to be competitive in the 1970s, is now an essential part of getting forward (Zimon2019)... To economically and effectively address the demands of future generations, it is vital to combine supply chain activities with sustainability characteristics (Pagell and Wu, 2011). But methods that make it possible to integrate sustainability into supply chain operations still have a ways to go. The need for experts to ascertain the benefits of sustainable practises throughout their firms for better application of regular methods, as well as the thought that SC top management should be more effective, have lately attracted the attention of investigators. Sustainability and green initiatives, according to the investigators, hold the key to the conventional supply chain's future. A close relationship exists between sustainability's social and environmental dimensions, say Sudusinghe and Seuring (2020). Urbanisation and industrialization have negative impacts on the environment, although legislative agencies are working to ameliorate things (Bai et al. 2015). Industry is under pressure to adopt eco-friendly practices to seem responsible and gain an edge over competitors as end users become more aware of the need of a clean environment. An increasingly important part of the supply chain that concerns both businesses and all life on Earth is ensuring that operations continue to be environmentally friendly. The concept of

sustainability has recently attracted the attention of researchers. Substituting the concept of sustainability with the traditional supply chain and its components is shown in figure 2.

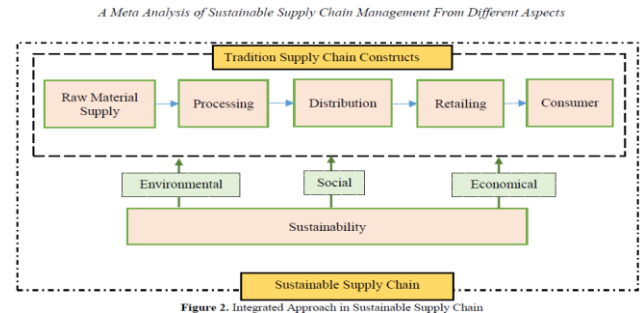


Figure 2. Integrated Approach in Sustainable Supply Chain

## Review of Literature

Worldwide, the environment is greatly affected by small and medium-sized organisations (SMEs), which constitute more than 95% of all businesses. Small and medium-sized enterprises (SMEs) have begun to discover more effective methods to enhance their environmental performance after being acknowledged for the vital roles they play in implementing sustainable practices to reduce pollution. A growing body of research suggests that small and medium-sized businesses (SMEs) are better equipped to be environmentally conscious than bigger companies, despite earlier claims to the contrary. This is due to their lower individual environmental impact and potential lack of expertise in environmental issues. Small and medium-sized enterprises (SMEs) are able to make choices more rapidly than huge organisations, which supports this argument.

For instance, small and medium-sized enterprises (SMEs) are more likely to be nimble and responsive to changing market circumstances, allowing them to swiftly implement operational initiatives. Particularly notorious for its enormous influence on the environment, the restaurant business is considered a small and medium-sized enterprise (SME) sector. In the end, cafeterias' eco-friendly policies and procedures were crucial in meeting the demands of contemporary customers and promoting environmental excellence. As a consequence, many

small and medium-sized eateries (SMEs) take several measures to enhance their environmental performance, such as reducing food waste, conserving energy, decreasing reserve usage, and keeping ecologically friendly appliances. Academic research suggests that small and medium-sized enterprises (SMEs) may enhance their environmental practices by forming and maintaining well-structured alliances and networks amongst their business partners.

Academics often use the term "green supply chain management" (GSCM) to describe corporate and organisational choices that aim to reduce their environmental impact via the products and services they buy. At GSCM, we prioritise eco-friendly management practices that permeate every step of our business, from raw material procurement to final product use. GSCM is another name for "environmental purchasing," which is the practice of buying raw materials and finished goods that are less detrimental to the environment and that use fewer materials derived from more renewable and naturally existing resources.

Most people agree that GSCM is the best way for businesses to eliminate or significantly reduce pollution from resources and the air they breathe (energy, materials, and products). To back this up, previous studies have shown that GSCM adoption is critical for reducing the environmental impact of commercial and industrial operations, which in turn improves businesses in terms of ethics, society, and competitive advantage. As a result, GSCM practices are now essential for businesses to meet or beyond customer expectations and improve their overall performance.

Multiple studies have shown that when all parties involved in the supply chain work towards the same goals, it greatly enhances company performance. That is why all links in the supply chain must work together seamlessly to achieve GSCM. In order to monitor environmental presentations and share

important data with corporate partners for better conservation practices, robust systems and platforms are required.

**Objective of the study**

- To identify the most important considerations for the SME sector in Nagpur while implementing GSCM.
- Acknowledge the challenges faced by GSCM performance assessment evaluation in SMEs in Nagpur.

**Research Methodology**

Literature research and interviews with industry experts informed the development of a comprehensive questionnaire that was then disseminated to various industries in southern India. The most common obstacles identified by various groups were documented after a thorough review of the returned surveys.

**Data analysis and interpretation**

How much your company agrees with the following statements on the following obstacles to implementing green supply chain practices:

	N		Mean	Std. Deviation	Skewness	Kurtosis
	Valid	Missing				
Lack of Management Commitment	93	0	2.75	.905	-.026	-.965
Lack of industrial associations' support for implementation	93	0	3.17	1.109	-.252	-.917
Entrepreneurs' resistance to change is a challenge to GSCM implementation	93	0	2.84	.825	-.403	-.241
Green practices implementation is not a top priority for top management	93	0	3.01	.950	.056	-.723
Lack of partners support is the barrier to	93	0	2.84	.888	.420	-.030

implement GSCM						
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In order to gauge the lack of motivation among business owners, partners, and entrepreneurs to adopt environmentally friendly supply chain methods, a researcher has devised a 5-question survey. The Likert scale was 5-point, with responses ranging from "strongly disagree" to "strongly agree" for each survey item. To find out whether the questions consistently measure the same thing, 93 organisations served as the sample size for Cronbach's alpha. A score of 0.873 for Cronbach's Alpha is considered suitable. Skewness is a metric for symmetry or, more precisely, the lack thereof. Symmetry is the property that data or a distribution exhibits when both sides of the central point seem identical. Low values for the skewness indicate left-skewed statistics. When researchers say that a distribution is "skewed left," they imply that one tail is longer than the other. The figures in the table above, which range from -0.026 to 0.420, are almost zero and negatively skewed. When looking for data outliers, kurtosis is a useful tool. It provides us with the overall level of outliers. A negative kurtosis may take on values between -0.030 and -0.965. A smaller kurtosis value indicates a flatter peak.

**Hypothesis Testing**

One-Sample Test				
Lack of will on behalf of proprietors/partners/entrepreneur	Test Value = 0			
		df	Sig. (2-tailed)	Mean Difference
Disinterest on the Part of Management	29.340	92	.000	2.753
The implementation is not supported by industry organisations.	27.572	92	.000	3.172
One obstacle to the adoption of GSCM is the reluctance of entrepreneurs to adapt.	33.192	92	.000	2.839

Upper management does not prioritise the deployment of green techniques.	30.570	92	.000	3.011
Could you kindly specify the level To adopt GSCM, one must overcome the obstacle of unsupportive partners.	30.821	92	.000	2.839

The green supply chain management t-values for the eighth driver are shown in the table above. When determining if an owner, partner, or entrepreneur lacked the necessary will, five issues were evaluated. The results show that, with a 95% confidence level, the critical value is higher than the table value.

**Conclusion**

Sustainable practises are becoming more apparent to small and medium-sized enterprises (SMEs) in Nagpur, according to the present research. There is a long way to go before GSCM methods in India reach their full potential. Some interesting and encouraging results have motivated the researcher to write this piece, which could be useful for manufacturing companies looking to use GSCM strategies. By including their suppliers in their company strategy and embracing collaborative methods to process and product development, SMEs may achieve better financial and environmental outcomes, giving them a major competitive advantage. But not outside of Nagpur's small and medium-sized enterprise (SME) sector. But most Nagpur SMEs still don't grasp the significance of eco-friendly policies and procedures.

Although respondents do not really like rules as a variable, they are still one of the elements that impact GSCM operations. While initially vital, it ultimately allows legal guardians to exploit these SMEs to their maximum extent or promotes unethical activity. Accordingly, most manufacturers

on small and medium-sized enterprises may get away with breaking stringent environmental laws. This is a major contributor to India's high levels of carbon emissions. Workshops and seminars should be organised to talk about how these SMEs may enhance their performance in the long run by using GSCM practices.

**References:**

- [1] Husam Ahmed Al Hamad "Use an Efficient Neural Network to Improve the Arabic Handwriting Recognition" International Conference on Systems, Control, Signal Processing and Informatics, Page no 269-274, 2013
- [2] Jayanta Kumar Basu, Debnath Bhattacharyya and Taihoon Kim "Use of Artificial Neural Network in Pattern Recognition" International Journal of Software Engineering and Its Applications Vol. 4, No. 2, April 2010
- [3] FajiriKurniawan, Mohd. ShafryMohd. Rahim, NimatusSholihiah, AkmalRakhmadi and DzulkifliMohamad "Characters Segmentation of Cursive Handwritten Words based on Contour Analysis and Neural Network Validation" ITB J. ICT, Vol. 5, No. 1, 2011
- [4] Le Dung and Mizukawa M. "A Pattern Recognition Neural Network Using Many Sets of Weights and Biases", Computational Intelligence in Robotics and Automation, Page no 285-290,2007.
- [5] Dilruiba, R.A., Chowdhury, N.Liza, F.F. and Kiarmakar "Data Pattern Recognition using Neural Network with BackPropagation Training ", Electrical and Computer Engineering, ICECE, Page no 451-455, 2006
- [6] Zaheer Ahmad, Jehanzeb Khan Oraikzai and InamShamsher, "Urdu compound Character Recognition using feed forward neural networks,", International Conference on Computer Science and Information Technology, IEEE, pp.457-462, 2009.
- [7] Kauleshwar Prasad, Devvrat C. Nigam, AshmikaLakhotiya and DheerenUmre "Character Recognition using Matlab's Network Toolbox" International journal service, Science and Technology Vol. 6, No. 1, page 13 February 2013
- [8] Binu P, Chacko, Vimal Krishnan and G. Raju "Handwritten character recognition using wavelet energy and extreme learning machine" springer, International Journal of Machine Learning and Cybernetics, Volume 3, Issue 2, Page no. 149-161, June 2012
- [9] Dawei Qi, Peng Zhang, Xuejing Jin and Xuefei Zhang "Study on Wood Image Edge Detection Based on Hopfield Neural Network", Proceedings of the International Conference on Information and Automation, IEEE, Page no 1942-1946, 2010
- [10] Mingai Li, Jun-feiQiao and Xiao-gang Ruan "A Modified Difference Hopfield Neural Network and its application" IEEE, Vol 1, Page 199-203, 2005
- [11] **Dharamveer, Samsher.** Comparative analyses energy matrices and enviro-economics for active and passive solar still. materialstoday:proceedings. 2020.<https://doi.org/10.1016/j.matpr.2020.10.001>.
- [12] **Dharamveer, SamsherKumar A.** Analytical study of N<sup>th</sup> identical photovoltaic thermal (PVT) compound parabolic concentrator (CPC) active double slope solar distiller with helical coiled heat exchanger using CuO Nanoparticles. Desalination and water treatment.2021;233:30-51.<https://doi.org/10.5004/dwt.2021.27526>
- [13] **Dharamveer,Samsher, Kumar A.** Performance analysis of N-identical PVT-CPC collectors an active single slope solar distiller with a helically coiled heat exchanger using CuO nanoparticles. Water supply. 2021.<https://doi.org/10.2166/ws.2021.348>
- [14] **Dharamveer Singh,** Ashok Kumar Yadav, Anil Kumar, Samsher, "Energy matrices and life cycle conversion analysis of N-identical hybrid double slope solar distiller unit using Al<sub>2</sub>O<sub>3</sub> nanoparticle". *Journal of Water and Environmental Nanotechnology*, <http://doi:10.22090/jwent.2023.03.006>

[15] **Dharamveer Singh**, Satyaveer Singh, Ashok Kumar Yadav, Osama Khan, Ashish Dewangan, Saiful Islam, Meshel Q. Alkahtani, Saiful Islam “From Theory to Practice: A Sustainable Solution to Water Scarcity by Using Hybrid Solar Distiller with Heat Exchanger and Aluminum Oxide Nanoparticles” Journal ACS Omega, <https://doi.org/10.1021/acsomega.3c03283>

[16] **Dharamveer Singh**, [Satyaveer Singh](#), [Aakersh Chauhan](#), [Anil Kumar](#) “Enviroeconomic analysis of hybrid active solar desalination system using nanoparticles” Journal of Environmental engineering and Science, Vol. 18 (3) 1-10, July 2023, **ESCI Index**, Emerald Publishing Ltd. <https://doi.org/10.1680/jenes.23.00045>