CHAPTER – 1

INTRODUCTION
Introduction

The environmental management has now become a vital issue across the world. Tremendous growth in the production, consumption and transportation has caused the environmental issues such as global warming, climate change and air and water pollution. Besides, manufacturing supply chain is one of the major sources of environmental pollution by release of unnecessary waste and emissions throughout the operations. As a result, environmental issues have become a threat for manufacturing organizations.

Increasingly, pressures from government, customers, competitors, supply chain partners, and other stakeholders have been significantly pushing organizations either directly or indirectly to implement environmentally conscious supply chain. Subsequently, organizations are facing increment in the cost of energy and raw material and scarcity of resources. Consequently, these pressures have induced organizations to reduce use of energy, raw material, reduce wastage to reduce overall cost, operational efficiency and remain competitive in the marketplace.

Green initiatives in supply chain operations of manufacturing organizations have emerged as indispensable approach which not only reduces the environmental issues but also yields economic benefits to manufacturers. It identifies the excessive environmental impact of manufacturing supply chain and eliminates or minimizes emission and waste in the energy and material.

Automobile sector is one of the major contributor in critical environmental issues. Meanwhile, Indian Automobile Sector is also tackling a range of environmental issues in their supply chain. Thus, greening the supply chain has become essential for Indian automobile manufacturers to take global competitive edge.
1.1 Supply Chain Management (SCM)

In the decade of 1990s, globalization and increased competition has realized organizations, the importance of integrated procurement, manufacturing and logistics functions in the form of SCM concept. The SCM has traditionally being viewed as the network amongst raw material suppliers, manufacturers, distributors and end customers. This aimed to satisfy the end customer needs in cost effective and efficient manner with smooth flow of information, product/material and fund amongst supply chain members.

A number of definitions are offered by authors in the literature on the SCM concept. Few of them are discussed below.

According to the Council of Logistics Management, SCM is defined as the process of planning, implementing controlling efficient and cost effective flow of material, and related information from point of order to point of consumption for fulfilling customers requirements as efficiently as possible. Karchu (2009) defined SCM as conscious effort to maximize customer value and sustainable competitive advantage. Stevens (1989) stated that SCM is the integration of business functions involving the flow of materials and information from inbound to outbound ends of the business.

According to Hervani et al. (2005) SCM is a vital business function which includes sourcing, manufacturing/assembly, storage, order entry and tracking, distribution throughout the various channels of distribution and delivers to the end customer. It is a set of approaches utilized to efficiently integrated suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level (Simchi-Levi et al. 2003).
Sarkis (1999) presented a broader view of SCM. According to him, SCM has evolved from purchasing, marketing (distribution channels), logistics, and operations management. SCM issues include management of various activities like inventory, customer-supplier relationship, product development, delivery time and purchasing. APICS combined; design, planning execution, control and monitoring, as a SCM functions to create net value, build competitive infrastructure and measure performance at the global level. Currently, effective SCM has become a potentially valuable way of securing competitive advantage and improving organizational performance since competition is no longer between organizations, but among supply chains (Li et al., 2006).

SCM involves extraction and exploitation of the natural resources (Srivastava, 2007). Consequently, it causes environmental degradation. Zhu et al. (2006) indicated that organizations have realized the environment management as a key strategic issue with the potential for a lasting impact on organizational performance. Besides, conflict between natural environment and manufacturing supply chain has become more complex and need of efficacy of environmental friendly initiatives has raised across full SCM activities; from extraction of resources to disposal of end life of product.

1.2 Green Supply Chain Management (GSCM)

GSCM has emerged as add-on to traditional SCM concept. It is the process of incorporating environmental consciousness in the SCM activities. Jung (2011) defined GSCM as fast moving, multidisciplinary field and an effort of organization to integrate environmental requirements with SCM systems.

Green et al. (1996) defined green supply as referred to the way in which innovations in SCM and industrial purchasing may be considered in the context of the environment. Godfrey (1998) addressed GSCM as the practice of monitoring and improving environmental performance in the supply chain.
According to Gilbert (2001) greening the supply chain is the process of incorporating environmental criteria or concerns into organizational purchasing decisions and long-term relationships with suppliers. In addition, it is the integration of environmental consciousness in the management of all supply chain activities; material sourcing, product design, manufacturing, and distribution all the way to delivery of the final products (Hazen et al., 2011). Hervani et al. (2005) stated that adding the "green" component to SCM involves addressing the influence and relationships of SCM to the natural environment.

Srivatava (2007) defined GSCM as integration of environmental thinking into the SCM which includes product design, material selection and sourcing, manufacturing, delivery of product and end-of-life management of the product after use. Similarly, it covers all phases of a product’s life cycle, from the extraction of raw materials through the design, production, and distribution phases, to the use of the product by consumers and its disposal at the end of the product’s life cycle (Walker et al., 2008).

GSCM can be also defined as socially responsible SCM. According to Rettab & BenBrik (2008) the green supply chain as a managerial approach which minimizes a product or service’s environmental and social impacts or footprint. Thus, GSCM is an integrated effort by all supply chain members of the organization, to put “green” as a strategic part of operations and mitigate environmental harm at all the levels of product life cycle.

Hervani et al. (2005) has given supply chain of an individual organization’s supply chain practices (Refer Figure 1.1). This model indicates major operational activities within the organization and a number of environmental conscious practices throughout the supply chain ranging from designing to the end-of-life of product; green design, green procurement, total quality environment management, environmental packaging, transportation to the various product end-of-life practices defined by the "4Re's" of reduction, reuse, remanufacturing and recycling.
1.2.1 GSCM Practices

Green et al. (1996) stated that finding and implementing innovative techniques and process for GSCM should be considered as an opportunity for business. Innovative techniques in SCM to reduce environmental impact and maximize economic benefits are known as GSCM practices. GSCM practices include all environmental supply chain practices which aimed to reduce waste and emissions, recollection, recycling, remanufacturing or reuse of used products.

Zhu et al. (2006) provided a range of GSCM practices includes, green purchasing to integrated supply chain from suppliers to manufacturers, to customer and reverse logistics. According to Hervani et al. (2005) GSCM includes various practices; green purchasing, green manufacturing/materials management, green distribution, marketing, and reverse logistics.
An organization may undertake a set of endeavours to minimize the negative environmental effects associated with the entire life cycle of its products or services, starting from design to acquisition of raw materials to consumption and product disposal (Zsidisin & Siferd, 2001; Hsu et al., 2013).

As per the literature available on GSCM practices, the following are included in GSCM Practices:

a. Green Design,
b. Green Procurement,
c. Green Manufacturing,
d. Green Packaging,
e. Green Warehousing & Building,
f. Green Distribution & Transportation, and
g. Green Reverse Logistics.

a. **Green Design**: Design stage of supply chain can be defined as the function of the product, process, or service and selects the raw materials, supplies, and process chemicals to be used. These choices in turn determine the energy consumed to create products and the waste generated. In addition, the durability, serviceability, and energy consumption of products during their lifetime can be determined (WBCSD, 2006). Thus, design of product affect environment from the source to final disposal.

Fiksel (1996) considered green design as addition of ecological terms with new product development stage which includes “cost”, “performance”, “quality” and “environmental” characteristics of product.

Green design is also called as “eco-design” or “design for environment”. It refers to identify and minimize the environmental aspect of product over its entire life cycle. It is considered as very important stage of supply chain, because most environmental impact arises from the production, consumption, and disposal of the product are direct consequences of decision made in the design stage (Handfield et al., 2001).
Accordingly, green design practices reduce environmental risk of product and provide economic benefits to manufacturers and users as well.

b. **Green Procurement:** Green procurement is aimed to assure the environmental soundness of purchasing items, processes and suppliers. It helps manufacturers to reduce waste at the source and maintain quality of raw material. According to Min & Galle (1997) green procurement is environmentally-conscious purchasing activities that ensure meets environmental goals of purchasing organization.

Hsu et al. (2013) considered green procurement as external linkages with suppliers. It address issues such as environmental certifications, recyclable environmental purchasing, sourcing with minimum wastage and proper guidance to suppliers for environmental practices development in their internal operations. Ninlawan et al. (2010) stated environmentally conscious purchasing that includes the reduction, reuse and recycling of materials in the purchase stage of supply chain. In addition, it is a solution for environmentally concerned and economically conservative business, and a concept of acquiring a selection of products and services that minimizes environmental impact (Salam, 2008).

Consequently, green procurement provides economic and environmental both benefits to while dealing with upward supply chain members; suppliers.

c. **Green Manufacturing:** Green manufacturing aims to continuous integration of environmentally consciousness production processes and resources to reduce and prevent waste, emission into land, water or air. It helps to reduce environmental and human health risk throughout the conversion process of raw material to finish goods.

Ninlawan et al. (2010) defined green manufacturing as a production process which inputs are with relatively low environmental impacts, highly efficient and which generates little or no waste or pollution. In the view of Kung
et al. (2012) it is the environmental standard manufacturing processes. Sah et al. (2014) denoted green manufacturing as processes which aims to 3Rs; reduce, reuse, and recovery, the environmental burden by using appropriate materials and technologies.

Accordingly, it helps organizations to optimize production process, reduce or remove waste, emission and noise while using cleaner technology, save overall cost of production, disposal of waste and improved corporate image.

d. Green Packaging: Packaging plays a major role in environment pollution. By using environmentally friendly packaging materials and recycling techniques organization can reduce the waste and extra cost burden of it. Crumrine et al. (2004) stated green packaging is a use of green or recycled packaging materials, improved packaging design and techniques.

According to Ho et al. (2009) green packaging materials are used for making sustainable packing with least or no impact on environment. On the broader perspective, green packaging starts from designing of green packaging, optimize package structure, reduction in packaging material size and weight and at the same time reuse or recycling of used or waste packaging material. Packaging has its direct negative impact on the environment. Adoption of green packaging reduces environmental risk of organization and its related supply chain members.

e. Green Warehousing & Building: Basically, warehouse is designed for loading and unloading of goods and storage of material whereas, building includes manufacturing plant and other facilities of organization. Smith and Perks (2010) stated that businesses should use space-saving warehousing or storage facilities that cut costs and reduce the impact on the environment.

It requires considering the construction materials used, as well as considering heating and cooling facilities and using natural light. It aims to balance and manage economic and environmental inputs and outputs of the
warehousing function of supply chain. Besides, Environment Pollution Agency (EPA) has defined green building as environmentally responsible and resource efficient structure and process throughout the building’s life cycle.

Green warehousing & building identifies the environmental impact of energy, material and resources required in plant building facilities and warehousing. The aim is to minimize environmental impact and reduce energy consumption. Organization can achieve this by energy, energy efficient material handling, and day lightning system. Accordingly, it optimizes storage resources, reduces CO2 emission and improved economic performance.

f. Green Distribution and Transportation: Transportation greening is crucial because while sourcing of raw material and delivery of final product vehicle consumes fuel and other energy sources and it increase air pollution. Smith and Perks (2010) suggests that bio - fuels could be used for the transportation fleet to reduce carbon emissions; containers used for transport are at full capacity to reduce transport trips, or try to limit the number of transport trips. In an effort to become greener, alternative means of transport could also be used.

Zhu et al. (2008) indicated that use of less energy during product transportation is an important measure to minimize emissions during transportation when shipping or moving by road, rail or sea. Consequently, it improves the economic and environment performance, by releasing less pollution, meanwhile meeting product volume requirements and cost performance goals.

g. Green Reverse Logistics: It includes the recycling of products, packaging and material within the organization or with coordination of third party logistics. According to Brito & Dekker (2002), reverse logistics is about collection of goods and redistribution processed goods already supplied to the market either as return inwards or faulty products.
Stock (1998) explored new aspects of reverse logistics as product returns, source reduction, recycling, material substitution, reuse of material, waste disposal and refurbishing, repair and remanufacturing. It is the process whereby companies can become more environmentally efficient through recycling, reusing, and reducing the amount of materials used (Rogres & Tibben-Lembke, 2001).

Accordingly, effective use of green reverse logistics can help organization to reduce cost, improve social, economic and environmental aspects of performance. Organization can compete in high intense competition and low profit margin with green reverse logistics.

1.2.2 Efficacy of GSCM Practices

“GSCM practices could generate profits only if organizations have efficacy (ability) to implement and monitor it correctly.”

The word “Efficacy” Dictionary means quality of being able to bring about an effect. Efficacy can also be termed as capacity, ability, power or effectiveness. The study has considered efficacy as the ability to produce desired outcome. In addition, it's an ability of an organizations (or self) which is not inbuilt rather which earned through frequent performance evaluation and motivation. It means that efficacy is combination of some performance standards, strategic planning, essential motivators (intern and external both) regress implementations, and evaluations of the outcomes.

The study is contributing concept of efficacy of GSCM in the emerging field of greening the supply chain in manufacturing sector. For the study purpose, efficacy of GSCM is defined as: “the ability of an organization to plan, implement and monitor green initiatives in product supply chain; from designing to proper disposal, to reduce environmental risk which in turn enhance competitive advantage, improve economic and operational performance.”
The efficacy level of an organization has influence on its performance. Thus, efficacy measurement is essential for organization to control the performance and set performance standards within the organization and suppliers as well. Efficacy measurement can improve the environmental and economic performance through reduction in cost of resources, reduction in wastage, optimal use of resources, and improvement in productivity / delivery time / quality / customer response and enhance overall profitability.

1.2.3 GSCM Drivers

Organizations have to meet the stakeholders’ expectations to proactively perform environmentally concerned operations and do more what is required by government regulations. As Hoffman (2001) suggested that there are several drivers that encourage firm to adopt green supply chain initiatives, such as government, community, investors, customers, suppliers and employees.

There are some forces as to why organizations should engage in GSCM practices. According to available literature the essential drivers include:

a. Regulatory Driver,
b. Suppliers’ Drivers,
c. Competitors’ Drivers,
d. Internal Drivers, and
e. Social Responsibility Drivers.

a. Regulatory Drivers: A set of rules and regulations from government and environmental agencies to enhance environmental compliances is one of essential driver towards green initiatives.

Zhu et al. (2006) has highlighted, environmental regulations is considered to include domestic environmental regulations, government environmental policies and international environmental agreements. In addition, these are official mechanisms take the form of standards, laws, procedures and incentives
set by regulatory institutions to inspire firms to become environmentally responsible (Hsu et. al., 2013).

Regulations are essential stakeholders which exert political and economic pressures on the organization. In addition, environmental regulations imposed by domestic and foreign both countries significantly influence organization’s growth and profitability. Namely, cleaner production technology and processes, ISO certifications and Basel Treaty are few of them.

b. **Supplier:** According to Sarkar & Mohapatra (2006) suppliers’ poor performance can influence the overall supply chain performance. If supplier has invested in environmental technology, certifications, participate as a core supplier of organization it has great influence on the core organization green initiatives. In addition, manufacturer and supplier association is essential factor for acquiring competitive advantage for organizations.

c. **Competitors:** Zhu et al. (2007) pointed that large and successful firms in an industry generally face intense pressures from competitors. Organizations which are constantly in pressure from their competitors are now forced to adopt green technologies and process into their supply chain. The organizations mainly adopt green supply chain to achieve competitive advantage for them.

d. **Internal Drivers:** Internal drivers are described as organization’s factor which includes environmental mission, multinational policies, innovation, liability towards environmental harm and cost for disposal are few of them. These are the internal motivators of organization to resolve environmental issues in the supply chain.

e. **Social Responsibility Drivers:** Organizations have obligations towards society. Zhu et al. (2010) stated that social responsibility is important organizational drivers to reduce wastes and recycle wastes discharged by these organizations. Society health and safety, pollution prevention, and responsibility
to minimize negative effect on the environment could be pressure organizations to adopt green their supply chain.

According to Eltayeb et al. (2010) organizations adopt green initiatives not just due to external inducements but also from sense of responsibility towards the society in which they exists. The issue such as global warming and pollution may also raise awareness and interest of organizations to behave in a more socially responsible manner and reflect commitment towards social responsibility.

1.2.4 GSCM Performance

GSCM is a key to resolve the supply chain risk related with environment, economic and society. Effective implementation of Green Supply Chain practices can benefit an organization in various ways like; reduction in wastage, reduction in wastages disposal penalties, reduction in wastage treatment cost, improve brand image as a green organization, improve customer responses to buy green product, improvement in productivity, quality and delivery time, increase in market share and competitive advantage and many more.

On the basis of available literature performance indicators include:

a. Environmental Performance,

b. Economic Performance (Positive and Negative both),

c. Operational Performance, and

d. Competitive performance.

a. **Environmental Performance:** Environmental Performance improvement is essential area of GSCM performance measurement. According to Zhu et al. (2008a) environmental performance related to the ability of a manufacturing company to reduce air emissions, waste, decrease the consumption of hazardous materials. Hervani et al. (2005) stated that for the environmental performance improvement, inter – organizational sharing is required. GSCM should promote the sharing of environmental responsibilities and lend itself to reduce environmental burden caused by organization.
For environmental performance improvement core organization is required to spread environment protection responsibilities throughout the supply chain from suppliers to retailer to customers.

b. Economic Performance: Manufacturers always prioritize economic benefits out of all performance criteria. Similarly, while considering green initiatives manufacturers measure economic performance to examine the impact whether these initiatives are cost effective or not. This could be measured in two aspects positive as well negative outcomes of GSCM practices implementation.

Zhu et al. (2008a) has defined economic (positive) performance as the manufacturing plant’s ability to reduce costs associated with purchased materials, energy consumption, waste treatment, waste discharge, and fines for environmental accidents. Whereas, economic (negative) performance includes increase in the investment cost, operating cost, employee training cost, and purchasing cost of environmentally friendly material.

c. Operational Performance: Under the SCM performance measurement operational performance measurement is essential criteria for manufacturing organization. Similarly, GSCM also considered operational performance as an essential aspect of performance measurement while environmental considerations. Lin et al. (2011) considered the operations are the foundation of efficient distribution and manufacturing which in turn leads to financial returns.

Min & Galle (1997) defined operating performance as the measurement of reliability, production cycle time, and inventory, which finally affects the market share and customer satisfaction. In addition, Zhu et al. (2008a) described operational performance as capabilities of manufacturing plants to efficiently produce and deliver the goods to customers.


d. **Competitiveness Performance:** Competitiveness is the primary interface between organization and market forces, like market share, sales, customer responses and quality improvements in comparison to competitors. Rao & Holt (2005) stated that organization those proactively incorporate environmental goals in to their business practices and with proper strategic planning enjoy a competitive advantage.

Hence, there are various essential drivers, practices and performance aspects under GSCM concerned to manufacturing organizations.
1.3 Overview of Indian Automobile Sector

Automobile sector has recorded an intense growth after liberalizing economic policies to enhance trade and manufacturing in India. Since then majority of the global manufacturers have setup their facilities in Indian Territory. Additionally, Indian automobile sector has become a favoured outsourcing hub for many automobile multinationals for lower cost and high technical innovation.

Subsequently, Automobile Sector has been one of the major contributors in the rapid industrialization, economic and social development of India. The sector has provided employment to 19 million people, directly and indirectly both ways. In the manufacturing GDP automobile sector contribution is 22 percent whereas 7.1 percent in the overall GDP of India in last financial year.

The majority of automobile manufacturing facilities are located around four states of India; Maharashtra- Mumbai, Pune, Nashik, Aurangabad, Nagpur; Tamilnadu – Chennai, Hosur; Karnataka- Bangalore, Dharwar; Haryana-Delhi, Gurgaon, Faridabad, Manesar. This is because of their proximity to ports and availability of skilled workers. The other states includes; Gujrat, Andhra Pradesh, Madhya Pradesh, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Rajasthan, Panjab, and Telangana.

The Indian government encourages various policies to boost sector growth. The government has designed “The Automobile Mission Plan (AMP)” for the period of 2006- 2016 for Automobile sector to accelerating and sustaining growth in this sector and establish well regulatory framework to promote India as a preferred world manufacturing hub. Additionally, the government has initiated plans to promote eco-friendly cars in the country like; CNG, hybrid and electric vehicles.

The sector comprising of the automobile and auto component sub sectors. Automobile sector is one of the key sector of the Indian economy with the upstream and downstream linkages with the other key segments of the economy.
The upstream include; mining, steel, metals, fuel, plastic, rubber, glass and electronics. Whereas, downstream contain finance and insurance, service after market, used car market, car hires & rentals, advertising, transportation and warehousing. The core automobile sector original equipment manufacturers (OEMs) and auto component manufacturers jointly support a large number of business segments and this leads to the multiple effects on economic growth and development of country.

**I.3.1 Automobile Manufacturing (OEMs)**

As per the Society of Indian Automobile Manufacturers (SIAM) data, the Indian Automobile Industry is the seventh largest manufacturer in the world with an annual production of 23.37 million vehicles in the last financial year with a growth rate of 8.68 percent compared to last year. The industry comprises of passenger vehicles, commercial vehicles, three wheelers and two wheelers, respectively.

The two wheeler segment is the leader with 81 percent of the market share and passenger vehicles with a market share of 13 percent. Three wheeler and commercial vehicles has market share of 3 percent of each. Presently, India ranked second largest two wheeler manufacturers in the world, first largest manufacturer of three wheelers, sixth in the passenger vehicle and eighth in the commercial vehicle manufacturing segment.

There is huge competition in Indian Automobile Sector as well as market dominated by few players in particular segments. Hero MotoCorp holds 55 percent market share in bike segments. Honda holds more than 50 percent of share in scooters category. Piaggio holds 40 percent of market share followed by Bajaj. Maruti Suzhuki holds 45 percent market share in passenger vehicle segment and Tata motors is leading 60 percent market of commercial vehicles.
1.3.2 Auto Component Manufacturing

The Indian auto component industry has experienced a sound growth in the last few years. The state level government policies and large domestic and international market demand has developed favourable platform for Auto Component manufacturing at small and medium scale level enterprises. The manufacturing is classified into organized and unorganized sectors. About 500 organizations in organized sector are manufacturing high volume and quality products of components for original equipment manufacturers and more than 10000 organizations in unorganized sectors are mostly the aftermarket category service providers.

According to the industry statistics, derived by Automotive Component Manufacturers Association of India (ACMA), the component industry has registered a growth rate of 11 percent in the last financial year. Auto components exports have been increased by 15 percent in the last five years and have been reached up to more than 160 countries.

Over the years, the component industry has developed manufacturing facilities of mostly all types of components required to manufacture vehicles for both domestic and export. The sector component manufacturing is focused on seven segments; engine parts cover 31 percent of product range of automobile component production, drive transmission & steering parts 19 percent, body & chassis 12 percent, suspension & braking parts 12 percent, equipments 10 percent, electrical parts 9 percent and other components 7 percent of total production of automobile components in India.

The components are highly competitive in international market with the lower cost and high quality substances. Currently, USA, Germany, Turkey, UK and Italy are the major export market and top suppliers includes; China, Germany, Japan and South Korea. The main export components include piston rings, fuel pump nozzles, hydraulic power steering system and gear boxes & parts, parts of diesel engine parts, spark plugs, body parts for automobiles and earth movers. Besides, popular import components are batteries, wheels and engine values.
1.4 Rationale of the Study

Organizations’ environmental challenges have created a new area of environment management throughout the supply chain. Whereas, greening the supply chain develops capabilities for continuous environmental improvements.

Manufacturing organizations, specially, automobile aimed to adopt a win-win strategy in their supply chain. Pressures form environmental regulations, complex supply chain, complexity of global trade and competitors makes it essential for organizations to implement, develop and measure the efficacy of GSCM practices to protect environmental, economic and social interest in their operations.

There are countless opportunities for the Indian Automobile Sector, in the both the markets; domestic and international. Additionally, GSCM awareness and implementation has escalated in recent years in Indian. Thus, there is scope for research in Indian Automobile Sector.

Thus, this study attempts to measure the implementation level of GSCM in every aspect of automobile SCM; green design, green procurement, green manufacturing, green packaging, green warehousing & building, green transportation & distribution, and green reverse logistics. In addition, efficacy (ability) of GSCM is empirically measured, which is an addition into the field of GSCM concepts. Functional relationship is developed among GSCM drivers, efficacy of GSCM practices and performance.
1.5 Objectives of the Study

The study aims to measure the efficacy level of Green Supply Chain Management practices in the Indian Automobile Sector. It also investigates functional relationship in driver, efficacy of Green Supply Chain Management practices and performance in India Automobile Sector. More specifically, the study has the following objectives:

1. To explore the Green Supply Chain Management (GSCM) practices adopted by the Indian Automobile Sector.
2. To explore and rank various Drivers of GSCM Practices on the basis of its importance to the organization of the Indian Automobile Sector.
3. To measure the Efficacy level of GSCM Practices adopted in the Indian Automobile Sector.
4. To find out the relationship amongst GSCM Drivers, Efficacy of GSCM Practices and GSCM Performance.
5. To empirically investigate the functional relationship of various measures of Efficacy of GSCM Practices with GSCM Drivers.
6. To empirically investigate the functional relationship of various GSCM Performance measures with Efficacy of GSCM Practices.
7. To propose the GSCM efficacy (GSCME) Model.
8. To suggest implications of the study to the Indian Automobile Sector.
1.6 Conclusion

It is widely accepted by the manufacturing organizations that absence of environmentally concerned operations in their supply chain can harm their brand image and economic benefits. Therefore, green initiatives have become an essential part of their supply chain strategies from design to end-life management of product. Thus, the measurement of efficacy of GSCM practices is essential to maintain and achieve environmental and economic goal of supply chain.

This chapter has discussed the various definitions of SCM and GSCM, practices, efficacy, drivers and performance variables, which has given insights of these concepts for developing strong theoretical background of the study. Moreover, chapter has presented highlights of Indian Automobile Sector followed by Rationale of the study and objectives. In the next, chapter 2 of the study will provide review of previous studies on manufacturing sector to explore the gap in GSCM research.