

## A Meta Analysis of Sustainable Supply Chain Management from Different Aspects

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### Abstract

In recent times there is surge in the sustainable supply chain field. The focus of the present work is targeted towards viewing the major aspects of SSCM by focusing towards SSCM through the lens of meta-analysis by performing a structured literature review with the help of the already published articles available on SCOPUS database. A total of 369 articles have been identified from the database over a period of 15 years (2006-2020). The research articles chosen have been categorised and analysed in the viewpoint of journal wise, year wise, application wise, methodology, various barriers and drivers for SSCM. The study has enlightened on the key point of SSCM with the up-to-date developments, trends and the current scenarios. The research has shown that the multi criteria decision making techniques have been employed in abundance in the literature with a fair share of developing countries like India and China contributing into the field of study. This study is advantageous for both researchers and industry personnel for better understandings of SSCM.

**Keywords:** Sustainable supply chain management (SSCM); Literature review; Multi criteria decision making (MCDM); Triple bottom line (TBL); SSCM drivers and barriers.

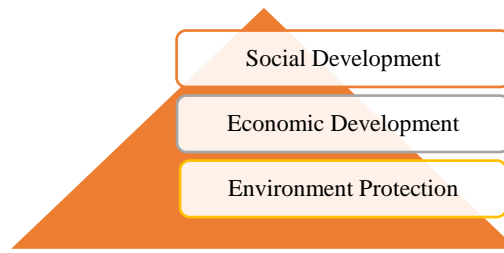
### 1. Introduction

Conventional Supply chain endorses linkages that acts as a medium to convert input into output for an organisation. Earlier scenarios of the supply chains were confronted by the obstacles related to the on-time delivery of goods in cost effective manner. But, exponential rise of urbanisation and globalisation shifted the viewpoint related to traditional approach of working. Currently, dynamics of the supply chain promotes adoption of eco-friendly practices and effective utilisation of the man, material and money related resources, essence of this is consolidated in the term named 'Sustainability'.

In the current era, supply chain management is becoming hot topic, which is escalating new venues to meet supply and demand patterns in a cost-effective way. In lieu to the same, focus of the researchers is also shifting towards this domain, for explorations of the new horizons, which improve supply chain potencies. To succeed in the competitive environment and hold the hefty market shares, supply chain needs to be relooked for implementation of performance-oriented business practices. Such conditions, has prompted academicians and industrialists to explore new possibilities, dedicated to serve need of the hour (Silvestre, 2015).

'Sustainability' term was first coined in the Brundtland Report in 1987, with the inception of Environmental protection agency being setup in United States. (Elkingston,1998) has nicely pointed out the three key layers of sustainability, widely known as the concept of 'Triple Bottom Layer (TBL)' consisting of social, environmental and economic layers. In 2005, the World Summit held on '*Social Development*' three goals have been set which have been showcased in the figure 1.

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DOI: 10.22034/IJSOM.2021.3.4



**Figure 1.** Goals of sustainability

Ever since year 1990 there has been around 1800 research articles been published with keywords such as ‘SSCM’, ‘SCM’, ‘Supply chain’. While most of the work has been done by the researchers from Europe a handful has been done by the Asian researchers (Fahimnia et al. 2015). According to Ageron et al. (2012) one third of the industries still lacks the adoption of SSCM. Being a hot topic of research these days SSCM has not been explored much by the researchers from the developing countries and hence this has become a research gap which needs to be expedited to get the more insights for the case of developing nations (Jia et al. 2018, Zailani et al. 2012, Thong and Wong 2018, Said 2019; Shareef et al. 2020).

The scenario of Supply chain which seemed to be non-competitive in the 1970s have become an integral part these days for competitive edge (Zimon 2019)..It has been confessed by the Pagell and Wu (2011), that aligning the supply chain practices with the dimensions of sustainability, is becoming crucial to cater the needs of future generation in effective and efficient way. But still the practices enabling the integration of sustainability with the operating protocols of supply chain have not matured yet (Hassini et al., 2012). In recent times researchers have highlighted on the viewpoint for better efficacy of SC top management and experts need to ascertain on implications of sustainable practises across their firms for better utilisation of natural resources (Yadav et al. 2020; Wang et al. 2018; Seuring 2013). Researchers has regarded that the sustainability and green initiatives can be seen as the future of traditional supply chain. (Seuring and Yavar 2017; Zimon et al. 2019; Svensson 2007; Silvestre 2016; Muduli and Barve 2013; Tannous and Yoon 2018; Gold et al. 2013; Ulgen et al. 2019; Siegel et al. 2019). Sudusinghe and Seuring (2020) have identified that there is a positive relationship among social and environmental dimension of sustainability.

In the hindsight of the environmental consequences of the urbanisation and industrialisation, the law-making bodies are showing exercises towards making the environment better (Bai et al. 2015). At the same time, industry is also compelled to adopt environment friendly practices to portray their environment conscious picture and get an edge over the competitors because of increasing awareness about the clean environment among end customers. One key stream of the Supply chain which is gaining focus is the maintain sustainable nature of business not only for businessmen, but for all the living species on the earth. The sustainability concept has been embraced by researchers as an area of interest among them. In lieu to the concept of sustainability figure 2 has been sketched out showing the integration of traditional supply chain and dimensions of sustainability.

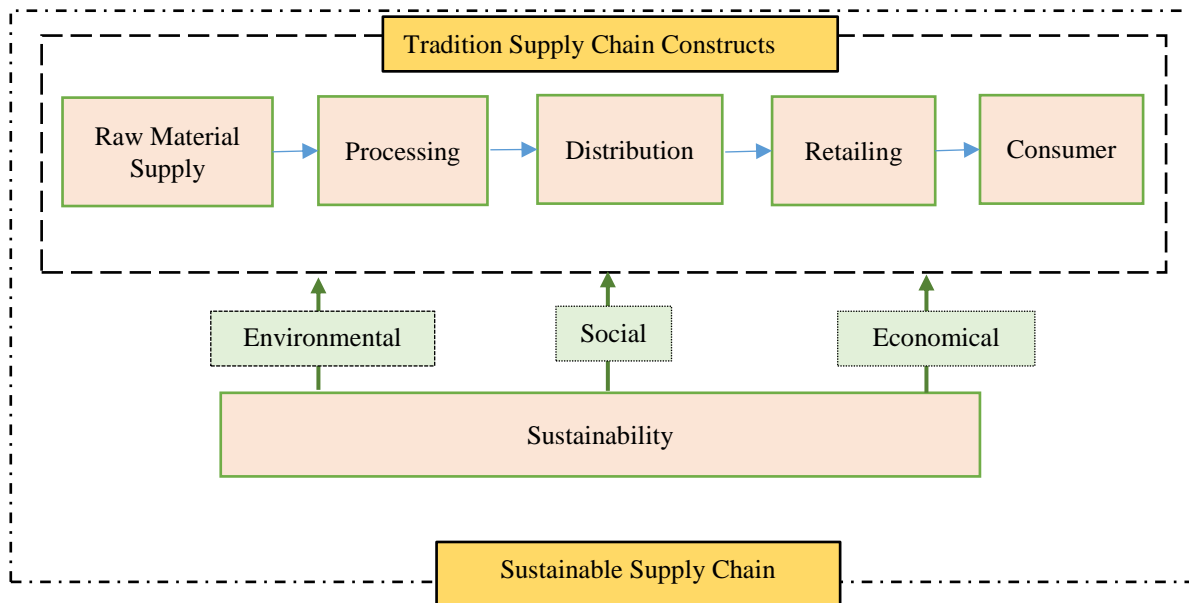


Figure 2. Integrated Approach in Sustainable Supply Chain

The fundamental goal of this current research work is to elaborate on the rising possibilities, investigate patterns and essence of SSCM by dividing the accessible writing articles into different aspects, to upgrade the current available literature about SSCM. The current study has been divided into six sections which includes introduction and literature review as well as key definitions in section 2 which is followed by research methodology in section 3 and Inferences in section 4 which is then followed by results and conclusions in section 5 and 6 respectively. As the idea of SSCM has risen in mid-2000; thus, the examined articles are distributed during the time frame of 2006–2020.

## 2. Previous Literature Reviews on SSCM

The literature review being carried out here starting with the previously available reviews in the field of SSCM. By keeping an eye on the existing review articles, a clear idea with respect to the new advancements of the subject of interest chosen can be triggered. HI and Searcy (2013) investigated the various implications of Green and Sustainable across the supply chain management. For analysing the key definition in relation to GSCM and SSCM, they elaborated two set of features which included the key qualities for business sustainability and SCM. Seuring (2013) reviewed modelling approaches being adopted in the field of SSCM. Golicic and Smith (2013) have addressed that the implication of SSCM gives a positive impact on the performance of firms. Beske et al. (2015) pointed upon that the definitions of sustainable supply chains were scarcely focussed on the societal terms, however SSCM definitions have focussed on environment, flow, cooperation and coordination among the supply chain actors while Touboulic and Walker (2015) examined the theoretical background of SSCM.

For better understanding, keywords used to cluster various research articles used in this manuscript have been incorporated in the figure 3.

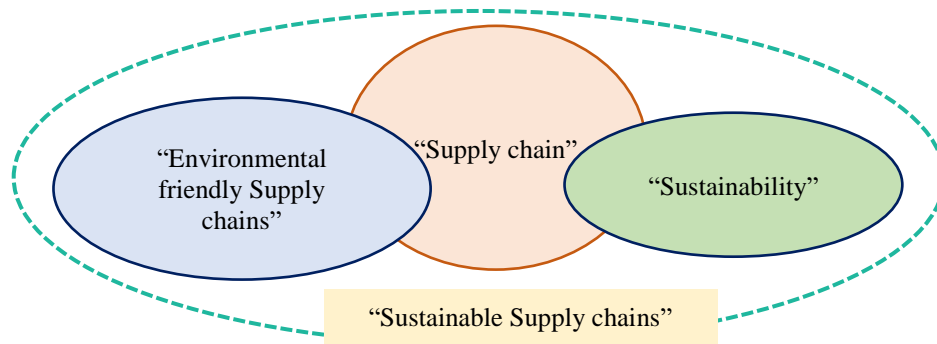


Figure 3. Keywords search for literature

Mor et al. (2015) reviewed the various perspectives associated with the Agri food sector. Dubey et al. (2017) encapsulated various metrics and drivers for adoption of SSCM practises with their interrelationship is been analysed using TISM approach which further analysed using MICMAC analysis. Ansari and Kant (2017) have pointed that more value has been given to the case studies and theory development while advanced development strategies are not widely used by researchers. Oelze (2017) enlightened organization’s performance in accordance with the implications of sustainability management to ascertain the environmental and social performance of the firm. Figure 4 has been shown with a view to bring the key facets of SSCM.

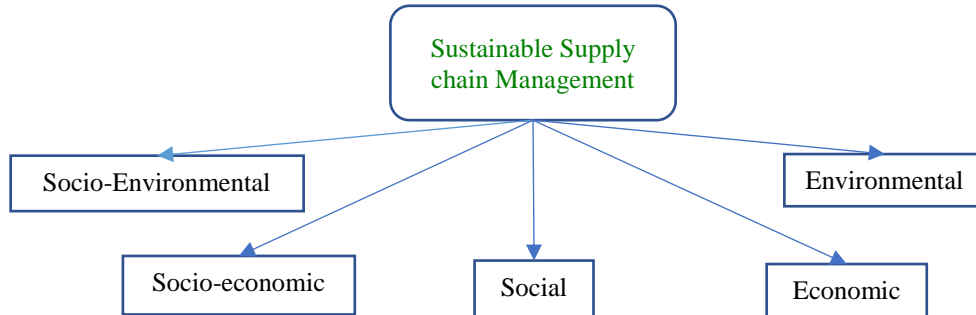
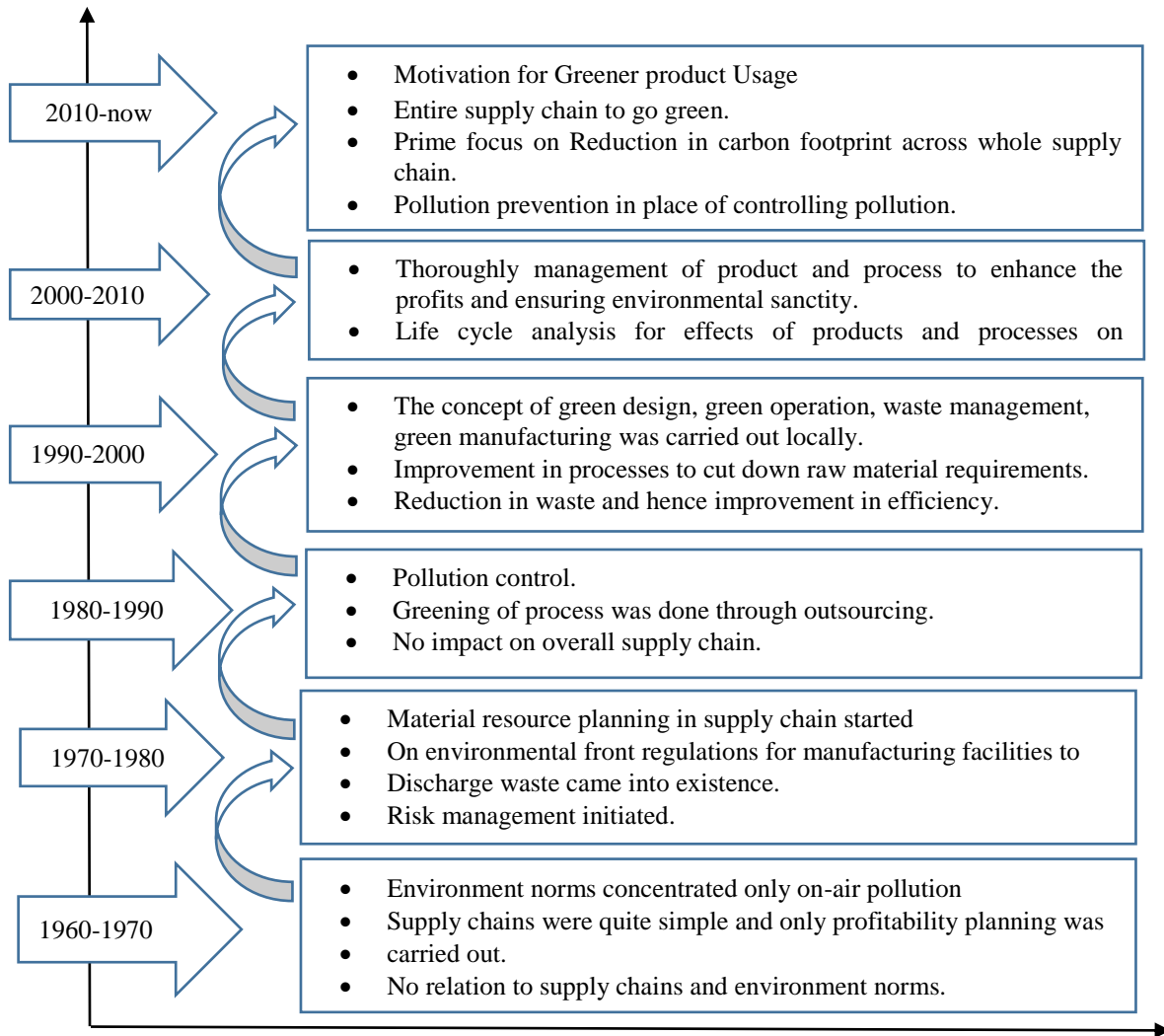


Figure 4. Key facets of SSCM

Oliveira et al. (2018) stated that although many searches have been done in SSCM field there is still lack of single report in this field which could be valuable for both the researchers and specialists. Zhang and Ding (2018), expedited that sustainable practises consequences on the supply chain dynamics skills are encouraging. Das (2018) performed questionnaire-based survey has been done to identify relation among Sustainable practises and SSCM performance. Fantasy and Tipu (2019) indicated infrastructural shortage, educational shortage hampers the implication of sustainability in supply chains.

Piyathanavong et al. (2020) recognized the deficiency of understanding sustainability amongst the developing economies. Khan et al. (2020) identified that the theoretical and concept building were initialised, but afterwards the research is inclining towards the dynamics of economics and mathematical models which have also been expedited by Mehrjerdi, and Lotfi (2019) in their studies. Sharma et al. (2020), reviewed the various perspectives associated with the Indian food supply chain system under the vivid notions of its dynamics

Panigrahi et al. (2019) and Zamanian (2020) have raised an opinion that the existing research literature has taken a surge in the recent times on the topic of sustainability in the SC. Keeping the environmental focus the experts need a more ecologically centred approach and with a vision on utilization of least resources under current circumstances. Some deep insights are still necessarily required which will aid the decision capability of the SC managers in the dynamic environment with the competitive edge. The flow over the years in SSCM have been presented in figure 5 highlighting the key progresses.



**Figure 5.** Growth in Sustainability across supply chain over the years (Adopted from Wang and Gupta 2011)

In order to outlay the past research literature an outline of the literature reviews published by the researchers in past in the area of SSCM is presented in table 1 with the description of their focus area and findings.

**Table 1.** Literature reviews in Past on Sustainable Supply Chains)

S.No.	Researcher and Year	Reviewed Articles	Citations	Central Idea and Key Findings
1	Zhu, Sarkis and Lai 2007	Chinese based automobile sector study	1081	Questionnaire based study to measure the performance and key drivers to sustainable practises.
2	Linton et al. 2007	Concept building with 110 articles	1829	A background has been unearthed of sustainable supply chains, its key components, interactions with supply chains have been identified.
3	Svensson, 2007	Conceptual study of SSCM	443	The multi facets of supply chain in Sustainable background has been depicted taking apparel industry as case industry.
4	Carter and Rogers 2008	Reviewed 166 articles	3254	Triple bottom line into consideration for SCM,
5	Seuring and Muller, 2008	191 Research Papers	4635	Different aspects of Sustainable supply chains including Barriers, supplier selection and sustainable products have been assessed and a theory building for supplier management.
6	Carter and Eaton, 2011	80 Research articles	1300	Key advancements and advantages of SSCM have been explored.
7	Ageron, Gunasekaran and Spalanzanu, 2012	55 Research articles	774	Conceptual model building for SSCM to develop an understanding on various key pressures which impacts SSCM implementation along seven dimensions.
8	Winter and Knemeyer, 2013	456 articles	323	This research has established an understanding about SCM and Sustainability have been identified as unique concepts.
9	Ahi and Searcy 2013	124	973	Numerous SSCM and GSCM definitions have been explored through available literature to generate commonness among them.
10	Seuring 2013	75 Research articles	809	Review of modelling approaches being adopted in SSCM have been carried out depicting LCA, MCDM, AHP and Equilibrium models as the key approaches being identified.
11	Brandenburg et al. 2014	134 Articles	849	A full depth infiltration of ecological and monetary aspects of Sustainable Supply chains and additional recommendations for attention to weak reception of societal components.
12	Touboulic and Walker 2015	308 Papers	384	This research suggests a theory-based groundwork for SSCM investigate, clarifies the consequence of TBL parameters.
13	Beske et al. 2015	140 articles	154	The current research fundamentally surveys Sustainable SCM execution estimation framework listed within the available literature which shows that numerous phenomenal methods have already been depicted but then there are openings at different stages to enhance its working information.
14	Bastas and Liyange 2018	93 articles on SSCM, SQM, SQM-Green, SSQM	70	The paper sets up key subjects, patterns and new roads for explore through an organized review. The efficient study attempted incorporates both unique examination and up-to-date blend of best in class quality administration, sustainability and supply chain coordination.
15	Martins and Pato 2019	198 Articles under Review	23	Review of SSCM from 1995 to 2018 a state-of-art survey. The Study suggested that the previous studies have been focused upon systematic literature reviews while industry specific studies are stilling not much expedited.
16	Koberg and Longoni 2019	66 articles	61	Key elements of SSCM have been identified in the context of global supply chains. The study revealed that there is lack of closed configurations pertaining to sustainable performance across global supply chains.

**2.1 Definitions of Sustainable Supply chain management (SSCM) from Literature**

SSCM is the proper mixture of sustainability as well as the traditional Supply chain management practices. (Seuring and Muller 2008) has elaborated the meaning of sustainability as the consideration of the three critical elements- ecological, social and financial components– that straightforwardly impacts the business procedures and activities of the enterprises. SSCM based initiatives adoption pace is quite tardy in the scenarios of developing countries and its appropriation rate is quite low (Wittstruck and Teuteberg 2012). Sustainable supply chain has been elaborated by a lot of researchers from last two decade and hence numerous definitions have been thrown into literature. Researchers have their own views on SSCM which are been shared in table II.

**Table 2. SSCM Definitions**

<b>Author and Year</b>	<b>Definition</b>
Khan et al. 2017	“Sustainable Supply Chain management is being referred to as the process of converting input into out with the effective resource utilization and improved societal and environmental life”.
Al Zabbi et. al 2013	“SSCM is a way which depicts plan of a firm for mitigating, detecting and responding to the global risks. (Risks involves marketing and SC deliberations which further includes R&D, decisions of market, manufacturing and sourcing, complexities, transportation, managing of talent, substitute source of energy.”
Ahi and Searcy 2013	“SSCM is Supply Chain in which there is an integration of environmental and social focus alongside with economic considerations where every system throughout the business is so designed to work in an efficient manner which includes material flow, information flow and the Capital flow which are linked with the raw material purchase , Manufacturing and the supply of goods/services whose ultimate goal is to increase and enhance the profitability to stakeholders as well as the competitiveness with resilience in long/short run.”
Wittstruck and Teuteberg 2012	“SSCM is the addition of the conventional Supply chain with the Social and environmental practises”
Seuring and Beske 2010	“SSCM has been narrated as planning and managing of various steeps across the Supply chain consisting of sourcing and procuring materials/services, conversion and logistical services at every stage of manufacturing in a closed loop with an eye on environmental and social development.”
Carter and Rogers 2008	“SSCM is integrating and achieving Social, environmental and economic goals of an organisation which further enhances the economic performance in longer run.”
Seuring and Muller 2008	“SSCM has been described as the way of managing finance, information and material flows as well the cooperation amongst the enterprises all across the Supply chain with an aim to deliver goals of attaining sustainable development which itself includes Economic, Social and Environment development.”
SK Srivastava 2007	“GSCM as a way of integration of environmental thought into each phase of Supply chain starting with product design to material sourcing to process of manufacturing to delivery of final product lastly to the end of the product(disposal) after its full use.”

**3. Research Methodology**

The literature review is viewed as the primary piece of any investigation as it helps in researching the late turns of events and present dynamic zones of a specific area. This examination follows the organized writing approach at first to channel the investigations to be remembered for the literature survey also, later these examinations are breaking down through different characterizations so as to have a more extensive comprehension of the SSCM area. To follow the efficient selection process, the exploration strategy has been adopted given in figure 6.

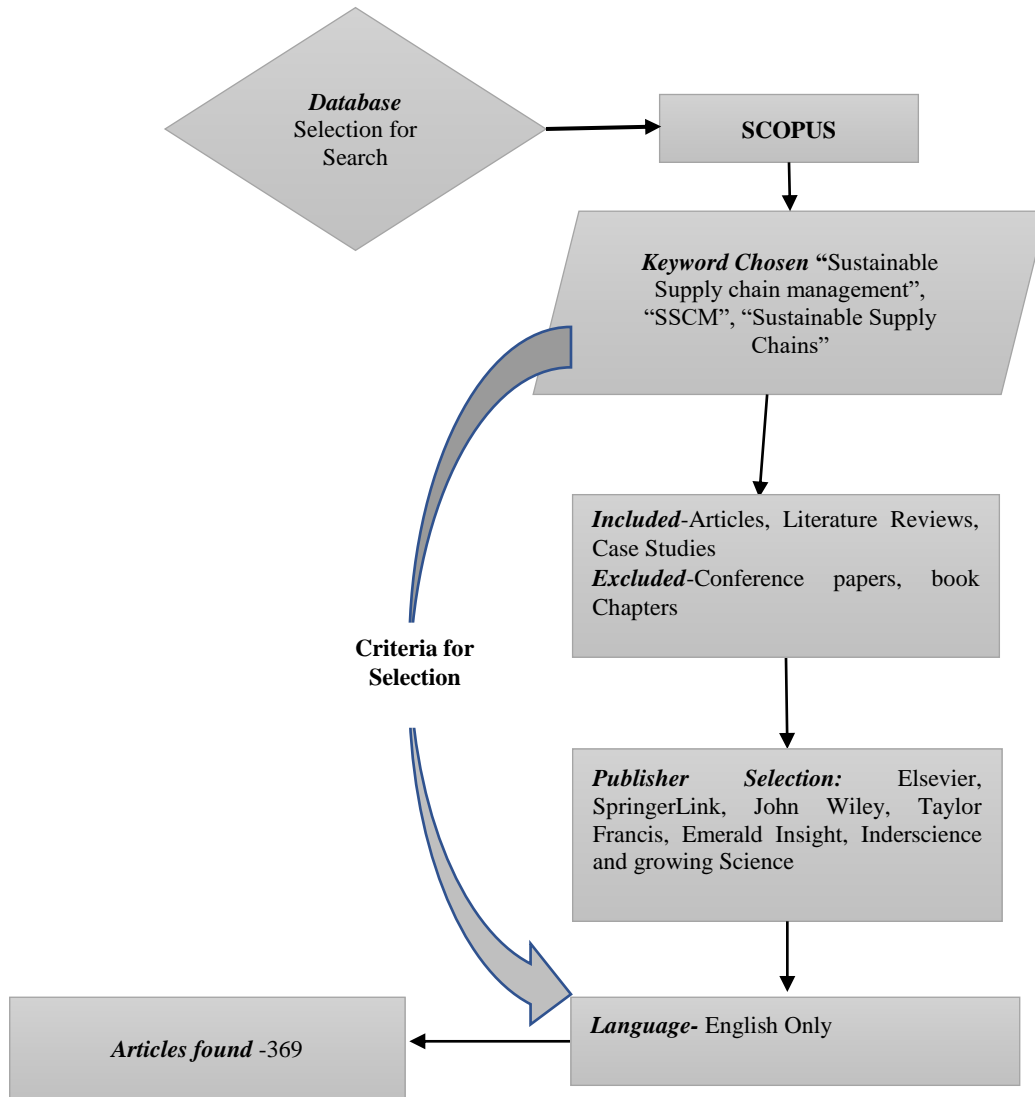


Figure 6. Adopted Methodology for literature review

### 3.1 Taxonomical framework for selection of articles

The goal of this research article is to discover past findings in the domain of Sustainable supply chain management. To achieve this objective of the study SCOPUS database has been searched with keywords "sustainable supply chain management", "Sustainable supply chains" "Environmentally friendly supply chain" and "SSCM". With the selected keywords within title, abstract, keywords, article a total of 369 articles have been found over a time period of 15 years from 2006 to 2019.

The research articles after adopting the above selection methodology have been categorised on the following key parameters.

- (1) Year wise
- (2) Publishing Journals and Publishing Media
- (3) Contributing countries
- (4) Affiliated universities
- (5) Top authors
- (6) Keywords
- (7) Research Area



- (8) Success Factors
- (9) Key barriers
- (10) Decision making Techniques

#### 4. Inferences

SSCM articles have been showcased in figure 7 over a period length of 15 years (2006-2020). From mid-2000s, the consciousness of SSCM can be viewed exceptionally low. The strong practice of SSCM appeared around 2011. From that point forward the quantity of articles has been growing exponentially. The applications of SSCM has widened the scope in the field of healthcare, management, production, education, construction which is evident in the studies. The ever-evolving field is adding new dimensions into it with every new research.

##### 4.1 Research Articles Journal Wise and Year Wise

SSCM research encompasses various domains of searches including management, decisions sciences, finance., economics, environment, social sciences and many more. This variety is evident in table. The most evident journal for SSCM turns out to be is *J. of Cleaner production* with 12.7% of papers. Ever since 2006 this journal has published numerous researches in the field of SSCM with multiple aspects covered in those researches. This is followed by *Sustainability Journal* with 7% contribution having good amount of 25 paper and then *International J. of Prod. Econ.* and *SCM Journal* with 17 papers from each of them. Management and economics are key aspects of Supply chain with conservation of resources and hence 9 papers from *Resources Conservation and Recycling Journal* has emerged. Production is an important activity of Supply Chain which feature in as in *International Journal of Production Research* and *Production Planning and Control* Journals with contribution of 9 papers each from them. Year wise trend of research articles published in the relevant domain have been showcased in figure 7.

In publisher's viewpoint, Elsevier contributed greatest articles (26.5%) on SSCM followed by Emeraldinsight (12.2%), Taylor and Francis (8%), MDPI (7.9%), John Willey (6.5%) Inderscience (5.5%) and Springer (3.5%)

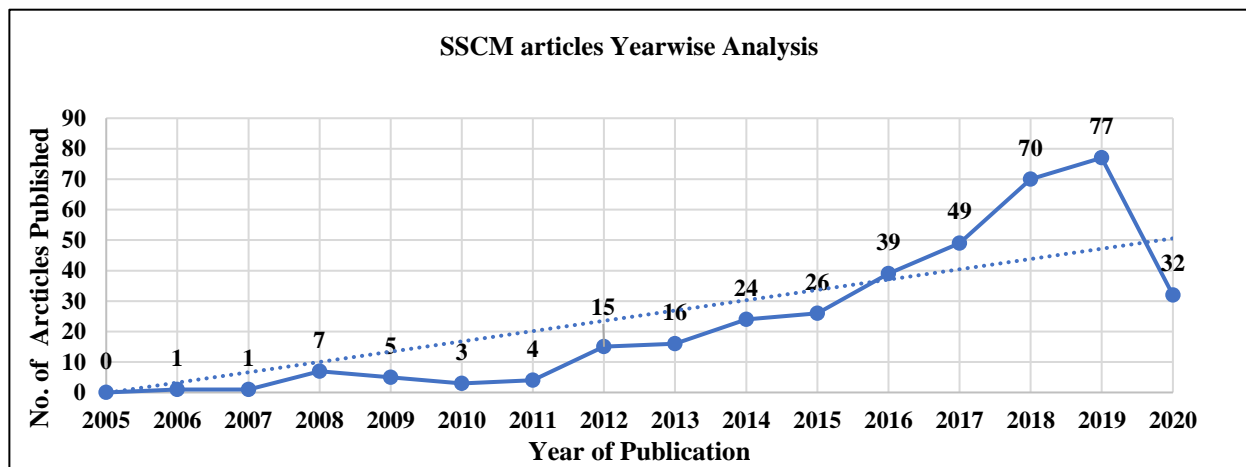
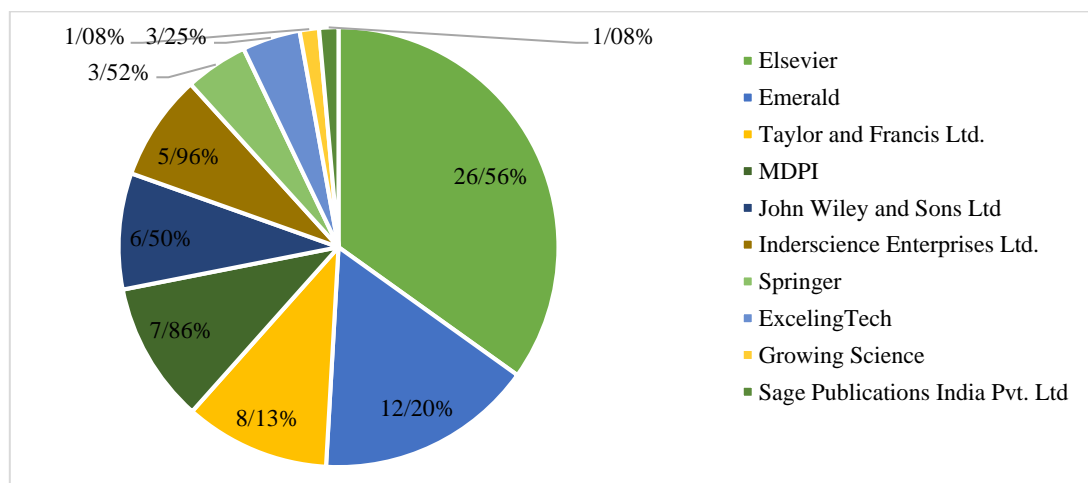


Figure 7. Year wise Papers Analysis on SSCM from 2006-2020

A wide scope of research territories under the SSCM area was distinguished through the writing search from these Publishers Articles distributed in Elsevier extensively secured the application regions including designing, the executives, administration. The hypothetical establishment-based articles impacting producing parts, structure advancement and overview-based articles are key territories secured by different analysts in Emerald insight. Articles from Taylor and Francis diaries focussed on the exercises identified with administration and wellbeing including contextual analysis-based methodologies. Different research concentrates from John Wiley did their exploration work in improving the profitability by focussing on nature and social variables through a few case applications. Table III highlighted the list of journals having key contributions in the relevant domain in recent past.

**Table 3.** Contributing Journal with Publisher Name

Journal	Publisher	Paper Count
Journal of Cleaner Production	Elsevier	47
Sustainability	MDPI	25
International Journal of Production Economics	Elsevier	17
Supply Chain Management	Emerald	17
Resources, Conservation and Recycling	Elsevier	9
Business Strategy and the Environment	John Wiley and Sons Ltd	9
International Journal of Production Research	Taylor and Francis Ltd.	9
Production Planning and Control	Taylor and Francis Ltd.	9
International Journal of Supply Chain Management	Exceling Tech	8
Supply Chain Forum	Taylor and Francis Ltd.	8
Journal of Business Ethics	Springer Netherlands	7
Corporate Social Responsibility and Environmental Management	John Wiley and Sons Ltd	7
Sustainable Development	John Wiley and Sons Ltd	5
Uncertain Supply Chain Management	Growing Science	4
Journal of Purchasing and Supply Management	Elsevier	4
International Journal of Operations and Production Management	Emerald	4
Journal of Supply Chain Management	Exceling Tech	4
Resources Policy	Elsevier	4
Symmetry	MDPI	3
Management of Environmental Quality: An International Journal	Emerald	3
International Journal of Physical Distribution and Logistics Management	Emerald	3
Journal of Business Logistics	Wiley-Blackwell	3
International Journal of Productivity and Performance Management	Emerald	3
International Journal of Logistics Management	Emerald	3
Global Business Review	Sage Publications	3
Industrial Management and Data Systems	Emerald	3
International Journal of Industrial and Systems Engineering	Inderscience Enterprises Ltd.	3
International Journal of Logistics Systems and Management	Inderscience Enterprises Ltd.	3



**Figure 8.** Key Publishers Published SSSM Articles

### 4.2 Country Wise Research Articles

The articles presented through literature review have shown a wide range of research accumulating from 30 countries around the world. A total of 369 papers were identified out of which 64 from India followed by 61 from UK and 48 from China followed by 40 each from Germany and USA. Iran (29) and Malaysia (22) contributed significantly as well. Canada (19), Australia (18) also have a fair share amongst the identified papers. The detailed view of the country wise contributed papers in the research domain identified can be observed from figure 9.

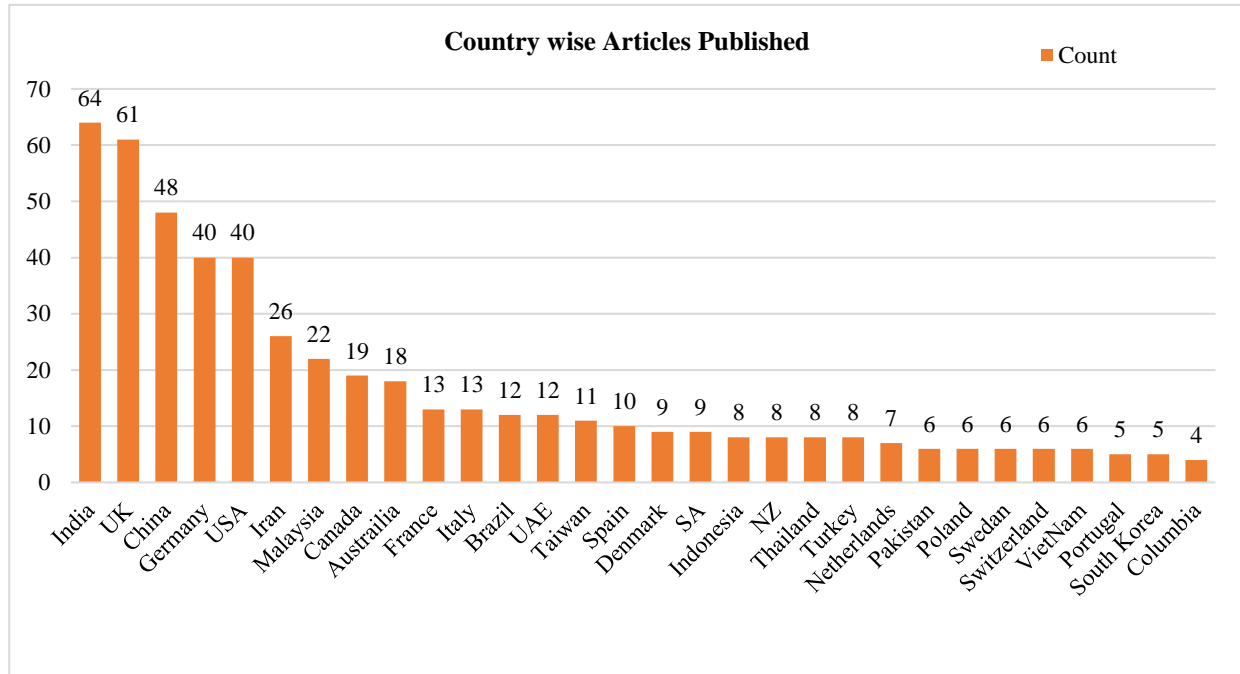


Figure 9. Country wise Published Articles in SSCM Domain (2006-2020)

### 4.3 Top Universities contributing to SSCM domain

SSCM research domain has been helped by 159 identified universities across the globe from literature review. The universities contributed from range of 1-19 authorship from each of them. The key universities identified are University of Kassel, University of Malaysia, Syddansk University, Islamic Azad University, Worchester polytechnic institute, University of Plymouth are the key universities. The same has been showcased with figure 10.

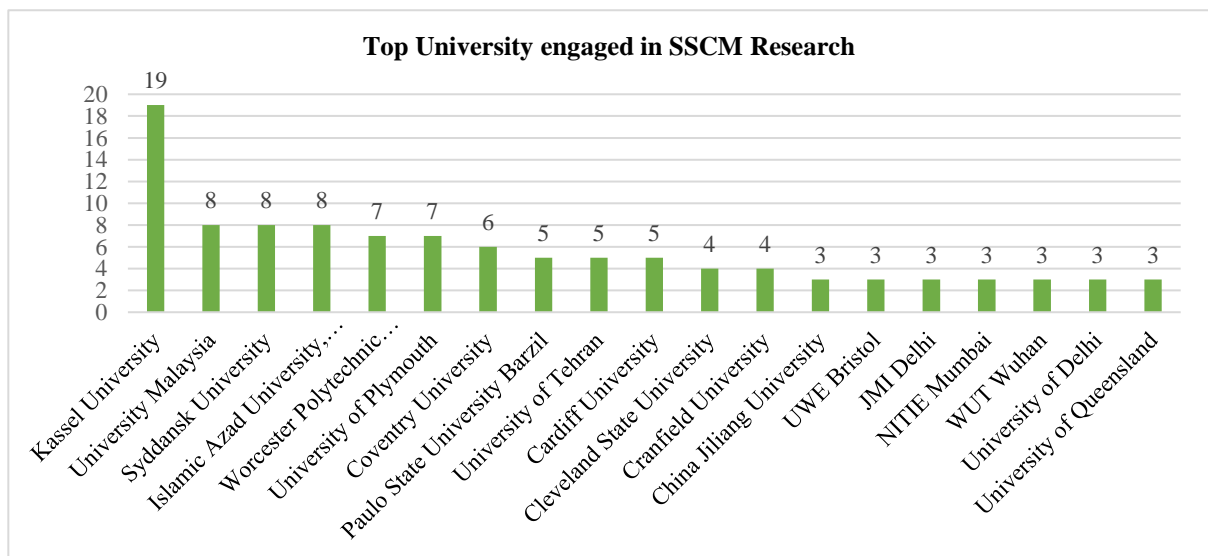
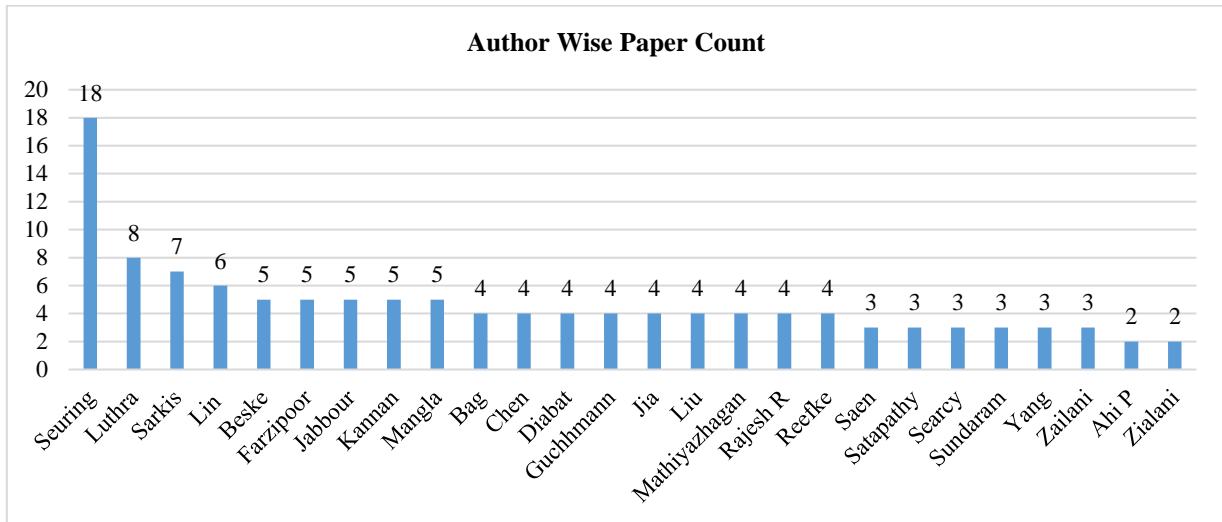


Figure 10. Key Universities in SSCM Research Domain

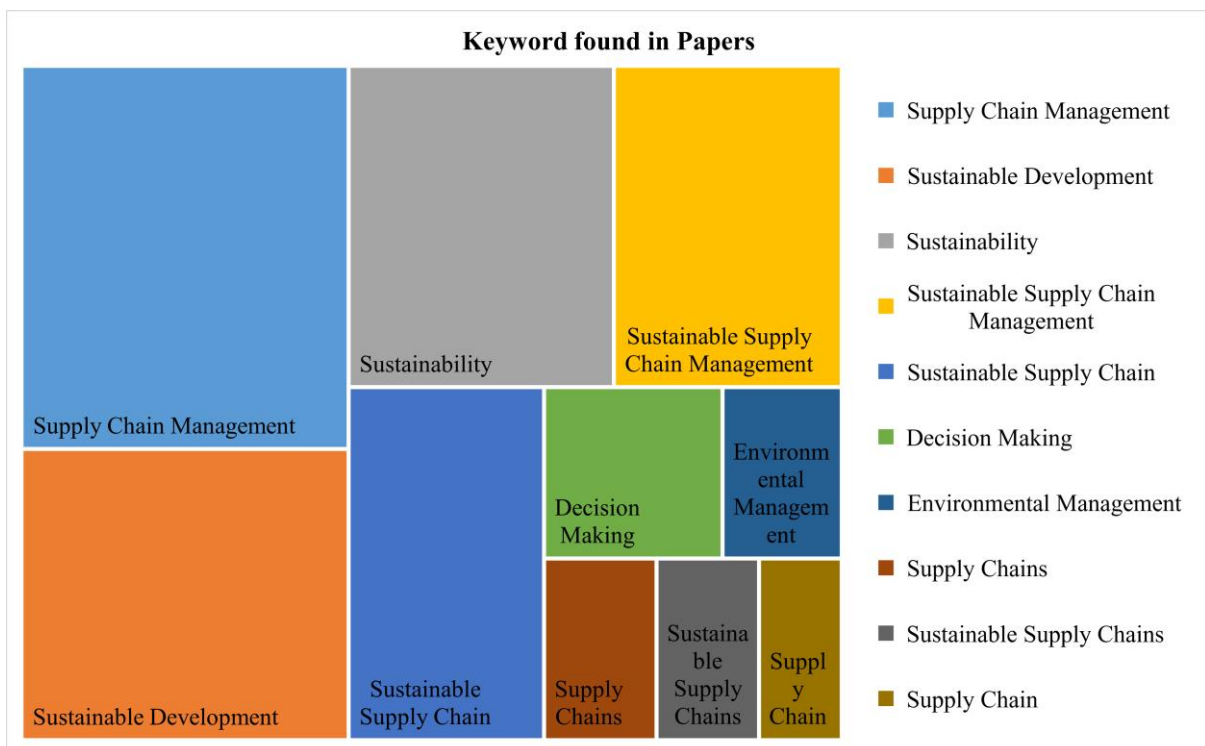
**4.4 Top authors in the field of SSCM**

Key authors involved in the SSCM research field identified from the literature review. 159 different authors were found. The major contributor is Seuring with 18 papers followed by Luthra with 8 papers and Sarkis with 7 papers which is followed by Lin with 6 papers and Beske, Farizpoor, Jabbour, Kannan with 5 papers each between them. Figure 11 showcased the author wise contribution.



**Figure 11.** Top Researchers in SSCM Field

The identified papers were also analyzed for important keywords showing that supply chain management being the central area have been used as a key word for 209 times which is followed by Sustainable development(159), Sustainability(142), Sustainable Supply chain management(122), Sustainable Supply chain(114), Decision making(51), Environmental management(34), Supply chains(34) and Sustainable Supply chains(31). Figure 12 have showcased the prime keywords being used in research articles in the past.



**Figure 12.** Top Keywords in Research Papers

#### 4.5 Top Keywords in SSCM Papers

SSCM has roots in different areas of business starting from economy, finance, management, decision making, computer science, agriculture, energy, environment management etc. business, management and accounting shares for highest research part with 252 outcomes followed by Engineering (132), Environmental Sciences (123), Decision Sciences (97), Social Science (87), Energy (83) and finally Computer, Economics completes the list. Area of application has been witnessed with figure 13.

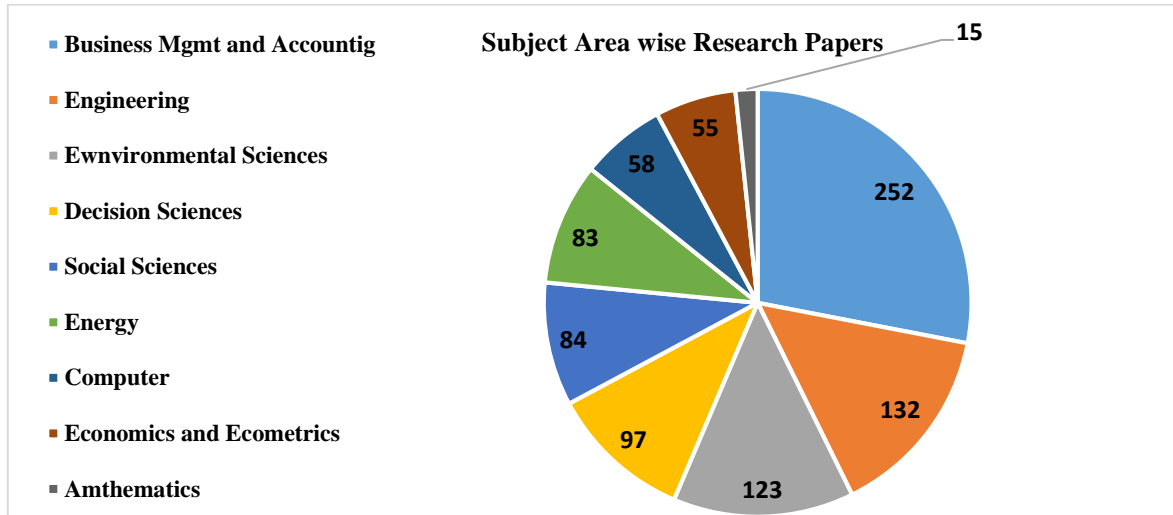


Figure 13. Subject area wise Research Articles

#### 4.6 Decision making in SSCM

MCDM methodology causes the scientists to improve the arrangements acquired while managing complex condition issues. From 369 articles being identified on the subject of sustainable supply chain it has been observed that 74 papas have application of multi criteria decision making. With the research focus on decision making skillset to get inferences about the important barriers in adopting to the sustainable practise and motivating factors for SSCM implementation, MCDM techniques has found abundance in literature. AHP, ANP, VIKOR, DEMATEL, TOPSIS have been implemented with great ease. Recently ISM and SEM methodologies also got fair share in literature. In environmental factors study DEA have been exercised as per the study of Silva et al (2019). MCDM strategies help in examining information and creating models and furthermore recognizing the circumstances and logical results relationship among the factors utilized. Some of searches has been summed up in table IV.

Table 4. MCDM Techniques in SSCM

S. No	Author and Year	MCDM Technique
1	Diabat and Govindan 2011; Mathiyazhagan et. al 2013; Luthra et al. 2015; Gopal and Thakkar 2016; Venkatesh et al. 2015; Mani et al. 2016; Luthra and Haleem 2015 Movahedipour et. al 2017 Kausar et al. 2017 Moktadir et al. 2018 Raut et al. 2017; Panigrahi and Rao 2018; Benitez et al. 2018; Luthra et al. 2018; Zhu et al. 2018 Esmael et al. 2019, Majumdar and Sinha 2019 Mohanty 2018, Soni et al. 2020, Tooranloo and Rahimi 2018	ISM-MICMAC, ISM, TISM
2	Mani et al 2014; Wu et al. 2018; D Kannan 2018; Mangla et al. 2015; Gandhi et al 2016; Mathivathanan et. al 2017, Biswal et al. 2018, Chand et al. 2018, Zhu et al. 2018	AHP, Fuzzy AHP
3	Azadi et al. 2015, Rashidi and Culliname 2018	Fuzzy DEA
4	Li and Mathiyazhagan 2016, Garg and Sharma 2020, Luthra et al. 2018, Wang et al. 2016, Su et al. 2016, Mathivathanan et al. 2018, Lin et al. 2018, Agyemang et al. 2018, Zhou et al. 2018, Luthra et al. 2018	DEMATEL, Grey-DEMATEL.
5	Ahmadi et al. 2017, Govindan et al. 2019	BWM
6	Biswal et al. 2018, Rashidi and Culliname 2018, Rajesh 2020	TOPSIS, Fuzzy TOPSIS
7	Nayak and Dhaigude 2019, Yadav and Singh 2020	ANP, Fuzzy ANP
8	Mohanty and Prakash 2014, Vargas et al 2018, D Das 2018, Hong et al. 2018, Mani et al. 2020, Malesios et al. 2018, Wang et al.2018	SEM
9	Garg and Sharma 2020, Zhou et al. 2018	VIKOR

#### 4.7 Success Factors in SSCM Espousal

Implementation of any new strategy needs to have evaluated on the basis of its key success factors which have been explored in literature. Prasad et al. (2018) have identified the legislature compliances, Top-management commitment as well as employee involvement as key success factors. Luthra et al. (2015) anticipated scarcity of natural resources as key drivers for implementing sustainability across supply chain while Kumar et al. (2015) emphasized on the better strategy for sustainable practises and top management commitment as the success factor. Saeed and Kersten (2019) have witnessed regulatory and market pressures as the key motivating factors. The Success factors thus identified have been classified into six categories. Further the major success factors have been represented in figure 14.

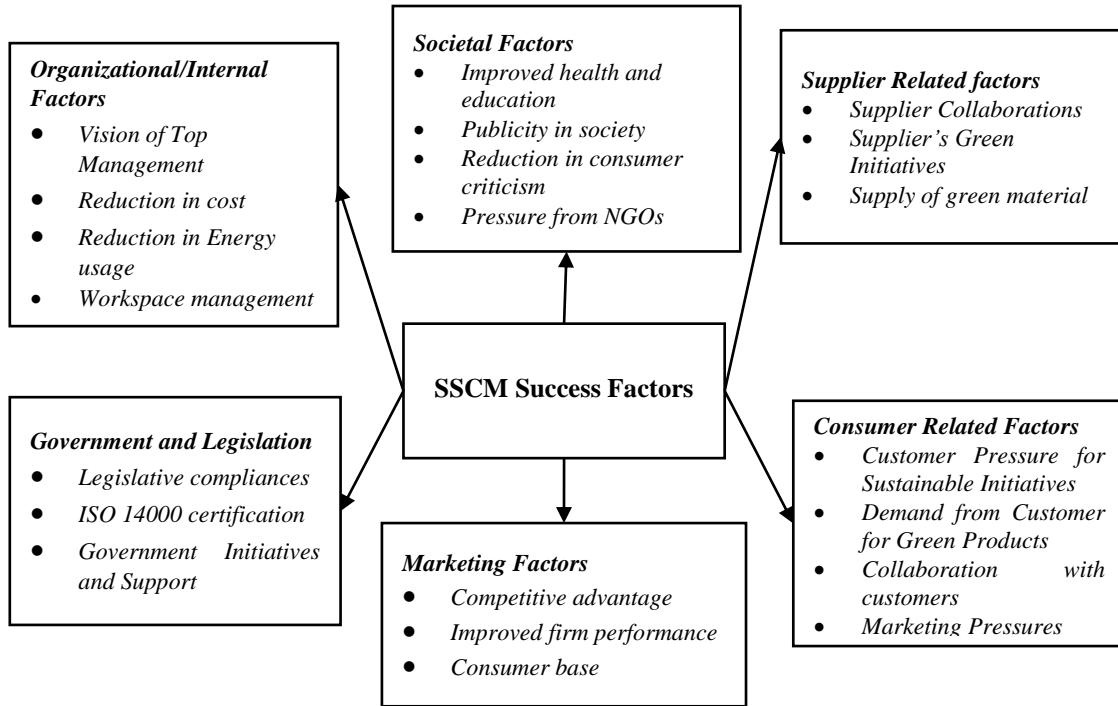


Figure 14. SSCM Success Factors

#### 4.8 Challenges in SSCM espousal

SSCM methodology and its implementation has never been easy for many of the organisations and it is clearly depicting from the researches which points out the key barriers, hurdles or failure factors for SSCM adoption. Barrier analysis is key aspect which has to be laid down while performing the implementation phase for any new strategy. Many researchers pointing out that SSCM and GSCM implementation though have been done from industries but they sought no real profit out of them. Ageron et al. (2012) inferred that one third of the industries still lacks the adoption of SSCM as they failed to figure out barriers. Mudgal et al. (2010) identified lack of management approach as key hindrances for SSCM adoption. (Diabat and Govindan. 2011; Luthra et al 2011; Govindan et al 2013; Luthra et al 2016) emphasized on the government regulations as major setbacks for SSCM implementation. (Bai and Satir 2020; Raut et al. 2019a; Kausar et al. 2017; Dhull and Narwal 2016, Luthra et al. 2016; Mehmet et al. 2018) have identified that lack of reward for adopting sustainability from government has been the obstacle for SSCM implementation. Valiente et al. (2017) have identified barriers relating to CSR in the aspect of performance. Tyagi et al. (2015) glimpsed various issues related to adoption of effective CSR initiatives in the supply chain performance system. Absence of strong environmental legislation. enforcement of law and regulations has been seen as key barriers by many researchers (Tasmia et al. 2020; Esmael et al. 2019; Raut et al. 2019b). Kumar and Goswami (2019), Luthra et al. (2016) have identified government hindrances in their studies. (Sridharan Kumar 2019; Mathivanthanam et al. 2017; Kaur et al. 2017; Pati et al. 2016; Mudgal et al. 2010; Seuring and Müller 2008) have identified that sustainable manufacturing practice in industry is ignored by top management with no proper monitoring and lack of policy framing for retaining experienced operators and lack of strategy with reluctance to change. (Gupta et al. 2020; Majumdar and Sinha 2018; Kaur et al. 2017; Diabat et al. 2013) have identified that design complexities possess a cause of concern. Absence of closed loop chain have been identified by (Jabbour et al. 2018; Moktadir et al. 2018; Sarkis 2012). Lack of Capacity has been raised by (Muduli and Barve. 2013; Mudgal et al. 2010;

Sridharan and Kumar 2019) raised lack of motivation as an important hindrance. Goods and Service Tax emerged as a key hindrance for SMEs to adopt sustainability in their operation as per market Research. While information gap has been identified by (Soni et al. 2020, Yang et al 2017; Muduli et al. 2013). (Tasmia et al. 2020; Kumar and Goswami 2019; Chen et al. 2016) rated lack of market demand for recycled/reused product as a factor which prevents adoption of Sustainable practises. shortages of incentive, short-term objectives. The lack of cooperation and willingness among supply chain partners, constraints have been depicted by Faisal et al. 2019. Budgetary constraints, high initial investment, Market competitiveness, Credit availability are regarded as key financial hindrance by different studies (Narimissa et al. 2019; Majumdar and Sinha 2018; Sridharan and Kumar 2019; Diabat et al. 2013).

## **5. Discussions**

It is evident from research literature, that a majority of the article are on a specific topic, as opposed to covering by and large parts of the SSCM. Subsequently, this investigation helps in dissecting the turn of events in SSCM over a few research strings. Literature shows that SSCM investigate covers contextual analyses and quantitative models. The Scopus database chosen for the literatures survey have shown tremendous research and a ton of research strings are still to be investigated. The study has focused upon the keyword SSCM in the keyword section as well as the abstract. Numerous researchers have been working in sustainable supply chain management field found a common understanding that while sustainability has been under key focus while on the other hand 'SSCM' word has been found missing in some of the titles. In spite of the fact that it is seen that a large portion of methodologies that have been shared by specialists are yet to be confirmed numerically or then again using Simulators. MCDM techniques have been employed a lot in the previous studies.

Seuring, Luthra, Sarkis, Mangla, Beske, Kannan Govindan are the top researchers in the domain of SSCM. With Indian authors contributing a lot. India have been emerged as the leading country in contribution to research domain of SSCM followed by UK, China and USA. Theoretical studies are more prominent while mathematical modelling still lacking in SSCM research domain. (Baliga et al 2019) suggested a positive impact of environmental practises on SSCM performance. Neutzling et al. 2018 have thrown picture towards collaborative work among supplier and buyers acting as a source of learning and new innovations eading to adoption of new technologies. Aboelmaged (2018) expedited a positive consequence of stakeholder's pressure for employee's participation in sustainable supply chain.

A generalised framework has been perceived from research articles which is shown in figure 15. With every focal organisation by listing out the key barriers (which includes some general barriers as well as industry specific) and removing them and have a common understanding of the key success factors will lead to a successful implementation of SSCM with collaborative work within the SC partners.

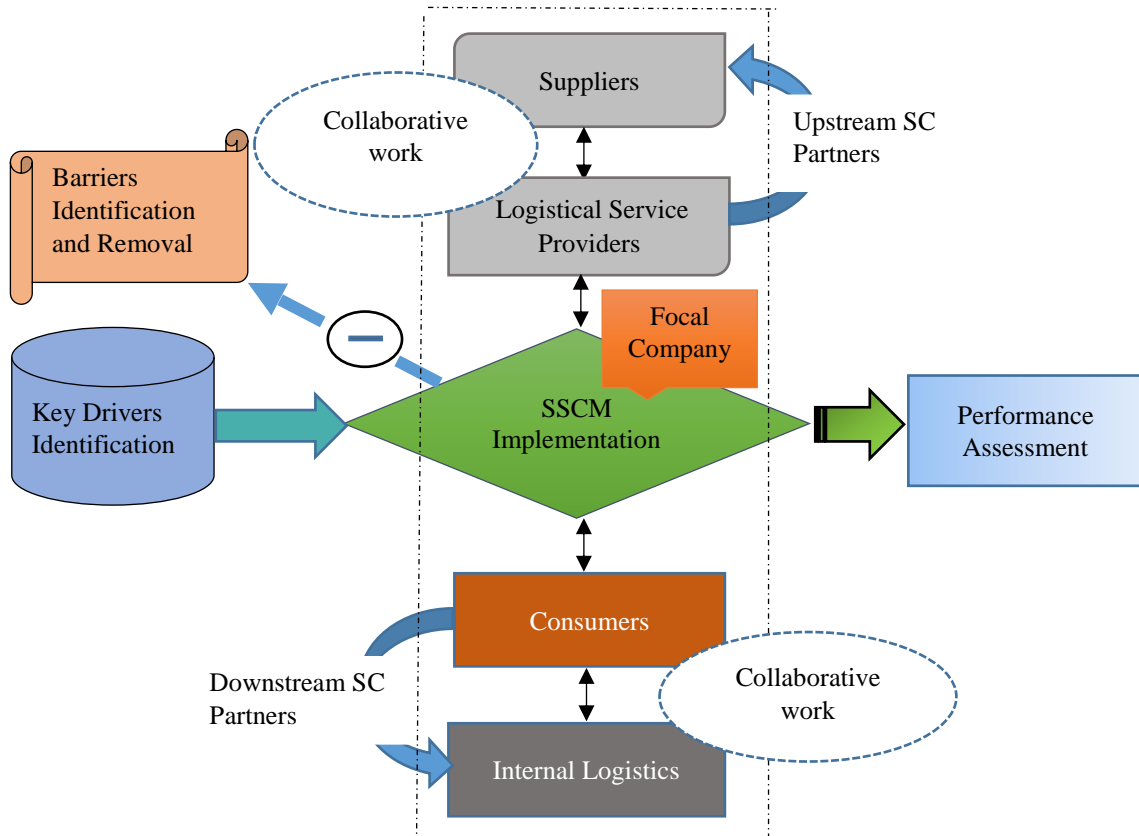


Figure 15. Proposed Framework for SSCM adoption

## 6. Future Research direction

The conducted study has selected the research papers on the topic sustainable supply chain management taking keywords “Sustainable Supply chain management”, “SSCM”, “Sustainable Supply Chains” and hence a possibility arises with some research articles may fall short without having the same keywords but touching the central idea of this very topic. Although, countless investigations instigated the hypothetical base, not many examines helped in connecting the created speculations in the realistic condition through scientific demonstrating which could improve the efficiency through SSCM implementation. Notwithstanding characterized results of these articles and their future behaviours, extremely constrained analysts endeavoured to investigate the darker sides in detailed view. This again makes abundant chances, as the use of SSCM should be received through the whole framework. Despite the fact that numerous articles introduced contextual investigation-based methodologies and acquired productive outcomes, they battled through the profound infiltration of SSCM because of the inaccessibility of well-equipped systems which could manage the subordinates to encourage its implementation.

In spite of the fact that, the idea of sustainability picked up its significance across the well-established economies; but it is quite evident that the reception level of sustainable initiatives and SSCM have not been raised much during the most recent few years among the developing economies. Other significant factor is its irrelevance over the immense business variations. In contrast to other approaches; SSCM can be received in pretty much in every modern division (producing, administration, medicinal services, and so forth.). Besides, it is going to be highly effective in the perishable goods industry where the delivery time is very low in comparison to other industries.



## **7. Concluding Remarks**

The fundamental reason for this study is to lead an efficient survey and meta-investigation of late improvements in the domain of SSCM. Henceforth with this vision the investigation of papers has been performed from renowned SCOPUS database for a period of 2006–2020 including “SSCM” and “Sustainable Supply Chain Management” as a catchphrase inside titles, abstracts and keywords. The study explored the Scopus databases in the hind set of depicting key advancements in SSCM domain. The study revealed 369 papers in the literature which consisting of various domains and sub-domains like key challenges in adoption of sustainable initiatives among enterprises barriers, key success factors and motivating drivers for adopting SSCM have been assembled in this paper. The drivers and barriers thus identified can be helpful in further studies. MCDM methods have been seen as the key methodology in the literature with fair amount of share. The study also highlighted the top universities and researchers who are contributing to different facets of SSCM. The most common findings have been summed up below:

- India, UK, China, USA, Germany these five countries accounted for nearly 70% of the total research articles published showing that developed countries have been emerged as the leaders in the field of sustainable supply chain management which are now been followed by the developing nations like India and China in recent past take the research forward for a better tomorrow.
- Conceptual models hold the key in area of research ‘Sustainability’ with a total share of 50% across all the literature available on the subject. Simulation and modelling have not been much accessed and validation of the case studies through simulation is still missing across the literature.
- Although plethora of research articles are available on SSCM subject still this is in inception stages and more exploration is obligatory to comprehend the subject.
- Empirical studies and qualitative research are more prominent while mathematical modelling is not been seen much in the past literature yet.

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