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*Review Article*

# Sustainable Supply Chain Management in Oil and Gas Industry in Developing Countries: A Systematic Literature Review

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**Abstract:** “Sustainable Supply Chain Management” (SSCM) has become a hot topic on which eminent researchers are working on every day. However, it is clear that we still observe in this field of research, an artistic vagueness on the fundamental differences between Sustainable Supply Chain Management and Green Supply Chain Management (GSCM). Moreover, it is regrettable to note that previous researchers haven't yet thought about having a specific theory which can be applied to SSCM, the use of macro theories still being observed. In addition, we observe a lack of research in the oil and gas industry especially in Developing Countries when we know that this industry is the most lucrative and polluting. Therefore, this paper's purpose consists to make a Systematic Literature Review (SLR) of 38 papers published from 2005 to 2023 especially in oil and gas industry and in Developing Countries, in order to make a clear distinction between SSCM and GSCM while highlighting the practices related to them and at the same time, generating a united theory which will bring together the triple bottom line of the SSCM. As findings, the authors built a Conceptual Framework that applies the triple bottom line of the SSCM in oil and gas industry by demonstrating that GSCM which is more related to environmental issues and is a part of the SSCM. Therefore, in order to be more efficient and to have a great impact on their performances, Oil and gas companies should apply SSCM practices rather than GSCM practices which are very different from what is applied in Developed Countries because of certain barriers and pressures.

## 1. Introduction

Over the past decade, SSCM has become a research area that receives increasing attention. Many literature reviews have been published on different axes, such as green management of the supply chain [1], and green purchasing [2]; the definition and measurement of SSCM [3,4], and their environmental impacts, while other literature reviews focus on the SSCM's social impacts [5,6]. Also, other articles deal with both: social and environmental effects [7].

According to [8] SSCM activities include the monitoring and the support of and the integration of sustainability performance criteria into the supplier selection process. With accordance to [9], “effective Supply Chain Management may be used to increase the performance of an organization through the following aspects: customer relationship, supplier relationship, level of information, level of information sharing, and postponement”. Conclusions of [10], also proved that SCM performance is positively related to the performance of a company. Supply Chain Management and sustainable development can be integrated to produce three dimensions which include the economic, environmental, and social issues associated with the development of humans and which are related to the strategies and activities of a company [11].

The motivation behind the optimal SCM is the increase of competitive advantages of the supply chain [12]. In 1985, Porter defined dual kinds of competitive advantage: “cost leadership and differentiation”. In accordance with [13], increased overall customer satisfaction can ameliorate the company's profitability and competitive advantage. Similarly, [14] proposed to SCM to provide economic value and higher customer service through synchronous management of tangible goods flows with related information from supply to utilization. In accord with Porter, the competitive advantage develops essentially from the value of a client, which is created by the company, and aims

to create sustainable and profitable position against the different forces that settle competition in the industry. In this regard, it's suggested that the introduction of Supply Chain Management increase the satisfaction and value of customers, that has increased the supply chain's competitive advantage as well as for each member firm. That definitely increases the profitability of the supply chain and its members. Some researchers offer particular goals to increase competitive advantage, profitability, and value/satisfaction of the supply chain's customer base, as well as its participants. For instance, the main goal of SCM consists to reduce the costs required to issue the required "level of customer service" in a particular segment [15,16].

Another main goal is to boost customer service by increasing inventory availability and reducing the time of the order cycle [17]. The goals of the customer service can be additionally achieved by a customer-enriching procurement system based on improving innovative solutions and synchronizing the flow of products, information and services to generate unique, "customized customer service value sources" [18]. And, an inexpensive differentiated service helps create a competitor agonistic for the supply chain [19–21]. In order to gain a competitive advantage that eventually initiates gainfulness. When we differentiate between the customer service operating function and the resulting goal of value and customer satisfaction, the discussion guides us to deduce that the effects of CMS are lower costs and better value and customer satisfaction to gain a competitive advantage. Different reports from Industry confirm this claim (Performance Management Group 2001).

Since 1992, a total of 9000 articles in management literature dealing with SSC have been published, and the most important works come from a small number of academics, largely from the United States, Europe, and parts of Asia [1]. There are almost no African academics that have spent a lot of his or her time on this practice in Developing countries. When we know that SSCM has become a subject of global interest, the lack of non-Asian and non-Western originated research is perceived as a gap, as a source of dissatisfaction by suppliers in developing countries who feel under-represented in trade policies and sustainable development strategies [22].

Although there is a large body of research on SSCM in the management and supply chain literature, it has brought out that this research does not satisfactorily reveal the particular problems of SSCM in Emerging Economies [1,23]. Apart from that, many publications talk about Green Supply Chain Management only. Also, we observe a crucial lack of research made on sustainability that report the different O&G practices in the context of industry, especially in terms of SCM [24]. Last studies focussed on companies in specific countries especially European, American and Asian countries [24] or they do not integrate all sustainability dimensions, namely, economic, environmental and social factor. Also, there is an ambiguity while talking about sustainability and SCM because of the fact there is no existing theoretical difference between Green Supply Chain Management and Sustainable Supply Chain Management. Each term is used from one article to another without pointing out the clear difference between the two. It's quite sure that research is still influenced by green/environmental aspects. Because social issues and also the integration of the three aspects of sustainability are still scarce [4].

According to [25], Theory- building efforts in SSCM remains scarcer. In fact, there is a predominance of many popular imported macro theories. And it appears to be a weakness for the SCM which deserves a hold theory regarding to the consistency of the subject [25].

The ultimate purpose of this work, consists to put in the same framework these four concepts: Sustainability; Supply chain Management; Developing Countries; and Oil and Gas industry. In order to know the importance of Sustainable Supply Chain Management in Oil and Gas Industry in Developing countries. Therefore, we will use a 5W+1H pattern to help us understanding the phenomenon, by setting up the best following questions [26]:

1. What: What are the main findings of the related literature review?
2. Who: Who are the main and active authors in the related area of research interest?
3. Where: What are the main countries associated to the published research in that area?
4. When: When do publications have been made in our area of Research?

5. Why: Why is it useful for scholars to conduct research on this topic? Why is it important to additionally examine this research scope if this field of research is so active with a multitude of publications each year?
6. How: How does SSCM apply in O&G industry in DC?

This review paper is organized as follows: The first Section gives a brief conceptual framework to better understand the review, the second section presents the methodology adopted; Section 3 presents and discusses the different results of the study including the descriptive analysis as well as synthesis; the limitations of this study and possible future research directions as well that the theoretical and managerial implications of the study are addressed in the last session.

## 2. Conceptual framework

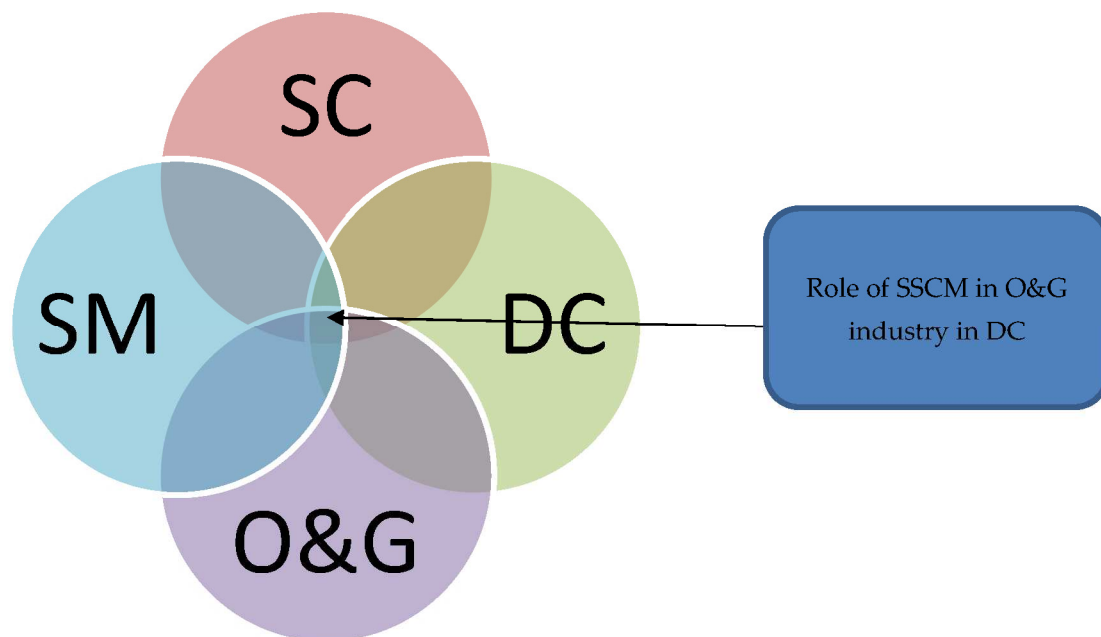
In order to better understand this study, we will proceed in the following to a brief framing of the four key research concepts, namely: (1) the supply chain, (2) Sustainable Management (3) Developing Countries (4) Oil and Gas Industry.

- (1) **The Supply Chain(SC)**: According to [17,27,28], the explanation of “supply chain” appears to be more popular among authors than the definition of “supply chain management”. La Londe and Masters have proposed “that a Supply Chain is a set” of companies that transmit materials. Currently, many independent companies are involved in the manufacture of a product and place it in the hands of the end-user in a Supply Chain: producers of raw materials and components, product assemblers, wholesalers, retailers and companies of transport are all members of a supply chain [27]. The Supply Chain is made up of all the phases involved, directly or indirectly, in satisfying a customer’s request. It includes not only the manufacturer and suppliers, but also carriers, warehouses, retailers and customers themselves [29]. Thus, supply chain management consists of coordination of production, inventory, location and transportation in order to obtain the best combination of responsiveness and efficiency for the market served. It’s about management of the various activities necessary to coordinate the flow of products and services in order to best serve the end customer. All traditional logistics activities are involved, in addition to activities such as marketing, new product development, finance and customer service. Furthermore, these additional activities are now considered as part of the work required to meet customer demand [30].
- (2) **Sustainable Management(SM)**: As for the concept of sustainable management, which comes from Sustainable Development, which was defined for the first time in 1987 by the World Commission on environment and development, (1987) in the Brundtland report as “development that meets the needs of the present without jeopardize the ability of future generations to meet theirs”. It is often approached through the dimensions: economic, environmental and social [31]; or all three pillars of sustainable development (3P: Profit, Planet, and People). In other words, organizations should make a profit, but not at the expense of the environment (Planet) and society (People). Economic concerns relate not only to profitability objectives financial, but also the objectives of wealth creation with an equitable distribution of these riches. Environmental concerns relate mainly to the concerns about global warming, pollution, resource depletion natural, etc. Finally, social concerns relate to the increase in inequalities in the global level, poverty and access to basic needs (drinking water, food, housing, work, care, education, etc.) [32]. Several definitions of the Sustainable Supply Chain Management have been discussed in the literature. The most common definition used nowadays, has been proposed by [4]: “The management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements” In effect, it consists of managing environmental, social and economic impacts throughout the life cycle of goods and services. Its objective consists to generate, protect and improve the value long-term environmental, social and economic benefits for all stakeholders involved in bringing services and products to market [33].
- (3) **Developing Countries (DC)**: According to [34], Developing Countries “refers to the low-income and import-dependent nations in Eastern Europe, Latin America, Africa, and Asia that accept

the rules, norms and standards with regards workplaces, businesses and global economic practices". This definition is not far from what has been proposed by the IMF. According to this Bretton Woods institution, "Developing countries are those countries whose standard of living, income, economic and industrial development remain more or less below average".

(4) **Oil and Gas (OG)** in the Power Sector, Oil and Gas are the principal industry with a critical role in the World Economy as the primary fuel sources in the word [35]. OG industry is divided into three mean segments [35]:

- Upstream: the business of O&G exploration and production;
- Midstream: it regroups companies specialized in transportation and storage;
- Downstream: regroups refining and marketing companies.



**Figure 1.** Our area of interest.

### 3. Methodology

In accordance with the objective of this review, this document is based on a two-pronged approach components: bibliometric analysis [36,37] and systematic review and [38].

Indeed, using visualization tools (like VOSviewer), the bibliometric analysis sums up large amounts of bibliometric data to show the state of the art and trends emerging from a topic or research area. As for the systematic review of literature, it sums up and synthesizes the conclusions of the existing literature on a subject or a field of research [39].

#### 3.1. Search Strategy

This SLR was conducted based on the PRISMA's guidelines (Preferred Reporting Items for Systematic Review and Meta-Analysis). The basics of Scopus, and Science Direct data were searched by applying the following search equation: (Supply Chain) AND (sustainable OR sustainability OR Green OR echo) AND (Oil and Gas). Note that the research was stopped on March 20, 2023.

#### 3.2. Inclusion criteria

By typing all the 4 key concepts together, we found no articles in almost every databases. Therefore we had to eliminate the key concept Developing Countries.

Inclusion criteria for the type of documents: articles, review, conference paper, review of conference and books.



Exclusion criteria: any documents that are not written on Developing Countries or Emerging Countries. Also, we have excluded non relevant publications after reading. In total we obtained 38 articles. Figure 2 synthetizes the research process with the number of included articles according to the 2020 PRISMA diagram.

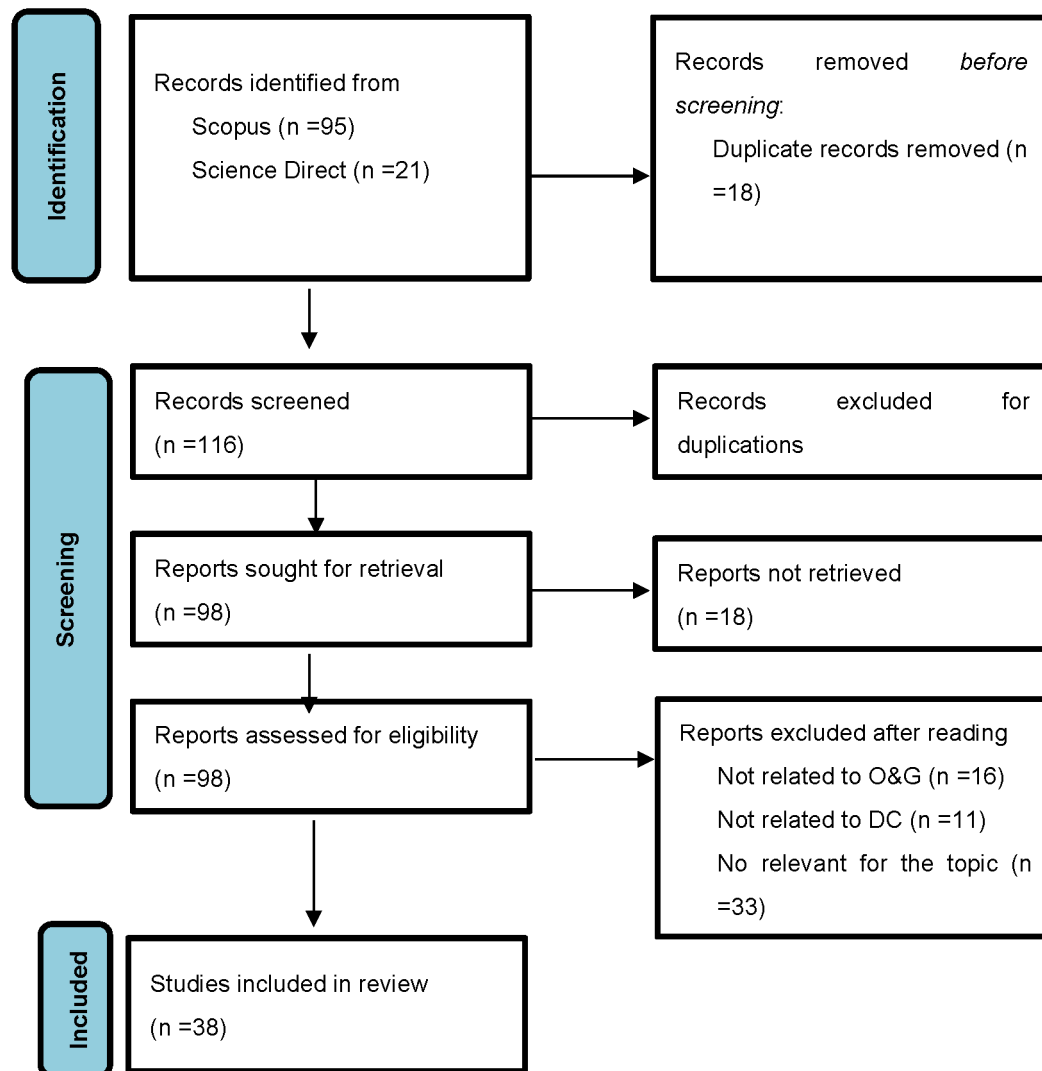


Figure 2. PRISMA diagram of the SLR.

#### 4. Results and discussions

We have analysed 38 publications. The following session section consists to present and discuss the results obtained and highlight the limits, then we will propose possible future directions after mentioning the theoretical and managerial implications of our study.

##### 4.1. Descriptive analysis

As shown in the Figure 3, it was in 2015 that the enthusiasm of researchers increased consistently. We have gone from one publication per year for the previous years to 3 publications that year. Then, the number won't stop growing until 2018 when we will witness total omerta (0 publication). The year 2019 will see things change since we will move to three publications then the pic in 2020 and 2021 with a record of 6 publications for each year. The number will drop to 5 the following year to stabilize at 4 after the first quarter of 2023. Everything suggests that this year will

record the greatest number of publications in this field of research. This shows how, despite the importance of this topic, researchers pay very little attention to it.

Documents by year

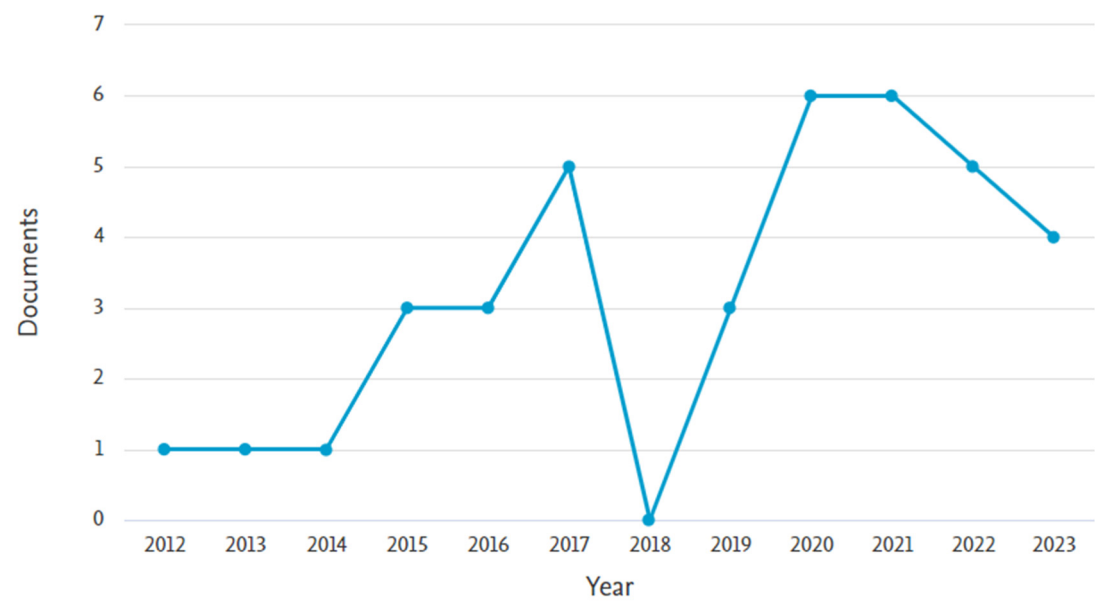


Figure 3. Documents per year. Source: Scopus.

Figure 4 is an illustration of the most active authors in the field. And we notice that Rezaei, J. is the most active with a total of six publications? Loan follow-up by Tavasszy, L. A. It should be noted that both researchers are from the Netherlands, which is the country from which the most publications have been made as shown in Figure 5.

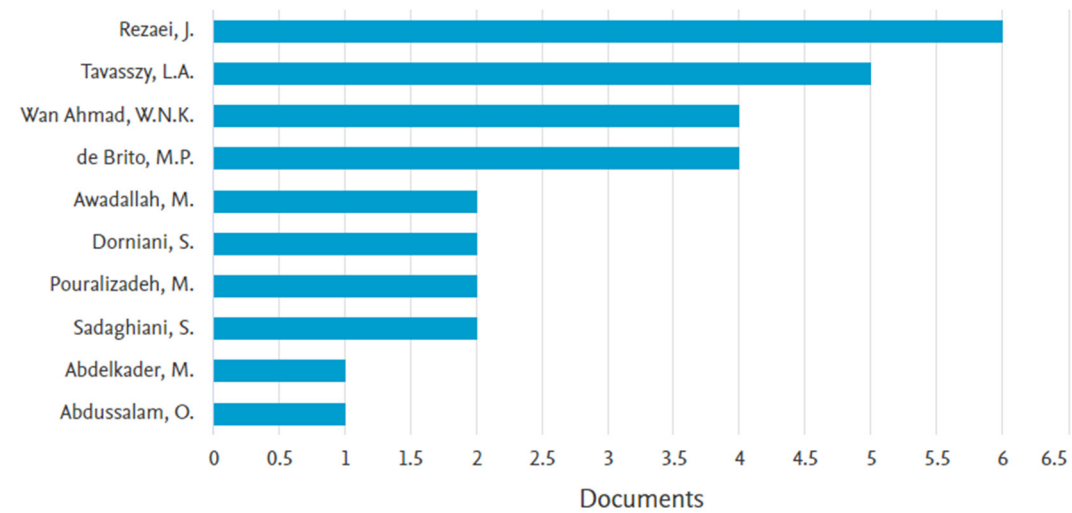
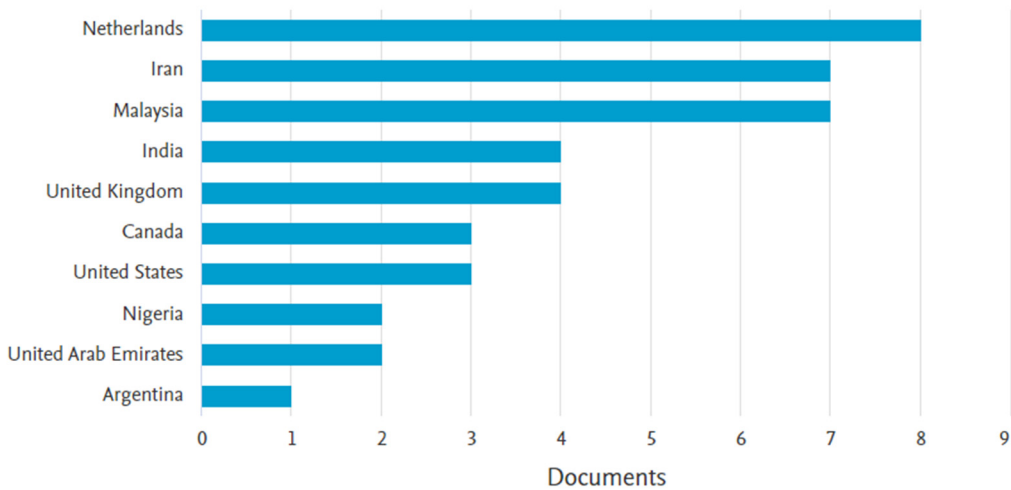


Figure 4. The most active authors. Source: Scopus.

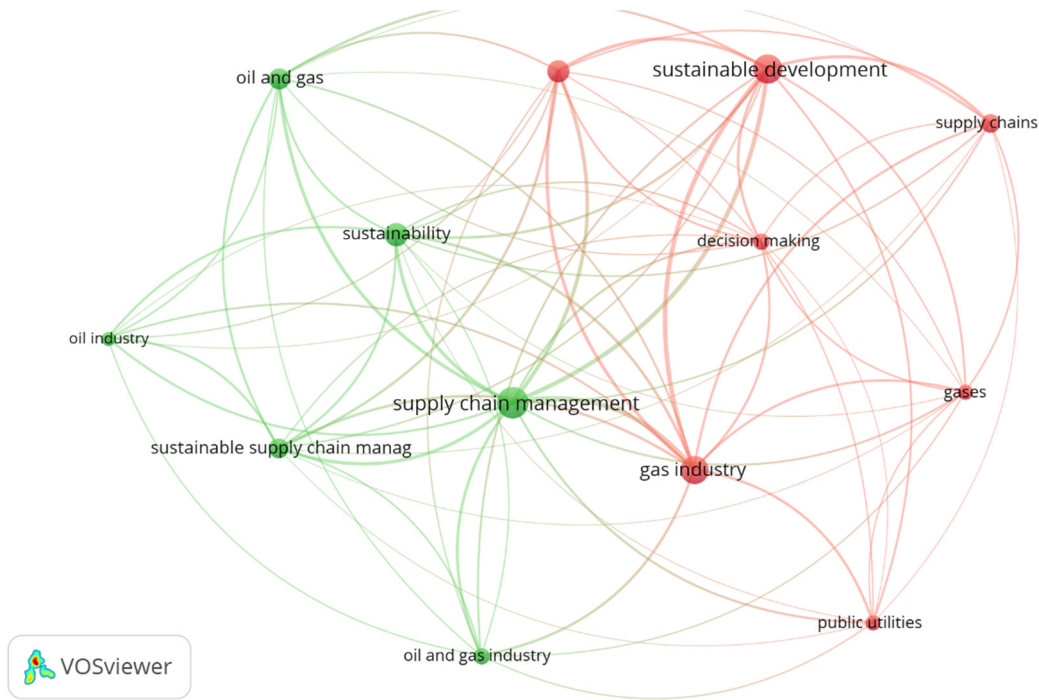


**Figure 5.** Documents by country or territory. Source: Scopus.

Most of the authors used Resource-Based View theory [40], Which consists to obtain access to another company’s core competencies in order to acquire competitive advantage [41]. This theory confirms that the most important assets of a firm, are its resources and capabilities. SSCM involves the interconnection between many companies, and how each company in that chain manage to be unique in terms of competitiveness. This theory can be related to the economic aspects of SSCM. because the economic aspect is very often measured in terms of market share, sales, operational efficiency and especially improving [42].

4.2. Bibliography analysis

We used the VOSViewer to visualize the keyword co-occurrence network in the publications included. A total of 13 out of 404 meet the threat (higher or equal to 4). The Figure 6 illustrates the details.



**Figure 6.** Keyword network.



According to [36], the size of the node and the font depends on the weight of the keyword. The larger is the weight, the more the keyword appears, and the larger the corresponding nodes will be; the line between the nodes indicates that a keyword appears in common with another keyword. This says that two co-occurring keywords. The keywords grouped together in the same “cluster”, or “group of keywords”, can be closely related to a given concept. This allowed us to carry out a grouping around the keywords as indicated in Table 1.

Table 1. Keyword Grouping.

Keywords	Related Concepts
Supply Chain Management	Supply Chain; Decision making;
Sustainable Development	Sustainability; Public utilities; Sustainable Supply Chain; Sustainable Supply Chain Management
Gas industry	Oil industry; Oil and Gas industry; gases; Oil and gas

VOSviewer also allows us to view the links between the authors who have collaborated together on the same topic. Each cluster in the network of co-authors represents a community of collaboration, the size of the nodes representing the number of publications per author and the thickness links indicating the level of collaboration.

For our review, as shown in Figure 7, only 10 out of 106 authors responded to the criterion of carrying out a minimum of two collaborations. The network revealed one author with nine collaborations (Awadallah M.), eight authors with 7 collaboration and two authors with the minimum collaboration. Thus, we can note that there is an interest increase of the author’s vis-à-vis the subject.

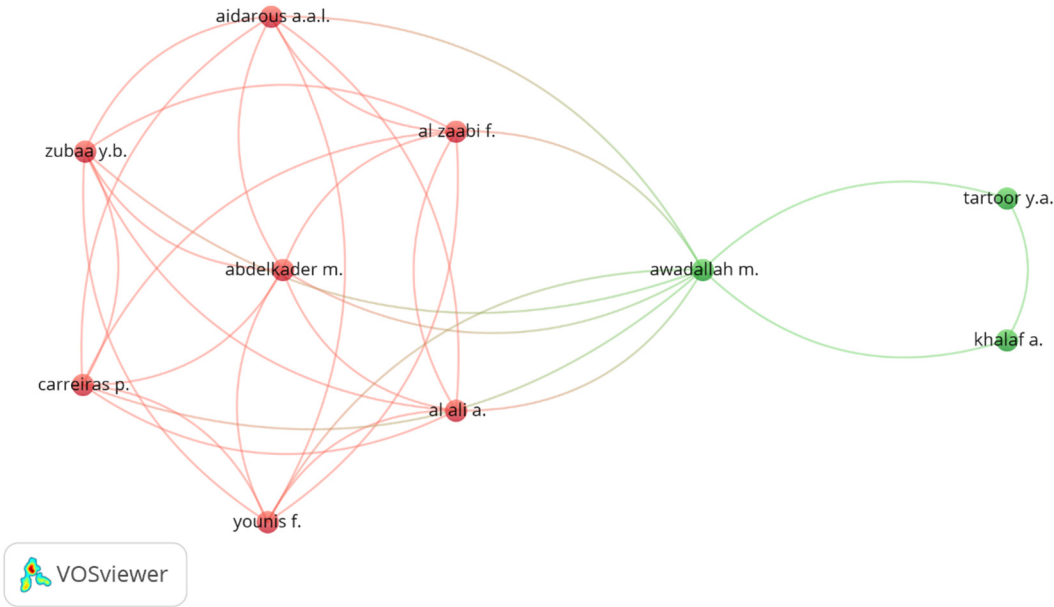


Figure 7. Collaboration between authors.

4.3. Sustainable supply Chain management in O&G industry in Developing Countries

4.3.1. Sustainable supply Chain Management: triple bottom lines

In an increasingly competitive market, the optimization of the supply chain by organizations must take into account the three dimensions of sustainable development (economic, environmental and social), [39]. Thus, the Supply Chain plays an important role in the achievement of the Sustainable

Development Goals. According to [43], the trend of the implementation of a sustainable Supply Chain has several motivations such as satisfaction stakeholder requirements, improving the public image and retaining the loyalty of long-term customers; thus, maintaining a competitive advantage [44].

In general, the sustainability of the Supply Chain is based on three pillars, namely the aspects economic, environmental and social (or the 3Ps of profit, planet and people) [45]. Supply Chain sustainability management can be defined as “the management of supply chain operations, resources, information and funds to minimize environmental impact and maximize profit and social welfare” [46]. Otherwise: “the management of flows of capital, information and of materials throughout the Supply Chain, taking into account the three dimensions of the sustainable development” [47]. Each aspect should be fully explained and its criteria highlighted. By referring to [45,48,49] we present the three dimensions of the Supply Chain in the Table 2:

Table 2. The triple bottom line of the SSCM.

Environmental	Economical	Social
It concerns inputs such as energy, water, materials, etc.; and outputs such as waste, emissions, etc.	It concerns the optimization of resources and the various costs, the distribution of wealth, optimization of the execution time of orders, minimization of the rate of default, maximizing the level of productivity and the profitability ratio, etc.	It consists of the way in which the company honours its commitments to its social and human capital or other stakeholders (suppliers, customers, etc.);
It takes into account greenhouse gas emissions, atmospheric emissions, water emissions, energy efficiency, solid waste disposal;	other criteria are taken into greater consideration, such as the integration of monitoring tools Information and communication technologies as an intangible asset allowing increase process efficiency;	It is concerned with their well-being, fair relations with suppliers and customers, career development opportunities for its human capital (through training or more promotions, etc.), safety, health care benefits, etc.;
It can be implemented through the adoption of a management system Standardized environment such as ISO 14001.	It can be implemented through the implementation of the ISO 9000 system standard quality management for continuous process improvement.	It can be implemented through the adoption of a standardized system for committing to deal in a socially responsible manner such as the ISO 26000 standard.

Source: By us from the revue.

We also found out that a successful SSCM, can affect different performances in the company “Environmental performance”, “Customer performance”, “financial performance”, “Information technology Performance”, “Social Performance”, “Risk performance”, “Logistics performance”, “Operational performance”, “Organizational performance” and “performance of innovation and growth” [50].

4.3.2. SSCM in oil and Gas industry in Developing Countries

The literature review clearly showed us the difference between Green Supply Chain Management and Sustainable Supply Chain Management. From the 38 selected papers, we’ve noticed that 14 focused only on the environmental dimensions of SCM, and for them, they clearly stated that the study limitations consists of the need to incorporate the economic and social pillars of the SCM. However, some of them, instead of mentioning the concept SSCM and just study the environmental dimensions, the replace the concept by Green Supply Chain Management. Only 5 publications, by mentioning SSCM, have studied the three dimensions of the SCM. Therefore from

the definition offered by [11] who said GSCM is “the provision of goods and services from manufacturers and suppliers to the end users using cash flows, information flows, and material flows, with reference to the environment.”. The main difference between the two concepts comes from the fact that, GSCM only focuses on environmental dimensions whereas SSCM includes all the three dimensions (economic, environmental and social).

In developing and emerging countries, factors such as institutional voids environmental conflicts and pressures “prevent supply chains from learning, innovating, and evolving at an appropriate pace on their sustainability trajectory” [51]. Also, [52] Knight (1921) has demonstrated that in Developing and Emerging Economies, Business environments show a higher risk of complexity and uncertainty, “because they are more turbulent than the business environments encountered in developed countries.” It is clearly demonstrated that when it comes to developing the SSC in DC, argues that when trying to put in place sustainable SSC, the combination of the above mentioned factors often affects the mind of decision makers who therefore face extreme ambiguity when have to decide.

Developing and Emerging countries present three main barriers that constitute a considerable obstacle to the implementation of sustainable management of the SC in O&G Industry [51]:

- **Corruption:** With the accordance of the yearly corruption ranking by The NGO Transparency International, Developing countries are the most corrupted in the world. For instance, a recent decision made by the Arbitral Court of London, convicted the MNE Glencore for corruption acts in a dozen of Developing Countries.
- **Lack of infrastructures** (pipelines, railways, roads, airports, ports, fiber optic technologies the internet, etc.): This is one of the main characteristics of DC, and it a real challenge in the implementation of SSCM.
- **Political stability and social crises:** several emerging countries, oil and gas producers are in the grip of socio-political crises: Iraq, Syria, Nigeria, South Sudan, etc.

According to SSCM practises in oil and gas industry in Developing countries, we have identified 9:

- **Green purchasing:** the adoption and integration of sustainable development principles into purchasing processes and decisions, while ensuring that they meet the requirements of the company and its stakeholders. This covers both the sustainability of products and materials, as well as the responsibility of supplier practices. These are the main benefit of a green purchasing: Better control of risks; Lower the costs; Promote innovation and differentiation; Increase turnover; improve purchasing indicators; Improve talent acquisition and retention.
- **Supplier environmental collaboration:** “Collaboration can include providing suppliers with resources such as materials, standards or technologies; jointly developing more environmentally friendly products; and helping them to implement sustainable production processes.” [42].
- **Reverse logistics:** Reverse logistics or return logistics concerns all activities and actions linked to the reuse of products and materials. That consists of process of moving tangible products from the final delivery location in order to capture additional value or dispose of them appropriately. Repair and remarketing activities can also be incorporated in the concept of reverse logistics [53];
- **Green manufacturing:** defines a process of products manufacturing in which manufacturers use less natural resources, by reducing pollution and waste. It also characterized by the recycling and reuse materials, and of course the moderation of emissions in the processes [54].
- **Eco-design:** Eco-design is a twin practice to eco-design. The first part is related to the development and manufacturing a product, whereas, the second part is strongly related to the aesthetic and functional of the product. The idea behind this practice is to limit the impact of a product on the environment by putting in place the aesthetic of that product with a better functionality of course.
- **Legislation and regulation:** Legislation can be define a set of laws and rules that equally apply to all individuals in a specific territory, whereas regulations impact only people who are working with the identity which is responsible for those regulations;
- **Green information systems:** [55] Affirmed that it’s the implementation of IS in the process of “environmental objectives” “achievements.

- **Cooperation with customers:** According to [56], it consists to create a solid relationship with customer who are considered as primary drivers who pressure the company to align its practices with the environment issues.
- **Investment recovery:** In some circumstances, there some assets which are no longer needed by the company, investment recovery intervenes when the value of those assets are identified, disposed and reused as surplus assets [57].

## 5. Conclusions

### 5.1. Theoretical implications

Although being a very hot topic, Sustainable Supply Chain Management still today presents gray areas that are very less explored by researchers. For instance, the case of SSCM in the Oil and Gas Industry in Developing Countries. When we know the essential place of this industry in Developing Countries, it became more than urgent to look into it.

In the context of this article, which represents blessed bread for researchers, we first succeeded in making a clear and distinct difference between the concepts of Sustainable Supply Chain and Green Supply Chain which has always been so confused in research. The first concept encompasses a three-dimensional aspect (Social, economic and environmental) of the supply chain as well as all related practices. While the GSCM was only limited to the environmental dimension. The simultaneous use of the following concepts for the first time: Sustainable; Supply Chain Management; Oil and gas industry and Developing Countries has highlighted a new approach to developing empirical research in the field by researchers. By using the 5W + 1H pattern, we were able to provide clear and precise answers to our research questions and the achievement of our objectives. Simultaneous use of analysis tools such as PRISMA and VOSviewer allowed us to draw a better picture of what is the literature review in this hot topic.

### 5.2. Practical implications

The other happy beneficiaries of our article are obviously SCM practitioners in DC. Indeed, in this article we make a precise study on the few rare cases of management of the supply chain in the oil and industry in the Developing Countries which allowed us to notice that practices and barriers in these countries are not the same as in the Developing country.

We were able to note that companies which want to settle in these countries and in particular MNEs, will have to face several barriers such as corruption, and the lack of infrastructures to which can be added pressures coming from the public authorities and NGOs. All of this taints a healthy practice of the sustainable supply chain. For companies already established, this article will give them some idea of what could be done for a sustainable management of their supply chain. Clearly, we can say that, if the management of the supply chain precisely in the oil and gas industry is a challenge, for Developing Countries, it is still a luxury. And the multiplication of articles of this kind, would help to deconstruct this myth.

### 5.3. Limitations and further research

Our review paper has some limitations: the first limitation is that we only used Sciences Direct and Scopus as Databases. Although we have noticed that almost the same papers appear in the both databases, there is a chance that by not checking other databases we omitted some relevant articles. Also other limitation is that we limited ourselves to English publications be possible. It may be possible that we omitted other relevant publications in other languages. Another limitation is that the study only focuses on Developing country. For a better understanding, a comparative analysis between what is done in Developed and developing countries should be good. For further research, we propose to use more Databases in order to be sure we have considered all the publications. On the other hand, other languages should be consider.

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