EXPLORING THE ENVIRONMENTAL SUSTAINABILITY AND PERFORMANCE IN GLOBAL LOGISTICS HUBS

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Introduction

Globalization has had different effects on the world since the concept emerged. Globalization impact on supply chains and logistics has revolutionized global trade. It has resulted in new levels of speed, efficiency, effectiveness and endless options. With the concept of globalization applied in supply chains and logistics, it has resulted in the emergence of global logistics hubs. Global logistics hubs have many advantages and are the base for global trade nowadays and they are a crucial link in global supply chains. Without the facilitations that global logistics hubs bring to the table, it is nearly impossible to carry on global trade with the same standards we see today. Global logistics hubs are massive composition of activities, offering all types of transportation modes, light manufacturing and added-value logistics services, and handling global amounts of products. This agglomeration of activities as much as it helps in keeping the global trade system going smoothly, it has immense environmental externalities, affecting the local communities and the rest of the world.

Sustainability, governments, and NGOs' increased interest in the sustainable development and the environmental impact of organizations since the Rio Summit in 1992. This brings our attention to the effect of the agglomerated activities of global logistics hubs and how it is measured and managed. Since sustainability has multiple dimensions, such as people, culture and institutions (O'Riordan, 2014), it is interesting to explore how stakeholders affect and are affected by environmental sustainability in global logistics hubs as well. This paper is based on an ongoing PhD research that aims to explore the holistic model of global logistics hubs and their environmental sustainability and measurement, in addition to the stakeholders and their influence on environmental sustainability.

Ports and Port Clusters

By reviewing the literature, the term global logistics hub seemed ambiguous and used loosely and interchangeably with other similar terms but none of which has a clear framework in the scholarly articles. Some scholars attempted to define the term but still the definition is a general idea of the function of a global logistics hub. The lack of a known framework of global logistics hubs has contributed to the vagueness of the term. Additionally, it was also found that it is confusing to use the terms port, port cluster and similar terms to global logistics hubs in the same context. Therefore, in order to clear this, the research attempts to clarify the difference between ports, port clusters and global logistics hubs.

Maritime ports have been evolving since the 1960s due to the changes in the market and the requirements of trade nowadays. The UNCTAD (1999) defined four generations of ports and Flynn and Lee (2010) coined the fifth-generation port evolution. According to Notteboom (2011) after the 1990s port generations were influenced by globalization and the change that happened to the global trade scene. Ports went from offering simple exchange of transport services to complex systems of sophisticated operations and integration (Beresford et al., 2004). Thus, ports became central nodes
to global trade activities (Wan et al., 2014). The importance of the link that ports offer to the global trade made it a good base for global logistics hubs. Fourth and fifth-generation ports are the generations that are considered advanced enough to be a base for global logistics hub, since they can be integrated horizontally and vertically (Zang & Lam, 2013) in the global logistics chain. A main differentiating point between fourth and fifth-generation ports is the operation viewpoint, where fourth-generation ports aim to improve internal profit, but fifth-generation ports aim to improve customer satisfaction and consider stakeholders in their decisions (UNCTAD, 1999, Flynn & Lee, 2010).

The objectives of this research align with the fifth-generation ports to be the base for global logistics hubs operations. By connecting and integrating with the system where it exists, in this case under the global logistics hub umbrella, and involving stakeholders in their operations, fifth-generation ports will facilitate exploring the environmental sustainability of the port and the global logistics hubs as a whole and the influence of stakeholders. A port is perceived as one entity of interrelated activities and connections to offer the best service to its customers (UNCTAD report, 1999; Flynn and Lee, 2010), however, a global logistics hub is a more complex system requiring a strategic location, a concrete infrastructure to be able to receive huge numbers of products and offer services to sustain global trade and provide a smooth flow of products for global supply chains, have strong multimodal connections and routes to the feeder network connected to it, in order to serve the region surrounding the global logistics hub.

A port cluster is another concept that was found confusing in the literature with global logistics hubs because of the agglomeration of activities in both. Haezendonck (2001, p.136) defines a port cluster as “a set of independent firms engaged in port related activities, located within the same port region and possibly with similar strategies leading to competitive advantage and characterized by a joint competitive position vis-à-vis the environment external to the cluster”. A port cluster is a concentration of similar activities and infrastructures serving several ports located around a geographical region to avoid intensified competitions between ports that adversely affect regional economies, encouraging ports to cooperate rather than compete (Zhaoliang et al., 2009; Lam et al., 2013). Port clusters, in addition to the port operations of maritime transportation, cargo handling, and logistics activities, include manufacturing and trade activities such as shipbuilding, oil refining, specialized suppliers to port industries (Haezondonck and De Langen, 2012). Therefore, the purpose behind developing a port cluster is different from developing a global logistics hub and both concepts include a port as part of their operations. This also shows that they require specific activities to serve their operation’s aim.

Figure 1 illustrates the position of a port and the position of a port cluster. This figure is missing the position of a global logistics hub and what is its layout, and thus one of this research’s objectives is to find out where a global logistics hub would lie in this image and what would its borders encompass.
Global Logistics Hubs

The emergence of global logistics hubs resulted from the dispersion of supply chain operations all over the world and the agglomeration of the global manufacturing output in certain parts of the world (Sheffi, 2012). With customers of global supply chains located in different parts of the world, it is a challenge for supply chains to deliver their products to their customers in high quality with low costs to achieve high customer satisfaction. Global logistics hubs help them achieve this by offering a strategic location to act as a centre for consolidating the huge number of products transported to a certain region in the world, offering value-added services and logistics services, acting as a hub to the feeder network where the deconsolidation happen to distribute the products through the network using the multimodal facilities offered through the global logistics hub. Yang and Chen (2016, p.181) defines a global logistics hub as “a port in a strategic geographical location at the intersection of major trunk and feeder systems, and which possesses a logistics park or free trade zone in the port hinterland providing integrated value-added logistics services in addition to conventional import, export, and transit cargo operations”. This helps supply chains in providing a smooth flow of products to their customers, decrease the risks that is associated with having the manufacturing operations across the world, take advantage of the economies of scale, decrease costs, and improve responsiveness.

Several authors addressed the lack of conceptualization and the ambiguity of the concept of global logistics hubs. As much as they added to the knowledge, proposing a framework of the terminologies and classification of logistics hubs (Notteboom et al., 2017), highlighting different types of global logistics hubs (Sheffi, 2012), or describing a global logistics hub concept through a specific case study (Yang & Chen, 2016), they either failed to incorporate the transportation viewpoint, or to identify the stakeholders of global logistics hubs, they also didn’t take into account ownership, governance or economic development position that would be different in each global logistics hub. Global logistics hub framework and definition would not be the same mold for all of them if all aspects are taken into consideration.

A port is one entity of interrelated activities serving the purpose of maritime transportation and cargo handling and is the base for both port clusters and global logistics hubs. A port cluster is an agglomeration of associations not an entity (De Langen, 2004), it includes activities to enhance regional economy and benefit the competitive position of ports in the same geographical region. A
global logistics hub buffers some of the risks associated with global supply chains and provides a smooth flow of products for a specific region. In addition to a fourth or fifth-generation port, a global logistics hub must have a strategic geographical location, a strong physical infrastructure to accommodate global capacity of products, Free Trade Zone, a well-connected multimodal network (e.g. rail, road, inland waterway, seaports, airports).

Even though a global logistics hub is a crucial link in the global trade operations and support global supply chains, they have immense adverse impact on the environment. According to Rondinelli and Berry (2000) logistics and transport operations have major environmental impacts such as green space displacement, soil and sediment contamination, air, water and noise pollution, lost habitat, and wetlands destruction. In global logistics hubs, transport, logistics and other services are immensely present and agglomerated to serve global trade operations, which intensifies and increases the adverse environmental impacts. These environmental externalities result in a challenge to balance between the financial and economic benefits and the environmental sustainability of global logistics hubs.

The large amount of activities carried out under the umbrella of a global logistics hub connects a large number of stakeholders. Different types of stakeholders are identified by using stakeholder theory and it is also used to manage stakeholders’ responsibilities (Lavassani and Movahedi, 2010). Stakeholder theory (Freeman, 1984) has been used as an organization management framework to understand business operations and solve problems in micro and macro contexts. Alam (2013) explains that organization’s activities affect stakeholders in a direct and indirect way and are also affected by them. In the context of this research, it is essential to explore the stakeholders involved in global logistics hubs’ and their effect on the environmental sustainability. The involvement and influence of stakeholders are essential to take into consideration when exploring the environmental sustainability in a holistic manner, since it will reveal their relative prominence to the environmental sustainability of global logistics hubs as well as the potential cooperation that might help in managing it. Additionally, identifying global logistics hubs’ stakeholders will help develop a more accurate framework for global logistics hubs.

Figure 2 illustrates a theoretical framework of stakeholders involved in a global logistics hub.
Through the literature review on global logistics hubs it was found that the studies were mainly concerned with the economic aspect of developing a global logistics hub (Veldman et al., 2005; Lee et al., 2009; Xiao & Liu, 2017) and there was a lack of interest regarding the organizational responsibility or the environmental sustainability of global logistics hubs. To address the environmental sustainability and environmental performance measurement in global logistics hubs, a literature review was conducted through Scopus and Web of Knowledge to reveal the environmental sustainability position of the constituents of global logistics hubs since literature on global logistics hubs is relatively insufficient.

**Environmental Sustainability and Environmental Performance Measurement in Global Logistics Hubs**

Sustainability encompasses environmental, economic, and social aspects (Carter & Rogers, 2008), however this research is focusing on the environmental aspect of sustainability in global logistics hubs and its measurement. With the increasing interest of scholars, governments and NGOs with the environmental impact of organizations, it is important to understand the environmental impact and sustainability strategies of the agglomeration of activities that take place in global logistics hubs.

According to Defra (2011) the environmental impact is manifested through 4 key areas: emissions to air, water, land and resource use. However, through the literature review it was found that scholars mainly concentrate on air pollution and the carbon footprint of operations such as the study by Lee and Wu (2014). Furthermore, by reviewing the literature, it was found that the maritime transport sector environmental sustainability exists, however there is a lack of unity in the measurement frameworks and that is because of the diversity of sizes and functions in maritime ports. Additionally, in the logistics services sector, the studies addressing the sustainable development are rare (Evangelista, 2014), and even the studies addressing the environmental impact of the logistics services are shallow and do not reveal the interrelation between the different modes or the stakeholders.

Other constituents of global logistics hubs must have their own individual environmental sustainability strategies; however, they are not reflected in the literature. This shows that scholars are treating global logistics hubs’ constituents in a standalone manner and there is a lack of integration in the literature within the various parts of a global logistics hub, which makes it difficult to view the holistic position of the environmental sustainability and measurement in global logistics hubs. The holistic approach would benefit the efficiency of environmental sustainability of global logistics hubs, since it would eliminate the duplication of measurement and enhance the integration of the system, which in turn would help more parts of the global logistics hub, regardless of their size or impact, be involved in the environmental sustainability measurement and management. Thus, improving the overall environmental sustainability of the global logistics hub, facilitate implementing any environmental management system and benefit the global logistics hub’s stakeholders.
Methodology
This research is looking into exploring the holistic view of global logistics hubs' operational model and their environmental sustainability and measurement, an inductive approach is appropriate since theory on global logistics hubs is scarce, therefore, the theory is developed from observation of empirical reality, thus moving from the specific to the general (Collis & Hussey, 2013). Furthermore, according to the research questions, the research method can be selected (Ellram, 1996). Given this research questions a case study methodology is found appropriate to implement and will provide a holistic and in-depth exploration in a real-life setting (Ellram, 1996; Yin, 2013). Additionally, Yin (2013) recommends the multiple case study strategy to overcome the vulnerability of the single case study. Moreover, by using a multiple case studies strategy in this research, it will help the research to study different cases of existing global logistics hubs to define the activities and operations considered under the authority of global logistics hubs and explore the environmental sustainability situation in each setting, that is to address the heterogeneity of global logistics hubs and the different characteristics that could be found in their different governance, ownership, and developmental settings which will affect the case study selection as well. Unstructured interviews are being considered as the primary data collection method due to the rarity of literature and ambiguity of the global logistics hub concept. Easterby-Smith et al., (2012) explain that unstructured interviews are used as a general area exploration with the aim of in-depth understanding. It will allow the interviewees the opportunity to further illustrate the concept and the environmental sustainability measurement and management and the stakeholders’ influence without affecting the answers or imposing the researcher’s thoughts on the outcome.

Findings
Global logistics hubs have an essential role in the global trade, but they also adversely impact the environment. By reviewing the literature on the research topic, gaps were revealed that requires addressing in order to achieve the research objectives. The literature review showed that global logistics hubs have no clear operational or conceptual model in the literature. Previous scholars who studied global logistics hubs failed to address their heterogenous nature, since they usually have different ownership and governance settings, economic development levels, operation systems, sustainability approaches, or market to serve, which in turn will have an effect on developing a clear, inclusive and holistic definition and framework. Additionally, the vagueness of the responsibilities of global logistics hubs’ environmental sustainability and the influence of stakeholders regarding this issue is another aspect that is not addressed in the literature. It will help the research in viewing the issue holistically, especially that stakeholders’ interest is the motive behind sustainable development of organizations. Furthermore, several constituents of global logistics hubs are environmentally aware of their impact and have sustainability strategies and management tools in an individual organization’s efforts. However, they are not integrated to address the environmental sustainability of the global logistics hub as a whole or as a system of agglomerated activities. By integrating the environmental sustainability and measurement of global logistics hubs constituents, it will result in a more efficient and effective management of the environmental externalities and will unveil possibilities that will affect the management of these externalities.

To address the research gaps, the following questions are going to direct the research towards the research objectives:

- What are the constituents of a global logistics hub?
- Who is responsible for the environmental sustainability of global logistics hubs? And who would manage the integration of the environmental sustainability of global logistics hubs constituents?
- How would the stakeholders be involved and affect the integration and how would they come together and integrate?
• What are the drivers and barriers that face global logistics hubs when integrating their environmental sustainability measures?

• What are the environmental externalities resulting from global logistics hubs’ agglomerated activities that are additional to that of a seaport or a port cluster?

**Conclusions**

Environmental sustainability has attracted much attention lately. Global logistics hubs are important links in the global trade network and they have a lot of advantages for the regions hosting them. However, they still affect the environment immensely with the agglomeration of transport and logistics activities. The activities and operation model of global logistics hubs as a whole are not clear in the literature, which makes exploring their environmental sustainability and measurement difficult. Even the existing literature discusses the individual attempts of the constituents of global logistics hubs in managing their environmental sustainability. Additionally, the literature is lacking the stakeholders position or influence on the environmental sustainability of global logistics hubs. While it is beneficial that individual organizations are concerned with their environmental sustainability, the integration of these constituents under a holistic system to measure and manage the environmental sustainability would improve the efficiency of the system, reduce duplication, include all parts of the global logistics hubs whether they have a small impact on the environment or they are just a small organization that their impact would be overlooked. By exploring the stakeholders effect on the environmental sustainability, it will improve the understanding of the macro and micro setting of the global logistics hub operation. Furthermore, this paper is reporting an ongoing research and it is mainly presenting the preliminary findings of reviewing the literature through the gaps found and the questions that are going to be addressed in the next steps. These questions are going to explore the scene through an inductive approach on global logistics hubs and their environmental sustainability. The following steps would be to select the pertinent case studies to explore the real-life situation, create the interview structure and specifying the interviewees.

**References**


