African Journal Of Business And Management
Special Issue: Volume 7, Issue 2, November 2022 http://aibumaorg.uonbi.ac.ke/content/journal
Pgs 233-250

AFRICAN JOURNAL OF BUSINESS AND MANAGEMENT

(AJBUMA)

ISSN 2079-410X

GREEN LOGISTICS PRACTICES AND PERFORMANCE: A REVIEW OF LITERATURE

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Date Received 19/09/2022 | Date Accepted 21/10/2022

Abstract

Transportation and distribution activities are major contributors to resource consumption and environmental degradation within organizations. Emissions from vehicles and related organizational actions contribute to air emissions that can cause environmental implications like smoke within the location, acid rain in the region and global climate change. As environmental concerns are gradually attracting public attention, widespread implementation of a clean-technology for delivery vehicles has been of significant importance for practitioners in the logistics industry. The movement towards the green logistics concept is a part of reducing the environmental impact of organizations. As firms implement the green logistics concept, they should also be able to see the business sense in it, in that it will aid them to make greater sales margins. The objective of this paper is to come up with a detailed empirical literature review on green logistics practices and performance. The empirical review shows that little has been done to specifically look at greening the logistics part of the supply chain which is critical because of its emission levels which are way above any other part of the supply chain. Very few studies have been done to establish the link between green logistics practice and the performance of the organization, and the few which have been done have not linked the two. Therefore, today's organizations have not gotten a clear picture of the benefits which accrue due to the greening effort in their logistics activities and how this affects their environmental, economic and even social performance. Key research gaps emerging from the paper include; No enough research on the link between green logistics practices and performance; consideration of carrying out research in a developing country context; use of actual and more objective data on variables measuring firm performance instead of relying on respondents' perception to measure performance and lastly research that does not have a purely positivist approach but a realism one.

Keywords: *green logistics; environmental performance; economic performance; social performance; organizational performance.*

Introduction

Environmental concerns have become essential for organizations given the current context of globalization. Industrialization and consumerism are ever-growing bringing in a scenario where the trade pursuit of humans has begun to spread unfavourable environmental impact (Ratnajeew & Bandara, 2015). In pursuit of economic development, developed countries have shown environmental concerns and little respect, however nowadays; there is an expanded attentiveness on a portion of their enterprises, consumers and even governments for conserving the environment and eliminating pollution. The race is for speedier economic development and economies are blasting because of fast industrial extension. This has prompted a circumstance where these enterprises are becoming the top polluters of tomorrow's world (Anish & Rajiv, 2015).

There are several sources of environmental pollution by firms, including energy generation, manufacturing and transportation. Transportation and logistics operations are widely recognized to impact the natural environment in the greatest negative way. There has been an expanded focus on ecological pollution through transport practices and governments, transport suppliers and associations have taken diverse initiatives aimed at diminishing the natural effect of logistics and transport activities (Ratnajeew & Bandara, 2015). The greening of fleets, particularly automobiles and trucks, is increasingly gaining the interest of companies in several industries (Bae, Sarkis & Yoo, 2011). Green logistics in recent years has become popular in developed countries.

Research Problem

Eight per cent of the world's current aggregate carbon emissions emanate from transport and the environment is to a great extent affected (McKinnon, 2010). 5.5 per cent of the total greenhouse emissions globally originate from logistics. This is inclusive of all types of greenhouse gases, not just carbon dioxide. Two-thirds of these can be linked to road transport (World Trade Economic Forum, 2009). Emissions related to logistics are increasing at a greater rate compared to any other sector and the trend is expected to continue such that by 2030 these levels will be 80% higher than present levels unless there is a change. In consideration of the above high rates of emission coming from the transportation sector, it is vital to initiate mitigating resolutions. Ribeiro et al. (2007) indicate that a commonly talked about approach is the implementation of green logistics measures to reduce the environmental effect of transportation activities.

Earlier logistics scholars argue that a major challenge that will face logistics in the future is the environment (Cooke, 1991; Foster, 1992; Stock, 1992). The main aim of this study is to critically assess whether or not green logistics practices lead to firm performance. A concern amongst operations practitioners is actually if the implementation of green initiatives leads to improved firm performance. Thus, the objective of this study is to conduct an in-depth literature review with the main aim of identifying research gaps.

Research Questions

Explicitly, the review aims to answer the following questions;

(i) What does theoretical literature say about green logistics and firm performance?

(ii) What empirical studies exist on green logistics practices and performance and what did they find out? Can this relationship be enhanced by considering other factors?

(iii) What research gaps exist in the literature?

Research Objectives

The general objective of this study is to carry out a critical literature review on green logistics practices and their relationship with a firm's performance.

The specific objectives will be to:

(i) Theoretically review the literature on green logistics practices and performance

(ii) Empirically review the literature on green logistics practices and performance

(iii) Identification of research gaps

Literature Review

Green Logistics Practices

Kutkaitis and Župerkienė (2011) define green logistics as a structure based on energy consumption efficiency and less harm to the environment while at the same time increasing labour efficiency and competitiveness. A critical look at this definition seems to suggest that the context of an application for green logistics is not highlighted. However, Čepinskis and Masteika (2011) in their definition of green logistics indicated it to encompass four fields of implementation: raw material mining, energy consumption, distribution and manufacturing (production). Green logistics practices consist of all activities which are related to the eco-efficient organization of the forward and reverse flows of information and products from the point of origin and the consumption point to meet or exceed customer expectations. Carter and Rogers (2008) highlighted that green logistics is not new in terms of re-inventing logistics, but it emphasizes the incorporation of environmental goals into the target systems of firms and value chains to provide a balanced set of total value to customers. This definition seems to capture the whole area of green logistics practices in the supply chain and it is the definition adopted by this paper.

The idea of green logistics practices can be considered to have a relationship with sustainable development; one can urge that the green logistics concept is anchored on three corresponding points: social, economic and ecological. This indicates that the execution of the green logistics practices concept in an organization should be supported by values of social, environmental and economic responsibility (Hampus & Henrik, 2014). Other suggestions for the implementation of green logistics practices as indicated by Isaksson and Huge-Brodin (2013) propose nine types of ecological logistics and the greener logistics path. These include alternative fuel, transport mode combination, documented energy data and emission, eco-driving, the design of logistics systems, environmentally classified vehicles, choice of partners, transport

planning and an environmental management system (Martinsen, 2011). The practices looked further into in this study are reverse logistics, fuel efficiency, measuring carbon emissions, packaging optimization and route optimization. From the theory, applying these practices should decrease the firm's carbon footprint and make them environmentally pleasant while reducing costs simultaneously.

Green Packaging

The use of packaging optimization techniques is important for logistical organizations to reduce their environmental impact. When organizations are implementing their environmental programs, it becomes important to reduce solid waste like metal scrap, materials, packaging and organic waste. Thirty-three per cent of the waste stream comes from packaging material; this indicates that it is important to have programs in green packaging to have the ability to decrease an organization's carbon footprint effectively (Min & Galle, 1997). There is a need for packaging optimization as reusable and returnable packaging is required even more, together with reverse logistics. Package optimization translates straight to a reduction in environmental effects because of less waste in packaging and a smaller number of vehicles used as a result of better space utilization (Wu & Dunn, 1995).

Packaging reductions aim to reduce packaging which is unnecessary, the use of returnable or more biodegradable packaging, re-usage and recycling. Therefore, there is a greater drive of reducing packaging waste within the logistics chain. Min and Galle (1997) indicate that the above avails a challenge for managers in logistics to initiate programs that will deal with the concerns of the environment. Initiating green packaging activities can reduce the company's overall cost and also bring down the total environmental impact and that is why it is vital to consider this activity in this research.

Fuel Efficiency

A tool that can be friendly to the environment and efficient is using improved fuel-efficient fleets. Fuel efficiency can be enhanced by using proper maintenance programmes, eco-driving techniques and alternative fuels. Logistics greenness can be increased by shifting to more efficient and eco-friendly fuels. Wu and Dunn (1995) identified safer, cleaner and more accessible alternative fuels compared to diesel, which is comprised of liquefied natural gas (LNG and compressed natural gas (CNG) which is cheaper than petrol by 40 per cent, and there ought to be a shift by logistics companies to the usage of alternative fuels if they want to have an environmentally sustainable future.

Environmental impact is reduced as an outcome of keeping track of driving behaviours and implementing driver training which leads to increased fuel efficiency and decreased fuel consumption. Another major environmental issue is proper maintenance of the trucks in an efficient and safe condition which not only extend the vehicle lifetime but also improves the efficiency of the vehicle and reduce the rate of accidents (Wu & Dunn, 1995). The efficiency of fuel becomes a significant facet when going green on two grounds. One, it enhances the efficiency of the vehicle meaning that the vehicle can operate better for prolonged periods, translating to reduced expenses for logistics firms. Secondly, proper maintenance of vehicles, eco-driving techniques and better fuel makes the logistics operations more environmentally

friendly. The author deems this activity important to be studied, as it is a crucial portion when initiating green logistics.

Optimization of Routes

Optimization of routes has to do with the coordination of a fleet of vehicles which has a capacity that is fixed in the most possible efficient way which gets a feasible solution which reduces the voyage amount; time travelled in total and the vehicle numbers in use to the minimum. Ecologically responsible logistics companies would have better space utilization, more direct routes, fewer shipments, less handling and shorter movements (Wu & Dunn, 1995). The above issues lead to lower pollution levels because automobiles travel at the best efficient paces that are friendlier to the environment and consume less fuel. Therefore, optimization of routes is an expense reducer as a result of minimization of travelled distances and economical vehicle usage.

Janota et al. (2010) posit that tracking systems can be used to optimize routes and have the ability to monitor a vehicle when it is off the track. The technology can choose the fastest route, foresee and avoid collisions and optimize the routes by using traffic reports and reducing the carbon emissions of trucks. Optimization of routes is a vital feature to study in this research because of its large potential to impact carbon emissions and it is a simple action for logistics chain optimization, cost reduction and environmental footprint

Carbon Emissions Monitoring

Logistics companies can and should measure the emissions which come from their activities. Transportation actions produce the largest carbon dioxide emissions within the logistics industry (Wolf & Seuring, 2010). If a company measures the logistics chain emission it can reduce the associated expenses and the environmental impact by checking the areas of emission and unnecessary waste to reduce it. Hart (1995) argues that pollution prevention is the ability to not only reduce the company's overall impact on the environment but also cost reduction enhancing the overall efficiency and effectiveness of the firm.

The environmental performance of firms and the ecological impact is monitored and measured by guidelines issued by ISO 14001 which certify the firms in compliance with the guidelines (Mollenkopf, Stolze, Tate & Ueltschy, 2010). When companies discover and analyze their logistics chains, they receive knowledge of areas they can achieve waste reductions and also areas of inefficiency. It is not only important to enhance supply chains but it is also paramount to do carbon emission measurements to discover the effects of the green initiative and give out information on their effects. It is usually a company policy decision and it is done above the managers. The reviewer sees the need to check whether organizations apply this activity to reduce carbon footprint in their operations.

Reverse Logistics

The concept of reverse logistics is referred to as the material movement from the point of consumption back to the original point. It is different from forwarding logistics which refers to specifically the transport from the place of origin to the consumption point (Rogers & Tibben-Lembke, 2001). Therefore, the approach intends to utilize transport fully and decrease the number of empty return freights. They further stated that the vehicles making a return from the point of consumption are involved in,

reusable packaging, remanufacturing and recycling. This illustrates how the flow of goods and reverse logistics fits into the supply chain. Wu and Dunn (1995) argue that there is an increase in two-way freights and this can only increase into the future because of returnable and reusable packaging. They continue to posit that there is a need for supply chains to have the capacity to adapt to this increase and reverse logistics raises costs because of the extra storage and handling. Entirely there will be a reduction in the logistics cost because manufacturers add returnable packaging costs, so there is a minimization of disposal cost given that the package can be used several times (Wu & Dunn, 1995).

Because reverse logistics entails reusable packaging and recycling, there is a direct impact on carbon emissions and a chance of reducing the ecological impact of a logistics company. Mihi-Ramirez and Girdauskiene (2013) indicate that a challenge often faced in reverse logistics is information dissemination and an important feature when this action is being implemented is good information management to aid managers in the process of making decisions. Nevertheless, Van Hoek (1999) alludes that, reverse logistics is insufficient on its own, as the logistical chain as a whole requires evaluation when executing green supply chain programs. Although there is the argument that it is not enough on its own, the author emphasizes that reverse logistics is a vital aspect to evaluate in Kenya. This is because it is a component that has cost reduction capacity and also reduces logistics' environmental impact.

Organizational Performance

Organizational performance management is a way of receiving better outcomes from an organization as a whole or individuals or teams within it, by comprehending and supervising performance within an agreed structure of planned objectives, principles and capability requirements (Armstrong, 2000). A firm's performance is a combination of both the marketing and financial performance of the company in comparison to the industry average (Green & Inman, 2005).

According to Markley and Davis (2007), an organization that wants to be sustainable should make sure that it contributes to development which is sustainable by ensuring environmental, economical and social benefits. Bloemhof (2005) agrees and posits that the triple bottom line is particularly centred in forwarding logistics that is, from manufacturer to customer, and is consequently linked with the green logistics concept. Implementing environmental and social initiatives can make managers execute a strong strategic value (Porter & Kramer, 2006).

When a firm promotes Triple Bottom Line it is an indicator to stakeholders that the firm exists not only for economic but also for social and environmental matters (Markley & Davis, 2007). According to De Giovanni (2012), an effective organization ought to have a strategy that is sustainable in that it takes into consideration the social, economic and environmental performances.

The research on economics and the environment in the logistics industry is what has been labelled green logistics. These two fundamentals (economical and environmental) are what a majority of business research studies on sustainability have focused on (Seuring & Muller, 2008). Hassan, Balan and Prakash (2016) added a new facet to Elkington's triple bottom line

which he called operational performance. Therefore, given the different effects green logistics practices can have on a firm's performance, it can be argued that they fall under four different performance measurements: environmental (such as resource savings and waste reductions), operational (such as improved quality and enhanced efficiency), economic (such as positive stock returns and improved profitability) and social (such as enhanced health and safety and improved job satisfaction).

Social Performance

Social performance is a firm's arrangement of principles of responsibility socially, social responsiveness observable outcomes, processes, programs and policies as they relate to the organization's societal relationships. The social performance considered by this study is a concept to quantify the results of the green logistics practices about the increasing company and product image, ensuring customer loyalty and satisfaction and protecting employee health and safety (Zailani, Eltayeb & Hsu, 2012b; Ashby, Leat & Smith, 2012).

The measure of the social impact of an organization can be indicated by the level of satisfaction of both the customer and employee (Markley & Davis, 2007) this can also be measured by human rights, labour practices, product responsibility and community impacts (Savitz & Weber, 2006). A sustainable organization will make all its decisions having in mind its workers and the community to contribute toward society's development. Customers are becoming aware of the implication of the Triple Bottom Line social element and are therefore becoming a growing contributor to an organization's performance.

When an organization is socially aware it keeps an eye on the conditions of labour to confirm that they are up to a certain standard (Decent wages, safe working, fair working hours and environments) such an organization does not exploit labour in whichever way, for example, child labour. Exploiting low-cost countries which have costs of labour being low, are involved in child labour and have bad labour conditions is what Triple Bottom-Line organizations refrain from since these are the issue considered unethical socially. In the logistics industry, focusing on the social facets would comprise endurable hours of driving with enough time to rest or community contribution through health care or education.

Economic Performance

The economic value and profits that a company generates is the economical factor in the Triple Bottom Line. The economical aspect is the conventional measurement instrument that is mostly used when assessing the performance of an organization (De Giovanni, 2012). The conventional monetary measurement tools like return on investment, profit, sales, financial flows and taxes paid, determine the economical factor (Savitz & Weber, 2006). In road transportation, firms can cut costs and get better economic performance through fuel or route optimization and reverse logistics.

On the other hand, when a logistics company cuts its costs, it impacts less on the environment, because there are lower levels of emissions (Hampus & Henrik, 2014). This study will use the definition of economic performance as suggested by Zhu et al. (2008) who urged that economic performance relates to the ability of an organization to cut down on costs related to

materials purchased, energy consumed, waste treated, waste discharged, and fines due to environmental accidents.

Environmental Performance

The environment is the final element of the Triple Bottom Line. It refers to the activities set up to cut down on the climatic effect. As environmental awareness is increasing amongst customers, De Giovanni (2012) indicates that companies are paying special attention and are launching green initiatives in their operations, which sequentially improves the performance of the firm. These programs reduce environmental impact but De Giovanni argues that to some extent they are not easily measurable, unlike economical measurements.

One can measure the environmental impact by the waste produced, energy usage, the water and air quality. Being ecologically sustainable will become more lucrative in the long term and this is the reason why companies often shun destructive and harmful products and practices (Savitz & Weber, 2006). El Saadany, Jaber and Bonney (2011) view environmental performance as measuring the number of pollutants released into the atmosphere from industries and harmful materials moved to and from other plants that end up affecting water and soil quality as a landfill. This study will adopt the definition of environmental performance given by Zhu et al. (2008) as the capability of an organization to cut down on air emissions, solid and effluent wastes and the ability to reduce the consumption of dangerous and toxic substances and reduce the occurrence of an ecological accident. Logistics firms can reduce their ecological impact through activities such as route optimization, green packaging, reverse logistics and fuel efficiency.

Green Logistics Practices and Organizational Performance

All organizations are confronted by extreme situations in an attempt to remain competitive in the current global markets. Subramanian and Gunasekaran (2015) have observed that appreciating the need to slot in the triple bottom line and sustainability as part of their strategic plan, organizations focus on measuring the environmental, economic and social impacts of their actions and stress on the connection between performance and sustainability

New and more comprehensive measures have to be taken to cut emissions. These measures include the usage of alternative means of transport and energy sources and also more efficient usage of current forms of energy. Due to government legislation and management, corporate environmentalism and social awareness the shift towards green initiatives in the supply chain is now enforced across the globe by supply chain and logistics organizations (Natarajan & Wyrick, 2011). In the recent past, interest has shifted to the effect logistics have on climate change, owing to the improved understanding of the danger being posed by global warming (McKinnon, Cullinane, Browne, & Whiteing, 2010). This emphasizes the need to implement green logistics practices.

Green Logistics Practices and Social Performance

Firm performance focus in today's global environmental demands has changed. Formerly, the focus was mainly on wealth creation through economic performance

which was superior and measured in terms of liabilities, assets success and market strength in general. Today the focus has shifted to social and environmental performance while attaining high economic performance to reach optimal heights of sustainability performance (Carter & Rogers, 2008). The business strategy of sustainability is closely linked to corporate social responsibility (CSR). For organizations to attain a long-term competitive edge there must be an intersection of society, environmental and economic superiority according to organizational sustainability (Thoo, Abdul, Rasli & Zhang, 2014). Therefore, firms ought to shift focus to long-run profitability that could lower the societal and environmental risks simultaneously (Porter & Kramer, 2006).

The link between green logistics practice and social performance is anchored in the stakeholders' theory which recommends to organizations create externalities that affect numerous parties who are both external and internal to the organization. It recognizes the fact that other than shareholders, there are people or groups to whom the firm is committed and who are prone to be specifically affected by the moves made by it or have an unequivocal legally binding relationship with it (Sarkis, Zhu & Lai, 2011). Therefore, Green logistics practice is a primary point in influencing sustainability in social performance.

Green Logistics Practices and Economic Performance

Green logistics practices centre on the eradication of wastes related to ecological sustainability. If this waste is reduced it will lead to a reduction in cost and this will result in an economic performance improvement. Rao and Holt (2005) established a relationship between green supply chains and economic performance. They indicated that green supply chain management practices led to better economic performance and competitiveness. Evidence points out that the market values environmental awards and announcements of winning such awards are always rewarded with a rise in valuations reflected by higher stock prices (Klassen & McLaughlin, 1996).

The relationship between green logistics practices and economic performance can also be explained by the institutional theory in which Zhu and Sarkis, (2007) argue that organizations clinch to certain strategies to gain legitimacy within society. Consumers are gradually more concerned with environmental and ethical issues which shape their purchasing decisions (Trudel & Cotte, 2009). Organizations, cannot resolve the sustainability challenges facing the globe alone and thus there is a need for stakeholders or social partners to also be involved. Once the organization has been accepted by society because of implementing green practices in its logistics, then the economic performance will improve.

Green Logistics Practices and Environmental Performance

Extension of the conventional supply chain into ecological matters facilitates the contemplation of the short- and long-term environmental effects of processes and products (Beamon 1999). Green logistics is part and parcel of the larger GSCM strategic imperative based on the fact that customer is now demanding ecologically sustainable products and the processes that produce them are designed and run to improve environmental sustainability. By

embracing green logistic practices, logistics firms can reduce solid waste by developing environmentally friendly packaging, route optimization, ensuring fuel efficiency and reverse logistics. A definite issue of growing concern globally is waste, firms need to indicate the description and measurement method used to track and report their waste quantities. Specific indicators may include the type of waste whether is it hazardous or non-hazardous or its final destination, like incineration, landfill or recycling. Potential measures of environmental impact reduction would thus include hazardous waste reduction; noise reduction; GHG emissions reduction; solid waste disposal reduction and wastewater discharge reduction (Verfaillie & Bidwell, 2000).

A product's environmental impact is the effect of interconnected choices taken at various phases in the supply chain (Green et al. 2012). Green logistics is part of the larger supply chain. Consumer goods waste generation, packaging and transportation are examples of ecological facets that cannot be dealt with fully without the involvement of several organizations in the supply chain. Since organizations are indirectly involved in these phases, partnership with different members of the supply chain is a vital tool for reducing the environmental impact of the product and improving the environmental performance of the firm (Testa & Iraldo, 2010). Therefore, firms are progressively taking up environmental collaboration and monitoring practices to make sure that the equipment and materials supplied are friendly to the environment and are created using ecologically sustainable processes (Rao & Holt, 2005; Green et al. 2012).

Empirical Literature Review

Zailani et al. (2011) did a study that was exploratory the perception of managers in Malaysia on green innovation adopted by logistics service providers to investigate the effect of green innovation implementation on firm performance. A survey of 153 Malaysian automotive firms was conducted and analyzed by use of the partial least square technique. Firm internal initiatives, ecological regulations and market demand, were found to have a positive effect on green innovation initiatives (GIIs) which in turn have a positive effect on environmental, social and economic performance. Certain limitations of this study can be observed. The study tested and verified the hypotheses using a questionnaire survey but provided only a cross-section of the study. Consequently, this approach confines the ability to imply causality in the relationships among variables and therefore the results cannot observe dynamic changes. A longitudinal study that examines the relationships for an extended period should be performed to provide precise results. Other limitations noted in this study are, first, that not all the facets of performance were included in the study. Operational performance was particularly left out and as suggested by Hassan, Balan and Prakash (2016) it should be included in the evaluation of firm performance. Second, the study only focuses on the Malaysian automobile industry. However, the maturity of certain innovations and the decision process for implementation may vary between countries. Third, the study employs moderated regression analysis but the dependent variables are defined on an ordinal scale.

Isaksson & Huge-Brodin (2012) did an explorative study on the Swedish market on six Logistics Service Providers (LSPs) going green which sought to identify diverse types of drivers, barriers and firm characteristics, describing how the factors can impact the implementation of green initiatives. The findings were that the LSPs have started green initiatives implementation given that they experience potential pressure, appreciate the consequences and understand the necessity to react to the growing worldwide competition. Regression analysis results showed that customers have vital and considerable authority over green initiative implementation. Several limitations of the study can be identified; first, the case descriptions are mainly based on semi-structured focused interviews. Due to the relatively small sample, it may be impossible to deduce generalized assumptions about the industry. Second, the study employs moderated regression analysis yet the dependent variables are defined on an ordinal scale. Lastly, no relationship between green initiatives and the performance of the firms is established.

A study of by Hampus and Henrik (2014) on the perceptions of managers in South Africa's Road transportation industry, sampled seven companies using a qualitative approach and collected data through semi-structured interviews. The findings indicated that although green logistics in South Africa is a new phenomenon, it is gaining momentum as the government as well as companies' efforts for a green future increase. Transportation companies because of the high carbon emission rates are looking towards an environmentally friendly and sustainable solution, green logistics. They continue to argue that although organizations are increasingly becoming attentive to green logistics initiatives, numerous impediments still affect logistics costs. The major weaknesses of the study can be pointed out. First, the selected companies were chosen on a convenient sampling method which has a limitation. This method is subject to bias and influences which may be beyond the researcher's control (Saunders, Lewis & Thornhill, 2009). Instead, a random sample would have been more appropriate. Secondly, a semi-structured interview method was used and thus there may have been a slight variation in the researcher's questions for each interview. The interview pool size only represents a small portion of the transportation industry; therefore, the results may not serve as an indicator for the entire industry.

Sari and Yanginlar (2015) researched the impact of green logistics practices on firm performance in the Turkish healthcare industry. The study had the objective of investigating the relationship between green logistics practices and firm performance. Data was collected through a questionnaire-based survey from 40 hospitals in Turkey and analyzed using regression and explanatory factor analysis methods. Empirical data analysis indicated that reverse logistics and green purchasing and manufacturing are the two practices that positively support firm performance in the three performance indicators of operational, economic and environmental measures. The other practice of green distribution and marketing only supports positively the economic performance of hospitals. It was also observed that performance improvements through green logistics practices are greater for private hospitals

compared to public hospitals and university hospitals. Certain limitations of the study are observed. First, there are only three practices of green logistics practices are considered, while performance is considered in only three facets and social performance was left out. Secondly, it has used convenience sampling instead of random sampling. Thirdly, the pressures to adopt green logistics practices are not addressed.

Mogeni and Kiarie (2016) did a study on 10 multinational organizations in Kenya on the effect of green logistics practices on supply chain performance. Using purposive random sampling and regression as a method of analysis, they found out that there is a significant influence of green logistics practices on supply chain performance in multinational firms, through the implementation of green purchasing, eco-design, green packaging and reverse logistics. It is observed that for effective supply chain performance, green logistics practices should be in place, or progressively adopted as a framework of best practices in the industry. This study is of value because it looks at green logistics practices and performance in the Kenyan context. However, a few weaknesses can be observed. First, the sample size of 10 is too small. Secondly, the study used purposive random sampling instead of random sampling. Thirdly, the data is based only on multinational firms in Kenya. Fourthly, the driver or the motivating factors towards green logistics practice have not been considered. Lastly, the firm performance variable is based on factors considered rather general and the study focuses on perceptual organization performance measures.

Odock (2016) examined the relationship between GSCM practices implementation and performance of 67 ISO 14001 certified firms in East Africa using a cross-sectional research design. Data were analyzed using PLS-SEM and found that there exists a significant positive link between GSCM practices and organizational performance. The researcher noted that the addition of operational and environmental performance constructs amplified the variance explained in organizational performance from 14.2% to 59%. The results indicated that the moderating variables used of firm size, firm age and spatial scope of the market served by the firm have no moderating effect on the positive relationship between GSCM practices and organizational performance. This study is an eye-opener in the area of GSCM in the East Africa region. However, some weaknesses of the study can be noted. Firstly, the study only considered early adopters of GSCM practices and concentrated on a small sample of ISO 14001 certified manufacturing firms in East Africa, other firms with well-established non-accredited environmental programs should have been included in the sample. Secondly, firm performance was assessed using perceptual data and was limited to operational, environmental and economic dimensions.

The studies under green logistics practices are few and the ones available have focused on developed countries, with a small number concentrating on Africa and specifically Kenya. However, though previous research has made major literature contributions, a lot remains to be learnt about ecological management issues in logistics (McKinnon, 2010; Venus, 2011). The few studies done have a limited focus and narrow perspective. Further, most of these studies have taken a positivist stand, yet studies involving green

logistic practices and performance are largely in the social sciences. Table 3.3 summarizes these studies by outlining the scholars(s), the focus of the study, methodology, major findings, and the knowledge gap(s).

Research Gaps

Conceptual Gap

An empirical review of the literature shows that several studies have centred on the area of sustainability in the supply chain (Seuring & Muller, 2008). Very little has been done to appreciate the function and significance of logistics in a firm's pursuit of sustainability and eventual organizational performance. While a lot of research is addressing the environmental sustainability issue in the whole of the supply chain, studies specifically focusing on environmental sustainability in freight transportation and logistics are less and comparatively more recent. A lot of contributions on this subject can be found in the existing literature, occasionally under the tag "Green Supply Chain Management" (GSCM) (Zhu et al., 2008). Though previous research has contributed a lot to literature, a lot remains to be learnt about environmental issues management in logistics (McKinnon, 2010; Venus, 2011). Estimates from United Nations Framework Convention on Climate Change (UNFCCC) indicate that the transportation of goods and people contributes to about a quarter of emissions in Green House Gas (GHG) which is energy-related globally. It is expected that by 2030, GHG emissions will increase by about 50 per cent and in 2050 they will have increased by more than 80 per cent from 2009 (UNFCCC, 2014). As such, there is a need for action, especially by the players in the logistics sector. A study on green logistic practices would be valuable.

Motivating businesses to adopt green supply practices like green logistics practices starts by exploring the improvements these practices can bring about, not only on the economic side but also on other dimensions including the operational, social and environmental dimensions of the organization. Most of the studies reviewed have not exhaustively looked at the four dimensions of firm performance and have a limited focus on green logistics practices (Zailani et al., 2011; Hampus & Henrik 2014; Sari & Yanginlar, 2015). Hence, a study with a wider focus on green logistics practices and performance is called for. Further, most of the studies on green logistics practices and performance have left out the control variables like the motivators or the institutional pressures towards green logistics practices (Hampus & Henrik, 2014; Sari & Yanginlar, 2015) except for Isaksson (2012) who looked at the drivers and barriers to green logistics practices but left out the relationship to firms' performance. A firm's characteristics as a moderating variable have been left out in most of the studies, except for Sari and Yanginlar (2015) who included ownership as a moderating variable. This is an area which requires investigation (Zhu & Sarkis, 2007).

Methodological Gap

The majority of the studies that have looked at the connection between green logistics practices and firm performance have relied on the respondent's perception to measure performance, and at the same time used the same respondent to provide information on both green logistics practices and firm

performance (Sari & Yanginlar, 2015). Future research should focus on actual and more objective data on firm performance (Odock, 2016). The tool of analysis is the other reason why objective data should be used. Most of the studies reviewed have used regression analysis as a method of data analysis with the dependent variable defined on an ordinal scale. Saunders, Lewis & Thornhill (2009) indicated that when using regression analysis as a method of analysis, the dependent variable should be captured as either ratio or interval scale if statistically powerful results are to be obtained.

The bulk of green logistics studies have used a sample that can be considered small, they also used convenient sampling and therefore cannot be generalized (Sari & Yanginlar, 2015) The weakness of this type of sampling is that; it is subject to influences and bias beyond the control of the researchers (Saunders, Lewis & Thornhill, 2009). A study that uses structural equation modelling or other statistical tools to overcome the weakness of regression analysis and also uses random sampling would be valuable.

Contextual Gap

In the literature, researchers' attention has started to shift and they are now being attracted to environmental practices in service sectors (Seuring & Muller, 2008). However, the majority of empirical studies related to environmentally sustainable improvements have largely been directed at manufacturing organizations (Min & Kim, 2012). A review of literature by Lin and Ho (2008) indicated that in the last decade few studies have centred on ecological concerns in the logistics industry. Additionally, in green supply chain research, the logistics industry has received very little attention (Seuring & Muller, 2008).

Although previous research has made major contributions to literature, a lot remains to be understood about the management of ecological concerns in logistics (McKinnon, 2010; Venus, 2011). Furthermore, studies approaching environmental sustainability issues from third-party logistics (3PLs) perspective are few (Seuring & Muller, 2008). Again, most of the studies on green logistics practices have been done in more developed countries with very few being done in Kenya. A developing country like Kenya faces great challenges in ensuring a balance between development and environmental sustainability. Many Kenyan firms are yet to fully grasp the impact of environmental emphasis, especially in the export market. Rao (2002) observed that, in comparison to developed countries, developing countries' firms are still in the learning process of how to integrate green practices into their day-to-day operations. A study in a developing country looking at green logistics practices in place and their relationship to firm performance would be of interest.

Conclusion

The idea of having green logistics is not easy to actualize; greenness and logistics have basic inconsistencies (Rodrique, Slack & Comtois 2011). Logistics operators follow cost-saving strategies that are habitually at variance with the environment because the environmental cost is usually externalized. In addition, logistical actions do not typically pay the total cost of infrastructure usage. Consequently, logistics operators use the least energy efficient, most polluting and most infrastructure intensive transportation modes to increase distribution speed (Geroliminis & Daganzo, 2005). Empirical evidence indicates that a lot of research has

concentrated on greening the whole supply chain and its relationship to firm performance. However, little has been done to specifically look at greening the logistics part of the supply chain which is critical because of its emission levels which are way above any other part of the supply chain.

Very few studies have been done to establish the link between green logistics practice and the performance of the organization, and the few which have been done have not linked the two. Therefore, today's organizations have not gotten a clear picture of the benefits which accrue due to the greening effort in their logistics activities and how this affects their environmental, economic, operational and social performance. This could be due to the limitations of these studies as established in the review. This paper aimed at reviewing both the empirical and the theoretical literature to identify gaps in this area and establish the direction of this relationship. A conceptual framework was developed which considers firm characteristics as a moderating variable to the aforementioned relationship. Geroliminis and Daganzo, (2005) indicated that global logistics are unevenly harming the environment because logistics firms are compelled to maintain high ecological standards in developed countries but can lower them in less developed. A study looking at the implementation level of green logistics in a developing country would be valuable given that most of the studies are in more developed countries.

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