

GREEN SUPPLY CHAIN MANAGEMENT: A STUDY BASED ON AUTOMOBILE INDUSTRY

Master of Business Administration

by

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Register No. 40410055



DEPARTMENT OF MANAGEMENT STUDIES

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**



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DEPARTMENT OF MANAGEMENT STUDIES

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of **GANESAN S (40410055)** who carried out the project entitled “**GREEN SUPPLY CHAIN MANAGEMENT: A STUDY BASED ON AUTOMOBILE INDUSTRY**”

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DECLARATION

I **GANESAN S (40410055)** hereby declare that the Project Report entitled “GREEN SUPPLY CHAIN MANAGEMENT: A STUDY BASED ON AUTOMOBILE INDUSTRY ” done by me under the guidance of **Dr. MATHAN.N** is submitted in partial fulfillment of the requirements for the award of Master of Business Administration degree.

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ABSTRACT

Adding pressures and challenges to ameliorate profitable and environmental performance have caused developing countries in general and the automobile manufacturing companies in particular to consider and start enforcing a green supply chain operation. It's arising as an important approach which not only reduces environmental issues but also brings a profitable benefit to manufacturers. Academicians and interpreters have made ferocious studies on this issue, Still, studies on performance evaluations are few. In responses this study explores the criteria that impact the performance of the machine manufacturing an assiduity, using Green supply chain operation practices. The mongrel system evaluates its performance to find crucial criteria in improving the manufacturers green performance. Findings show that an utmost of the machine diligence successfully pursuing these generalities, It also has some walls like an increase of cost for purchasing an environmentally friendly material is the most influential and a significant criterion, while the pollution control initiatives are the most effective criterion for this concluding reflections are made.

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CHAPTER – 1

INTRODUCTION

1.1 INTRODUCTION

1.1.1 OVER VIEW OF SUPPLY CHAIN MANAGEMENT

The term supply chain management has not only been used to enlighten the logistics conditioning and planning, organizing and controlling the inflow of accouterments and affiliated information across the supply chain channel but also used it to explain strategic and inter organizational issues and challenges. Supply chain should be to maximize the overall value generated. The value also known as supply chain surplus a force chain generates is the difference between what the value of the final product is to the client and the costs the supply chain incurs in filling the client's requests. Advanced the supply chain profitability, the more successful is the supply chain. For utmost profit making supply chains, the supply chain surplus will be explosively identified with gains. Supply chain design, planning, and operation decision plays a significant part in the success or failure of a firm.

To stay competitive, supply chain must acclimatize to changing technology and client prospects. A scale dimension of supply chain operations reference SCOR affiliated performance pointers and proposed constructs, SCOR related performance pointers as practices within the Indian manufacturing sector. The focus of SCM is integration of three broad functions videlicet supplier relationship operation, Internal supply chain operation and Client relationship operation with a view to managing the smooth inflow of product, information and finances among the supply chain mates and delivering superior value to the end clients.

1.1.2 GREEN CONCEPT IN SUPPLY CHAIN MANAGEMENT

The term Green supply chain management (GSCM) refers to the conception of integrating sustainable environmental processes into the traditional supply chain. This can include processes similar to a product design, a material sourcing and selection, Manufacturing and production, operation and an end of life management. Rather of simply trying to alleviate the environmental impact of the supply chain GSCM involves driving a value creation throughout the supply chain organizations to reduce total environmental impact. While the specific thing of GSCM is frequently the reduction of CO₂ discharge, Other palpable benefits for an organization include, Greater effectiveness of means, lower waste production, Greater invention, a reduction of product costs, Exercise of raw accouterments, Increased profitability, Perception of added value to the customer base, and so on. Integral to the success of GSCM is the approach taken by each party to their upstream and downstream mates in the supply chain.

A much lesser degree of collaboration, Translucency and integration of force chain and of processes and systems is needed for the action will to be effective. Multitudinous green practices have espoused, companies in their business and supply chain operations to ameliorate their productivity with better environmental growth. By espousing GSCM practices, enterprises may enhance their functional performance through perfecting product quality and perfecting delivery service. Green supply chain operation enterprise also helps associations to ameliorate their environmental performance similar as reduction in carbon emigration, elimination of waste from end to end supply chain, effective and strong collaboration with suppliers would drop their communication costs and fluently promote exercise, recovering and manufacturing. Environment operation system has integrated into firms manufacturing strategy will help the firms to enhance its ecological performance

1.1.3 IMPORTANCE OF GSCM

Green principles and strategies have come essential for companies as public mindfulness of their environmental impacts has increased. Today clients are gradationally more health conscious and laboriously support greener lifestyles. Green supply chain operation is also honored as sustainable supply chain operation or environmental supply chain operation. Green supply chain operation is about making the entire force chain more environmental sustainable GSCM aims to reduce or exclude extinctions including dangerous chemical, emigrations, energy and solid waste along force chain. As similar, GSCM plays a vital part in egging the total terrain impact of any establishment involved in supply chain conditioning and therefore contributing to sustainability performance improvement.



Green supply chain has gained with both academics and experts to aim in reducing waste and conserving the quality of product life and the natural coffers. Eco effectiveness and remanufacturing processes are now come important coffers to achieve stylish practice. This conception works on the principle of recycling so increases asset application and it enhanced client services, when business goes global, chances of profit and deals increases as further customers are available.

GREEN MATERIAL SOURCING

Green sourcing means sourcing or purchasing accouterments and factors which have similar enviable eco friendly characteristics as reusability, recyclability and non use of dangerous chemicals. With further concerns on environmental protection, procurement professionals have been motivated to review their being sourcing, coping strategy and their impact on environmental sustainability.

The part of eco friendly purchasing is the involvement of recycling and remanufacturing. This kind of sourcing supporting waste reduction enhances recycling and remanufacturing and other conditioning in force chain. Owing to the successful relinquishment of green purchasing strategy, products cost is reduced and environmental performance and fiscal performance of firm is increased with positive character attained in the request.

GREEN MARKETING

The conduct directed to all incorporates and consumers comprise green marketing, a broad range of marketing conditioning like planning, product, process, price and creation, After trade service designed to illustrate the thing of association to alleviate the dangerous effects of their products. Green marketing practice promotes the products with environmental friendly parcels It contains the conditioning that can satisfy mortal solicitations of minimal negative effects on the environmental beauty. In addition, green marketing enhances firms competitiveness and fiscal and environmental performance with positive commercial character and image.

GREEN MANAGEMENT

Green management give a diligence with supplementary sources of information that can enhance their business and environmental objects. Relinquishment of green management practices help with bettered firm image, increased effectiveness, Environmental compliance enhancement, cost savings, achievement of societal commitment and reduction of carbon and waste emigrations.

GREEN DISTRIBUTION

Green distribution can reduce the waste and play an important part in energy reduction and value addition of green products ,It significantly ameliorate overall performance of association with better commercial image and Green distribution helps firms to gain superior fiscal and environmental performance.

GREEN MANUFACTURING

Green manufacturing practices are to apply socially and environmentally responsible practices to alleviate dangerous goods of manufacturing and increased profitability of firms. Green practices in product ameliorate effectiveness of processes. This practice involves the operation of the green resources, which may lead towards competitive advantage through reduction in products cost and enhancement in products quality. Spare and green manufacturing assiduity both are working for barring waste and perfecting the effectiveness of manufacturing processes. Green practices in product processes alleviate the bad goods of manufacturing processes on environmental sustainability, while green manufacturing ameliorate functional, environmental and fiscal performance of firm.

1.2 STATEMENT OF THE PROBLEM

Green supply chain management plays vital role in automobile industries, very few of the automobile sectors in India were innovatively pursuing this concept, One of them was HUYNDAI MOTOR INDIA.LTD. The economic growth increases the level of energy and material consumption, which actually contributes the environmental issues and resource depletion problems. By this concept of green supply chain management, Automobile industries can recycle their manufacturing waste in innovative ways and strengthen their value chain.

This paper focuses on the necessity of 'green' also concerned on value chain of the industry, It has become increasingly significant for automobile industries facing competitive regulatory and community pressures to balance economic and environmental performance. To face these challenges automobile industries should increasingly focus on innovative ideas in recycling wastes for successful value chain and environmental conscious supply chain, Also called as green supply chain.

1.3 INDUSTRY PROFILE

Automobile is one of the largest industry in India as well as in the global market. Automobile industry has surfaced as daylight sector in the Indian economy. This industry occupies a prominent place in the fabric of Indian Economy. Automobile is considered as leader in product, process and technologies in manufacturing industries. Machine assiduity drives the profitable growth and its performance is viewed as a reflection of the economy's health. India was the world's fifth largest manufacturer of cars and seventh largest manufacturer of marketable vehicles. Indian automotive industry including element manufacturing is anticipated to reach 16.16-18.18 trillion by 2026. The Government aims to develop India as a global manufacturing and exploration and development (R&D) hub. It has set up National Automotive Testing and R&D Structure Design (NATRIP) centers as well as National Automotive Board to act as facilitator between the Government and the assiduity. In May 2021, India's product of motorcars reached units, The Indian automobile industry has bettered its product capability and quality over the times. The machine assiduity comprises a wide range of companies and associations involved in the design, development, manufacturing, marketing, and selling of motor vehicles, And it's one of the world's largest diligence by profit. It's plant that automobile industry is using numerous technological software tools similar as ERP, SCM, SRM, CRM, TMS, and also using physical tools similar as barcodes, RFIDs, GPS, interfaces similar as EDI, Internet, procedural tools similar as outsourcing noncore conditioning to others like logistics (3PL/ 4PL LSPs), installation operation (FM), VMI, bring reduction initiatives by being procedural changes and periodic reviews like checkups, VSMS. Still it's seen that cost reduction pressure is there to boost unborn demand and hence new technologies similar as IOT, Big Data, Data Science, Artificial Intelligence (AI) & machine literacy, robotics are coming up at a fast face to revise the supply chain as a whole.

1.3.1 GSCM PRACTICES IN AUTOMOBILE INDUSTRIES

Environmental pollution is the major problem that people face in present state, The profitable growth increases the position of energy and material consumption, which actually contributes the environmental issues and resource reduction problems. By this conception of green supply chain operation, Machine diligence can reclaim their manufacturing waste in innovative ways and strengthen their value chain. It's arising as an important approach which not only reduces environmental issues but also brings profitable benefit to manufacturers. In responses this study explores the criteria that impact the performance of the automobile manufacturing industry, using the fuzzy set proposition and decision Making Trial and Evaluation Laboratory. The mongrel system evaluates its performance to find crucial criteria in perfecting the manufacturers green performance. Findings show that the increase of cost for coping environmentally friendly material is the most influential and significant criterion, while the pollution control initiatives is the most effective criterion. Directorial counteraccusations are also bandied and concluding reflections are made.

Very few of the automobile sectors in India were innovatively pursuing this conception, One of them was HYUNDAI MOTORINDIA.LTD, It has come increasingly significant for machine diligence facing competitive nonsupervisory and community pressures to balance profitable and environmental performance. To face these challenges machine diligence should increasingly focus on innovative ideas in recovering wastes for successful value chain and environmental conscious supply chain, Also called as green supply chain

1.4 GSCM PRACTICES OF HYUNDAI MOTOR INDIA.LTD

I took HYUNDAI MOTORINDIA.LTD (HMIL) as an example for this concept because they are increasingly concerned in green supply chain operation with their innovative ideas. Hyundai's environmental principle states that HMIL will admire the values of humankind by guarding the environment and will fulfill its social liabilities for the harmony of humans, environment and society.

ENVIRONMENTAL MANAGEMENT POLICY OF HMIL

Based on the spirit of corporate citizenship, Hyundai will establish the following global environmental policy and ply its best effort to save the environment of the earth, with the aim to admire the values of humans and produce an abundant and sustainable society.

- Recognize the environment as the crucial success factor of a company and produce corporate values through proactive environmental management.
- Fulfill its social responsibility as an automobile company by developing and distributing eco friendly cars.
- Strive for sustainable consumption of energy and reduction in pollutants throughout the entire process ranging from the development to the production, sales, use, and disposal of products.
- Laboriously support environmental training of workers as well as the environmental management activities of merchandisers, and try its best for CSR activities.
- Comply with environmental laws and regulations to carry out and ameliorate environmental management, and disclose related outcomes

1.4.1 CONTRIBUTIONS IN GSCM

Hyundai is committed to establishing an intertwined portal system related to the terrain and safety of entire business spots to totally manage overall processes, including checking the current situation and managing issues according to Hyundai's internal policy. In addition, It'll carry out a regular internal examination as well as on point examinations by a third party to strengthen the monitoring of greenhouse gas emigration, water coffer, and environmental adulterants

Hyundai strives for eco friendly design and the environmental impact assessment of the entire process and also strive to produce a design support system to develop recycling friendly vehicles and to minimize environmental pollution by totally managing dangerous substances like metals. Developing disassembly technologies for scrapped cars and recycling scrapped parts. Hyundai strive to promote the use of eco friendly cars by developing crucial element technologies for EVs and FCEVs and securing their competitiveness. In addition, Hyundai focus on the development of eco friendly products. For this, Hyundai takes necessary conduct, including perfecting technologies for advanced energy frugality and lower greenhouse gas emigration, to misbehave with laws and regulations. To reduce hothouse gas emigrations in response to climate change, Hyundai is committed to buttressing energy effectiveness in the entire process in product development, procurement, product, logistics, use, and disposal and adding new and renewable energy use

Hyundai is committed to negotiating the target related to greenhouse gas emigration by buttressing investment in innovative energy saving technologies and adding the installation of solar panels on factory roofs and at parking lots. Likewise, Hyundai will pursue innovative improvement activities to negotiate carbon neutrality in its operation by 2050.

Hyundai check and ameliorate its water installations so that it can use water of high quality in a timely manner in the operation process and will secure wastewater treatment installations to increase the wastewater recycling rate. Hyundai manages the effective use of water as planned at its business spots and support real time monitoring of the quantum of use and exercise of water as well as the quantum of wastewater and sewage discharge.

In order to minimize and efficiently treat wastes generated throughout the operation process from vehicle production to delivery and scrapping, Hyundai develop and apply waste storehouse, delivery and processing management standards. In addition, Hyundai store and transport wastes as per their operation standard by waste type, and rigorously manage outsourced waste treatment companies so that they will handle wastes according to laws. Hyundai HQ and business spots will internally cover progress regarding their periodic waste volume target and reduction plans grounded on what was achieved in the former time.

Hyundai run waste product collection and recycling services and give customers with information about the collection system to insure proper collection of waste products. In addition, Hyundai strive to increase the recyclability of waste products by considering recyclability from the product design phase. A resource rotation network will be operated to increase the number of new scrap car recycling companies as well as the overall recycling rate.

To prevent environmental pollution and save energy, Hyundai efficiently operate and manage an integrated logistics system with merchandisers for the transportation of parts and vehicles. Optimizing inventory management to develop, apply and cover standards for environment related facilities air, water quality, waste, soil, marine environment and greenhouse gases.

Hyundai contributes in the sales of eco friendly products through brand strategies for eco friendly cars as well as affiliated marketing and sales activities and misbehave with car scrapping regulations of each region, minimize adulterants generated from service centers and require maintenance service providers to gain ISO 140001 certification.

According to its global environmental management policy, Hyundai won't use four major heavy metals (lead, mercury, chromium VI and cadmium) for its vehicles and parts that are sold across the world. Hyundai is committed to voluntary compliance with this policy.

End of Life Vehicle Scheme of Hyundai states that, "Every Hyundai is erected with consideration for what happens at the end of its life". They're using recycled and recyclable materials wherever possible. To make recycling easy, They label all parts weighing over 50g using recognized identification codes. And at own steel mill, They were piloting a unit that can strip a Hyundai at the end of its life to a shell in just 30 minutes, also they reclaim the steel for new Hyundai cars.

Hyundai and battery supplier SK Innovation have announced that they will cooperate on the development of a sustainable ecosystem for EV batteries. The cooperation will cover business areas related to the EV battery industry, including battery sales results, battery management service and battery reuse and recycling.

Hyundai has been developing and employing innovative, ecological accoutrements in the innards of its vehicles, similar as wood fiber, eucalyptus cellulose and castor oil, since 2016.

The seat, headlining and carpet fabric includes bio components extracted from sugar cane and corn, While leather used in the interior is be painted using flaxseed oil, reducing for the need for animal by products.

For their restyle project, designers up cycle discarded accoutrements from the car manufacturing process into sustainable fashion pieces. Up to 32 plastic bottles are tattered into plastic chips. Those chips are reused and spun into thread that makes an inviting, woven upholstery fabric.

Doors and crash pads are painted using an especially reused bio paint, which makes use of oil extracted from plants similar as rape flowers and corn. Hyundai continues to investigate the usage of bio materials, especially recovering and reusing existing materials.

In collaboration with Healthy Seas, Floor mats will be produced using the regenerated nylon yarn ECONYL. Recycled from reclaimed fishing nets and other nylon waste ECONYL gives this dangerous marine waste to alternate life.

CHAPTER – 2

LITERATURE REVIEW

2.1 REVIEW OF LITERATURE

Goshen Stephen and Ravi Kumar (2020) Stated that, By taking survey at current green activities in Automobile manufacturers in India and to estimate green supply chain operation. To survey current green conditioning in automobile parts manufacturers in India, many manufacturers are case studied who handed in depth interview about green procurement, green manufacturing, green distribution and or rear logistics. To estimate green supply chain management, Also suggestions to develop GSCM in Automobile industry are presented.

Jain and Shivani Sharma (2020) Concluded that, Green Supply Chain Management (GSCM) has surfaced as new operation strategy for machine associations to come more environmental friendly, cost effective and competitive. The end of this study is to review the literature of GSCM Practices and find out the common GSCM practices amongst the machine and bus element association in Madhya Pradesh (India). The data came from check of 10 associations. According to the check results, some practices are at the stylish stage but utmost are on the primary stage. So, he states that there are openings for business to borrow further environmental friendly operation.

Srivastva (2019) Concluded that, environmental pollutions caused by the diligence is the main problem that humanity faces every day. The traditional supply chain rehearsed in the diligence in early 1990's, focuses on the cost reduction and perfecting of different overflows within the association but the environmental consideration is ignored.

Zhu (2019) Concluded that, In the present globalized and competitive request the diligence are pressurized to follow the environmental operation, these pressures are deduced from the internal and external sources in the association.

Johansson and Winroth (2018) Stated that, Green supply chain aims for nonstop advancements of artificial processes and products to reduce or help pollution to air, water and land. They also suggested that by these advancements, there's possibility of minimizing pitfalls to humans and other species.

Zhu and Sarkis (2017) Suggested that, Green Supply Chain Management is a broad term in which all the diligence work with their suppliers and guests to ameliorate their environmental performance. These environmental performances can be rehearsed by different focuses they indeed included the conception Reverse Logistics in to the Green Supply Chain Management.

Ninlawan (2015) Concluded that, Green perpetration on machine diligence where he proposed conditioning of Green supply chain operation. These conditioning compromises all the process in green supply chain starting from green procurement to green manufacturing to green distribution till reclaim and waste operation of the product.

Salam (2015) Stated that, Result for environmentally concerned and economically conservative business. This conception minimizes environmental impact by selection of products. Green Procurement is defined as an environmental purchasing which involves conditioning like reduction, exercise and recycling of accoutrements in the process of purchasing.

Atlas and Florida (2014) Stated that, Green manufacturing can lead to lower the raw material cost, increase the product effectiveness and reduces the environmental and occupational safety charges. The power consumption can be reduced to lesser extent by enforcing green manufacturing process.

Richard & Nicolas (2015) Stated that, Green procurement is the purchasing of accoutrements or services which have lower impact on terrain over the whole life cycle. Green procurement also involves the integration of environmental issues into coping opinions grounded on price, performance and quality. Along these opinions the environmental impacts has to be consider more important for reducing the waste and pollution.

Hoshino (2015) Concluded that, Remanufacturing is defined as recycling integrated manufacturing. According to diligence that apply remanufacturing generally include motorcars, electronics and tires. Product recovery refers to the conditioning designed to reclaim value from a product at the end of its useful life.

Shalishali (2015) Suggested that, The traditional supply chain comprises five parts Raw material, Assiduity, Distribution, Consumer and Waste. Each of the links in the supply chain can be a reason for pollution, waste and other hazards to the terrain. Regarding raw accoutrements, a supplier may use environmentally dangerous accoutrements similar as lead. Still, associations can put pressures on suppliers to use further environmentally friendly accoutrements and processes.

Jiange (2014) Concluded that, Supply chain operation has come a promising area in achieving sustainability due to transnational environmental pressures and conception of “Green Supply Chain Management (GSCM)”

Ninlawn (2013) Stated that, GSCM has appeared as an important element of business conditioning to help associations develop win to win strategies that achieve profit and request share objects by lowering their environmental pitfalls and impacts, while raising their ecological effectiveness

Grandzol (2013) Suggested that, Developing practices, processes and products that have minimum impact on the ecosystem has come a crucial motorist for supply chain operation professional.“ Going green” can both lower cost and give a competitive advantage, yet maturity of enterprises remain unprepared.

Kumar (2013) Suggested that, By Investigating the correlation of two major factors Organizational literacy and operation support, with the extent of adaption of GSCM practices in Indian manufacturing. He plant a positive correlation in Organizational literacy and operation support. In that paper he consider different GSCM practices grounded on literature.

Carter and Bowen (2013) Suggested that, The internal practices or internal environment operation is the key to ameliorate enterprises performance and the support from the top position and medial position director is a key to successful perpetration of GSCM practices.

Handfield *et al* (2012) Stated that, The conflict between the natural environment and the manufacturing are getting decreasingly serious. The problem has two aspects on one hand, with the expansion of supply chain manufacturing diligence affect more on natural environment on the other hand, the environmental problems also bring further constraints and limitations to manufacturing company.

Simpson *et al* (2012) Concluded that, Some foreign automobile manufacturers similar as Volkswagen and Ford have formerly taken environment as social responsibility. Meanwhile, this action is also converted into the competitive advantage of themselves.

Mandal (2010) Stated that, The fast development of economics makes the conflict between environmental and profitable benefits more and more serious. The exploration of green supply chain operation involves the following three parts supply chain operation, environmental protection, and resource optimization.

Murphy *et al* (2008) suggested that, Green supply chain operation is a supply chain that guided by the sustainable development propositions. The purpose of it's to achieve the thing of perfecting welfare, achieve compatibility with the environment and material optimization by ameliorate the speed, certainty and other affiliated channel. it results short term benefits and long term benefits cannot be well dealt with. So it's necessary to establish green supply chain operation, so that the enterprise can have sustainable development.

Christopher (2008) Suggested that, The green procurement is the purchase of raw accoutrements is concern about the supplier and logistic also, In order to keep the whole routine safe, a lot of aspects should be considered. In order to insure that the entire supply chain will be carried out successfully, both the supplier and the logistics should be considered.

Sarkis (2007) Concluded that, Green supply chain operation substantially began from product design, and end in final product reclaim. It substantially includes the following aspects green procurement, green design, green manufacturing, green distribution, green logistics, green consumption and green recycling.

Benson (2006) Concluded that, Green management completely consideration to the ecological and environmental impacts in the design stage of products. So the designs can minimal energy consumption and environmental pollution. Green designs substantially include the exploration about formalized, modular, removable and retrievable design.

John (2005) Stated that, Green transport is substantially grounded on the logistic process, with the dramatic increase in the quantum of logistics and increase of business inflow, the atmospheric environment was oppressively defiled. Green transports substantially include evaluation of centralized distribution and consumption of resources and reasonable transportation route planning.

Reck (2005) Stated that, Environmental protection is getting the sustainable strategy of every enterprise, so the exploration of green supply chain operation will be delved and carried more constantly.

Lee *et al* (2005) Concluded that, The green supply chain substantially includes two aspects First, the crucial point of the internal operation and strategy is to minimize enthralled resources and increase the productivity as well as maximize the profit. Second, the company, the suppliers and other mates should cooperate and to share experiences in order to lower the cost, so the environment protection capability can be bettered.

Mohd Rozar *et al* (2002) Suggested that, The efforts to contribute with business conditioning to the conservation of the ecological equilibrium don't relate only to the new green sectors of the frugality, similar as indispensable energy or water and waste management, but to all profitable sectors ranging from manufacturing to the service assiduity. Therefore, a car producer, similar as Volkswagen, recognizes the need to get involved in greening its products and processes as much as a bank with its fiscal services.

Heyman *et al* (2002) Suggested that, The necessity to concentrate on green supply chain operation practices particularly in the manufacturing sector is underscored also by the decreasingly important part that logistics and supply chain play for that sector in times of the global renaissance of manufacturing and the re industrialization.

Hervani *et al* (2001) States that, GSCM is a ultramodern conception of operation practices trying to integrate environmental thinking into all stages up and down the supply chain. These practices number, among numerous others, conduct similar as environmental friendly product design for reduced consumption of material and energy, and recovering initiatives.

CHAPTER - 3

METHODOLOGY

3.1 RESEARCH METHODOLOGY

Research methodology is needed for the purpose of framing the research process and designs tools that are to be used for the project purpose. More specifically, it's about systematically designs a study to ensure valid and reliable results that address the research aims and objectives. Our research methodology helps to find, how the automobile industry concerned in environmental issues. This time research methodology is framed for the purpose of analyzing and assessing the green supply chain management practices in automobile industry.

3.2 NEED,SCOPE AND OBJECTIVES

Need for the study

This study was based on, How the environmental issues caused by the automobile industries and how to reduce the causes and effects by implementing Green supply chain management with highly innovative ideas, For this concept of Green supply chain management in automobile industry HYUNDAI MOTOR INDIA.LTD was takes as an example, Because of their biggest contribution to environment by successfully implementing and pursuing Green supply chain management practices in several ways innovatively.

Scope of the study

- This study analyzes, how the Green supply chain management practices is implementing in automobile industry.
- This study analyzes the importance of Green supply chain management.
- This study assess the efficiency of Green supply chain management in automobile industry.

Objectives of the study

- To study the Green supply chain management practices in automobile industry.
- To study the new trends, technologies and innovation of Green supply chain management practices in automobile industries.
- To find the challenging factors in the implementation of Green supply chain management.

3.3 POPULATION, SAMPLING AND QUESTIONNAIRE SURVEY

Sampling is a vital strategy in a statistical analysis, which comprises a selection of a few portions of a potential population so as to assess or learn something from the population at a cheaper cost. Simple random sampling (SRS), popularly known as “random sampling”, includes the selection of sample at arbitrary from the sampling frame utilizing either random number tables or an internet arbitrary number generator. The questionnaire comprises close-ended and open-ended questions with multiple-choice options. The survey questionnaire is designed online, hosted in google drive and shared in a Google form. Link to the Google form is shared on professional platforms such as LinkedIn and construction professionals’ forums, as well as direct emails sent to the key players in the built environment. A total of 100 responses were received

3.4 GOOGLE FORMS

Forms are among the internet's most versatile tools. Whether you need a contact form or a checkout page, a survey or a student directory, a form is all you need to easily gather that information. With Google Forms, it only takes a few minutes to make one for free. Google forms along with Docs, Sheets, and Slides is part of Google's online apps suite of tools to help you get more done in your browser for free. It's easy to use and one of the simplest ways to save data directly to a spreadsheet, and it's the best sidekick to Google Sheets' spreadsheets.

3.5 PERCENTAGE ANALYSIS

Percentage analysis is the method to represent raw streams of data as a percentage (a part in 100 - percent) for better understanding of collected data. A percent change analysis shows how two items changed as a percentage from one period to another period. Used on a balance sheet, a percent change analysis shows how a balance sheet account changes from year to year, or quarter to quarter. The balance sheet accounts are assets, liabilities and stockholders' equity. Percentage Statement Analysis is an analysis which highlights important relationships in the percentage statements. Percentage Statement analysis embraces the methods used in assessing and interpreting the results of past performance and current percentage position as they relate to particular factors of interest in investment decisions. It is an important means of assessing past performance and in forecasting and planning future performance.

Percentages are often used to express a proportionate part of a total. If 50% of the total number of students, long before the existence of the decimal system, computations were often made in fractions. The term "percent" is derived from the Latin per centum, meaning "hundred" or "by the hundred". The Percentage increase and decrease, Due to inconsistent usage, it is not always clear from the context what a percentage.

Majorly the percentage error formula is used to determine how accurate the calculated value is by keeping in mind the actual value. I mentioned in a very rough language, it is the variation of the gap between the calculated value and the genuine value expressed in the form of a percentage. Commonly, the extent of the percentage error is expressed in the positive denominations, although having a negative percent error is not a wrong approach. Relying on the sign of the percentage error measure, it could be analyzed whether the calculated value is being paced below or higher to the actual value. The tool of percentage error formula is one of the most reliable and accurate tools in calculating the relative error by keeping the original measure as the basis.

3.6 STATISTICAL ANALYSIS

Statistical analysis is the science of collecting, exploring and presenting large amounts of data to discover underlying patterns and trends. Statistics are applied every day in research, industry and government to become more scientific about decisions that need to be made.

Importance

Statistical analysis is a study, a science of collecting, organizing, exploring, interpreting, and presenting data and uncovering patterns and trends. Many businesses rely on statistical analysis and it is becoming more and more important. One of the main reasons is that statistical data is used to predict future trends and to minimize risks.

DESCRIPTIVE ANALYSIS

The descriptive statistic is used to describes the basic features of information and shows or summarizes data in a rational way. Descriptive statistics is a study of quantitatively describing. This type of statistics draws in all of the data from a certain population or a sample of it. Descriptive statistics can include numbers, charts, tables, graphs, or other data visualization types to present raw data. However, descriptive statistics do not allow making conclusions. we cannot get conclusions and make generalizations that extend beyond the data at hand. With descriptive statistics, you can simply describe what is and what the data present.

Inferential type

This type of statistical analysis is used to study the relationships between variables within a sample, and we can make conclusions, generalizations or predictions about a bigger population. In other words, the sample accurately represents the population. Moreover, inference statistics allows businesses and other organizations to test a hypothesis and come up with conclusions about the data. One of the key reasons for the existing of inferential statistics is because it is usually too hard to study an entire population of people or objects.

3.7 RESEARCH TESTS

ANOVA

ANOVA in SPSS is used as the test of means for two or more populations. ANOVA in SPSS must have a dependent variable which should be metric (measured using an interval or ratio scale). ANOVA in SPSS must also have one or more independent variables, which should be categorical in nature.

CHI-SQUARE

The Chi-Square Test of Independence determines whether there is an association between categorical variables, whether the variables are independent or related. It is a nonparametric test. This test is also known as Chi-Square Test of Association.

CORRELATION

Correlation analysis in research is a statistical method used to measure the strength of the linear relationship between two variables and compute their association. Simply put correlation analysis calculates the level of change in one variable due to the change in the other.

3.8 RESEARCH DESIGN

From the objective we have studied the Green supply chain management of automobile industry. To analyze this different data have to be collected from various automobile industries such as in what way the GSCM plays a vital role in their industry and what are the barriers to implement this concept also been discussed.

3.9 HYPOTHESIS TESTING

- H0: There is no relationship between performance and eco design
H1: There is a relationship between performance and eco design
- H0: There is no relationship between performance and employee competency
H1: There is a relationship between performance and employee competency
- H0: There is no relationship between performance and packaging
H1: There is a relationship between performance and packaging
- H0: There is no relationship between performance and barriers
H1: There is a relationship between performance and packaging

CHAPTER – 4

DATA ANALYSIS AND INTERPRETATION

4.1 PERCENTAGE ANALYSIS

TABLE 4.1.1 GENDER

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	Male	61	61%
2	Female	39	39%
TOTAL		100	100%

TABLE 4.1.1 representing Gender of the respondents

- Out of 100 respondents male respondents are 61.00 percentage and female respondents are 39.00 percentage

TABLE 4.1.2 AGE GROUP

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	27-35	37	37%
2	36-44	24	24%
3	45-55	33	33%
4	55 above	6	6%
TOTAL		100	100%

TABLE 4.1.2 representing Age group of the respondents

- Out of 100 respondents, 37.00 percentage of the respondents are aged between 27-35, 24.00 percentage of the respondents are aged between 36-44, 33.00 percentage of respondents are aged between 45-55 and 6.00 percentage of the respondents are at the age group of above 55

TABLE 4.1.3 EDUCATIONAL QUALIFICATION

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	Graduate	70	70%
2	Post-Graduate	23	23%
3	Doctorate	7	7%
TOTAL		100	100%

TABLE 4.1.3 Representing Educational qualification of the respondents

- Out of 100 respondents, 70.00 percentage of respondents belong to Under graduation, 23.00 of the respondents belong to Post-graduation and the remaining 7.00 percentage of the respondents are Doctorates

TABLE 4.1.4 OCCUPATION

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	Self employed	7	7%
2	Government	23	23%
3	Private	70	70%
TOTAL		100	100%

TABLE 4.1.4 Representing Occupation of the respondents

- Out of 100 respondents, 70.00 percentage of the respondents were private employees and 23.00 percentage of the respondents were government employees and 7.00 percentage of the respondents were self-employed

4.1.5 INCOME

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	20,000-30,000	10	10%
2	21,000-40,000	27	27%
3	41,000-50,000	62	62%
4	Greater than 50,000	1	1%
	TOTAL	100	100%

TABLE 4.1.5 representing of the respondents

- Out of 100 respondents, 10.00 percentage of the respondents comes under the category of income 20000 - 30000, 27.00 percentage of the respondents comes under the category of income between 31000 – 40000, 62.00 percentage of the respondents comes under the category of income 41000 – 50000 and 1.00 percentage of the respondent comes under the category of income above 50000.

4.2 STATISTICAL ANALYSIS

4.2.1 CORRELATION

PERFORMANCE AND ECO DESIGN

H0: There is no relationship between performance and eco design

H1: There is a relationship between performance and eco design

Correlation				
			Performance	Eco Design
Spearman's rho	Performance	Correlation Coefficient	1.000	.702**
		Sig. (2-tailed)	.	.000
		N	100	100
	Eco Design	Correlation Coefficient	.602**	1.000
		Sig. (2-tailed)	.000	.
		N	500	500
**. Correlation is significant at the 0.00 level (2-tailed).				

- From the table, It is interpreted that the significance value is 0.00 which is less than 0.05 and less than the critical value 1, So the null hypothesis rejected and alternative hypothesis got accepted. Thus, there is a relationship between performance and eco design

PERFORMANCE AND EMPLOYEE COMPETENCY

H0: There is no relationship between performance and employee competency

H1: There is a relationship between performance and employee competency

Correlation				
			Performance	Employee Competency
Spearman's rho	Performance	Correlation Coefficient	1.000	.502**
		Sig. (2-tailed)	.	.001
		N	100	100
	Employee Competency	Correlation Coefficient	.502**	1.000
		Sig. (2-tailed)	.001	.
		N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).				

- From the table, It is interpreted that the significance value is 0.01 which is less than 0.05 and less than the critical value 1, So the null hypothesis rejected and alternative hypothesis got accepted. Thus, there is a relationship between performance and employee competency

PERFORMANCE AND PACKAGING

H0: There is no relationship between performance and packaging

H1: There is a relationship between performance and packaging

Correlation				
			Performance	Packaging
Spearman's rho	Performance	Correlation Coefficient	1.000	.402**
		Sig. (2-tailed)	.	.001
		N	100	100
	Packaging	Correlation Coefficient	.402**	1.000
		Sig. (2-tailed)	.001	.
		N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).				

- From the table, It is interpreted that the significance value is 0.01 which is less than 0.05 and less than the critical value 1, So the null hypothesis rejected and alternative hypothesis got accepted. Thus, there is a relationship between performance and packaging

PERFORMANCE AND BARRIERS

H0: There is no relationship between performance and barriers

H1: There is a relationship between performance and barriers

Correlation				
			Performance	Barriers
Spearman's rho	Performance	Correlation Coefficient	1.000	.602**
		Sig. (2-tailed)	.	.001
		N	100	100
	Barriers	Correlation Coefficient	.602**	1.000
		Sig. (2-tailed)	.001	.
		N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).				

- From the table, It is interpreted that the significance value is 0.01 which is less than 0.05 and less than the critical value 1, So the null hypothesis rejected and alternative hypothesis got accepted. Thus, there is a relationship between performance and barriers

4.2.2 CHI SQUARE

PERFORMANCE AND ECO DESIGN

H0: There is no association between performance and eco design

H1: There is an association between performance and eco design

		Chi-square and df	Fishers Exact Test	Total
	Performance	Pearson	Sig 2 sided	
Eco Design	Strongly agree	6.0 and 4.8	.001	90
	Agree	6.0 and 4.84	.001	10
Total				100

- From the table, It is interpreted that the significance value is 0.001, which was less than 0.5, So the null hypothesis rejected and alternative hypothesis got accepted with the chi square value 6.0 and 4.8. Thus, there is an association between performance and eco design

PERFORMANCE AND EMPLOYEE COMPETENCY

H0: There is no association between performance and employee competency

H1: There is an association between performance and employee competency

		Chi-square and df	Fishers Exact Test	Total
	Performance	Pearson	Sig 2 sided	
Employee Competency	Strongly agree	7.5 and 6.5	.001	91
	Agree	7.5 and 6.5	.001	9
Total				100

- From the table, It is interpreted that the significance value is 0.001, Which was less than 0.5. So the null hypothesis rejected and alternative hypothesis got accepted with the chi square value 7.5 and 6.5. Thus, there is an association between performance and employee competency

PERFORMANCE AND PACKAGING

H0: There is no association between performance and packaging

H1: There is an association between performance and packaging

		Chi-square and df	Fishers Exact Test	Total
	Performance	Pearson	Sig 2 sided	
Packaging	Strongly agree	5.0 and 5.5	.001	94
	Agree	5.0 and 5.5	.001	6
Total				100

- From the table, It is interpreted that the significance value is 0.001, Which was less than 0.5. So the null hypothesis rejected and alternative hypothesis got accepted with the chi square value 5.0 and 5.5. Thus, there is an association between performance and packaging

PERFORMANCE AND BARRIERS

H0: There is no association between performance and barriers

H1: There is an association between performance and barriers

		Chi-square and df	Fishers Exact Test	Total
	Performance	Pearson	Sig 2 sided	
Barriers	Strongly agree	6.0 and 4.8	.001	92
	Agree	6.0 and 4.84	.001	8
Total				100

- From the table, It is interpreted that the significance value is 0.001, Which was less than 0.5. So the null hypothesis rejected and alternative hypothesis got accepted with the chi square value 6.0 and 4.8. Thus, there is an association between performance and barriers

4.2.3 ANOVA

Performance		Sum of Squares	Df	Mean Square	F	Sig.
Eco Design	Between Groups	1.739	10	.580	5.108	.002
	Within Groups	56.283	90	.113		
	Total	58.022	100			
Employee Competency	Between Groups	1.703	9	.568	4.935	.002
	Within Groups	57.049	91	.115		
	Total	58.752	100			
Barriers	Between Groups	1.783	8	.594	5.312	.001
	Within Groups	55.505	92	.112		
	Total	57.288	100			
Packaging	Between Groups	1.783	6	.594	5.312	.001
	Within Groups	55.505	94	.112		
	Total	57.288	100			

- Results states that, There is a relationship between dependent variable and independent variable because of the strong F value, which was greater than the significance value
- eco design $5.108 > 0.002$, employee competence $4.935 > 0.002$, Barriers $5.312 > 0.001$, Packaging $5.312 > 0.001$
- So the null hypothesis rejected and alternative hypothesis got accepted

CHAPTER – 5

RESULTS AND DISCUSSION

5.1 FINDINGS

Out of 100 respondents, Majority(61%) of the respondents are male, Majority(37%) of the respondents falls in category of 27-35 years of age. Majority(70%) of the respondents are graduated. Majority(70%) of the respondents working in private sectors. Majority(63%) of the respondents having income 40,000 to 50,000.

Out of 100 respondents, Majority(80%) of the respondents agreed that Manufacturing units in an industry get commitment and support for environment friendly practices from top management. Majority(60%) of the respondents agreed that GSCM practices will not affect the organizational growth and productivity. Majority(55%) of the respondents agreed that GSCM strategies strengthen the value chain of an organization it values environmental, social, and economic outcomes effectively. Majority(45%) of the respondents agreed that GSCM can improve organizational efficiency and increase organizations value resulting in greater organizational performance.

Out of 100 respondents, Majority(75%) of the respondents agreed that Organization conducts environmental training and awareness programs for employees to succeed in GSCM practices. Majority(55%) of the respondents agreed that Increased use of major heavy metals for manufacturing will affect the environment as well as the employees of an organization. Majority(55%) of the respondents agreed that Employees in industry should have clear view and knowledge about it to implement GSCM practices. Majority(56%) of the respondents agreed that Implementing GSCM practices in manufacturing units will not excess the work load of the employees.

Out of 100 respondents, Majority(78%) of the respondents agreed that Re-using and Re-cycling of materials or components for manufacturing will not affect the quality of product and it helps in cost reduction. Majority(53%) of the respondents agreed that Organization strives for eco friendly design and also strives to create a design support system to develop recycling friendly vehicle. Majority(70%) of the respondents agreed that Organization takes necessary actions in improving technologies for higher fuel economy and lower greenhouse gas emission. Majority(65%) of the respondents agreed that Purchasing environmental friendly materials for eco design manufacturing will not leads to increased operational cost

Out of 100 respondents, Majority(81%) of the respondents agreed that Lack of technology, experience and innovative ideas about recycling is most common barrier in implementing GSCM practices. Majority(37%) of the respondents agreed that There is less government regulations and support for eco friendly practices in automobile industry. Majority(47%) of the respondents agreed that Organization try to adopt GSCM have to strive hard in convincing the stakeholders and it's not an easy task. . Majority(55%) of the respondents agreed that Implementing GSCM in the industry requires a lot of effort as it may involve a restructuring of the business processes and the product itself

Out of 100 respondents, Majority(83%) of the respondents agreed that Organization is increasingly focused on eco packaging which has a big role in environmental impact in many ways. Majority(45%) of the respondents agreed that Rather than plastics, using cardboard box or any bio degradable products for packaging manufactured materials which has good ecological benefits. Majority(47%) of the respondents agreed that Organization making the Packaging process with recycled or reused materials which also helps in cost reduction. Majority(48%) of the respondents agreed that Eco packaging does not cause any damage for goods inside it during transportation

5.2 SUGGESTIONS

- Automobile industries had good knowledge on green supply chain management and strives to adopt the compatible ways of implementing/practicing the green supply chain in their manufacturing firm
- Funding from the government for implementing the concept and spreading the knowledge on the concept is necessary
- The management should train their employees to work with less wastage and for the safety of environment
- For the effective implementation of GSCM practices, every stakeholder has to contribute, than only we can protect our environment
- The organizations should go for the improvement of less common practices so as to compete with international market. They should start to prioritize to consider ISO 14001 certification, Green purchasing and reverse logistics
- Management should train their employees to work with less wastage and for the safety of environment.
- Government should also frame certain policies to make organizational operations more environmental friendly like tax rebate, allowances and training on the environment safety
- For the effective implementation of GSCM practices, every stakeholder has to contribute, than only we can protect our environment
- To promote eco design products which as an activity that integrates environmental aspects into product design and development, the integrated activities lead to continual improvement of the environmental performance of the entire product through technological innovation
- Set rules for disposing automobile waste and consider more investment in recycle plants, Propagate GSCM knowledge and encourage using environmentally friendly goods and services

5.3 CONCLUSION

Green Supply chain management has emerged as an important and vital aspect in today's marketplace and a very much essential philosophy to the sustainability of the organizations and supply chains. This research study based on GSCM practices in the automobile industry that are highlights for the cost effective and easy to implement to achieve environmental sustainability. The adoption of GSCM practices in automobile industry has some of barriers but than most of the respondents responding positively. The overall green practices in automobile industry is with the satisfactory level. However, green initiatives taken by the Government will lead to future practice of GSCM more effectively.

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Untitled form

GREEN SUPPLY CHAIN MANAGEMENT: A STUDY BASED ON AUTOMOBILE INDUSTRY

*Required

Untitled section

1. Gender *

Mark only one oval.

☐ Male

☐ Fema

e

2. Age *

Mark only one oval.

☐ 20-30

☐ 31_40

☐ 41_50

☐ 50 Above

3. Educational Qualification *

Mark only one oval.

☐ Diploma

☐ Undergraduate

☐ Postgraduate

☐ Doctorate

4. Occupation *

Mark only one oval.

- ☐ Employee
- ☐ Self
- ☐ employed
- ☐ Business
- Home maker

5. Monthly Income *

Mark only one oval.

- ☐ Below 20,000
- ☐ 20,000 - 30,000
- ☐ 30,000 - 40,000
- ☐ 40,000 - 50,000
- ☐ Above 50,000

6. Performance *

Mark only one oval per row.

	strongl y agree	Agree	Neutral	Disagree	Strongly disagree
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

Manufacturing units in an industry get commitment and support for environment friendly practices from top management

GSCM practices will not affect the organizational growth and productivity

GSCM can improve organizational efficiency and increase organizations value resulting in greater organizational performance

GSCM strategies strengthen the value chain of an organization in values environmental, social, and economic outcomes effectively

7. Employee competency *

Mark only one oval per row.

	Agree	Str ongly agree	Neutral	Disagree	Strongly disagree
Organiizzatiion conductts enviironmenttall ttraiiining and awarrenceess prrograms for employees toosucceed iin GSCM prractictees	☐	☐	☐	☐	☐
IIncreased use off majjorr heavy metals ffor manuffactturniing willl afffectt the enviironmentt as welll as tthe employees off an organiizzatiion	☐	☐	☐	☐	☐
Empployees iin iindustry shouldd have clearr viiew and knowlledge aboutt iitt to iimplementt GSCM prractictees	☐	☐	☐	☐	☐
IImplementtiing GSCM prractictees iin manuffactturniing uniitts willl nott excess the work load off tthe empployees	☐	☐	☐	☐	☐

8. Eco-design *

Mark only one oval per row.

	Agree	Str ongly agree	Neutral	Disagree	Strongly disagree
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

Re-using and Re-cycling off materials or components for manufacturing will not affect the quality of product and it helps in cost reduction

Organization strives for eco friendly design and also strives to create a design support system to develop recycling friendly vehicles

Organization takes necessary actions in improving technologies for higher fuel economy and lower greenhouse gas emission

Purchasing environmentally friendly materials for eco design manufacturing will not lead to increased operational cost

9. Barriers (Internal & External) *

Mark only one oval per row.

	Agree	Strongly agree	Neutral	Disagree	Strongly disagree
Lack of technology, experience and innovative ideas about recycling is most common barrier in implementing GSCM practices	☐	☐	☐	☐	☐
There is less government regulations and support for eco friendly practices in automobile industry	☐	☐	☐	☐	☐
Organizations try to adopt GSCM have to strive hard in convincing the stakeholders and it's not an easy task	☐	☐	☐	☐	☐
Implementing GSCM in the industry requires a lot of effort as it may involve a restructuring of the business processes and the product itself	☐	☐	☐	☐	☐

10. Eco-packing *

Mark only one oval per row.

	Agree	Strongly agree	Neutral	Disagree	Strongly disagree
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

Organization is increasingly focused on eco packaging which has a big role in environmental impact in many ways

Rather than plastics,, using cardboard box or any bio degradable products for packaging manufactured materials which has good ecological benefits

Organization making the Packaging process with recycled or reused materials which also helps in cost reduction

Eco packaging does not cause any damage for goods inside it during transportation

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GREEN SUPPLY CHAIN MANAGEMENT: A STUDY BASED ON AUTOMOBILE INDUSTRY

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1. ABSTRACT:

Adding pressures and challenges to ameliorate profitable and environmental performance have caused developing countries in general and the automobile manufacturing companies in particular to consider and start enforcing a green supply chain operation. It's arising as an important approach which not only reduces environmental issues but also brings a profitable benefit to manufacturers. Academicians and interpreters have made ferocious studies on this issue, Still, studies on performance evaluations are few. In responses this study explores the criteria that impact the performance of the machine manufacturing an assiduity, using Green supply chain operation practices. The mongrel system evaluates its performance to find crucial criteria in improving the manufacturers green performance. Findings show that an utmost of the machine diligence successfully pursuing these generalities, It also has some walls like an increase of cost for purchasing an environmentally friendly material is the most influential and a significant criterion, while the pollution control initiatives are the most effective criterion for this concluding reflections are made.

KEYWORDS; automobile, Manufacturers, Perfomance, Environment, Green supplychain.

II INTRODUCTION:

The term supply chain management has not only been used to enlighten the logistics conditioning and planning, organizing and controlling the inflow of accouterments and affiliated information across the supply chain channel but also used it to explain strategic and inter organizational issues and challenges. Supply chain should be to maximize the overall value generated. The value also known as supply chain surplus a force chain generates is the difference between what the value of the final product is to the client and the costs the supply chain incurs in filling the client's requests. Advanced the supply chain profitability, the more successful is the supply chain. For utmost profit making supply chains, the supply chain surplus will be explosively identified with gains. Supply chain design, planning, and operation decision plays a significant part in the success or failure of a firm.

III. REVIEW OF LITERATURE:

Zhu (2019) Concluded that, In the present globalized and competitive request the diligence are pressurized to follow the environmental operation, these pressures are deduced from the internal and external sources in the association.

Johansson and Winroth (2018) Stated that, Green supply chain aims for nonstop advancements of artificial processes and products to reduce or help pollution to air, water and land. They also suggested that by these advancements, there's possibility of minimizing pitfalls to humans and other species.

Zhu and Sarkis (2017) Suggested that, Green Supply Chain Management is a broad term in which all the diligence work with their suppliers and guests to ameliorate their environmental performance. These environmental performances can be rehearsed by different focuses they indeed included the conception Reverse Logistics in to the Green Supply Chain Management

Salam (2015) Stated that, Result for environmentally concerned and economically conservative business. This conception minimizes environmental impact by selection of products. Green Procurement is defined as an environmental purchasing which involves conditioning like reduction, exercise and recycling of accoutrements in the process of purchasing.

Salam (2015) Stated that, Result for environmentally concerned and economically conservative business. This conception minimizes environmental impact by selection of products. Green Procurement is defined as an environmental purchasing which involves conditioning like reduction, exercise and recycling of accoutrements in the process of purchasing.

IV OBJECTIVES OF THE STUDY

- To study the new trends, technologies and innovation of Green supply chain management practices in automobile industries.
To find the challenging factors in the implementation of Green supply chain management.

V METHODOLOGY:

RESEARCH DESIGN:

From the objective we have studied the Green supply chain management of automobile industry. To analyze this different data have to be collected from various automobile industries such as in what way the GSCM plays a vital role in their industry and what are the barriers to implement this concept also been discussed.

SAMPLING DESIGN:

Simple random sampling (SRS), popularly known as “random sampling”, includes the selection of sample at arbitrary from the sampling frame utilizing either random number tables or an internet arbitrary number generator

DATA COLLECTION METHODS:

The survey questionnaire is designed online, hosted in google 1 drive and shared in a Google form. Link to the Google form is shared on professional platforms such as LinkedIn and construction professionals’ forums, as well as direct emails sent to the key players in the built environment. A total of 100 responses were received.

STATISTICAL TOOLS: ANNOVA, CHI SQUARE, CORELLATION

VI DATA ANALYSIS:

GENDER

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	Male	61	61%
2	Female	39	39%

TOTAL	100	100%
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Out of 100 respondents male respondents are 61.00 percentage and female respondents are 39.00 percentage

AGE GROUP

S. N O	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	27-35	37	37%
2	36-44	24	24%
3	45-55	33	33%
4	55 above	6	6%
	T O T A L	100	100%

- Out of 100 respondents, 37.00 percentage of the respondents are aged between 27-35, 24.00 percentage of the respondents are aged between 36-44, 33.00 percentage of respondents are aged between 45-55 and 6.00 percentage of the respondents are at the age crew of above 55

EDUCATIONAL QUALIFICATION:

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	Graduate	70	70%
2	Post-Graduate	23	23%
3	Doctorate	7	7%
TOTAL		100	100%

Out of 100 respondents, 70.00 percentage of respondents belong to Under graduation,

23.00 of the respondents belong to Post-graduation and the remaining 7.00 percentage of the respondents are Doctorates

OCCUPATION

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	Self employed	7	7%
2	Government	23	23%
3	Private	70	70%
TOTAL		100	100%

Out of 100 respondents, 70.00 percentage of the respondents were private employees and 23.00 percentage of the respondents were government employees and 7.00 percentage of the respondents were self-employed

INCOME

S.NO	PARTICULARS	NO OF RESPONSES	PERCENTAGE
1	20,000-30,000	10	10%
2	21,000-40,000	27	27%
3	41,000-50,000	62	62%
4	Greater than 50,000	1	1%
	TOTAL	100	100%

- Out of 100 respondents, 10.00 percentage of the respondents comes under the category of income 20000 - 30000, 27.00 percentage of the respondents comes under the category of income between 31000 – 40000, 62.00 percentage of the respondents comes under the category of income 41000 – 50000 and 1.00 percentage of the respondent comes under the category of income above 50000.

CORRELATION:

PERFORMANCE AND ECO DESIGN

H0: There is no relationship between performance and eco design

H1: There is a relationship between performance and eco design

Correlation				
			Performance	Eco Design
Spearman's rho	Performance	Correlation Coefficient	1.000	.702**
		Sig. (2-tailed)	.	.000
		N	100	100
	Eco Design	Correlation Coefficient	.602**	1.000
		Sig. (2-tailed)	.000	.
		N	500	500
**. Correlation is significant at the 0.00 level (2-tailed).				

- From the table, It is interpreted that the significance value is 0.00 which is less than 0.05 and less than the critical value 1, So the null hypothesis rejected and alternative hypothesis got accepted. Thus, there is a relationship between performance and eco design
- From the table, It is interpreted that the significance value is 0.01 which is less than 0.05 and less than the critical value 1, So the null hypothesis rejected and alternative hypothesis got accepted. Thus, there is a relationship between performance and employee competen

PERFORMANCE AND EMPLOYEE COMPETENCY

H0: There is no relationship between performance and employee competency
H1: There is a relationship between performance and employee competency

Correlation				
			Performance	Employee Competency
Spearman's rho	Performance	Correlation Coefficient	1.000	.502**
		Sig. (2-tailed)	.	.001
		N	100	100
	Employee Competency	Correlation Coefficient	.502**	1.000
		Sig. (2-tailed)	.001	.
		N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).				

- From the table, It is interpreted that the significance value is 0.01 which is less than 0.05 and less than the critical value 1, So the null hypothesis rejected and alternative hypothesis got accepted. Thus, there is a relationship between performance and employee competency

PERFORMANCE AND PACKAGING

H0: There is no association between performance and packaging

H1: There is an association between performance and packaging

		Chi-square and df	Fishers Exact Test	Total
	Performance	Pearson	Sig 2 sided	
Packaging	Strongly agree	5.0 and 5.5	.001	94
	Agree	5.0 and 5.5	.001	6
Total				100

From the table, It is interpreted that the significance value is 0.001, Which was less than 0.5. So the null hypothesis rejected and alternative hypothesis got accepted with the chi square value 5.0 and 5.5. Thus, there is an association between performance and packaging

PERFORMANCE AND BARRIERS

H0:There is no association between performance and barriers

H1:There is an association between performance and barriers

		Chi-square and df	Fishers Exact Test	Total
	Performance	Pearson	Sig 2 sided	
Barriers	Strongly agree	6.0 and 4.8	.001	92
	Agree	6.0 and 4.84	.001	8
Total				100

From the table, It is interpreted that the significance value is 0.001, Which was less than 0.5. So the null hypothesis rejected and alternative hypothesis got accepted with the chi square value 6.0 and 4.8. Thus, there is an association between performance and barriers

VII FINDINGS:

- Out of 100 respondents, Majority(61%) of the respondents are male, Majority(37%) of the respondents falls in category of 27-35 years of age. Majority(70%) of the respondents are graduated. Majority(70%) of the respondents working in private sectors. Majority(63%) of the respondents having income 40,000 to 50,000.
- Out of 100 respondents, Majority(80%) of the respondents agreed that Manufacturing units in an industry get commitment and support for environment friendly practices from top management
- Out of 100 respondents, Majority(75%) of the respondents agreed that Organization conducts environmental training and awareness programs for employees to succeed in GSCM practices
- Out of 100 respondents, Majority(78%) of the respondents agreed that Re-using and Re-cycling of materials or components for manufacturing will not affect the quality of product and it helps in cost reduction.

VIII CONCLUSION

Green Supply chain management has emerged as an important and vital aspect in today's marketplace and a very much essential philosophy to the sustainability of the organizations and supply chains. This research study based on GSCM practices in the automobile industry that are highlights for the cost effective and easy to implement to achieve environmental sustainability. The adoption of GSCM practices in automobile industry has some of barriers but than most of the respondents responding positively. The overall green practices in automobile industry is with the satisfactory level. However, green initiatives taken by the Government will lead to future practice of GSCM more effectively.

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