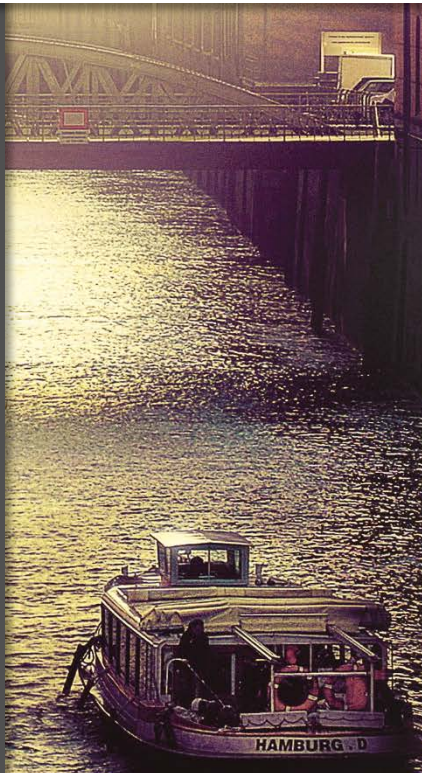


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# Literature Review of Drivers of Sustainable Supply Chain Management



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# Literature Review of Drivers of Sustainable Supply Chain Management

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*The incremental awareness regarding social and environmental issues has pushed organizations to adopt sustainable practices. Over the last few years, organizations are considered to be responsible for their business activities that affect the environment, society, and the economy of their own business as well as their supply chain participants. Different stakeholders pressurize organizations and their supply chains to follow sustainable actions in order to achieve sustainable supply chain management (SSCM) goals. However, not all stakeholders have the ability to force organizations to take sustainability initiatives. Some of them help organizations at least to be aware of sustainability issues such as media/press while others emphasize to adopt a certain level of commitment and implement sustainability goals such as NGOs, customers, government, shareholders, community activists, global competition, etc. This research paper aims to identify drivers that push organizations towards achieving sustainability in their operations. The systematic literature review of scientific journal articles has identified "regulatory pressures" and "market pressures" as the most frequently cited drivers for the implementation of sustainability initiatives.*

**Keywords:** Sustainable supply chain management; Drivers of sustainable supply chain management; Systematic literature review

## 1 Introduction

Since the introduction of the idea, sustainability and the terms associated with it - corporate social responsibility (CSR), sustainable development, business ethics, socially responsible businesses, corporate citizenship, corporate responsibility, triple bottom line, etc. - have been constantly evolving and have numerous interpretations by scholars (Weitzman, 1997; Diesendorf, 2001; Mihelcic, et al., 2003; Kleindorfer, Singhal and van Wassenhove, 2005; Seuring, et al., 2008; Carter and Easton, 2011; Schaltegger and Burritt, 2014; Broman, et al., 2017; Köksal, et al., 2017). With an increasing awareness, stakeholders especially consumers are more concerned about the environmental and social issues associated with the development and the use of products. Over the past few decades, sustainability within the operations of organizations as well as within the supply chain has become an important area of research. The implementation of sustainability initiatives not only improves the environmental and social performance of organizations but also provides them a competitive advantage by acquiring a new set of competencies (Adebanjo, Teh and Ahmed, 2016).

Several internal and external factors influence organizations to take decisions for the implementation of sustainability initiatives within and outside of the organizational boundaries. The aim of this paper is to identify these influencing factors by addressing the following “what drives organizations to implement sustainability initiatives in their operations and how can these drivers be categorized?”. This research article provides a clear understanding and a better categorization of the drivers of SSCM. To the best of authors’ knowledge, none of the previous research articles have identified an exhaustive list of drivers of SSCM, categorized and defined them clearly. A systematic literature review is conducted that attempts to address the problem by providing a comprehensive list of drivers of SSCM including their degree of influence as well as a holistic classification.

The remainder of the paper consists of four sections. Section 2 presents the state of the art in the field of SSCM, as well as understanding and classification of drivers of SSCM. Section 3 briefly presents the research methodology. Section 4 provides a detailed analysis of the findings of the literature review. Finally, section 5 presents the conclusions and limitations of the research.

## 2 Research background

The basic terminologies related to the topic of sustainability, SSCM, drivers of SSCM and classification of drivers of SSCM are described below in detail.

### 2.1 Sustainability

Sustainability or sustainable development has become a widely discussed term in almost every business or society e.g. sustainability in supply chains (Seuring and Müller, 2008a; Pagell and Wu, 2009; Carter and Easton, 2011), sustainability at local government level (Brugmann, 1996), sustainable tourism (Tao and Wall, 2009; Fodness, 2016), sustainable cities (Berke, 2016) and many more. The concept of sustainable development combines the idea of sustainability with the concept of development and was first defined as an issue of intergenerational equity in the Brundtland report, entitled 'Our Common Future', then adopted by United Nations' World Commission on Economic Development (WCED). It is defined as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). This definition serves as the basis for the current as well as future research in the field of sustainability.

Several authors have considered sustainable development as a process to achieve sustainability (Diesendorf, 2001; Brockhaus, 2013) while others have considered sustainability as an environmental dimension of sustainable development (Holden, Linnerud and Banister, 2014). However, many authors have contended and tried to ignore the difference between "sustainable development" and "sustainability" (Mihelcic, et al., 2003; Seuring, et al., 2008; Carter and Easton, 2011; Ahi and Searcy, 2013). The concept "triple bottom line" (TBL) proposed by John Elkington (Elkington, 1997) has extended the traditional approach from single bottom line of corporate health in terms of profit and loss (Kleindorfer, Singhal and van Wassenhove, 2005) to two other bottom lines, also known as environmental and social dimensions of sustainability.

Weitzman (1997) has defined sustainability as "annuity-equivalent" level of resource consumption and considered both social and environmental resources as a form of capital that needs to be improved. Mihelcic, et al. (2003) defined sustainability as "the design of human and industrial systems to ensure that humankind's use of natural resources and cycles do not lead to diminished quality of



life due either to losses in future economic opportunities or to adverse impacts on social conditions, human health and the environment". Therefore, sustainability is an approach that prevents from or eliminates the irresponsible behaviors that damage environmental, economic, and/or social systems.

Organizations are considered responsible for their own as well as their supply chain partners' activities (Pagell and Wu, 2009). To achieve the sustainability across the whole supply chain, the importance of integration and collaboration for managing social and environmental issues (Caniato, et al., 2012) at each level in the supply chain has increased (Pagell and Wu, 2009).

## 2.2 Sustainable Supply Chain Management

The term SSCM incorporates the sustainability view to the supply chain management (SCM) definition and discussed in literature as green supply chain management (GSCM), ethical or responsible SCM, corporate social responsibility (CSR), etc. (Seuring and Müller, 2008b; Varsei, et al., 2014; Broman, et al., 2017). Several literature reviews on SSCM have been published in recent years (Carter and Rogers, 2008; Seuring and Müller, 2008b; Carter and Easton, 2011; Ahi and Searcy, 2013; Köksal, et al., 2017). Carter and Rogers (2008) defined SSCM as "the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual organization and its supply chains". They mention the need for inter-organizational coordination with the prime focus on long-term economic performance. According to Pagell and Wu (2009), a truly sustainable supply chain does not harm the environment and the society. In addition, non-economic dimensions (environmental and social) must complement economic dimension and vice versa.

To achieve sustainability organizations are required to redesign their current supply chains to incorporate sustainability goals into their operations from purchasing till distribution (Bansal, 2002). Ben Abdelaziz, Saeed and Benleulmi, (2015) have identified the goals of an SSCM i.e. to provide maximum value to all stakeholders and to fulfill customer requirements by achieving sustainable flows of products, services, information, and capital as well as enabling the cooperation among supply chain participants.

The scientific literature has identified the need for an increased level of cooperation among different supply chain partners for achieving higher levels of value creation in sustainability (Seuring and Müller, 2008a; Brockhaus, Kersten and Kne-meyer, 2013). Further, it has highlighted the customers' and other stakeholders' needs while improving the sustainability of an organization and its supply chain (Ben Abdelaziz, Saeed and Benleulmi, 2015). The relationships of the focal organization within its supply chain have prime importance for the implementation of sustainability initiatives as the focal organization has to coordinate with suppliers to achieve customers' and other stakeholders' goals.

### 2.3 Drivers for SSCM

Organizations and their supply chains are pressurized to adopt sustainability practices (Hsu, et al., 2013; Varsei, et al., 2014). These pressures are defined in literature synonymously as triggers, enablers, and drivers (Caniato, et al., 2012; Hsu, et al., 2013; Köksal, et al., 2017). Caniato, et al. (2012) defined these pressures as drivers that push organizations towards the implementation of specific sustainable practices. Hsu, et al. (2013) defined drivers as motivators that encourage organizations to adopt green/sustainability initiatives within and across the organizational boundaries. Therefore, drivers for SSCM are defined as motivators or influencers that encourage or push organizations to implement sustainability initiatives throughout the supply chain.

Drivers of SSCM can influence either one or more sustainability dimensions and emerge from pressures of both internal and external stakeholders (Hsu, et al., 2013; Meixell and Luoma, 2015). Different drivers affect supply chain decisions to a distinct extent (Haverkamp, Bremmers and Omta, 2010). Furthermore, due to the rising transparency, offered by new forms of mass communication such as social media (Ben Abdelaziz, Saeed and Benleulmi, 2015), consumers are more eager to know about the conditions under which products were manufactured and want to be more informed about the sustainability of products and/or brands.

Drivers of SSCM are classified, in the literature, according to their degree of influence and their contribution or significance within the supply chain (Walker, Di Sisto and McBain, 2008; Caniato, et al., 2012; Ayuso, Roca and Colomé, 2013; Glover, et al., 2014; Schrettle, et al., 2014). According to institutional theory, drivers of SSCM can be categorized as coercive drivers, normative drivers and mimetic drivers (Zhu and Sarkis, 2007; Hsu, et al., 2013; Glover, et al., 2014). Stakeholder theory

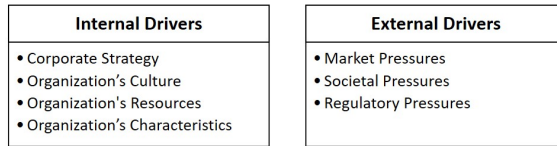


Figure 1: Classification of drivers of SSCM

helps to understand the role of pressure exerted by different stakeholders for the implementation of sustainability initiatives (Varsei, et al., 2014).

In accordance with institutional and stakeholder theory drivers of SSCM are identified and divided into external and internal drivers (Zhu and Sarkis, 2007; Walker, Di Sisto and McBain, 2008; González-Benito and González-Benito, 2009; Haverkamp, Bremmers and Omta, 2010; Harms, Hansen and Schaltegger, 2013; Schrettle, et al., 2014), as shown in figure 1.

### 2.3.1 External Drivers

External drivers refer to exogenous pressures generated outside the organization and considered to have more influence than internal drivers (Walker, Di Sisto and McBain, 2008). The research on external drivers of SSCM predominates in the literature (Bai, Sarkis and Dou, 2015). These drivers are categorized into three groups: (1) regulatory pressures, (2) societal pressures, and (3) market pressures.

#### Regulatory pressures

Regulatory pressures are one of the most cited drivers in the literature (Beamon, 1999; Walker, Di Sisto and McBain, 2008) and are exerted by both national or supranational (regional or international) regulatory institutions in the form of standards, laws, procedures, and incentives to promote sustainability practices (Hsu, et al., 2013; Xu, et al., 2013). These drivers have a significant impact on the organizations' sustainability approaches and can have the ability to dictate organizations to adopt certain sustainability practices (Haverkamp, Bremmers and Omta, 2010; Schrettle, et al., 2014). Adopting enforced legislations prevent

organizations from fines or penalties. This driver category includes pressure from government agencies, regional (e.g. EU) or international regulators, certification (e.g. ISO), trade/professional associations, financial incentives, etc. (Beamon, 1999; Zhu and Sarkis, 2007; Walker, Di Sisto and McBain, 2008; González-Benito and González-Benito, 2009; Haverkamp, Bremmers and Omta, 2010; Huang and Kung, 2010; Tate, Ellram and Kirchoff, 2010; Giunipero, Hooker and Denslow, 2012; Harms and Klewitz, 2013; Hsu, et al., 2013; Xu, et al., 2013; Schrettle, et al., 2014).

### Societal pressures

Societal pressures, also named in literature as societal values and norms (Schrettle, et al., 2014), are expectations or demands of different interest groups from organizations to adopt sustainability practices in their operations (Walker, Di Sisto and McBain, 2008; Schrettle, et al., 2014). These pressures help to increase public awareness regarding different sustainability issues e.g. scarcity of resources, environmental damages, human rights, social well-beings, health and safety, etc., (Walker, Di Sisto and McBain, 2008; González-Benito and González-Benito, 2009). Societal pressure drivers include pressures from NGOs, media/press, societal groups (inhabitants, environmental organizations), value based networks, consumer organizations, community, etc. (Beamon, 1999; Walker, Di Sisto and McBain, 2008; Freeman, 2010; Haverkamp, Bremmers and Omta, 2010; Harms, Hansen and Schaltegger, 2013; Hsu, et al., 2013; Schrettle, et al., 2014).

### Market Pressures

Market drivers are responsible for the market shape (Schrettle, et al., 2014) which is considered as one of the main concern by organizations. Investors can withdraw investments if organizations fail to achieve sustainability goals (González-Benito and González-Benito, 2009; Schrettle, et al., 2014) this results in increased risks and damages to organizations' reputation. This drivers' group includes pressures such as customers/consumers, competitors, shareholders, suppliers and buyers, investors, reputation/image, financial institution, competitive advantage, supply chain and network, etc. (Zhu and Sarkis, 2007; Walker, Di Sisto and McBain, 2008; Freeman, 2010; Haverkamp, Bremmers and Omta, 2010; Huang and Kung, 2010; Caniato, et al., 2012; Giunipero, Hooker and Denslow, 2012; Ayuso, Roca and

Colomé, 2013; Harms, Hansen and Schaltegger, 2013; Bai, Sarkis and Dou, 2015; Govindan, et al., 2016).

### 2.3.2 Internal Drivers

Internal drivers are pressures generated within the organization (Caniato, et al., 2012) and predict a proactive sustainability behavior of an organization (González-Benito and González-Benito, 2009). These drivers are categorized into four groups: (1) corporate strategy (2) organization's culture (3) organization's resources (4) organization's characteristics.

#### Corporate strategy

The integration of sustainability principle at a strategic level is the pre-requisite for a successful achievement of the organizations' sustainability goals (Haverkamp, Bremmers and Omta, 2010; Schrettle, et al., 2014). This driver group includes organization's sustainability strategy, top management commitment, cost related pressures, operational performance, etc. (Carter and Dresner, 2001; Walker, Di Sisto and McBain, 2008; González-Benito and González-Benito, 2009; Giunipero, Hooker and Denslow, 2012; Hsu, et al., 2013; Xu, et al., 2013; Govindan, et al., 2016).

#### Organization's culture

Organization's culture has a direct influence on the organization's motivation for sustainability. This driver category includes information dissemination, innovativeness, health and safety issue, code of conduct, etc. (Haverkamp, Bremmers and Omta, 2010; Harms and Klewitz, 2013; Hsu, et al., 2013; Schrettle, et al., 2014; Paulraj, Chen and Blome, 2015; Govindan, et al., 2016).

#### Organization's resources

The access to adequate resources is an important driver in achieving sustainability goals by an organization (Schrettle, et al., 2014). This driver category includes organizations resources, human resources, organizational capabilities, physical

capital (tech-nology, equipment), human capital (skills and capabilities), employees, etc. (Henriques and Sadorsky, 1999; Carter and Dresner, 2001; Walker, Di Sisto and McBain, 2008; Haverkamp, Bremmers and Omta, 2010; Hsu, et al., 2013; Schrettle, et al., 2014; Go-vindan, et al., 2016).

#### Organization's characteristics

The pressure for adopting sustainability practices does not only depend on the perceived pressures as mentioned above but also on the organization's characteristics (González-Benito and González-Benito, 2009; Haverkamp, Bremmers and Omta, 2010). This driver category includes organization's size, current level of environmental actions, degree of internationalization, geographical location, position in the supply chain, industrial sector, etc. (González-Benito and González-Benito, 2009; Haverkamp, Bremmers and Omta, 2010; Tate, Ellram and Kirchoff, 2010; Schrettle, et al., 2014; Bai, Sarkis and Dou, 2015; Mzembe, et al., 2016).

Drivers of SSCM are also classified as primary and secondary drivers according to their access to supply chain knowledge and value-contribution. The more the knowledge about the supply chain and the greater the value contribution the greater will be the importance of the pressure group. Primary drivers include government, shareholders, suppliers, employees, unions, customers/consumers, financial institutions, regulatory agents (Zhu and Sarkis, 2007; González-Benito and González-Benito, 2009; Alblas, Peters and Wortmann, 2014), competitor pressure (Hsu, et al., 2013), top management commitment, cost related pressures, resource utilizations, competitive advantage (Giunipero, Hooker and Denslow, 2012). Secondary drivers include media/press, NGOs, communities, social groups (González-Benito and González-Benito, 2009), reputation/image (Zhu and Sarkis, 2007), socio cultural responsibility/public pressure (Hsu, et al., 2013) certifications, financial benefits (Giunipero, Hooker and Denslow, 2012).

### 3 Research Methodology

In order to address the identified research question, a multi-step systematic literature review methodology (Tranfield, Denyer and Smart, 2003) methodology was followed to investigate the information published in scientific literature related to drivers of SSCM. Fink, (2014) has defined systematic literature review as “a

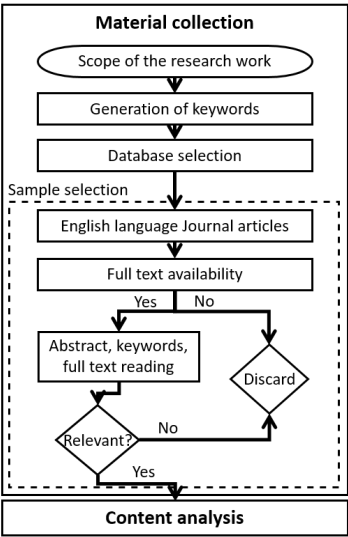


Figure 2: Systematic literature review process flow

systematic, explicit, comprehensive and reproducible approach for identifying, evaluating, and interpreting the existing body of documented work produced by academicians and practitioners”. The steps followed to identify drivers for SSCM, as shown in figure 2, are explained in next subsection.

### 3.1 Material Collection

Scientific literature articles published until the year 2016 in the field of drivers of SSCM were considered for the scope of this research work. An initial literature review has helped to identify related keywords which were later refined with rigorous trials and test searches of specific terminologies in different scientific databases. A final combination consisting of two keywords was developed, as shown in Table 1. The first keyword is a combination of two terms i.e. sustainab\*



Table 1: Keyword combinations and number of outcomes

Data Source <sup>a</sup>	Keyword 1	Keyword 2	Articles with repetition	Unique articles	Full-text available	Relevant/ Irrelevant (R/IR)
Science Direct	Sustainab*	Trigg*	160	503	462	217 (R)
Web of Science	AND "supply chain"	OR pressur* OR driv*	458			245 (IR)

'AND "supply chain", which has helped to identify articles in the field of SSCM. Whereas the second keyword is a combination of three terms i.e. driv\* OR trig\* OR pressur\*, which has helped to identify articles within that sample and have discussed or mentioned drivers of SSCM. The use of asterisk "\*" sign here has led to access a wide range of publications as authors use slightly different keywords to discuss the same idea.

Two well-renowned scientific databases, namely Elsevier's Science Direct ([www.sciencedirect.com](http://www.sciencedirect.com)) and the Web of Science ([www.webofknowledge.com](http://www.webofknowledge.com)) were selected to collect related scientific articles. A pilot keyword search was performed before conducting a thorough search in the two databases selected which helped to validate the keyword combinations (Kersten and Saeed, 2014). The search field "abstract, title, keywords" was selected. Due to the impartiality in reviews and quality of the manuscript, search results were constrained only to peer reviewed journals. As a result, 618 articles were initially identified from two databases i.e. 458 from Science Direct and 160 from the Web of Science. After cleaning and removal of duplicates (115), 503 unique articles were left, out of which 41 articles were inaccessible from the University VPN (Virtual Private Network). That has led the sample to 462 articles. The identified articles were further processed carefully by authors to ensure quality and validity. Articles that have mentioned drivers or pressures in aspects other than SSCM (e.g. water pressure), it was excluded from the final dataset. Out of 462 collected articles, 217 articles at least mentioned the drivers of SSCM.

<sup>a</sup>Text search categories were 'Title', 'Abstract' and 'Keyword'

### 3.2 Content Analysis

Drivers of SSCM were identified from the identified articles using a content analysis approach. It is a technique used to reduce documentary material into manageable bits of data (Weber, 2008). Drivers' information given in the form of tables, figures, appendices, or anywhere in the content of the publication was extracted. The exact wording and page numbers in the publication, for each driver, were documented for transparency and replicability purposes. In total 1,559 drivers were identified.

Drivers were classified according to main driver categories (see section 2.3) and sub-categories. Assumed sub-categories (identified from the initial literature review) and inferred sub categories (identified during the focused coding process) are given in table 4 and table 5. Drivers with similar meanings were grouped together such as "government regulations", "government legislations" or "government pressures", etc. In some cases, during the classification, the coherent and standardized driver names have resulted in some variation from the original text mentioned in publications. Further, a unique identification number was assigned to each driver. The content related to drivers of SSCM was collected in Microsoft-Excel spreadsheet for the analysis purpose. Therefore, this content analysis provides an essential starting point for the development of a conceptual structure and a coherent set of standardized SSCM drivers.

The systematic use of keywords search and documentation of each process step have ensured reliability in the material collection process. Both assumed and inferred driver categories are based on the extensive literature review. Furthermore, the validity of the coding process was ensured by involving two coders from the start of the research and differing judgments were resolved after detailed discussions.

## 4 Results and Findings

The application of a reference management software 'Citavi' has provided authors the opportunity to better manage the data. The classification of drivers of SSCM in different categorization has resulted in a quantitative data set from the qualitative content of scientific publications. The basic bibliographic information (author's name, journal's name, year of publication, page number, article's title, etc.) were exported from Citavi to Microsoft-Excel for conducting further analysis. This part

Table 2: Percentage of publications per year

Pub. Year	#	%	Pub. Year	#	%	Pub. Year	#	%
2003	1	0.5%	2009	5	2.3%	2014	36	16.6%
2005	1	0.5%	2010	9	4.1%	2015	43	19.8%
2006	1	0.5%	2011	8	3.7%	2016	51	23.5%
2007	5	2.3%	2012	28	12.9%			
2008	3	1.4%	2013	26	12%			
Total articles: 217								

of the article presents and discusses the findings in a way that provides some practical guidance for academics and practitioners in the field of SSCM.

#### 4.1 Descriptive Analysis

The importance of the research regarding drivers of SSCM over time and other descriptive features such as year of publication, the journal for each publication and publication authors are presented in this section. A continuous growth in the number of publications has been identified as shown in table 2. In addition, more than 80% of the total articles were published after the year 2011. This rapid increase in the number of publications is a direct indication of the growing attention towards the research field of adopting sustainability practices across the supply chain.

In total, 79 journals have published articles related to drivers of SSCM, only 29 of them have published more than two articles. Table 3 shows, the ten journals with the most number of publications on SSCM. The "Journal of cleaner production" is leading with maximum publications (39) and is the only journal that has published more than 30 articles. Whereas, "International journal of production economics", "Supply chain management - an international journal", "International journal of operations & production management" and "Business strategy and the environment" are the only journals that have published more than ten articles.

Author 'Sarkis, J.' has published a maximum number of fourteen articles in the field of drivers of SSCM. 'Zhu, Q.' has published eleven articles, and Govindan, K. has published eight articles. Figure 3 shows the list of authors who have published

Table 3: List of top-ten Journals in dataset

International Journal	# of Publications
Journal of cleaner production	39
International journal of production economics	15
Supply chain management-an international journal	14
International journal of operations & production management	13
Business strategy an the environment	12
Journal of business ethics	6
Journal of purchasing and supply management	5
Resources consevation and recycling	5
Resources policy	5
International journal of physical distribution & logistics management	4

at least four articles in this research area, either individually or together with a research group. The analysis has shown that a majority of the publications identified for this research are from developed countries and the majority of authors are affiliated with research centers from developed countries.

#### 4.2 Frequency Analysis of Drivers of SSCM

Drivers of SSCM were identified, extracted, documented and coded in a spreadsheet to perform frequency analysis. Frequency analysis helps to determine how often a driver of SSCM is mentioned in the sample. It yields a greater level of understanding of the use of drivers in SSCM literature as summarized in table 4 and table 5. The frequency analysis table represents the distribution of drivers of SSCM for each driver's category.

"Internal drivers" were cited 537 times and "external drivers" were cited 1022 times in this literature review. In case of external drivers' category, the "market pressures" (495) and the "regulatory pressures" (323) categories were mostly discussed in the literature review. The "corporate strategy" (220) and "organization's culture" (114) were most frequently cited in the case of internal drivers' category.

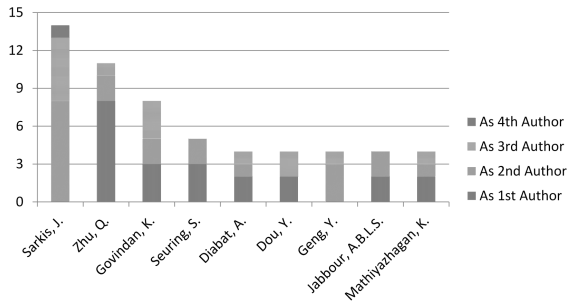


Figure 3: Authors' distribution in the dataset

Based on the frequency analysis, it can be predicted that the more frequently a driver is cited in the literature the more influence it has for the implementation of sustainability initiatives and proven to be more important than other drivers of SSCM.

The "primary drivers" were cited 1029 times and "secondary drivers" were cited 530 times in this literature review. The "customer pressure" (141) has more influence in primary drivers' category and "NGOs pressure" (70) has more influence in second/ary drivers' category based on how frequently a driver is cited in the literature.

Table 4: Frequency analysis of drivers of SSCM – External Drivers

		External Drivers (1022)	
		Regulatory Pressures (323)	Market Pressures (495)
Primary Drivers (1029)		Societal Pressures (204)	
	Professional/ trade associations (19)		Shareholders/ investors' pressure (29)
	Regulators (115)		Suppliers Pressure (40)
			Competitors/ competitors' pressure (53)
			Customers' pressure/ demand (196)
			Institutional pressure (34)
			Reputation/ Image (53)
Secondary Drivers (530)	Certifications (33)	Media/Press (22)	Globalization (28)
	Financial benefits (22)	NGOs Pressures (70)	
		Public pressure (societal group) (56)	
		Value based networks (5)	
		Social wellbeing/ community focus (37)	

Table 5: Frequency analysis of drivers of SSCM – Internal Drivers

		Internal Drivers (537)			
		Corporate strategy (220)	Organization's Culture (114)	Organization's Resources (111)	Organization's Characteristics (92)
Primary Drivers (1029)	Top management commitment (62)	Health and Safety (10)	Organizations resources (32)		Industrial sector (18)
	Organizations' strategy (37)		Resource depletion (16)		Geographical location (3)
	Cost related pressures (68)		Employees' pressure/ involvement (21)		Position in supply chain (13)
Secondary Drivers (530)	Operational/ economic performance (53)	Socio cultural responsibility (50)	Training & development (14)		Organization size (17)
		Innovativeness (17)	Physical capital, technology, equipment (10)		Degree of internationalizations (12)
		Code of conduct (14)	Human capital (skills and capabilities) (18)		Current level of sustainability actions (29)
		Information dissemination (23)			



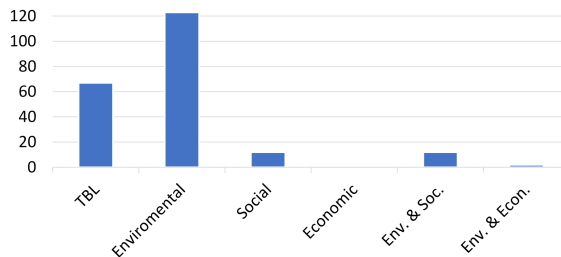


Figure 4: Distribution of sustainability dimensions

### 4.3 Dimensions of Sustainability

In the context of sustainability dimensions (see section 2.1), identified articles were also analyzed based on the TBL approach. The systematic literature review has shown that the environmental dimension of sustainability has attracted more attention and is most frequently discussed. This is also in accordance with the findings of other authors (Seuring and Müller, 2008b; Carter and Easton, 2011; Varsei, et al., 2014). Furthermore, 67 (31%) articles have been identified that have addressed all three sustainability dimensions (TBL) as shown in figure 4. Out of those 44 (66%) were published between 2014 and 2016 which entails a rapid increase in the interest of researchers in the field of TBL of SSCM. Whereas, 16 articles have addressed two sustainability dimensions i.e. either 'economic and social' (14) or 'environmental and social' (2).

### 4.4 Distribution by Methodology Applied

An inquiry into the research paper methodology has indicated that a range of methodologies were applied by different authors to address different research questions in their research articles considered for this study. Many authors have adopted multiple methodologies in their research and a majority of them have combined literature reviews with other methodological approaches. For the purpose of analysis, in case of multiple methodologies, each methodology is counted as one. The methodological approach of surveys (91), which is an empirical data

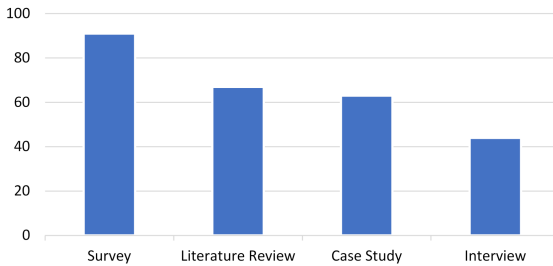


Figure 5: Top research methodologies applied

collection approach, is the most frequent methodology applied among all methods used. It is also in accordance with the findings of Bai, et al. (2015). Other methods are literature review (67), case study (63) and interviews (44) as shown in figure 5. In addition, some other methodologies were also applied by researchers such as DEMATEL, Interpretive Structural Modelling, etc.

#### 4.5 Industrial Sectors

The industrial sector analysis of research articles has led to the conclusion that 42 articles have addressed multiple industries. Results suggest that manufacturing industrial sector along with automotive industrial sector is under increased pressure to adopt sustainability practices and 39 articles have addressed the manufacturing sector while 17 articles have addressed the automotive industrial sector as shown in figure 6. Due to the food safety issues, the food industry has attracted more attention (Bai, Sarkis and Dou, 2015) and 20 articles have addressed food-related industry. In addition, other industries such as textile, electronics, services, construction, etc. were also addressed.

#### 4.6 Geographical Origin of Research Publications

Sustainability has become a global issue of importance, however, the majority of the articles identified are from developed countries. The analysis of the geographical origin of the data source, used in identified research articles, has shown that

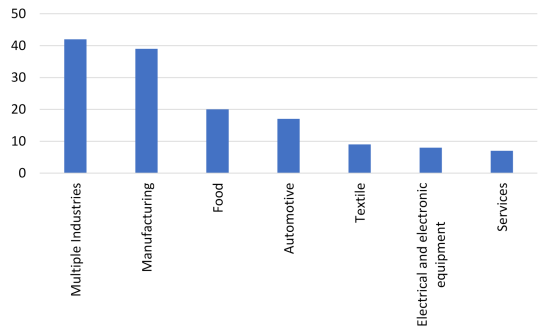


Figure 6: Top industrial sectors addressed in dataset

the majority of the publications are from the OECD (organization for economic co-operation and development) member countries i.e. 129 publications, whereas 88 publications are from non-OECD member countries as shown in figure 7. In addition, first author's university affiliation is used as a geographical location, if the origin of the data source is not clearly mentioned in the research article. It has led to a very interesting conclusion that sustainability issues are not only limited to developed countries. Organizations in developing countries are also influenced by both internal and external drivers to adopt sustainability practices. In terms of a number of publications, research articles addressing sustainability issues from developing countries e.g. India (26) and China (21) are among top five countries. However, 67 publications are from EU member states and 26 publications are from UK which makes 72% of the total publications from OECD member countries. On the other hand, publications from India, China, and Brazil makes 63% of the total publications from non-OECD member states. Furthermore, 85% of the publications from the developing countries are published between 2012-2016. It indicates that researchers have recently started focusing on sustainability issues in developing countries. Despite getting importance in developing countries, a clear gap still exists between developed and developing countries.

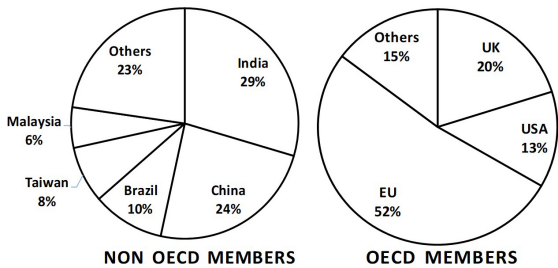


Figure 7: Geographical distribution data sources of selected research articles



Figure 8: Distribution of SCM processes

## 4.7 Supply Chain Functions

From the systematic literature review conducted, 150 articles were identified dealing with the network level of a supply chain. Out of which more than 100 articles were published between 2013-2016. This is a direct indication of the growing importance of the sustainability topic at the supply chain network level. With an increase in the awareness, stakeholders put pressures on organizations to implement sustainability initiatives across their supply chain. Furthermore, the analysis has shown that sustainability issues are not only addressed at supply chain network but also at individual function levels. Other supply chain functions identified in the literature view such as source (24), make (37) and deliver (6) as shown in figure 8.

## 5 Conclusions and Outlook

The main objective of this research article was to identify drivers of SSCM and to understand their role in the implementation of sustainability initiatives. The objective of the study has guided to adopt a systematic literature review to address the research question posed at the start of this study. This systematic literature review has provided a comprehensive review of drivers of SSCM. The findings of this research can help practitioners in decision making while adopting sustainability practices. As drivers of SSCM pressurize organizations to implement sustainability initiatives. However, understanding sustainability issues of importance identified by drivers of SSCM and precise selection of a certain sustainability initiative require a detailed knowledge of sustainability drivers. Which defines organization's future actions towards the adoption of sustainability practices. Therefore, both drivers of SSCM and decision making regarding sustainability actions are interlinked and this might lead organizations towards improved sustainable behaviors.

The findings of the frequency analysis have shown that the topic of drivers of SSCM is more of a network supply chain issue than individual supply chain functions. "External drivers" have more importance for adopting sustainability practices than "internal drivers". In addition, due to the influence, "primary drivers" are cited more than "secondary drivers". "Market Pressures", "regulatory pressures" and "corporate strategy" dominate the literature. Different industrial sectors are facing more regulatory and societal pressures than others. Furthermore, developed countries such as OECD member countries were represented more

(60%) in the sample than non-OECD member countries. But at the same time, the number of articles from developing countries such as India, China, and Brazil have also increased. However, to identify country specific drivers of SSCM and to understand the sustainability issues of importance in case of developing countries, further research is required from countries other than China, India, and Brazil. As current research is centered either around developed countries or few developing countries such as China, India, and Brazil.

Despite its contribution, many improvements and specifications can be added to this frame of reference. Our research sample does not pretend to be exhaustive, as the findings of this study are based only on journal publications from two scientific databases. However, it is expected to provide a reliable systematic literature review of the current research related to drivers of SSCM. As data saturation was noticed after reviewing articles from "web-of-science" and "science-direct" databases. Nevertheless, research focus can be extended by including other forms of literature e.g. books, conference proceedings, etc.

Future research is required to empirically verify the findings of this research article, to check the relevance of different drivers of SSCM and to analyze the interconnection among different drivers. Furthermore, the consideration of articles from other scientific data sources might have an effect on the findings of this research paper. In addition, further research is required to identify industry specific drivers of SSCM as well as geographically significant drivers of SSCM.

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