SUSTAINABILITY IN SUPPLY CHAIN MANAGEMENT IN CONSTRUCTION INDUSTRY

Harsha Debadwar[1]*, Monika Verma[2]

Abstract

This review is focused on various research studies in Supply Chain Management and achievingsustainability in supply chain management of civil engineering field. As the supply chain management is not concerned to the specific field but every person in the society is responsibleand part of this chain/management. To attain sustainability, it is important to examine and restructure the supply process of the particular material or service or organisation hierarchy forthat matter. There are many aspects to a supply chain such as logistics, economy, raw material,manufacturer, supplier, customer need, demand and supply of products etc. All these aspects of the chain run smoothly is a responsibility of supply chain manager. In case of construction lane, a lot of uncertainty and a project timeline affects the supply chain. In paper we are aimingto find the possible best way to maintain sustainability and efficient results from a constructionindustry's supply chain management.

Keywords: Sustainability, Supply Chain, Organisation, Logistics, Supply Chain manager

[1]*PG Scholar, School of Civil Engineering, Lovely Professional University, Phagwara, Punjab, India1144411, E-mail:- hdebadwar@gmail.com

[2*]Assistant Prof. School of Civil Engineering, Lovely Professional University, Phagwara, Punjab, India 1144411,
E-mail:- monika.25114@lpu.co.in

*__Corresponding author: -__ Harsha Debadwar
*School of Civil Engineering, Lovely Professional University, Phagwara, Punjab, India1144411,
E-mail:- hdebadwar@gmail.com

DOI: - 10.48047/ecb/2023.12.si10.00422

INTRODUCTION

In post pandemic world where online businesses had given a boost to the market of supply chain is nowan important aspect of management. Let it be a bread shop around the corner or pharmaceutical drugs or any construction material the phases of product from its raw stage to the final product travel is a kindof supply chain. Each and every aspect during this process is important in order to make it a successfulsupply chain. In today's sustainability-oriented world why to plan just conventional management whenit can be sustainable, economic and efficient. Delivering the product safely and timely as per requirement is the ultimate aim of this process. World has been closer due to internet over these years.

Supply Chain Management (SCM) represents all the tasks, planning, processes behind the products wesee in market/shops. This management varies as per the work field like medicinal, inventory, construction material, electrical, organic materials, fuels, etc. and also the type of mode of travel as well as the technology used to manage the supply chain affects the process. As per the researchers developed countries have better management systems than developing or below poverty line countries. To have sustainability in supply chain the whole work system of the company or organisation or team is responsible. Here the supply chain manager role comes in play. In this report various aspects of this supply chain achieving sustainability for long better life of planet earth has been reviewed around the globe. We analysed a project to achieve the objectives of the proposed research. For the civil engineering student SCM improvement through sustainable point of view is great.

1.1Sustainability

21st century has seen growing focus on sustainability. The factors driving an increased focus on supplychain sustainability can be divided into three distinct categories: 1. Reducing risk and improving the financial performance of the supply chain 2. Community pressures and government mandates 3. Attracting customers that value sustainability Sustainability in a supply chain can be viewed along threepillars-social, environmental, and economic. The Brundtland Commission of the United Nations defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The 2005 World Summit of the United Nations introduced a framework identifying economic, environmental and social sustainability as the "three pillars" of sustainable development. All three pillars must be reconciled forsustainability to occur. The focus on sustainability has increased as the economies in large countries such as Brazil, China, and India have grown. On the one hand, the growth of emerging markets is improving global living standards in a way that perhaps has not happened before in human history. Onthe other hand, this growth puts pressure on resources and the environment in a way that has also neverhappened. It has become increasingly clear that if supply chains do not become more sustainable than they have been in the past, the world's resources and environment will not be able to maintain this level of growth. Sustainability has presented more of a challenge when it requires efforts that do not pro-videobvious return on investment for a company. In fact, customers themselves have not always backed up their words about the importance of sustainability with a willingness to pay more for sustainable products or make more of an effort to support sustainability

1.2Sustainability in Supply Chain Management

As majority of research resulting in achieving the sustainability makes clear that we should consider using it in the supply chain area. These values do make noticeable point to save our and economy in every possible way. The supply chain which is environment friendly can makes the company lower products cost and give better service to customers. Locally available materials and service usage is the smart step towards efficiency economically and environmentally. Opportunities for improving supply chain sustainability can be identified by matching the social (workforce, customer, society) and environmental (resource reduction, emission reduction, product innovation) pillars we have described with the various supply chain drivers discussed in this paper. The goal is for every firm to measure its environmental impact for each driver along each of the social and environmental categories. The extent of recycling remanufacturing depends on the incentive to recycle or remanufacture and cost to recycle or remanufacture. The cost of product ending in landfill is borne by society.

1.5 Impact of sustainable Supply chain on Construction Industry

Including sustainable way in conventional methods of logistics, purchasing, marketing, material supply and reverse flow of the materials and services. As it is important to consider positive and negative factors of traditional civil construction industry had over the years affected our environment. The energy efficiency and

sustainability along with the customer perspective makes a big difference in long run. Additionally, in this changing environment, businesses can make use of product life cycles to encourage customer and stakeholder collaboration, sustainable social goals, and significant product innovations and cultural shifts that have a positive impact on supply chains, individual businesses, and environmental sustainability and energy efficiency issues.

Litreture Review

Hakan Aronsson et al. (2006) this study focused on lowering the cost of transportation and shorter lead times which are more focused to increase the effectiveness of operation which conventionally neglected environmental side of this issue. This is creating a burden on future which we cannot repay in sense of time and cost both. The study connected environmental impact to logistics decision-making. The research, which is based on three case studies, explicitly acknowledges a decision hierarchy of strategic, tactical, and operational options. Additionally, they discovered and described circumstances where the environment and operational efficacy are enhanced. The European commission (2001) gave some ideas to support this positive change as we can shift the mode of transport, reducing the demand for transport such as de-coupling, using the vehicles more efficiently so as it reduces its negative impact. If these alternatives do not work the company has to restructure the logistic system. Here strategic decisions affect directly on the supply chain and environmental footprints. • *Craig R. Carter et al., (2008)* Reviewed the past research along with interviewing and brainstorming with 35 executives and managers from 28 companies from different sectors on SSCM. Most of the companies do not focus on all the necessary guidelines to achieve sustainability and follows just some of them which is not enough to reduce waste and having good impact on ecosystem and economy. It is comparatively easy to implement the new rulesand train the staff of big organisation or company than a small business. Even though the businesses look small their impact combining all of them is a big deal as environmental and economic issue. This paper state that in a global report on sustainability 250 firms reported their annual sustainability report and 80% of the report were focused on SC related issues. The people are now getting more aware about their actions and its impact on economical social and environmental background. New concept of logistics social responsibility and purchasing social responsibility were explained with their role and advantage in economy diversity and human rights in relation to logistics of supply chain. The study also shows that using risk management in this process from planning stage is effective step which realises the priorities and affecting factors. Companies strategies, transparency, risk management and culture are the supporting factors to its sustainability. *Gupta et al. (2011)* Studied the effect of GHGs on environment and the pressure on organisations businesses to reduce their products negative impact on ecosystem and concentrate on products life cycle and its value. The way of approaching the design, source, manufacturing and distributing process plays an important rolein overall outcome. Firm's decision should be considerate of societies goodwill. Also, if it is not affected by political background and excludes governments rules the system organisation will be more effective. This paper gives an importance to role of the managers and people in the industry as they handle the supply chain and take decisions which can change the whole down line working of the project. They have to highlight the specific areas in the start to createa lean work flow that are closed loop supply chain, lean and green operation management, green process and product development, reduce-reuse-recycle. The analysis from a strategic management have its own benefit and the reason is that reverse logistics concept gives a valueto the process and product and every tiny detail get reviewed in this closed loop function. Theservice should be in demand and the remaining products reuse and further processes has to beplanned to have zero waste supply *chain.Togar M. Simatupang et al., (2011)* While a framework for collaboration is utilised as a tool to find initiatives for resolving challenges, drama theory offers the analysis of strategic engagement to identify dilemmas. Different viewsof the chain members can be structurally exposed and resolved using the illustrated case studydescribed in this paper. The underlying premise is that the interaction between participants' thoughts and feelings exposes contradictory circumstances and offers an explanation on how to resolve them at various phases of the interaction. Understanding the continuum of collaboration that aligns with their business imperatives is necessary for knowledge of collaboration. A common design that can be broken down into five components— informationsharing, collaborative decision making, process capabilities, and performance accountability and incentive alignment supports supply chain collaboration in a continuous manner. *Hokey Min et al., (2012)* this paper classified past research literature on green supply chain management and prepared list of them. Then the noting evolution

over 15 years because of trends and greening demand and its effect on future market. The main focus is on the businessactivities topics which are directly addressing and associated to environment. Those key topics are sourcing, making and delivering. Environmentally friendly practises are incorporated into all aspects of supply chain activities, including sourcing, product design and development, manufacturing, transportation, packaging, storage, retrieval, disposal, and post-sale services, including end-of-product life management, under the umbrella of global supply chain management (GSCM). Examples of these initiatives include the company's environmental guidelines and policy, adherence to environmental laws and standards (such as the U.S. Environmental Protection Act and European Union environmental laws), supplier certification and selection based on supplier commitment to sustainability, use of renewable energy sources, such as sunlight, air, wind and geothermal heat, biofuels, Degradable packaging etc. *Suhaiza Zailani et al., (2012)* Surveyed the field of Sustainable supply chain management in Malaysia by preparing a questionnaire. These been used to the profile of different companies in supply chain business. Impact those companies created on ecosystem with triple bottom line of sustainability is studied through their answers. Individual performance depending on the scoreis calculated as 5 section were there in the questionnaire. The formula to calculate the results and comparativeness used is Varimax Rotation following eigen values, Cronbach's alpha and finally regression analysis is used. *Namita Rajput et al., (2013*) In Buildings and environment transform, the United Nations Environment Program in recent times reported that on a global origin 30- 40% of all principal energy is worn in buildings. That's why, it necessitates the all encompassing computation of not simply construction, maneuvers and preservation, howeverthe contact of possessions augmentations above the building's productive subsistence and eradication and discarding afterward. Instead of packed gravel for parking lots in place of concrete or asphalt helps in enhancing replacement of earth streams. More Than 51% of the architects, engineers, contractors, owners anticipate that by 2015 almost 60% of their activitieswill be green. depicted critical analysis of green practices in construction sector's supply chain,room to cover (issues, challenges, success determinants, research factors) in green practices in overall supply chain in Indian construction industry, engagement of people in the alliance of organisations and institutions with in supply chain, sharing of experience and learning from others involved in the process. *Frank J. Xu et al., (2014)* Achieving horizontal and vertical transparency in local or cross-border/global, "closed" or "open" food supply chains is becomingincreasingly difficult and expensive due to factors like globalisation, individualised food consumption behaviour and the demand for high-quality, healthy foods from both developed and emerging economies. Four traceable information carriers are linear barcodes, RFID, tags and edible marking systems and DNA based technologies. In recent years, research has been done on simulation systems, prototypes, frameworks, and data models to pilot new technologies and standards for upgrading an existing quality management system with tracking and tracing features or creating new traceability systems. Members of the Asia-Pacific Economic Cooperation have started working together to assess if a traceability system for agricultural commerce and production is ready to be developed and put into use. The Institute of Food Technologists recently opened a new Global Food Traceability Centre with the goal of bringing together significant players in international food supply chains to work collaboratively on food traceability. *Vivudh Fore et al., (2016)* At present, supply chains are becoming increasingly complex, where suppliers and customers stretch between various countries and continents. The biggest problem faced by manufacturers is to optimize supply chain performance and reduce operational costs over such large geographical stretches. IoT acts as a solution to this problem as it facilitates the use of Wireless Sensor Networks (WSN) in order to interconnect all the various actors in a supply chain. This paper presented an Intelligent Supply Chain Management System (ISCMS) that benefits from the amalgamation of IoT and Cloud and provides real time monitoring, tracking and managing of goods from the perspective of a supplier, customer and shipper. they also proposed an algorithm that depicts the working of their system. The proposed Intelligent Supply Chain Management System alongwith the algorithm are simulated using the iFogSim simulator. IoT facilitates the use of Wireless Sensor Networks (WSN) in order to collect information from various sensors, whichis then exchanged and depicted onto the real world through the help of actuators. IoT is not justabout embedded devices connected to one another, rather, it consists of a large set of actors such as sensors, things, sensor networks, actuators and humans that lead to its proper functioning. This paper combined the IoT and Cloud to the maximum benefit in the process of supply chain that makes it work smart delivers the result. This

intelligent system would ensureefficiency of the supply chain, quality control, cost benefits and customer satisfaction. *Sara Saberi et al., (2018)* Reviewed the use of Block Chain Technology in supply chain management field. This technology is secure, modified, updated and does not require lot of asset. The manpower and labour work being 90% saved by this technology. It's a trustworthy end to endencrypted data recording technology. New era of the supply chain business started when this technology entered. According to the users it is reliable, authentic, easy to execute system. Authentic use of information technology in traditional business boosts the process resulting in successful rise in supply and management field. *Wafaa Shihadeh Al-Ghwayeen et al. (2018)* According to the review public has been more conscious about the packaging, ingredients andits effects on environment. Ecofriendly product production process and service to make environmental performance better helps a lot. Implementation of green practices reduces the carbon and GHG emission, reduces waste which indirectly improves company's economic performance. Logistics in industrial areas affects the GDP big time. To have great results in green sustainability conventional system has to make changes in it. Such as environment well-being in supply chain management changes the whole idea while designing the product, sourcing the material, collection site, its manufacturing, sales, delivery and recovery etc. Investments in such process of management needs a good preparation to convince corporation authorities and board members and investors. Reaction of customer is the most important thing in this as even after making sustainable product they should be the one making it more use that's the ultimate aim. So, we also have to keep in mind that customer must convince for potential of product and its effect in its life. At correct time management should be taking help from experts as it examines whole process and organisation objectives, its strategies, execution.To have better export performance its financial stability and strategic effectiveness are to be measured. *Piera Centobelli et al. (2018)* This paper covered the research gaps despite of beingsuch trending topic supply chain some points have been left of. The gaps are concerned about the technologies and initiatives in energy efficiency and the supply chain sustainability. They defined supply chain management as the control of a supply network of internal and external relationships between interdependent businesses and business units, which includes material suppliers, purchasing, production facilities, logistics, marketing, and related systems that enable the forward and reverse flow of goods, services, money, and information from the original producer to the final consumer with the advantages of creating value, maximising profitability through. Most of the papers have adopted quantitative methodologies which are surveys, mathematical and simulation models. Basic step to adopt the sustainable way is to understand properly and its true meaning in consideration of customer perspective and influence on business. Studied the two types of research work that are barriers and drivers. The initiative to achieve aim is categorized as administrative initiatives, Transport initiatives, Efficient initiatives, Intra-organizational initia-tives, Inter-organizational initiatives. The Sc model should be impactful in economic, operational and environmental performance. *Tu M (2018)* IoT has many choices in product tagging, such as Barcode or RFID technology, and RFID tagging is often used with EPC encoding scheme. RFID readers retrieve the informationfrom a RFID tag through radio waves, with no line of sight operation, which allows for batch scanning of products. Compared with barcode technology, RFID technology can repeatedly write data into the memory blocks of a tag, which can carry more information than barcode does. So, RFID tags can withstand harsh conditions and are resistant to contamination and damage. it is an important tool to help this research to explore the prevalent perception of enterprises about IoT technology. Essentially, GT attempts to develop a theory from a model, theme, or category, as found in the observed data. This study has tested the theoretical model about IoT adoption and synchronized the qualitative and quantitative findings. This research notes four key factors that affect firms' intention to adopt IoT when managing their logistics and supply chain: perceived benefits, perceived cost, trust of technology, and external pressure.Trust of technology indirectly affects the adoption intention through perceived benefits. The supply chains which are open or involve third party or closed chains represents detail flow of the system. Here they analysed how many elements or steps are involved in a process and howwe can make them most sustainable. After that each step is observed and *Esteban Koberg et al., (2018)* This paper gives the review about the implementation of sustainable supply chain management. Supply chain is a structure which connects a buyer to the direct supplier or sub supplier or party other than supplier. In order to better understand how focal enterprises, coordinate upstream sustainability initiatives, relational mechanisms were coded in accordance with their specific methods. If the buyers use open configuration system it is

beneficial for them to achieve economic performance. *Ripanti, E. & Tjahjono B, (2019)* They aimed on Circular economy of the supply chain which is very useful to create a closed-loop supply chain.The reverse logistics helps overcome the loopholes while planning in forward to result. It helpsin resulting fast product recovery. This paper used the circular economy formula having the five principles that are thematic analysis, value definition, literature filtering, value mapping, literature analysis. The approach followed in circular economy of supply chain is

I. Data Collection
II. Data filtering
III. Literature analysis
IV. Thematic analysis

Circular economy values refer to the core principles and concepts that underpin the philosophy of a circular economy. The circular economy aims to move away from the traditional linear "take-make-dispose" model of production and consumption and instead focuses on creating a regenerative system where resources are used more efficiently, waste is minimized, and products are designed for longevity, reuse, and recycling.

The system is a combination of technologies, economy available resources etc. across the completion of project at various stages. *Ahmed Sodiq et al., (2019)* the study is a review of sustainable cities and their uniqueness than other cities. Sustainable cities use non-renewable resources lesser than the renewable resources which means environmental-friendly lifestyle and business. The energy that city creates is more than the need of city in that way they save more energy which is sustainable. From the construction, education, small habits of the peoplein the city, economy, innovations, connectivity with governance, technology, resources etc. come together to make the city sustainable. The study shows the principles followed by the cityto achieve sustainability. The availability and usage of renewable and green resources in any task helps in decreasing the carbon footprint. In achieving a sustainable supply chain management first, the people organisation has to adopt the rules or we can say that lifestyle sothat when they start to work on any project they naturally opt for renewable affordable quality environment engaging and suitable for project option. This circular economy embraces the sustainability in the built industry. *Kannan Govindan et al. (2020)* This review summarizes that the supply chain results in good performance when its planning and execution follows the three pillars of sustainable supply chain. As our social practice and its environmental impact affects economic performance. The focus should be on minimizing negative impact on firm and other parties. There should be legal practices even if it is multi-tier supply chain. It does get difficult to track each activity of supplier distributor manufacturer in multi-tier chains. To make this understanding they prepared questions for firms or people who are involved in supplychain. As the questions are about the barrier and driver in multi-tier supply chain considering social and economic factors. Multi-tier systems working on so many social issues and tensionsas we have to be sustainable also. An employee's behavior towards such situation affects thesystem. Proper training, regular reports, analysis, management, stakeholder's decision. Preparing a conceptual framework helps to resolve much of the issues in chain. *Venugopal Reddy Battula et al., (2020)* Surveyed 50 organisations in a civil construction industry. He focused on how effectively supply chain management can be implemented in the constructionindustry. By preparing flow charts and studying the organisational structure in this industry heanalysed the data. There are three types of supply chain he observed those are prime, secondary and individual resource. Depending upon the project area, resource available, funding of the project, manpower available, government policies and environmental features at the time of execution and throughout the year all affects the final result of the process. To analyse the data collected correlation method worked best here. *Sarkis J. (2020*) this research has been done after COVID-19 and changes caused in supply chain because of pandemic. It is clear that pandemic has moved the world of business upside down. Online business and supply delivery demand increased suddenly. A lot of new birds entered in the market so the old ones has to stepup their strategies to run the company. As Sarkis J. focusing on the originality of the product while changing the plans is important. Social background, material availability, funds, workingstaff are some of the factors affecting the supply chain. In after pandemic world the current need of consumer and future prediction is creating new strategies for the supply chainmanagers. To attain the sustainability leanness and efficiency to the process is necessary. Thebusiness works on trust is known by every businessman so the communication and understanding with locals and contractors adds a positive rise to Supply chain. The 4.0 technologies are boosts to online business tracking and those are cyber-physical systems (CPS), Internet of Things (IoT), Cloud computing, cognitive computing, e-commerce, big data. Blockchain transparency and

traceability is one of the tools to identify supply chain's environmental and social vulnerabilities and then using big data predictive analytics tool to build needed capabilities and capacities. *Neeraj sood, et al., (2021)* the difference between the return on invested capital and the anticipated returns given risk, also known as the weighted average costof capital, was used to compute excess returns. We contrasted the excess returns for producersand middlemen with the typical S&P 500 company return. We discover that between 2013 and 2018, excess returns for manufacturers and middlemen were larger than those for the S&P 500. The excess returns for pharmaceutical manufacturers are lower than the S&P 500 (1.7% vs. 3.6%), but those for biotech manufacturers (9.6%), wholesalers (8.1%), and insurers/PBM/ retailers (5.9%) continue to be significantly higher than the S&P 500. This is because research and development (R&D) is treated as an investment rather than an expense. *Theofilos D. Mastos et al., (2021)* By establishing information transparency, the suggested approach enables businesses operating in closed-loop chains to monitor their operations in real- time and support decision-making while simultaneously enhancing their financial and environmental performance. This study is seen as a step in the direction of the circular economysince it demonstrates how the usage of industrial wastes, such wood, may be used as fresh materials for many applications, including power. A crucial element for businesses looking todevelop cleaner production techniques is the study's methodology. Applying this approach to the three case companies strengthens the empirical support for industry 4.0 solutions for CSCMdevelopment and promotes more environmentally friendly production and supply chain management methods. *Mathew Archer (2021)* studied the global agricultural supply chain. This chain is completely based on geology and atmospheric condition of the area. The marketneeds to be flexible according to the availability of the product and resources needed for the business. The management need to follow the guideline of the government. The communication with stakeholders when the organisation is based on multi stakeholder initiative governance. The policies should be designed such that it supports the flexible market criteria and demand. Working with the political ecologist and scholars to develop new designsand implementing them makes people positively manifest the outcome. *Zhiwen Su, et al. (2021)* Worked on the various research in global supply chain using CiteSpace software. The differentareas closely related to global supply chain are sustainable supply chain management, corporate social responsibility, green supply chain management, responsible supply chain management,and green procurement which been focused by the scholars. The SSCM is the combination of processes such as designing, planning, leading, controlling to coordinate material, information, capital flows, innovations, organisational structure, Economical plans of company and shareholders etc. The traditional literature review, theoretical research is slow and less effective as the Cite Space software is an advanced technology that collects all the topic related data andthe prior studies in that field. In this paper its work is to conduct co-author analysis, co-word analysis and co-citation analysis. The techniques followed is the co-occurrence which works when two authors, keywords, cited references or other data appear on same records. This helpsin finding the needed research gap and most focused area and least work area from relative study. The Bibliometric method helps in understanding supply chain management with different dimensions

Methodology

By reviewing all the papers, the methodology which works best is the Questionnaire method. As its best to understand the supply chain over the years and what new implementation neededin this after pandemic construction industry. In SSCM the study areas are classified in categories that are Synthesis, Policy, Purchasing, Manufacturing, Green Logistics and Reverselogistics. And to study these areas methodologies which can be adopted are conceptual, case study, Exploratory, Empirical or Analytic method. Each method has its own way of providingdata as its researches choice to use most efficient and accurate one. The questionnaire which we are preparing belongs to the exploratory method. (Sunil Chopra) The data is analysed based on questionnaire survey with the common practitioners in construction industry. Their opinion and implementation on environ-mentally friendly and sustainable materials, process, packaging,labour, safety, machinery, economy and so many more in detail is analysed.

Analytical method is the second methodology to being followed to get desired results. In civil engineering field as there has been comparatively less research in SC as focus is on using locally available materials as much as possible but world is changing and there are more technologies and options available to go for within budget and also supporting our planet goodwill. (SHAH, SUPPLY CHAIN MANAGEMENT TEXT AND CASES) There is an increasing demand for a more flexible,

open research approach, such as soft operations researchtools, that can successfully deal with the ill-defined, less-structured environmental concerns facing practising managers and policy makers. Environmental issues affect many functional areas of the supply chain and span the multiple levels of decision-making hierarchy (from operational to strategic).

To construct any structure, we have to follow the stepwise procedure as it may vary depending upon the type of construction process, type of building or structure to be constructed, geographical conditions, social background and many more things. There are six common steps to construction process with an overview,

- Conception of work
- Design stage of the structure
- Pre-construction stage
- Procurement stage
- Construction stage
- Post-construction stage

Achieving sustainability in every stage is our aim in this research work. Detail examination and analysis of these stages in a construction firm gives proper results. Which will be executedin the other half section of the report. Overviewing the projects actually executing and comparing it with the conventional method.

Analytical method

This method is used to analyze each stage the construction of the structure. Planning, designing, execution of material, transport, storage, Labouré, machinery, equipment, risk management, environmental performance, economic performance, social performance post-construction management like finance, paperwork, social issues, clearing out site, amenities etc. allthese will be reviewed in a project.

- **Material:** The types of materials used over the years are affecting the environment in a negative way which is why we have to find eco-friendly and sustainable materials for our construction. The materials should create minimum waste and having maximum working property. Life cycle of those materials will also assess. Materials like fly ash, rice husk, aerated blocks, pre-casted members, pre-fabricated beam, column, bar, staircase, doors window frames are the new concepts which make positive change in the process. These canbe used in project and results will be compared to show the sustainability in that construction project and its future implementation on large scale.
- **Labour:** Depending on the area and type of construction the labour availability varies. It also depends on the funds for the project. Using the available labour with their maximum potential and taking proper care of them males it efficient. Providing them proper service for food and living and medical services during the whole construction project is basic outline with economy of the project. Having skill labours and meeting the design proposedis the most challenging work.
- **Transport:** Available logistics and making its full use is the goal to achieve sustainability.Now a days any options are available in market but choosing the correct transport accordingto the materials needed on site and on the time is an important factor. Importing some materials from outside country or state takes an amount of time which makes changes the proposed plan which also have to consider. Logistics affects greatly on the overall project so has to be one of important factors in consideration.
- **Management:** Management work starts from minute the conception work of the project. Planning the design of the proposed project the design, the site, survey, testing of site geology and materials, contracts for the work, selection of the dealing companies for different work like material, design, security, transport, interior, exterior of structure and so much more small details when the actual work starts. Project has to complete in given period of time. For that risk management of the project and hiring according to that is very important. Having connection over the area to get the requirement fulfilled is the key of running business effectively.

Discussion

Sustainable supply chain has emerged as a new field of focus for firms and governments. Sustainable supply chain encompasses economic development, environmental performance and social betterment. The following factors drive firms towards greening:

Sustainable initiatives driven by consumer demand.

Achieving cost savings by implementing environmentally friendly practices

- Cost reduction through greening
- Price premium potential through greening
- Government regulations-driven greening

Green supply chain implementation faces challenges in terms of increasing costs of greening and unclear benefits of greening in short term. In addition, most green supply chain initiatives are

achieved through collaboration with partner firms, which are difficult to implement.

The following are the key metrics to measure the environmental performance of a supply chain:
- Energy consumption
- Water consumption
- Greenhouse gas emissions
- Waste generation

One of the key focus areas of sustainable supply chain management is "closed loop supply chain management" and it consists of activities that manage the movement of products from consumer back into the supply chain. Closed loop supply chain management throws unique challenges in the management of supply chains as firms not only need to work towards designing and managing forward supply chains but also need to manage product returns and reverse supply chains. Supply chains also have increasing social impact particularly in the communities that they operate in. It is equally essential that firms work towards social betterment as part of their sustainable practices.

CONCLUSIONS

Despite of so much research in the field of supply chain management there is less done in civil engineering field. The inventory, daily needs, petroleum or some other businesses are working successfully through the supply chain and they also need to implement sustainability in their system. Results concluded that the environmental good will needed to promote in all business and technology use is necessary which improves efficiency and achieves desired goals.

REFERENCES

1. Hakan Aronsson, Maria Huge Brodin, "The Environmental Impact of Changing Logistics Structures", The International Journal of Logistics Management, Vol. 17 No. 3, pp. 394-41 (2006)
2. Andersen, M. S., "An Introductory Note on the Environmental Economics of the Circular Economy", Sustain Sci, 2,133-140 (2007)
3. Craig R. Carter and Dale S Rogers, "A framework of sustainable supply chain management: moving towards new theory", IJPDLM 38,5 (2008).
4. Chen, J, "Material Flow and Circular Economy. Systems Research and Behavioural Science", 26(2), 269-278 (2009)
5. Sunil Luthra, Vinod Kumar, Sanjay Kumar, Abid Haleem, "Green Supply Chain Management Issues: A Literature Review Approach", Journal of information, knowledge and research in mechanical engineering, ISSN0 975-668X vol 1 issue 1 (2009)
6. Arzu Akyuz, G., and T. Erman Erkan, "Supply ChainPerformance Measurement: A Literature Review." International Journal of Production Research 48 (17): 5137–5155. (2010)
7. Sudheer Gupta, Omkar D. Palsule-Desai, "Sustainable supply chain management: Review and research opportunities", IIMB Management Review (2011) 23, 234-245.
8. Craig R Carter, P. Liane Easton, "Sustainable supply chain management: evolution and future directions", International Journal of Physical Distribution & Logistics Management Vol.41 No.1, 46- 62 (2011)
9. Suhaza Zailani, K. Jeyaraman, G. Vengadasan, R. Premkumar, "Sustainable supply chain management (SSCM) in Malaysia: A survey", Int. J. Production Economics 140 (2012) 330-340.
10. Hokey Min. Ilsuk Kim, "Green supply chain research: Past, present and future", Logistics research ISSN 1865-035X vol 4 Combined 1-2 DOI 10.1007/s12159-012- 0071-3 (2012)
11. Namita Rajput, Nitish Bagdi, Simple Arora, "Adoption of Green Construction in India: A Road Less Travelled", OIDA International Journal of Sustainable Development 06: 07 (2013)
12. Frank J. Xu, Victor P. Zhao, Lu Shan,Chuxiong Huang, "A Framework for Developing Social Networks Enabling Systems to Enhance the Transparency and Visibility of Cross-border Food Supply Chains", GSTF International Journal on Computing (JoC) Vol.3 No.4 (2014)
13. Vivudh Fore, Abhirup Khanna, Ravi Tomar, Amit Mishra, "Intelligent Supply Chain Management System", IEEE (2016)
14. Blomsma F. & Brennan G, "The Emergence of Circular Economy: A New Framing Around Prolonging Resource Productivity", Journal of Industrial Ecology, 21(3), 603- 614 (2017)
15. Sara Saberi, Mahtab Kouhizadeh, Joseph Sarkis & LejiaShen, "Blockchain Technology and its relationship to sustainable supply chain management", International Journal of Production Research (2018)
16. Wiliam L Swann & Aaron Deslatte, "What do we know about urban sustainability? A research synthesis and nonparametric assess-ment", Urban Studies Journsl Limited 1-19 (2018)
17. Esteban Koberg, Annachiara Longoni, "A systematic review of sustainable supply chain management in global supply chain", Journal of cleaner production 207 p no.1084-1098 (2018)
18. Piera Centobelli, Roberto Cerchione and

Emilio Esposito, "Environmental Sustainability and Energy-Efficient Supply Chain Management: A Review of Research Trends and Proposed Guidelines", energies, MDPI, 11, 275 (2018)
19. Eafaa Shihadeh Al-Ghwayeen and Ayman Bahjat Abdallah, "Green supply chain management and export performance: The mediating role of environmental performance", Journal of manufacturing technology management (2018)
20. Tu M, "An exploratory study of Internet of Things (IoT) adoption intention in logistics and supply chain management: A mixed research approach", The International Journal of Logistics Management, Vol. 29 No. 1, pp. 131-151.
21. Ripanti, E. & Tjahjono, B., "Unveiling the Potentials of Circular Economy Values in Logistics and Supply Chain Management", The International Journal of Logistics Management, vol. (In-press), pp. (In-press) (2019)
22. Ahmed Sodiq, Ahmer A.B. Baloch, Shoukat Alim Khan, Nurettin Sezer, Seif Mahmoud, Mohamoud Jama, Ali Abdelaal, "Towards modern sustainable cities: Review of sustainability principles and trends", Journal of Clear Production (2019)
23. Ana de Jesus, Antunes, Paula, Santos, Rui, Mendonça, Sandro, "Eco-innovation pathways to a circular economy: envisioning priorities through a Delphi approach." J. Clean. Prod. 228, 1494-1513 ISSN 0959-6526 (2019)
24. Neeraj Sood, Karen Mulligan, Kimberly Zhong, "Do companies in the pharmaceutical supply chain earn excess returns?", International Journal of Health Economics and Management 21:99–114 (2021)
25. Kannan Govindan, Mahesh Shaw, Abhijit Majumdar, "Social sustainability tensions in multi-tier supply chain: A systematic literature review towards conceptual framework development", Journal of cleaner production 279 (2021)
26. Venugopal Reddy Battula, Sundeep Kumar Namburu, Venkatesh Kone, "Astudy on factors involved in implementation of supply chain management in construction industry" (2020)
27. Joseph Sarkis, "Supply Chain Sustainability: Learning from the COVID-19 Pandemic", International journal of operations & production management, Vol. 41 No. 1, pp. 63-73 (2020)
28. Mathew Archer, "how to govern a sustainable supply chai: Standards, standardizers and the political ecology of (in) advertence (2021)
29. Theofilos D. Mastos, Alexandros Nizamis, Sofia Terzi, Dimitrios Gkortzis, Angelos Papadopoulos, Nikolaos Tsagkalidis, Dimosthenis Ioannidis, Konstantinos Votis, Dimitrios Tzovaras, "Introducing an application of an industry 4.0 solution for circular supply chain management", Journal of Clear Production 300 (2021) 126886
30. Zhiwen Su, Mingyu Zhang and Wenbing Wu, "Visualizing Sustainable Supply Chain Management: A Systematic Scientometric Review" (2021)
31. De Brito, M.P, "Managing Reverse Logistics or Reversing Logistics Management", Erasmus University Rotterdam, the Nether-lands. PhD Thesis
32. Barney, J., "Firm Resources and Sustained Competitive Advantage." Journal of Management 17 (1): 99–12