

Chapter 21

Sustainable Supply Chain Management in the Era of Digitalization: Issues and Challenges

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ABSTRACT

In the last two decades the term sustainable supply chain management (SSCM) has become quite popular. Organizations are working on sustainability of their supply chain (SC). Sustainability covers environmental, social, and economic aspects of different supply chain management activities. Organizations are continuously working in the direction of making their processes and product green. On the environmental front, use of renewable source of energy, reducing waste of energy, reducing carbon footprints is important. Simultaneously, reuse of products, re-cycling, and following environmental standards while disposing off is also recommended. In this chapter, the author has identified 13 issues and challenges of SSCM from literature review and expert opinion. Simultaneously, the author has also identified nine new technologies of modern time used in industries. Further, the author has tried to analyze the linkage between the challenges of sustainability and intelligent technologies by Jaccard's similarity coefficient methodology.

INTRODUCTION

In last two decades the term sustainable supply chain management (SSCM) has become quite popular. Organizations are working on sustainability of their supply chain (SC). Sustainability covers environmental, social and economic aspect of different supply chain management activities. Organizations are continuously working in the direction of making their processes and product green. On environmental front, use of renewable source of energy, reducing waste of energy, reducing carbon footprints is important. Simultaneously reuse of products, re-cycling and following environmental standards while disposing

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off is also recommended. On similar front while implementing sustainable practices in business, social aspect of processes and policies keeping in mind the SC members i.e. suppliers, vendors and customers should also be framed and implemented.

In current scenario, digitalization of organizations has raised the global competition to new heights of quality and service standards. Digitalization of organizations has influenced the management of supply chain management too. So organizations can take advantage of intelligent technologies while dealing with issues and challenges of SSCM.

In this chapter author has identified thirteen issues and challenges of SSCM from literature review and expert opinion. Simultaneously author has also identified nine new technologies of modern time used in Industries such as: Internet of things (IOT), Additive manufacturing, System integration, Big data, Augmented reality, Simulation, Cyber security, Cloud computing and Autonomous robots (elements of Industry 4.0). Further author have tried to analysis the linkage between the challenges of sustainability and intelligent technologies by Jaccard's similarity coefficient methodology. By this analysis author tried to observe possibility of reducing/managing these challenges with the help of new technologies. The sustainability issues and modern technologies are identified keeping in mind the Indian scenario and recent trends.

From analysis author observed that intelligent manufacturing techniques such as simulation, augmented reality and big data have similarity of 88% with challenges of sustainability. This mean that these techniques can help in managing sustainability challenges. Similarly intelligent techniques such as IOT, additive manufacturing and autonomous robots working with techniques like simulation, augmented reality and big data have similarity of 86% with challenges of sustainability. This implies that these intelligent manufacturing techniques help in managing challenges of sustainability in developing countries at both micro and macro-level when applied together in coordination.

SUSTAINABILITY AND SUSTAINABLE MANUFACTURING

U.S. Department of Commerce (2010) defined sustainable manufacturing (SM) as “creation of manufactured products that use processes that are nonpolluting, conserve energy and natural resources, and are economically sound and safe for employees, communities and consumers”. The basic concepts of lean, green and sustainable manufacturing are explained graphically in Figure 1. India as a growing economy is using its natural resources like land, hydrocarbons, water and minerals at a very faster rate. Demand of basic amenities of industrial development like energy and raw materials are very high. Excessive and unsystematic use of hydrocarbons and other natural resources leads to pollution of land, air and water and overall growth seems unsustainable (Mittal et al., 2013). Sustainable manufacturing means ability to sustain, producing less-waste or carbonless manufacturing (Bhanot et al., 2015). Practices of reprocess, recreate and recycling make both products and processes sustainable in long run. Intelligent and interconnecting production processes can help in reducing pollution and waste of natural resources (Kulatunga et al., 2013). Three aspects of sustainability are shown in Figure 2.

In today's globalised trend, the collaboration of academia and industry professionals is imperative when it comes to identifying the solutions for the sustainability issues (Bhanot et al., 2015).

On the way to sustainability there are number of challenges. Current manufacturing trends have become extremely competitive in the global market. Sustainability has three basic fronts in manufacturing i.e. economic, environmental and social (Mutingi et al., 2017). To be globally competitive, organizations

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