



Analysis of barriers of sustainable supply chain management in electronics Industry: An interpretive structural modelling approach

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ABSTRACT

Once upon a time, industries cared solely about the bottom line. To lessen chains, several companies are embracing sustainability practises. Their supply chain is a good example of this. Making a greener supply chain shift is not without its difficulties. Threats need to be removed or mitigated. If you want to deal with these issues efficiently, you need to educate yourself on them and look into them thoroughly. barriers that occur in only one context examine the most significant threats to sustainability. This is how the electronic manufacturing business operates in India. The literature was reviewed, and eleven experts were consulted. Policy, human resources, and technology are listed as the three main categories of obstacles. The structure of the company Researchers use interpretative structural modelling (ISM) to

investigate the make-up and interconnections of these challenges. methodology. One of the most significant findings of this research is how little people seem to respect sustainability practises. The importance of environmental laws and their enforcement, as well as the repercussions of a lack of commitment from senior management, cannot be overstated. Many obstacles must be overcome before a viable supply chain can be established. There are tremendous forces acting both on and against these barriers. and the level of their interdependence is established. MICMAC research revealed that there were five main causes.

The three obstacles serve as dependent variables, whereas the three linking variables represent potential solutions. Incompetence is the main problem. Metrics and assessment criteria for sustainability are very reliant and lack any driving

force. pointing to the importance of other variables. It is demonstrated that the bulk of barriers stem from institutional constraints. self-sufficient; capable of exerting their own power and authority. The results stress the need of tailoring treatments to individual needs. The success of the electronics industry depends on the implementation of sound regulations by both governments and businesses. Sustainability in supply chain operations. The modelling can shed light on how firms might get over obstacles. to ensure the long-term viability of their supply chains by making efficient use of all available resources. The and suggestions for further research.

Introduction

The term "supply chain management" has come to embrace more than only the production and distribution of goods that are inexpensive, marketable, and in demand among consumers, financiers, and politicians. Many other considerations come into play as well. Long-term success in business is increasingly being considered by government authorities, corporate partners, and stakeholders (including consumers). Businesses must strike a balance between satisfying customers' wants and protecting the environment while developing new products and services. Sustainable supply chains were created because unethical supplier practises posed a risk of legal action and financial loss to businesses and customers. There is growing consensus among researchers that environmentally responsible practises are becoming the standard in all industries. Businesses may be better able to fulfil their social and environmental duties if they implement a supply chain management strategy that prioritises sustainability and social responsibility. In response to internal and

external pressures, an increasing number of businesses are promising to integrate sustainable practises across their supply chains. In the literature on sustainable supply chain management, environmental problems have gotten more attention than quality of life issues including working conditions, community interactions, and working circumstances for women (Mani et al., 2016). (SSCM).

On the path to effective supply chain change management, businesses will face a number of challenges and obstacles. Changes in product quality, difficulties in operations, and interruptions in the supply chain are all results of sustainable supply chain efforts (Lee and Klassen, 2008).

There are a number of obstacles that need to be overcome before sustainable practises can become the norm. It is possible that the organization's efforts to reform will fail due to a lack of support from high management, resistance from employees, or some other factor.

Employees, a lack of access to cutting-edge equipment and resources, and prohibitive startup costs are just some of the reasons why some businesses struggle to innovate.

Different industries and businesses view these challenges in different ways. Therefore, difficulties have diverse results and consequences for various economic sectors (Diabat et al., 2013). One of the first steps in overcoming these roadblocks is realising how they are all interconnected. Some challenges may motivate and inspire others, and those individuals may in turn motivate and affect yet others.

Research into supply chain sustainability over the long term has taken place. According to research

conducted by Ravi and Shankar (2005), a lack of reverse logistics knowledge and senior management support are two of the biggest challenges facing the automobile sector. Zhu et al. (2012) used DEMATEL to examine the difficulties inherent in the garment industry while attempting to produce eco-friendly clothes.

Govindan and Bouzon (2018) identified 37 drivers of reverse logistics and 36 barriers to the implementation of their findings through the application of stakeholder theory. According to the findings of Majumdar and Sinha (2019), the most significant obstacle that must be overcome by the green textile and garment supply chain is the complexity of the design of green processes and systems. This is an obstacle that must be overcome in order for the supply chain to become successful. In order to develop a supply chain that is sustainable in a variety of different industries, it is necessary to take into account a number of different factors, as stated by Govindan et al. (2014). Existing research shows that there are still open problems about how to best implement sustainability in India's electronics sector. In the last decade, India has seen a dramatic increase in both the demand for and supply of electronic goods. One of India's most active sectors is the electronics industry. The electronics sector is booming, with increased output, consumption, and exports (Dimitrakakis et al., 2009). The impact of the industry on the natural world has to receive a lot more focus going forward.

Mangla et al. (2017) found that in the future, Asian manufacturers would face significant social and environmental concerns. This finding has prompted researchers to dig deeper into the electronics industry's supply chain in India.

A review of the relevant literature found that this created many issues for the electronics industry's supply chain. Based on the responses of three professionals in the field and one academic specialist, eleven challenges specific to India's electronics industry have been identified. The relationship matrix was constructed via the use of both expert opinion and a review of relevant literature. Using an interpretive structural modelling (ISM) strategy, we were able to identify the barriers' driving and driving abilities. To better understand the interdependencies between the constituents of various commercial enterprises, ISM may be implemented in a variety of settings. However, complications from many sources can be managed.

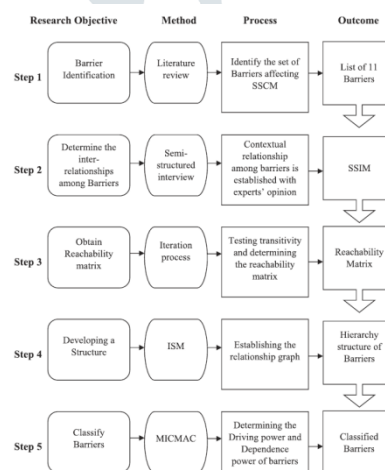


Fig. 1. Research flow.

In their paper from 2005, Jharkharia and Shankar presented the ISM model that they had developed. The investigational process that was carried out for the purpose of this particular study is depicted in fig.

This study aimed to identify the problems plaguing India's electronics industry and propose long-term solutions. The research's managerial implications are discussed, and an ISM model is employed to pinpoint the connections between impediments.

The study's findings will help businesses figure out how to prioritise sustainability despite these challenges. Prioritising challenges can help firms allocate scarce resources towards the areas most critical to achieving sustainability over the long run. The barriers have been classified as either independent, dependent, or linked in order to better comprehend their operational aspects.

Increasing consumption patterns, shorter product life cycles, and other disposal concerns in the electronics industry may be able to be addressed with the assistance of sustainability initiatives that businesses can use in their operations.

Disabling factors can be phased out depending on how much of an impediment they are. This research may help the Indian electronics industry smooth over any rough spots in the road to a more environmentally friendly supply chain.

OBJECTIVE

These are the aims of the present investigation:

Determine what is in the way of establishing a sustainable supply chain in India's electronic goods manufacturing sector.

Explore the dynamics between obstructions and identify the forces propelling them using a systematic approach.

The outline of this paper is provided below. The literature on SSCM and the difficulties it presents are as mentioned in the following section's reference. You can get more information about the investigation's methodology by reading Section 3, which can be found here. The findings that were obtained from the investigation are presented in the following section (section 4). Implications of the study are discussed in Section 5, followed by a

summary and suggestions for further investigation in Section 6.

Literature review

In this article, we examine SSCM's struggles in the Indian electronics industry.

In this piece, we'll talk about how the electronics industry in India may practise more sustainable supply chain management.

The growing awareness of the need to minimise negative impacts on the environment, society, and economy has led to a closer examination of supply chains (Carter and Rogers, 2008; Carter and Easton, 2011). This has resulted in an increase in the amount of attention paid to supply chain management. Because of this, there has been a rise in the number of businesses that have declared their intention to lessen the negative effects of their operations. Brundtland explains in her report from 1987 that what she means by the term "sustainable development" is that it is possible to meet the needs of the present without sacrificing the potential of future generations to do the same thing. This is what she means by "sustainable development." The Triple Bottom Line (TBL) is a strategy for conducting business that aims to achieve a healthy balance between profit, social responsibility, and environmental responsibility in addition to the traditional focus on just profit. According to Kleindorfer et al. (2005), consumers are placing a growing amount of pressure on the businesses that they support to source their goods and services in a manner that is socially and environmentally responsible. This is because consumers want to know that the companies they support are doing what's right for the world. In order to make a sustainable supply chain a reality, it is absolutely

necessary for all of the departments that are involved in the supply chain to work together. These departments include operations, procurement, engineering, and logistics. To an increasing degree, sustainability considerations are being incorporated into both business plans and initiatives being carried out by the government. In addition to possessing a number of other desirable qualities, a supply chain that is capable of long-term sustainability will exhibit no signs of damage, responsible management, and relatively few interruptions. According to Rauer and Kaufmann (2015) and Jayant and Azhar (2014), you should reduce the amount of resources, such as water and electricity, that you use, increase the amount of renewable energy that you put to use, and produce less hazardous waste. You can find more information on these topics here. Supply chain management (SSCM) is "a process in which organisations along the supply chain collaborate to achieve social, environmental, and economic goals, taking into consideration the demands of customers and other stakeholders," as defined by Seuring and Muller (2008). Incorporating environmentally responsible business practises into the supply chain, as stated by Namagembe et al. (2019), has the potential to result in a variety of benefits in addition to financial ones. As a direct result of these adjustments, the level of production at the company, in addition to the company's reputation, will increase over the course of time. The bottom line of the company will unquestionably get better as a direct result of this. As a consequence of this, both business executives and academics have begun to take an interest in the concept of sustainable supply chains (Sarkis et al., 2010).



Fig. 2. Barriers in implementation of a Sustainable supply chain.

According to Luthra et al. (2013), senior management has an influence on the process of formulating policies, developing innovative educational programmes, and putting innovative technological solutions into practise. It has been shown that there is a lack of executive sponsorship for the sustainability strategy of SSCM (Giunipero et al., 2012; Turker and Altuntas, 2014). These studies were conducted by Giunipero et al. and Turker and Altuntas. It is essential to have top-level management that is able to issue commands, provide incentives, and instruct employees in order for a supply chain to have any chance of being sustainable. If the executives of a company want the company to be successful, they need to make plans for the company's future and establish particular goals for the company. Only then will the company be able to achieve its potential.

According to Walker and Jones (2012), it is possible to establish a connection between problems with the implementation of SSCM and a lack of congruence between the organization's short-term and long-term objectives. Corporate executives have the ability to prevent their organisation from putting profit ahead of ethics and

social responsibility if they so choose to do so and make that choice public.

Results

We can see how the seven distinct levels of complexity that comprise the supply chain for the electronics industry interact with one another by looking at Figure 4. To restate, less significant obstacles affect more significant barriers. The lack of awareness of the benefits that can be gained from sustainable practises is the fifth obstacle, and it is especially problematic at the seventh and most fundamental level of the ISM model. This is because of the lack of awareness of the benefits that can be gained from sustainable practises. Businesses, organisations, and governments may discover that the most effective method for informing the general public about the benefits of taking this approach is to disseminate the findings of the results of their efforts to advance sustainability. This could be the case if the dissemination of these findings is the most effective method. According to the findings of research that was conducted on South Indian automobile companies by Mathishagan et al. (2013), the lack of environmental understanding on the part of suppliers is the most significant barrier to the implementation of green supply chain management (GSCM). The lack of education regarding recycling and the absence of regulation are the root causes of concerns regarding e-waste, according to Kumar and Dixit (2018). Both of these factors contribute to the problem. Education of the general population regarding sustainable practises should be a top priority. The sixth-level issue is the failure to regulate and enforce environmental standards. (Barrier7). When people don't understand environmental problems, they are less likely to

push for strong legislation. Unless people are made aware of the benefits, strict enforcement and regulation will not have widespread support. Citizens should make their voices heard to their government, and in response, both governments and businesses should impose stringent regulations and enforce them rigorously. Despite their outsized impact, the electronics sector is notoriously resistant to policy and regulation (Ravi & Shankar, 2014). There has to be improvements made to both the recycling infrastructure and the regulations governing the correct disposal of electronic garbage for the environment to benefit. Mitra and Datta (2014) note that the lack of a regulatory framework and of awareness of environmental sustainability in the Indian manufacturing industry makes GSCM implementation problematic, and they call for the expansion of programmes like EPR (extended producer responsibility). The lack of "Government support and policies" was named as the biggest obstacle to India's efforts towards sustainable consumption and production.

Because of these problems, top-level management is completely uninterested at the level 5 level. When upper management (Barrier 1) loses faith in the system because they feel there is not enough monitoring and punishment, the system fails.

According to Majumdar and Sinha (2019), when there aren't any hard and fast guidelines in place, upper management is unwilling to commit to a sustainable supply chain strategy. According to research by Muduli et al. (2013), in Indian mining enterprises, top-level management support for green supply chain management practises is the most crucial behavioural component. In the derived ISM Fig, this is seen at the level 4 representation.

Level 4's insufficient dedication to CSR and sustainability is a result of Barrier 2's financial constraints and Barrier 3's established norms and beliefs. (Barrier1). The corporate hierarchy determines the budget for sustainability programmes. The attitudes of the company's top executives have a major bearing on the company's culture and its level of CSR.

That's why it's problematic that CSR/Sustainability projects (B1, B3) aren't getting the backing they need from the company's highest echelons.

Spending on garbage collection and recycling centres is essential.

Keeping up is difficult in today's world of constant change and cheap, easily replaceable technologies.

Therefore, it is difficult to divide up resources among competing priorities. New technology and optimisation strategies need to be developed to reduce costs. Better goods and services might result from the collaboration of business and academia. It's crucial to make sustainability a part of the company's ethos. To ensure long-term success, businesses need to foster an inclusive and forward-thinking culture (Muduli et al., 2013). Green buying (Barrier 6), sustainability-related R&D (Barrier 8), and training/human competence (Barrier 9) are all hampered by financial restraints (2) and an aversion to sustainability/CSR (3) within the organisation. (Barrier3).

Barrier 6 is the absence of green buying, while Barrier 3 is the lack of research and development on sustainability; both are among the eight fundamental impediments to sustainability. More sustainable technologies, materials, and processes are developed thanks to investments in R&D as well as eco-conscious consumer practises.

Inadequate study and development in the field, as well as a lack of training and knowledge, constitute Barrier8, lowering resistance to sustainability (Barrier10). Barrier9 is the level that corresponds to Barrier10's Level

Ghazilla et al. (2015) state that a lack of research and development is a significant barrier to SMEs adopting green industrial practises. The slow pace at which new technologies, materials, and processes are applied is highlighted in Fig. 4 as the source of the absence technical difficulties are only encountered on the fifth, sixth, and seventh difficulties, it is reasonable to believe that other difficulties have a bigger influence on technological difficulties in general.

Conclusion

As a result, businesses throughout the world are focusing more on creating sustainable supply chains. Businesses that put their customers' needs and those of the planet first will thrive.

Even if they face pressure from the outside, businesses are making progress towards sustainability. A dependable supply chain is also of great use to them. The market for electronics is booming over the world, but especially in Asia. India. In less developed countries, more and more people are using technology devices. a buildup of antiquated machinery and depletion of natural resources generation, due to the distinct energy needs of the commercial sector. This design standard applies to the electrical sector in India and must be followed. When it comes to minimising an organization's ecological footprint, the supply chain often proves to be a crucial factor. There will be many obstacles to overcome during implementation in these sectors. sustainability. First, the article

identifies the problem at hand. stumbling blocks on the path to a more sustainable electronics supply chain companies operating in the Indian market. A diagram was then used to display the connections. The ISM method was used to build one of these barriers. There is a reciprocal relationship between barriers and the forces that push and pull against them. Moreover, there is no room for interpretation. MICMAC analysis might be used to go even further into the findings. We established three distinct barriers: standalone, interconnected, and reliant. A literature review and the input of four experts have helped remove eleven barriers. were found and documented during SSCM operation. as a result of benefits that set them apart from others Barriers in the form of policy, regulation, and enforcement were found. Methods for increasing efficiency in use, both human and technological phase. An ISM poll found that most people do not know this. Because of its far-reaching effects, sustainability's advantages pose a formidable challenge. to be really low on the totem pole of ISM. The following is a list of some of the factors that might second and third position belong to the failure to enforce environmental laws. and the fact that they had no support from the company's higher ups. Therefore, this is the most important factor. Significant challenges exist in establishing an SSCM. include a lack of regulations requiring sustainable practises and a lack of education about those practises. Lackadaisical administration regarding environmental safety management. These challenges make it considerably more challenging to work around budgetary and organisational constraints.

Cultural norms are a barrier to CSR and environmental responsibility. lack of interest in eco-friendly products among customers poor

funding for sustainability studies and a shortage of experts in the field. Connectivity barriers are evidence that autonomous systems are essential to achieving sustainability.

REFERENCES

Authors: A. Abuzeinab; M. A. Arif; and M. A. Qadri, 2017. An ISM study found that the construction industry in the UK has significant barriers to MNE green business models. *The Journal of Cleaner Production* 160: 27–37 (2005).

This study was conducted by Acciaro, Vanelslander, Sys, Ferrari, Rouboutsos and Giuliano, among others. A framework for innovation in environmental sustainability at seaports. *Political Science and International Affairs*, 41 (5): 480–500.

Ahmed, W., and Najmi, A. A developing country's view of the impact of GSCM on green and economic performance is presented in a framework for development and analysis. *International Journal of Environmental Quality* 29 (4), 740–758. <https://doi.org/10.11 \s08/MEQ-11-2017-0140>.

Diabat, A. and Al Zaabi, S. (2013). Al Dhaheri N. and Diabat A. (2013). Barriers to implementing sustainable supply chain management are examined in this study. *Journal of Advanced Manufacturing Technology*, 68, 895–905, 2001.

T. alKhidir and S. zailani (2009) presented their findings at the annual meeting of the American Society for Microbiology. Increasing environmental sustainability by going green in the supply chain. *Environmental Research* 3 (3), 246–251.

2018 S. AlSanad. All rights reserved. In Kuwait, there are many obstacles to implementing

sustainable cement manufacturing. *Journal of Sustainable Development*, 7, 317-317.

This paper was written by Bhanot, Rao, and Deshmukh in 2017. Analyzing the factors that promote and obstruct sustainable manufacturing through a holistic lens. *Clean Production* 142, 4412–4439. J. Clean.

Published in: Bohdanowicz (P), Zientara (P), and Novotna (E), 2011 An examination of Hilton's We Care! environmental protection programme in Europe from 2006–2008. *Sustainable Tourism*, 19 (7), pp. 797–816, in press.

In this paper, the authors present the findings of a study by Bouzon, Govindan, and Rodriguez, all of which were published in the year 2015. Minimizing mineral extraction through ISM-based reverse logistics in Brazil's machinery manufacturing sector. *Resour. Politician* 46, 27–36.

H.T.S. Caldera, C. Desha, and L. Dawes, 2019. Finding and addressing the factors that make it easier for small, lean businesses to implement sustainable business practises. 575–590, *Journal of Cleaner Production*.

the author's full name is Christopher R. Carter and the year is 2011. The evolution of sustainable supply chain management and its prospects for the future. *Physical Distribution and Logistic Management*, 41(1): 46–62.

As of 2008, Carter, CR, and Rorke, DS, Moving toward a new theory of sustainable supply chain management *Phys. Destrrib. Logist. Manag.* 38 (5), 360–387

Bozkurt Celaynkaya, Robert Cuthbertson Ewer Klaas-Wissing Piotrowicz and Christopher Tyssen 2011. Practical Ideas for Moving Towards Best

Practice in Sustainable Supply Chain Management. Science and Business Media Springer.

There is a lot to learn from the work of Chancerel (P), Meskers (CE), Hagelüken (C), and Rotter (VS) in 2009. Preparation of waste electrical and electronic equipment for precious metal extraction. 791–810 in *Journal of Industrial Ecology*.

Raynor, M.E. ; Christensen, C.M. ; and McDonald R., 2015. What is a disruptive innovation?

The Harvard Business Review, 5 (5). Accessed at <https://www.hbr.org/2017/12/17/what-is-disruptive-innovation.html>, 2017.

Pereira, S.C.F; Pereira Jabbour de Sousa Jabbour; Renwick DWS; Thome AMP; Thome AMP; Delmonico D; 2018. Evidence from a leading Latin American sustainable supply chain initiative for removing roadblocks to sustainable public procurement in emerging economies. *Conservation and Recycling* 134: 70–79.