**THE EXECUTIVES FORUM (52) “THE ROLE OF MANAGERS IN SUSTAINABLE DEVELOPMENTS” 2 - 4 NOVEMBER 2017**

 ***Towards a conceptual framework for sustainable***

 ***Supply chain management in seaports***

Dina Gaafar Hassan

*Assistant lecturer at faculty of commerce, Benha University*

 *Visiting scholar at faculty of business and law, Coventry University, UK.*

**Abstract**

**Purpose** – Sustainable supply chain management (SSCM) has emerged as a growing topic recent years. This can be seen by the number of papers published in different journals, however, the main focus of the academic research has been on the environmental dimension of sustainability rather than the social and economic dimensions. Also, few attempts have been made to integrate the three dimensions of sustainability in seaports. SSCM is an important concept to achieve competitiveness and improve performance, however, there are many barriers to the successful implementation of SSCM. Thus, the purpose of this paper is to propose a conceptual framework for SSCM in seaports aims to examine the relationship between the integrated three pillars of SSCM and supply chain (SC) performance, taking into consideration the barriers for implementing SSCM practices as a moderating role between these relationships.

**Design/methodology/approach** – mixed research method will be used as SSCM practices and barriers to SSCM obtained from the literature review need to be confirmed by conducting in-depth interviews with supply chain managers in seaports. In addition, a survey questionnaire will be developed to measure the level of SSCM practices, barriers to SSCM, and SC performance. The measures will be validated using Confirmatory Factor Analysis (CFA), and the responses will be analysed using structural equation modelling.

**Practical implications** –This study provides a better understanding of the SSCM practices in seaports and it considers as an important guidelines for supply chain managers who wish to build a more sustainable supply chain.

.

**Originality/value –** The paper presents seaports that have a long tradition of working with environmental and social issues. The study offers an empirical analysis of the moderating effect of barriers to SSCM on the relationship between SSCM practices and SC performance in seaports sector.

**Keywords** supply chain management; sustainable Supply chain management, Economic supply chain management practices, Social supply chain management practices, Environmental supply chain management practices, barriers.

**Paper type** development paper

**1- Introduction**

One of the most promising areas within the supply chain literature is the intersection between supply chain management and sustainability (Clift, 2004). The term sustainability in the business discourse is referred to the concerns with the Triple Bottom Line (TBL), which includes the need for a simultaneous assessment of the financial, environmental and social dimensions of business operations (Elkington, 1997). Based on the TBL approach, research areas related to supply chain management have emerged such as sustainable operations (Kleindorfer et al., 2005; Gimenez et al., 2012), sustainable logistics (Frota et al., 2008; Lee et al., 2010) and sustainable supply chains (Seuring & Müller, 2008; Linton et al., 2007).

The term supply chain management has been defined by Mentzer et al. (2OO1) as, “the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole” and by Lambert et al. (2006) as, “the integration of key business processes from end-user through original suppliers, that provides products, services, and information that add value for customers and other stakeholders”.

Based on the above definitions of SCM ,Carter and Rogers (2008) define sustainable supply chain management (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 company and its supply chains,”. The authors confirmed that engaging in sustainability, and SSCM in particular, is not discretionary, but rather a requirement. Also, Pagell and Wu (2009) define sustainable supply chain management as “the specific managerial actions that are taken to make the supply chain more sustainable with an end goal of creating a truly sustainable chain”.

Despite the increasing interest in the social factors of sustainability as stakeholder management, corporate social responsibility, ethical behaviour, social dimension of port sustainability has not been well-defined and it received little attention in the literature (Denktas-Sakar and Karatas-Cetin 2012). Thus, the purpose of this paper is to fill the knowledge gap by providing a conceptual framework for SSCM in seaports aims to integrate the three pillars simultaneously and analyse their impact on SC performance taking into consideration the barriers to SSCM practices in seaports.

After the previous introduction, this paper is organized as follows: section 2 provides a literature review on sustainable supply chain management .The research gap is described in Section 3 followed by research questions in section 4, then the research methodology is explained in Section 5 finally, a conceptual framework for SSCM is illustrated in section 6.

**2-Literature review**

The extant literature that forms the foundations of this study covers five important topics: the first topic discusses the evolution of Sustainable supply chain management followed by a detailed discussion of the three pillars of Sustainable supply chain management practices. The third topic provides an overview of Port sustainability while the fourth topic shows the impact of SSCM practices on SC performance, finally the last topic in the review comes to explain the barriers to implement SSCM .

**2.1 Evolution of Sustainable supply chain management**

The theory and practice of supply chain management have been recently hit by a new emerging paradigm: sustainable supply chain. Silvestre (2016) sum-up four types of supply chain approaches in regards to the environmental and social dimensions of supply chain sustainability (see Figure 1).

The traditional way to manage supply chains is to maximize the financial performance and pay little or no attention to supply chain environmental and social performances, this approach is known as ***Efficient Supply Chains*** and it was criticized by different authors (e.g.Hall et al., 2012).the authors suggested that supply chains that focus only on financial performance are likely to remain irrelevant, and consequently unsuccessful.

 Due to The internal and external pressures on organizations to take into consideration environmental issues when measuring performance, ***Green Supply Chains approach***is implemented. The term refers to the incorporation of environmental protection principles within the supply chain business practices. Srivastava (2007) argued that environmental protection principles must be embedded in all activities such as product design, sourcing, manufacturing, warehousing, distributing and end of life product management aspects of a supply chain. Furthermore, Green et al. (2012) proposed a green supply chain model that incorporates green business practices across the supply chain to support environmental sustainability.

Also, external pressures led theory and practice to implement a new concept of supply chain known as ***Humanitarian Supply Chains***. This type of supply chain is related to all sorts of social Charity, disaster relief and even commercial supply chains. For disaster relief supply chains, time is an important concern, and it must involve a variety of stakeholders to be able to succeed including donors, humanitarian organizations, NGOs, military, governments, and beneficiaries (Russell, 2005) while Social charity supply chains are usually more permanent than disaster relief supply chains, but have the same purpose: the social performance. They often operate to bring supplies (e.g., water, food and medicine) to a vulnerable population. Although these supply chains are often not designed to generate profits, cost (which is also related to the financial dimension) is always a key element to be considered. In this regard, Thomas (2004) suggests that effective cost control is crucial for an increased performance of these types of supply chains. Thus, this approach focuses on the social dimension beside financial dimension while little or no consideration for the environmental dimension (Silvestre, 2016).

As the result of all previous efforts, a new paradigm of supply chain has appeared known as ***Sustainable Supply Chains****.* The term is referred to as the one that performs well on both traditional measures of profit and loss as well as on an expanded conceptualization of performance that includes social and natural dimensions (Pagell and Wu 2009). Although many decision makers see a trade-off between the financial dimension and the other two key dimensions of the TBL (i.e., environmental and social), recent studies indicate that the implementation of sustainable supply chains actually leads to commercial and financial success in the long run (Zailani et al., 2012).



Figure (1) Supply chains approaches in regard to dimensions of sustainability

 Source: Silvestre (2016)

**2.2 Sustainable supply chain management practices**

Silvestre (2016) argues that studies cannot claim they focus on sustainability if the social dimension is not being addressed. It is absolutely necessary to focus simultaneously on the three key and interacting dimensions of the TBL in order to say it is truly a sustainability research or initiative.

Although social and environmental issues are clearly associated with the sustainable supply chain definition, a recent comprehensive literature review made by Seuring and Müller, (2008) revealed a clear deficit in the social dimension in research papers on the sustainable supply chain. also Silvestre (2016) mentioned that there is an impressive growth in the number of studies related to sustainable supply chain management between 2008 and 2015(see table 1), However some studies argue that research is significantly more concentrated on the environmental side while the social side of the TBL still remains neglected (Pullman et al., 2009; Silvestre, 2015). Similarly, almost no empirical analysis has been conducted on the use of social standards (except for very recent examples such as Beske et al. (2008) and Kortelainen (2008)), while several studies exist on environmental management standards. As a consequence, recent contributions (Matos and Hall, 2007) call for more research on the social dimension of sustainable supply chains, claiming that this particular element is emerging as the key challenge for sustainable supply chains.

Table 1 Number of articles listed by Google Scholar per term between 2008 and 2015

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Sustainable Supply****Chain** | **Sustainable Supply Chain****Management** | **Sustainable Supply****Chains** |
| 2008 | 320 | 165 | 116 |
| 2009 | 411 | 258 | 168 |
| 2010 | 625 | 407 | 292 |
| 2011 | 878 | 558 | 426 |
| 2012 | 1240 | 766 | 565 |
| 2013 | 1540 | 1030 | 694 |
| 2014 | 1990 | 1370 | 848 |
| 2015 | 1990 | 1400 | 880 |
| **Increase (%)** | **522%** | **748%** | **659%** |

Source: Silvestre (2016)

 Thus, this research aims to integrate the three dimensions of sustainable supply chain management (environmental, social, and economic) in order to decrease the deficit in the current literature.

 In relation to the economic supply chain management, Lee et al.(2016) identified economic SC capability as ” supply chain’s ability to address the quality, cost, delivery and flexibility issues in the supply chain in an efficient and effective way. This capability is characterized as a set of inter-organizational activities between the supply chain partners, including information sharing and collaborative practices, and consequential mutual trust and commitment.” Accordingly, the authors developed five items to measure economic SC capability in Korean SMEs, these items include information sharing, technical assistance, collaborative problem solving, mutual trust, and long-term partnership development.

 Regarding environmental supply chain management, Lee et al. (2008) defined environmental SC capability as the firm’s ability to manage environmental issues in the supply chain. Based on this definition and previous research on green SCM , lee et al.(2016) developed five items to measure environmental SC capability. This five-item scale reflected the monitoring and collaboration Practices conducted between the supply chains partners (environmental criteria for supplier evaluations, environmental management system implementation, auditing, environmental information sharing, educational and technical assistance, and collaborative product development). Pagell and Wu,2009 argue that the majority of the practices that make up green supply chain management model are modifications of existing practices. For instance, green purchasing factor is comprised of practices such as cooperation with suppliers, auditing and ISO certification. TQM, JIT and lean have long been linked to improved operational performance. And there is evidence that these process improvement philosophies and their associated tools improve environmental performance as well (e.g., Clark 1999; Curkovic, Melnyk, Handfield and Calantone 2000; King and Lenox 2001). Also, Collaborative behaviours with suppliers and customers are a component of creating an environmentally sustainable supply chain (Carter and Carter 1998; Zhu and Sarkis 2004). Golicic and Smith (2013) examined Four different environmental Supply chain practices: 1- Upstream supplier facing (e.g., supplier partnership, purchasing policies); 2- Design (e.g., eco-design, product innovation); 3-Production (e.g., pollution prevention, lean manufacturing); 4 Downstream customer facing (e.g., logistics process, customer cooperation)

In respect with Social supply chain management, the organization should provide equitable opportunities, encourage diversity, promote connectedness within and outside the community, ensure the quality of life and provide democratic processes along with open and accountable governance structures as social sustainability principles (Elkington 1994).Lyons et al. (2001) and Colantonio (2009) argue that social Sustainability is related to action and policy directed to the promotion of social aspects such as social capital, capability building, empowerment, stakeholders’ participation, and liveable communities. Lee et al.(2016) defined Social SC capability as” a supply chain’s ability to manage the social issues in the supply chain and then characterized as the extents of inter-organizational activities between a buyer and its supplier in responding to social issues”. The authors developed Five-item scale reflected the monitoring and collaboration practices conducted between a buyer and its supplier, including social criteria for supplier evaluations, management system certification, auditing, educational and technical assistance for social issue management, and collaborative and precautionary response. Hutchins & Sutherland (2008) argue that social sustainability must be addressed based on four key areas: labour equity, employee healthcare, labour safety and philanthropy. More recently, Carbone et al. (2012) argue that the social performance of supply chains includes working conditions throughout the chain such as salary levels, child labour, work safety, working hours, gender equality, and also product/service safety

**2.3 Port sustainability**

Ports as organizations having an important role in integrating their operations with their supply chains need to adapt themselves to the requirements of this changing business environment where sustainability concept gained considerable recognition. AAPA ,(2007) defined Port sustainability as *“business strategies and activities that meet the current and future needs of the port and its stakeholders while protecting and sustaining human and natural resources”*. In maritime sector, very limited research attempted to identify the main indicators of port sustainability, also few studies are available where the TBL is truly considered on its three key dimensions. The main reason behind the negligence of social dimension could be due to the fact that societal concern of the sustainability concept is difficult for organizations to apply since there is a lack of guidance regarding how organizations can effectively balance organizational responsibilities to the stakeholders (Denktas-Sakar and Karatas-Cetin 2012). Among these few studies, Covil (2012) and Blume (2009) show that port sustainability concept based on the triple bottom line principle, this is illustrated in Fig. 2.

****

Figure (1) Sustainable ports and main indicators

Source: Adopted from Blume (2009) and Covil(2012)

**Environmental dimension in seaports**: - Ports and Container terminals are considered to be the largest sources of air pollution in coastal cities which come with a heavy environmental burden and imposing threats to public health and environment, where containers are lifted from marine vessel by a crane and later moved by another crane, handler or forklift. The majority of these types of handling equipment are conventionally powered by internal combustion engines that are powered by diesel engines with non-road emission standards. Due to the fact that handling loaded containers are an energy-intensive function, types of handling equipment are often considered to be one of the most significant sources of air pollution caused by terminal operations. So, awareness of necessary action for the reduction of pollution has become a public concern (Hiranandani,2010). There are other faces of ports‟ pollution that harm community like noise, waste production, changes in marine ecosystems, and odour, and resource consumption, port development on land or sea and bunkering operations may engender oil spill risks with potentially catastrophic impacts on beaches, food chains, and sediment and fishing communities.

All of these pollutions requires coordination and collaboration to adapt policies, initiatives, and regulations not only to reduce the amount of waste produced by ports or using less energy but are concerned with developing processes that will lead to businesses becoming completely sustainable in the future and protecting the natural world(Vujičić,2013)

**Economic dimension in seaports: -** Baumgartner and Ebner (2010) identified the economic aspects of sustainability within port organizations and focused on the competitive ranking among container ports, the investments they are making in their future growth and technologies, innovative policies or practices that promote sustainability, and incentives they offer to their customers to reduce the negative impacts of port operations and improve the industry as a whole. Blume, (2009) refer to economic dimension in seaport by Collecting and re-investing user fees to provide operational efficiencies.

**Social dimension in seaports: -** According to Blume, (2009), social dimension deal with minimizing negative impacts on community that result from port activities. The social dimension of sustainability can be classified as internal and external activities with a focus on stakeholders and the surrounding community and internal activities with focus on employees and performance management.

The sustainability of the supply chain is dependent on the sustainability of ports (Denktas-Sakar and Karatas-Cetin 2012). Based on this and on the fact that sustainability practices considered as a part of a firm’s capabilities Pullman et al. (2009). So, the researcher will combine the dimensions of port sustainability and SSCM practices applied in different industries to come up with list of SSCM practices in seaports to be checked and confirmed through interviews.

**2.4 Impact of SSCM practices on SC performance**

 Prior Studies show that companies work closely with their supply chain partners to manage the trade-offs among the three TBL dimensions are likely to have better business performance (Pope et al., 2005; Matos & Silvestre, 2013).Tan (2002) summarised 25 supply chain management practices under six main dimensions: supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity and JIT Capability. Finally, the author concluded that all SCM practices positively impact performance. Li et al. (2005) stated that implementation of SCM practices has improved the performance of supply chain. Cook et al. (2011) showed that SCM practices can lead to better performance depending on the position of the company in its supply chain. According to Pullman et al. (2009), the three different dimensions of sustainability could generate competitive advantage for a firm. Specifically, sustainability practices are part of a firm’s capabilities and according to the resource-based view (RBV) of the firm, contribute to variability in performance across firms (Wernerfelt 1984; Barney 1991; Peteraf 1993). Supply chain management researchers have found that firms adopting comprehensive environmental practices experience better environmental performance in terms of significantly reduced waste (Melnyk, Sroufe and Calantone 2003) or reduced waste and other pollutants (Zhu and Sarkis 2004, 2007). Lam and Van de Voorde (2012) postulate that a green port will lead to positive outcome on port’s customer retention and economic performance.

In contrast, few types of research reveal that not all the SSCM practices have direct effect on SC performance (Govindan et al.,2014; Abdallah et al.2014 ;Zhu and Sarkis ,2004; Pullman et al. ,2009). Zhu and Sarkis (2004) found that the existence of internal environmental management programs led to both positive and negative economic performance. Pullman et al.(2009) focus on implementation of social and environmental Sustainability practices and the resulting perceptions of performance outcomes in food industry, the author’s results highlight the complexity of sustainability impacts on performance and suggest that performance benefits from sustainability programs may be difficult to recognize. Govindan et al. (2014) investigated the impact of lean, resilient and green SCM practices on social, economic and environmental sustainability of supply chain, the authors confirmed that not all the lean, resilient and green SCM practices have significant impact on supply chain sustainability. Also, Abdallah et al. (2014) tested the impact of SCM practices on supply chain performance, they pointed out that not all the SCM practices have a positive impact on supply chain efficiency and effectiveness performance. Pullman et al. (2009) argue that most companies will pursue sustainability programs only when performance improvements are measurable and attainable. So, the indirect Performance effects may not be enough to provide clear, compelling motivation for Companies to invest in sustainability programs.

Due to the contrast findings that were shown in the previous studies in different industries, and the fact that the implementation of sustainability programs in many industries is still infrequent and undeveloped (Pullman et al.,2009), the author aims to examine the impact of the three pillars of SSCM simultaneously

 on SC performance in maritime industry, particularly seaports.

**2.5 Barriers to SSCM**

Lots of studies present different barriers to the successful implementation of SSCM (Seuring and Muller, 2008; Seidel et al. 2010; Al Zaabi et al. 2013).Three aspects were frequently mentioned by Seuring and Muller (2008) as barriers for implementing sustainable supply chains: (1) higher costs, (2) coordination effort and complexity, and (3) insufficient or missing communication in the supply chain. Preuss (2009), and Bowen et al. (2001) pointed out that lack of motivation towards employees (incentives) consider one of the barriers for implementing SSCM in industries. The incentives should be aimed at decreasing the barriers that SMEs face; such incentives can be split into three main categories: financial, ease of implementation, and recognition. Seidel et al. (2010) mentioned that IT companies often have a lack of support from middle management within the organization, and this lack of transparency creates a negative impact while seeking to implement the SSCM concept. Herren and Hadley (2010) found that financial cost is the main barrier, followed by a lack of time to devote to such measures, and a lack of knowledge regarding the kind of actions that can be undertaken.

According to Morali and Searcy (2013), Resources required such as time, people, and financial costs, considered as the primary barrier. The second one is Lack of understanding the concept of sustainability amongst suppliers and customers, the third barrier is Risk management and monitoring, other important barriers also mentioned by the authors such as: lack of leadership from policy makers, lack of platforms to share expertise and best practices, required formal processes and bureaucracy to adopt and implement sustainability initiatives ,lack of communication across supply chain partners, and supplier reluctance to comply.

Al Zaabi et al.(2013) analysed 13 barriers for the adoption of SSCM in the Fastener manufacturing industries industry, they are: too high cost for disposal of hazardous wastes; Cost for environmentally friendly packaging ;Lack of clarity regarding sustainability ; cost of sustainability and economic conditions ; lack of sustainability standards and appropriate regulations ; misalignment of short-term and long-term strategic goals ; lack of effective evaluation measures about sustainability ; lack of training and education about sustainability ; complex in design to reduce consumption of resources and energy ; inadequate facility for adoptions of reverse logistic Practices ; lack of IT implementation ; inadequate industrial self-regulation ; lack of top management commitment to initiate sustainability efforts.

Glenn Richey et al. (2009) propose that Barriers to supply chain integration act as a moderator to strengthen the positive relationships between the drivers of supply chain integration and the firm performance, the authors expected that firm performance will suffer when SC barriers manifest at a high level. The authors suggest that when SC integration barriers are present, a firm often does not perform well and is less competitive in the market. In such a case, the importance of integration drivers is magnified. First, when the firm has a strong desire to improve its performance, it is more likely to embrace a supply chain philosophy and implement supply chain integration (Mentzer et al., 2001). This kind of willingness will contribute to a more significant improvement in firm performance. Second, the push from suppliers, customers, and competitors will force a firm to change its existing practices and integrate business processes to remain competitive. Similarly, this will result in a more Significant impact on firm performance.

Regarding Barriers to SCM in maritime sector, Yuen and Thai ( 2017) identified and discussed a list of barriers that inhibit supply chain integration (SCI )in the maritime logistics industry , authors suggested that the extensive barriers can be parsimoniously represented by five factors. The first factor relates to the lack of trust and commitment because of the display of scepticism and opportunistic behaviour. The second factor is related to resistance to change which is a result of complacency and individualism. The third factor corresponds to the incompatibility of operating and strategic goals, which is caused by inadequate supply chain leadership and poor partner selection. The fourth factor pertains to the lack of resources. Finally, the last factor relates to measurement failure.

It is appears from the review of Barriers to SSCM that most of studies focus on analysing these barrier according to different industries, however, no studies focus on examining the effect of these barriers as a moderating role between sustainable supply chain management practices and SC performance in seaport sector .Thus, it is worthwhile to examine the moderating effect of these barriers between supply chain management practices and SC performance in seaports.

**3 Research gap**

From the above literature review, the researcher observed two important points, the first point is the social dimension of sustainable SCM has been relatively little addressed in the literature and there are few studies which integrated environmental, social, and economic aspects in SCM simultaneously, while no current study in seaport sector .In addition, previous studies have focused on examining the effects of green SCM on supply chain performance while social performance has also been neglected in seaport.The second point refers to barriers to SSCM, it was noticed that many researchers address the barriers for implementing SSCM , however, none of them seek to analyse these barriers as a moderating effect except Glenn Richey et al. (2009) . Also when looking to sustainability in seaports literature we found that there are no researches seek to identify barriers to adopting SSCM in this area.

Given these gaps in the literature, the main objective of this study is to develop a conceptual framework aims to examine the relationship between the three pillars of SSCM practices (economic, social, and environmental) simultaneously and their impact on SC performance in seaports and it also aims to examine the effect of Barriers to SSCM as a moderating role between this relationship.

**4 Research Questions**

The research questions for this study are derived from the key research objective noted above. The paper aims to answer the following research questions:

1. ***What are the sustainable supply chain management practices in seaport?***
2. ***What are the barriers to sustainable supply chain management in seaports?***
3. ***What is the impact of sustainable supply chain management Practices on supply chain performance improvement?***
4. ***What is the effect of barriers to sustainable supply chain management as a moderator***

***Between the Relationship of sustainable supply chain management practices and supply chain performance?***

**5 research methodology**

Research methods are selected based on the purpose and nature of the research. This research has both exploratory and explanatory purposes. First, this research is exploratory as it aims to explore and investigate the SSCM practices and barriers to SSCM practices in seaports. According to Saunders et al. (2015), exploratory research adopts an inductive approach, the authors mentioned that Semi-structured interviews can be very helpful to find out what is happening and to understand the context. Second, this research is explanatory, as it explains the relationships between SSCM practices and SC performance as well as examines the moderating role of barriers to SSCM between this relationship. Saunders et al. (2015) note that an explanatory study is used to establish relationships between variables, and deductive approach can be applied. The survey strategy is usually associated with a deductive research approach.

As the research has both exploratory and explanatory purposes, this means that this research will employ mixed methods to obtain both insightful qualitative data and generalizable quantitative data, as neither data alone could fulfil all the research objectives. The mixed methods in the current research will be adopted by a sequential exploratory strategy by conducting semi-structured interviews, which is characterized by an initial phase of qualitative data collection and analysis, followed then by another phase of quantitative data collection (using questionnaire) and analysis. This is supported by a combined approach of inductive and deductive to achieve the research purposes for the current study.

 The sample of this research will be Global container terminal operators (GTOs). GTOs of DP World Company is chosen since it has the largest presence in the Middle East region. In addition, the company has a subsidiary DP Sokhna which operates a container terminal in Egypt and has expansion plans in the near future. Also, DP World has worldwide recognition for its sustainability practices and disclosure as well as the Company has received several awards for its sustainability initiatives and it is the first GTO to embark on the disclosure of carbon emission project.

**6 research framework**

 Silvestre ,2016 argues that because of the fact that sustainable supply chain management is based on context-dependent issues “one size does not fit all” calls for contingency approaches, where supply chain sustainability must be assessed and managed on a case by case basis, Therefore the researcher should investigate firstly the SSCM practices and barriers to SSCM in seaport by conducting semi-structured interviews and once the practices and barriers are identified then survey questionnaire will be developed to test the relationship between SSCM practises and SC performance as well as the effect of barriers to SSCM as the moderating role between this relationship in seaports. The following framework shows the relationships between the three construct (SSCM practices, barriers to SSCM and SC performance, the dimensions of each construct will be identified after interviews are conducted.

Economic SC practices

Environmental SC practices

Social SC practices

Barriers to sustainable supply chain management

Economic SC performance

Environmental SC performance

Social SC performance

Figure 3 conceptual framework for sustainable supply chain management in seaports

**Acknowledgments** The researcher would like to thank Professor Fareed EL-Nagger, Benha University for providing her with great support and assistance.

**References**

1. Sarkis, J. ed., 2006. *Greening the supply chain*. Springer Science & Business Media.
2. Seuring, S. and Müller, M., 2008. From a literature review to a conceptual framework for sustainable supply chain management. *Journal of cleaner production*, *16*(15), pp. 1699-1710.
3. Beske, P., Koplin, J. and Seuring, S., 2008. The use of environmental and social standards by German first‐tier suppliers of the Volkswagen AG. *Corporate Social Responsibility and Environmental Management*, *15*(2), pp.63-75.
4. Kortelainen, K., 2008. Global supply chains and social requirements: case studies of labour condition auditing in the People's Republic of China. *Business Strategy and the Environment*, *17*(7), pp.431-443.
5. Matos, S. and Hall, J., 2007. Integrating sustainable development in the supply chain: The case of life cycle assessment in oil and gas and agricultural biotechnology. *Journal of Operations Management*, *25*(6), pp.1083-1102.
6. Andersen, M. and Skjoett-Larsen, T., 2009. Corporate social responsibility in global supply *chains. Supply chain management: an international journal, 14(2), pp.75-86*
7. Ciliberti, F., Pontrandolfo, P. and Scozzi, B., 2008. Investigating corporate social responsibility in supply chains: a SME perspective. *Journal of cleaner production*, *16*(15), pp.1579-1588.
8. Carbone, V., Moatti, V. and Vinzi, V.E., 2012. Mapping corporate responsibility and sustainable supply chains: an exploratory perspective. *Business Strategy and the Environment*, *21*(7), pp.475-494.
9. Silvestre, B., 2016. Sustainable supply chain management: current debate and future directions. *Gestão & Produção*, *23*(2), pp.235-249.
10. Silvestre, B.S., 2015. Sustainable supply chain management in emerging economies: Environmental turbulence, institutional voids and sustainability trajectories. *International Journal of Production Economics*, *167*, pp.156-169.
11. Pullman, M.E., Maloni, M.J. and Carter, C.R., 2009. Food for thought: social versus environmental sustainability practices and performance outcomes. *Journal of Supply Chain Management*, *45*(4), pp.38-54.
12. Hutchins, M. J., & Sutherland, J. W., 2008. An exploration of measures of social sustainability and their application to supply chain decisions. *Journal of Cleaner Production*, 16(15), 1688-1698.
13. Colantonio, A., 2009. Social sustainability: linking research to policy and practice.
14. Matos, S., & Silvestre, B. S., 2013. Managing stakeholder relations when developing sustainable business models: the case of the Brazilian energy sector. *Journal of Cleaner Production*, 45, 61-73.
15. Srivastava, S. K., 2007. Green supply-chain management: a state-of-the-art literature review. *International Journal of Management Reviews*, 9(1), 53-80
16. Green, K. W. Jr, Zelbst, P. J., Meacham, J., & Bhadauria, V. S., 2012. Green supply chain management practices: impact on performance. *Supply Chain Management: An International Journal*, 17(3), 290-305.
17. Pagell, M., & Wu, Z. (2009). Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. *The Journal of Supply Chain Management*, 45(2), 37-56.
18. Zhu, Q. and Sarkis, J., 2004. Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of operations management*, *22*(3), pp.265-289.
19. Carter, C.R. and Liane Easton, P., 2011. Sustainable supply chain management: evolution and future directions. *International journal of physical distribution & logistics management*, *41*(1), pp.46-62.
20. Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D. and Zacharia, Z.G., 2001. Defining supply chain management. *Journal of Business logistics*, *22*(2), pp.1-25.
21. Lambert, D.M., Croxton, K.L., Garcı´a-Dastugue, S.J., Knemeyer, M. and Rogers, D.S., 2006, Supply Chain Management Processes, Partnerships, Performance, 2nd ed., Hartley Press Inc., Jacksonville, FL.
22. Morali, O. and Searcy, C., 2013. A review of sustainable supply chain management practices in Canada. *Journal of Business Ethics*, *117*(3), pp.635-658.
23. Al Zaabi, S., Al Dhaheri, N. and Diabat, A., 2013. Analysis of interaction between the barriers for the implementation of sustainable supply chain management. *The International Journal of Advanced Manufacturing Technology*, *68*(1-4), pp.895-905.

1. Seidel, S., Recker, J.C., Pimmer, C. and vom Brocke, J., 2010. Enablers and barriers to the organizational adoption of sustainable business practices. In *Proceeding of the 16th Americas conference on information systems: sustainable IT collaboration around the globe*. Association for Information Systems.
2. Hadley, J. and Herren, A., 2010. Barriers to Environmental Sustainability Facing Small Businesses in Durham, NC.
3. Preuss, L., 2009. Addressing sustainable development through public procurement: the case of local government. *Supply Chain Management: An International Journal*, *14*(3), pp.213-223.
4. Bowen, F.E., Cousins, P.D., Lamming, R.C. and Farukt, A.C., 2001. The role of supply management capabilities in green supply. *Production and operations management*, *10*(2), pp.174-189.
5. Lam, J.S.L. and Van de Voorde, E., 2012. Green port strategy for sustainable growth and development. In *Transport Logistics for Sustainable Growth at a New Level, International Forum on Shipping, Ports and Airports (IFSPA)* (pp. 27-30).
6. Acciaro, M., Vanelslander, T., Sys, C., Ferrari, C., Roumboutsos, A., Giuliano, G., Lam, J.S.L. and Kapros, S., 2014. Environmental sustainability in seaports: a framework for successful innovation. *Maritime Policy & Management*, *41*(5), pp.480-500.
7. Barney, J., 1991 .Firm Resources and Sustained Competitive Advantage. *Journal of Management*.(17:1), pp.99-120.
8. Yuen, K.F. and Thai, V., 2017. Barriers to supply chain integration in the maritime logistics industry. *Maritime Economics & Logistics*, *19*(3), pp.551-572.
9. Glenn Richey Jr, R., Chen, H., Upreti, R., Fawcett, S.E. and Adams, F.G., 2009. The moderating role of barriers on the relationship between drivers to supply chain integration and firm performance. *International Journal of Physical Distribution & Logistics Management*, *39*(10), pp.826-840.
10. Denktas-Sakar, G. and Karatas-Cetin, C., 2012. Port sustainability and stakeholder management in supply chains: a framework on resource dependence theory. *The Asian Journal of Shipping and Logistics*, *28*(3), pp.301-319.
11. Lee, J.S., Kim, S.K. and Lee, S.Y., 2016. Sustainable supply chain capabilities: Accumulation, strategic types and performance. *Sustainability*, *8*(6), p.503.
12. Lee, S.Y. and Klassen, R.D., 2008. Drivers and enablers that foster environmental management capabilities in small‐and medium‐sized suppliers in supply chains. *Production and Operations management*, *17*(6), pp.573-586.
13. Hiranandani, V., Sustainable development in the maritime industry: A multi case study of seaports, 2010.
14. Vujicic, A.M., Zrnić, N. and Jerman, B., 2013. Ports sustainability: A life cycle assessment of zero emission cargo handling equipment. *Strojniški vestnik-Journal of Mechanical Engineering*, *59*(9), pp.547-555.
15. European Commission, A Framework for Indicators for the Economic and Social Dimensions of Sustainable Agriculture and Rural Development, 2001 available at <http://ec.europa.eu/agriculture/publi/reports/sustain/index_en.pdf>
16. Blume, D. 2009, “Port sustainability, Balancing Competing Priorities,” AAPA (American Association of Port Authorities) (2009) Executive Management Conference, <http://aapa.files.cms-plus.com/SeminarPresentations/2009Seminars/09ExecMan/> BlumeDana.pdf
17. Chen, I.J. and Paulraj, A., 2004. Towards a theory of supply chain management: the constructs and measurements. *Journal of operations management*, *22*(2), pp.119-150.
18. AAPA (American Association of Port Authorities) ,2007, D-l 1: Embracing the concept of sustainability as a standard practice for ports and the association, ([http://aapa.files.cms- plus.com/PDFs/sustainability\_resolutions.pdf](http://aapa.files.cms-plus.com/PDFs/sustainability_resolutions.pdf))
19. Golicic, S.L. and Smith, C.D., 2013. A meta‐analysis of environmentally sustainable supply chain management practices and firm performance. *Journal of supply chain management*, *49*(2), pp.78-95.
20. Cook, L.S., Heiser, D.R. and Sengupta, K., 2011. The moderating effect of supply chain role on the relationship between supply chain practices and performance: An empirical analysis. *International Journal of Physical Distribution & Logistics Management*, *41*(2), pp.104-134.