Firm Resource Orientation and the Implementation of Supply Chain Sustainability Practices in the Logistics Industry

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Abstract: ***The design, orientation and configuration of key firm resources, capabilities and processes is increasingly viewed as critical to a balanced achievement of economic, social and environmental goals of supply chains. While the economic dimension of sustainability has been well researched and expounded in literature and practice, comparatively little research exist on the intricacies of balancing the three dimensions of sustainability, especially the influence of firm resource orientation and design on the implementation of supply chain sustainability practices in the logistics industry. The authors aim to develop a model that advances a relationship between the design and configuration of firm physical resources, human resources, technological resources and relational resources and implementation of supply chain sustainability practices. A regression equation model using a sample of 290 logistics firms based in Kenya has been used to test the hypothesised relationship. The theoretical underpinning this study was supported with the results showing that firm resource design influenced the implementation of supply chain sustainability practices, albeit to different proportions. The study provides insights for supply chain and operations managers in the logistics supply chains to leverage the research design and configuration for improved implementation of supply chain sustainability practices. The authors believe that the efforts to determine the association between firm resource orientation and the tripods of sustainability has not been made in Kenya. The paper makes advanced contribution to this literature and practice in Kenya by embedding an established construct of firm resource design into the supply chain literature.***

Keywords: firm resource orientation, sustainability, physical resource orientation, human resource orientation, technological resource orientation, relational resource orientation

1. Introduction

Thelast three decades after the Bruntland Report (WCED, 1987) has seen supply chain sustainability dominate debates and interest among practitioners and the academic community (Perotti, Zorzini, Cagno & Michel, 2012). This is reflected by the increased number of academic publications and professional interest on SSCM (Hassini, Surti, & Searcy 2012; Seuring & Müller 2008). The United Nations Sustainable development goals demands internal consistency and balance of environmental, economic and social goals of business enterprises. This implies simultaneous incorporation of economic growth, environmental protection and social accountabilityas the ultimate goals in the corporate sustainability management(Bansal, 2005; Zeng, Yin & Lin, 2013). In order to enhance the implementation of sustainability, logistics service providers have constantly redesigned, reconfigured and reoriented their physical , human, technological and relational resources, competences and capabilities to help manage economic success, environmental footprint and worker safety and health for social dimensions of sustainability.

The Kenya Vision 2030 has placed key emphasis on transportation and logistics as key component for realization of achievement of industrialization (RoK, 2012). Kenya has seen unprecedented growth in logistics infrastructures including the seaports, airports, roads and information technology systems (KNBS, 2015). This has resulted in massive growth of logistics services. However, sustainability remains a question to grapple with as sustainability issues remain of great concern (RoK, 2015; UNEP, 2015; Dos Santos, 2011). The impacts of global warming and climate change remains worrying (RoK, 2015; Dos Santos, 2011; IPCC, 2007), opportunity for educational empowerment among vulnerable cadre of workers remains low at 40%, HIV/AIDS infection among drivers is high at 49% (LVCT, 2014), long term family separations and unwarranted dismissals (KNHRC), Cargo Theft is at 10% (TAK, 2015), incidences of corruption to facilitate in logistics operations remains high (TI, 2014). Additionally, loss of transport time due to traffic jams very high (TAK, 2015), the logistics cost is prohibitive, leading to loss of competitiveness.

With these in mind, this study empirically explores the influence of logistics resource orientation on the implementation of sustainability among logistics service providers in Kenya. The findings of this study has both theoretical and practical value to both practitioners and academia. In theory though, there are numerous studies on business sustainability, existing empirical literature has focused on single aspects of the triple bottom-line at the expense of the others. Again, existing studies have not adequately expounded on the impact of supply chain resource orientation on the implementation corporate decisions to pursue sustainability goals. This study provides a more holistic perspective by exhaustively analyzing how business decisions on the tripods of sustainability management vary based on the orientation of logistics resources and capabilities.

Moreover, the existing studies has majorly focused on developed countries. The practical applicability of knowledge and insights from these countries may be impossible in developing countries, such as Kenya. Therefore this study endeavours to provide insight on the influence of logistics resource orientation on the implementation of sustainability in Kenya, a major economy in the continent of Africa.

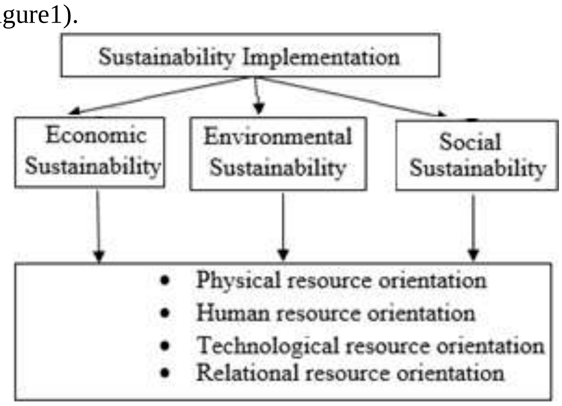
This study also provides practical value. Over the years, Kenya has faced daunting challenges related to global warming and climate change, product quality, occupational health and safety, loss of markets to neighbouring countries and business failures(NEMA, 2015; TI, 2015, Ndegwa, 2015). With the evidence that proper resource orientation, design and configuration is key to improving business sustainability, knowledge of business decisions on logistics resource orientation would be of considerable help in promoting sustainability implementation in Kenya.

2. Literature Review

This study discusses both business decisions on logistics resource orientation and the related theory. The first section deals with and builds on literature on logistics orientation and configuration. The second section deal with related theory, which in this case is the natural resource based view of the firm, an extension of the resource based view of the firm.

2.1 Logistics Resource Orientation

According to Maack (2012), the logistics service providers' sustainability effort is related to compliance, internal efficiency and competitiveness. Today, sustainability to a great extent seems to be only of implicit interest for competitiveness and more to concern future competitiveness. A large part of meeting sustainability demands today involves logistics service providers proving to their stakeholders that they have social and environmental effort, more or less regardless of what it actually includes. As such Sustainability has been increasingly addressed in the supply chain management literature and practice in different ways (Peters, Hoffsteter& Hoffmann, 2011; Maack, 2012). This paper takes the direction of analysis by Maack (2012) by examining how orientation of various firm resources may foster sustainability. The resources examined includes the physical resources, human resources, information technology and relational orientation (captured in figure1).



Source: Adapted from Maack, 2012

Figure 1: Relationship between sustainability Managemnet and Implementation with Different Resource Orientation

Physical Resources

Physical resources are tangible things such as buildings, plant, equipment, land and natural resources, raw materials, semi-finished goods, waste products and by-products, and for example unsold stocks of finished goods (Maack, 2012). Some resources are quickly and completely used up in the process of production. Some are durable and continue to yield substantially the same services for a considerable period of time thus possessing longer life cycle in line with life cycle theory (Piquer *et al.*, 2013). Physical resources are required to process and deliver products to customers; access to these resources is connected to the ability to maintain control of logistics activities and improve the reliability and the speed of delivery (Typical logistics physical resources mentioned in literature are for example logistics hubs, material handling and packaging equipment, office buildings, warehouse capacity and transport vehicles and the general office consumables (Prado- Prado *et al.*, 2014).

In an effort to achieve sustainability throughout the supply chain, logistics service providers must design, built and dedicate its physical resources to be economic, social and eco-friendly in orientation. The processes of acquisition of physical resources and usage preserve the environment. Buildings, offices, equipment, machinery and tools should be safe to use and promote safety and occupational health of the users (Ndegwa, 2015). The principle of ergonomic should be fulfilled for social sustainability (Mani *et al.*, 2015; Mysen, 2012). Further the materials should be capable of re-use, recyclability and disassembled. The equipment, vehicles, machines and buildings should be eco-designed to consume minimal energy and material and produce no Green House Gases. Vehicle and processes and procedures of transportation are safe, efficient and capable of reducing transportation and material handling equipment have been designed to use rechargeable batteries (Perotti *et al.*, 2014; Pazirandeh *et al.*, 2013; Maack, 2012).

Projects towards energy efficient lighting systems (i.e. installing skylights and clerestory windows in distribution facilities that allow companies to use natural light as a source of interior illumination), the use of less-polluting energy sources, and environmental programmes towards consumption reduction are some examples of relatively widespread initiatives (Marchet *et al.*, 2014). Scott (2013) observes that LED lights have replaced more energy consuming solutions, solar panels are introduced to support electricity consumption, and a biomass boilers are installed to reduce gas needs. Design systems should encourage rain water harvesting and water systems (e.g. plants and landscaping materials that minimize water waste, use of “gray water” systems) (Rizzo, 2006; Lieb & Lieb, 2010). Innovative processes related to engineering and new technology reduce energy use and external water supplies from external sources .Low flush toilets and time regulated taps are installed. Water use, heat, and humidity in the buildings, are fully automated monitored and regulated.

In industrial processes packaging activities have relevant effects on economic, social and environment sustainability (Garcia-Arca, Garrido & Prado-Prado, 2017). The authors assert that packaging resources facilitate social sustainability by providing transport, honest, understandable and truthful

information, adopting usage and product doses to the needs of different customers and guaranteeing safe usage. Initiatives towards environmental sustainability in this sense essentially lie in packaging reduction and packaging waste, encouraging returnability and use of recycled, waste recovery and ecological material (Gonzalez-Benito & Gonzalez-Benito, 2006), treatment of packaging waste in a more environmentally benign manner (Faruk *et al.*, 2001), and packaging design for reduced environmental impact (Ciliberti *et al.*, 2008). Optimizing freight loads has also been observed. Indeed, reducing weight and volume of packaging results in cargo efficiency and waste reduction (Sarkis *et al.*, 2004; Jumadi&Zailani, 2011). Finally, some authors and organizations take into account packaging and transportation issues within a more holistic approach. For instance, it is the case of Weever*et al.* (2007) and Kuehne+ Nagel (2014) who developed an approach based on product-level benchmark data analysis to obtain environmental strategic-level information. These are environmental benchmark (Weever *et al*, 2007), global facility carbon calculator (GFCC), global transport carbon calculator (GTCC) and global strategy carbon calculator (GSCC) (Kuehne+ Nagel, 2014).
Hence we make the following hypothesis

H_1: physical resource orientation is positively related to implementing sustainability supply chain practices

Information Technology
In literature concerning information technology (IT) and its role in creating superior firm performance through sustainability (Scott, 2013; Piquer *et al.*, 2013 & Bharadwaj 2000) identifies resources in IT infrastructure, human IT skills, IT-enabled intangibles and IT as an organizational capability created by synergies of IT resources and other organizational resources and capabilities (collaboration, innovation and creativity). Sourirajan *et al.* (2009) has identified an array of IT tools and resources in use in SC as web based technology and systems, e-commerce, RFID, GIS, IT-based carbon and transport calculators, e-procurement, fleet management systems and expert systems among others.

Further, (Piquer *et al.*, 2013; Bharadwaj, 2000) finds the relationship between superior IT capabilities and superior sustainability practices and a relationship between SCM sustainability achievement and superior firm performance to be positive and significant. Piquer *et al.* (2013) further links IT practices and efficiency and sustainability in supply chain management through the following; increased use of sustainable route and network planning; energy sources; load factor increases, packaging efficiency, loading efficiency; improved management, routing and positioning of resources; increased flexibility, multimodality and holistic approach to transportation reduction, dematerialization of supply chains, and IT supported carbon emission calculation (Piquer *et al.*, 2013; Sourirajan *et al.*, 2009).)

Information technology has been seen to influence forward flow of products, mainly focusing on the influence of IT on transportation reduction and the calculation of its environmental impacts (Tjoa & Thoni, 2015). IT planning tools that allows the calculation of carbon emissions (Sourirajan *et al.*, 2009). Software tools have been suggested that take an even broader range of environmental and social effects of transportation into consideration (Guenther & Farkavcová 2010). In an effort to improve precision, Iacob *et al.* (2013) propose a reference architecture for a transportation carbon calculation and management system based on true fuel consumption.

Another aspect seen in the investigated literature is that IT can improve sustainability at a vehicle-routing level. (Hasle, 1999) presented a tool to improve vehicle-routing, load planning and fuel efficiency that explicitly considers the environmental impact (Schaltegger & Burritt, 2014; Tjoa & Thoni, 2015). In a different approach, IT based intelligent platform can be used to improve on the last-mile delivery problem and to determine how the current standard system of door-to door delivery can be improved using a IT based social network (Suh, Smith, & Linhoff (2012). Similarly, focus on routing can be seen in intelligent transportation systems that enable truck drivers to bypass potential bottlenecks (Marett, Otondo & Taylor 2013). Research in the EU-funded project 'Super Green' specifically discusses IT technologies that enable environmental sustainability in freight transport corridors in Europe (Clausen, Geiger, & Behmer 2012; Fozza & Recagno 2012).

Researchers have linked IT tools to different supply chain sustainability initiatives. Besides, planning systems often make use of geographical information systems (GIS) that could help improve sustainability of production activities and of transportation links in. (Rao 2007); or for warehouse locations (Bosona *et al.* 2013). Ayoub *et al.* (2006) suggested the use of GIS as the primary tool for mapping locations along the value chain, which allows expert users to consider environmental and social factors when optimising the overall network.

Vannieuwenhuyse, Gelders, and Pintelon (2003) developed an interactive online tool to choose modes in a transportation network. Iakovou (2001) proposed a decision support system for risks in crude oil maritime transport operations. Chen, Tai, and Hung (2012) promote an expert system that allows optimum component selection in 'green' supply chain settings, especially given hazardous material regulations. The system by Koh *et al.* (2013) allows collaborative identification of carbon emission hot spots, as well as options for intervention (e.g. estimated impact).

E-commerce typically enables SCM activities before a physical product is sent along the supply chain (Davies, Mason, & Lalwani 2007). In the B2B context, e-commerce can have three sustainability effects in supply chains (Abukhader and Jönson 2004): it can (1) enable smoother operations, thus reducing, for example, energy and material consumption; (2) reduce the use of energy-consuming hardware equipment; and (3) bring about change in consumption behaviour.

IT systems forms important tools to improve sustainability decisions in the operational execution of supply chains and for monitoring activities. In Europe, information exchange is regarded as one of the major drivers for more sustainable European transport systems, which is based on IT-supported single-transport documents and (intermodal) route planning with tracking and tracing (Zografos, Sedlacek, & Bozuwa 2012). Carlson, Forsberg, and Pålsson. (2001) propose the exchange of environmentally relevant data between supply chain partners and combine this with an integrative data perspective. Meacham *et al.* (2013) even underline that real-time exchange of data in a supply chain is a prerequisite for an environmental management system. In Kenya information exchange has been driven using the G2B and the G2C components of e-commerce promoted by Kenya revenue authority through the KRAs SIMBA system (ROK, 2012). Cashless payment systems supported by e-commerce is considered to be panacea to corruption problem in the Kenyan logistics system (TI, 2015)

Thoni and Tjoa (2015) in their study, information technology for sustainable supply chain, through literature survey sought to deliver an updated perspective of how IT can be used to improve sustainability in supply chains. In this study, technological applications include, timing and positioning satellite-based services; as well all kinds of software support systems. They identified some of the strong points associated to the use IT as the traceability of the journey and the automatic exchange of cargo-related data for both regulatory and commercial purposes, thus, enhancing dematerialization, unnecessary meetings, automatic re-routing, and transport reduction. The authors also identified strong linkage between IT and components of sustainability such as reverse flow and product stewardship. Hence we make the following hypothesis:

H_2: technological orientation is positively related to implementing sustainability supply chain practices.

Human Resources Orientation

Past literature has increasingly portrayed HRM as having a more inward looking orientation by focusing on the traditional role of efficient development and use of people to achieve short term organizational objectives (EY, 2014)However, a more sustainable approach to HRM would involve creation of managers who can handle both present and future economic, environmental and social concerns of the organization; view employees as partners, just like those in the extended supply chain; place greater emphasis on the long term impact of HRM in the organization and develop a more integrative and holistic approach to people management. Sustainable HRM is the utilization of HR tools to help embed a sustainability strategy in the organization and the creation of an HRM system that contributes to the sustainable performance of the firm (Cohen, Tailor & Muller-Camen, 2012). Sustainable HRM creates the skills, motivation, values and trust to achieve a triple bottom line and at the same time ensures the long-term health and sustainability of both the organization's internal and external stakeholders, with policies that reflect equity, development and well-being and help support eco-friendly practices.

Barney & Clark (2007) and Cohen *et al.* (2012) examined the role of human resources in a firm's competitive advantage. The authors observe that unique human resource skills and knowledge other than being sources of sustainable competitive advantage can be leveraged to create sustainability-linked performance targets, compensation and benefits, training and education as well as value based recruitment. Human resources is defined as all of the knowledge experience, cultures, orientation, skill and commitment of a firm's employees, their relationships with each other and with those outside the firm. Regarding a firm's HR practices, they define these as all of the programs, policies, procedures and activities that firms use to manage their human resources (Barney & Clark, 2007).

Sustainable HRM falls into four main focus areas of HR practice (EY, 2014; Cohen *et al.*, 2012): employee attraction and selection; employee training, development and compensation; creation of sustainable organizational climate; management support and communication. Attracting applicants who value sustainability can enhance recruitment and retention (SHRM, 2011; Erdogan, Bauer & Taylor, 2012). SHRM (2011) further reveals that, when prospective employees have a stronger fit with the eco-values of the organization, they are more attracted to apply, and many employers believe they are more likely to stay with the firm. In fact, in recent years, MBA students have shown a growing reluctance to work for an organization not seen as a good citizen with regard to the ecological environment or social issues (Cohen *et al.*, 2012; Maack, 2012; Thompson, 2012).

Organizations can strive to develop understanding and commitment to organizations sustainability values and goals among their employees through training and development (Wagner, 2011). Awareness and skills required for behavioural changes concerning environmental stewardship, life cycle analysis, efficient use of resources and social concerns can be provided through targeted training. Weinstein (2008) observes that at Mohawk Industries, for example, employees are tested to make sure they learn the waste-reduction techniques that have been taught. Ongoing development is also key for uptake of sustainability knowledge. At Pricewaterhouse Coopers (PwC), for instance, teams of high-potential managers are sent to developing countries for several months at a time. The managers work with a local partner on a sustainability issues in order to build deeper understanding of global sustainable development challenges and the role of business in solving them (Pless, Maak & Stahl, 2011). For effectiveness (Brio, Fernandez, & Junquera, (2007) suggests that training and development should be supported by monitoring and assessment as well as reward systems that incorporate the organization's sustainability goals as seen at Westpac, an Australian bank group.

It is crucial that employers creating an organizational climate that encourages employees at all levels to pursue the firms sustainability strategy (Savitz & Weber, 2006). Employees farther down the hierarchical ladder may not be insync with sustainability visions of the organization (SHRM, 2011). On many occasions, an organization may need to change an entrenched culture that is not in line with sustainability beliefs. Examples include the extractive industries, which are traditionally male dominated and where gender diversity may run counterculture, and the financial services sector, where privacy concerns and risk aversion have traditionally been incompatible with open stakeholder dialog and transparent reporting.

Organizations must therefore understand the social and the environmental consequences of their business models. Employers also need to address the way in which various organizational subgroups, with their own unique norms and values, interpret corporate sustainability goals, motivations and values of the firm (Linnenluecke & Griffith, 2010). As an example, employees in some parts of an organization might see corporate sustainability efforts as trying to reduce resource consumption for purely economic reasons rather than for the preservation of the environment and the long term wellbeing of communities producing those resources. Employees' interpretations can influence their decision-making, leading them to make different choices when selecting vendors.

Creating roles that focus on sustainability and incorporating sustainability responsibilities into job descriptions are important ways of developing an organizational climate conducive to sustainability (Junquera, & Del Brio, 2008). This process helps legitimize sustainability, and in fact a lack of sustainability roles can actually impede implementation (Castka, Balzorova, Bamber, & Sharp, 2004). Finally, HR-derived programs can shift the organizational climate toward valuing sustainability. Examples include providing subsidies for using public transportation or biking to work or offering paid time off for volunteering in non-profit organizations. For example, Nike removed the individual waste bins that employees had at their desks in order to encourage recycling and raise consciousness about what is thrown away.
Hence we make the following hypothesis:

H_3: Human resource orientation is positively related to implementing sustainability supply chain practices

Supply chain relationship

Strategic management's relational view regards the management of inter and intra-organizational relationships as being an important competence or capability that can be leveraged by supply chain partners for improved sustainability performance (Xu, Huo & Sun, 2014). Relational orientation between firms may be seen in the perspective of collaborative integration between customers and suppliers, supply alliances and socialization capital (Xu et al., 2014; Peters, Hofstetter & Hoffmann, 2011). Socialization may provide mechanisms through which firms learn and appreciate sustainability values, abilities, behaviours and important knowledge for assuming leadership in implementation of sustainability.

Applying the arguments of Cousins et al. (2008) to sustainability, socialization mechanisms provide the impetus for supply chain partners to learn and share each other's sustainability plans and objectives, cultures, social norms and shared understanding. Socialization for sustainability has been observed to result into close interaction that is important for creation of trust, interdependent exchanges of knowledge and innovations as well as respect. These are key ingredients that facilitate a variety of improved sustainability performance outcomes.

Though it requires long term orientation, collaborative advantages and supply alliances are resources and capabilities that creates greater benefits to supply chains (Cousins et al., 2008; Dyer, 2000). Viewed from the lenses of RBV and social network theory (Granovetter, 1985), collaborative partnerships can create array of improved sustainability performance measures, including profits, high performance knowledge sharing networks for environmental and social management systems. These benefits are long term and sustainable in nature. Therefore we make the following hypothesis:

H_4: Firm relational orientation is positively related to implementing sustainability supply chain practices

Resource Based View of the Firm

Resource based view of the firm was proposed by Wernerfelt (1984) and subsequently improved on by (Barney, 1991). It provided a basis for understanding how a firms' bundle of valuable tangible or intangible resources can be applied to achieve competitive advantage. Competitive advantage enables a firm to create more economic value than the use of similar resources by marginal competitors (Barney, 1991). Barney and Clark (1995), created the VRIO framework, which can be used in the analysis of a firm's resources as a source of competitive advantage. The framework comprises of four dimensions that a firm's resources must possess; valuable, rarity, inimitability and organizational character (Barney & Clerk, 2007).

Firm resources are considered by Barney and Clark, (2007) and Maack, (2012) as all assets, capabilities, organizational processes, firm attributes, information and knowledge that a firm owns and enables it conceive and implement strategies that improves its efficiency and effectiveness. On the other hand, organizational capabilities are a complex bundle of skills, and collective learning executed through organizational processes that ensure more excellent coordination of functional activities (Maack 2012; Day, 1994). The natural resource-based view of organizations, highlights the sustainability risks and opportunities, and shows how environmentally and socially sustainable economic activities builds competitiveness for organizations (Sarkis *et al.*, 2014; Hart, 1995). Long term sustainable competitive advantage can also be achieved by firms through environmentally and socially friendly production lines (Connelly *et al.*, 2011). RBT, in general, has been advanced to tackle issues of whether supply chain resources are only based on upstream and internal resource developments has come under increased scrutiny (Priem & Swink, 2012).

Recent studies posit that resources should considered also from the downstream side of supply chains, and how these resources play a role in building competitive advantage. Priem and Swink (2012), Barney (2012), Lecocq *et al.*, 2013 and Hunt and Davis (2002) indicate that a systems perspective of resources can benefit the RBV application at the firm and supply chain levels for engendering sustainability practices as the firm can identify all its resource base both strategic, common and junk resources to fulfill its sustainability mandate. RBV, thus, provides a good point of evaluating sustainability resources in supply chain management. Recent studies by (Rao & Holt, 2005; Gold *et al.*, 2010; Pagell *et al.*, 2010 & Lecocq *et al.*, 2013), have made efforts to realize the relationship between RBT and sustainable supply chain management. These knowledge, processes, and capabilities that enable a supply chain to become environmentally and socially sustainable can be viewed as organizational resources from the perspective of RBV (Sarkis *et al.*, 2014; Sarkis *et al.*, 2011).

This theory supports the variable, logistics resource orientation as it considers the ability of firms resource and strategy architecture or orientation and design in enhancing the organization's competence, risk handling efficiency, income, image, trustworthiness, reputation and environmental resilience, all which are significant resources in the supply chain, and further improve the marketability of products and services as well as competitiveness of supply chains (Ammenberg, 2004; Shang *et al.*, 2010; Sarkis *et al.*, 2011, Maack, 2012). This is critical, as supply chains are a collection of interrelated organizations competing against other supply chains, as opposed to stand-alone organizations (CSCMP, 2014; Ketchen & Hult, 2007). In addition, the culture and the orientation of the supply chain and its key stakeholder being socially and environmentally sustainable could also be a source of sustained competitive advantage. From this argument, development of a truly sustainable supply chain can be seen as a valuable resource which could provide a competitive advantage (Hunt & Davis, 2002).

Hart (1995), presented a theory of competitive advantage that inserted concerns of the natural biophysical environment into the resource-based-view of the firm and developed the natural-resource-based view, NRBV, of the firm (Hart, 1995). Hart argues that one of the most important drivers of new resource and capability development for firms will be the constraints and challenges posed by the natural biophysical environment. Hart (1995) speaks of a paradigm shift, referring to the fact that many of the past economic and organizational practices are not environmentally sustainable. NRBV includes three different environmental strategies: pollution prevention, product stewardship and sustainable development (Maack, 2012).

The theory further provides clearer linkage by connecting the strategic capabilities of pollution prevention to the environmental driving force of minimizing emissions, effluents and waste, to the key resource of continuous improvement and to the competitive advantage of lower costs. Likewise, he connects the strategic capabilities of product stewardship to minimizing life-cycle cost of products, to the key resource of stakeholder integration and the competitive advantage of pre-empting competitors. Finally, he connects strategic capabilities of sustainable development to the key resource of minimizing the environmental burden of firms' growth and development to the competitive advantage of shared vision and future position.

3. Methodology

This paper included the respondents from both 3rd and 4th party logistics service providers located in the cities of Nairobi and Mombasa in Kenya. The population consisted of 1098 3rd and 4th party logistics service providers' registered by KRA. The sampling companies which have adopted sustainable practices were included in the research. An approximate sample size was derived using the formula $n = \frac{z^2 .N.\sigma_p^2}{(N-1)e^{2+z^2\sigma_p^2}}$ (Kothari, 2004). Where N is the population size,n is the sample size, e is the acceptable error (the precision level), σ_p is the standard deviation of the population and z is the standard variate at the given confidence level. Using a percentage of fuel intensity reduction of 25% for Kuehne+ Nagel in the past case, and precision level of 0.7 of the true fuel intensity reduction with 95% confidence level the sample size for this study was:

$$= \frac{1.96^2.(1098).5^2}{(1098-1).0.7^2 + 1.96^2 .5^2}$$

The formula yielded a total 167 firms at 95 percent level of certainty which translated to 15 percent of the total population. From each firm, two individuals, the supply chain managers and human resource manager were selected, giving a total sample size of 334. The sample size was sufficient since it surpassed the 10% of large population (n> 1000) of the target population (Gay, 2005).

Questionnaires were administered through self-administered interviewer drop and pick method to chief operating officer and the supply chain manager of the 167 firms. It targeted only the 3rd and 4th party logistics service providers in both commercial and humanitarian logistics. The valid administered questionnaires were 334, from which 319 responses were received. The received questionnaires were examined and cleaned by removal of questionnaires that were not completely filled and those that could not help in the analysis. This resulted in eventual response rate of 290 respondents.

Researcher used a five-point, Likert-type scale ranging from not at all (1) to very large extent (5) to measure all constructs. Sustainability management variables were adapted from Sarkis et al (2011). These assessed the degree of processes, practice and decision-making activities that help to implement the sustainability management. Factor analysis has a high potential to inflate the component loadings. It was employed to test the validity of data in the questionnaire. The items used to measure each constructthatwasextractedtobeoneonlyprincipalcomponent.TableIprovides factor loadings that are shown to be greater than the 0.40 cut-off and, thus, are statistically significant (Nunnally and Bernstein, 1994). The scales of all measures appear to produce internally consistent results. Thus, these measures are deemed appropriate for further analysis because they express an accepted validity and reliability in this study. The reliability of the measurements was evaluated by Cronbach's α coefficient. In the scales reliability, Cronbach's α coefficients are greater than 0.70 (Nunnally,1967). Table I provides Cronbach's α coefficient of constructs with values ranging from 0.71 to 0.77 the lowest coefficient for relational orientation and the highest coefficient for physical resource orientation. Thus, internal consistency of the measures used in this study can be considered good for all constructs.

Table 1: Reliability Test Statistics

Construct	*Cronbach's Alpha*	*No. of Items*
Physical resource orientation	0.773	7
Human resource orientation	0.774	7
Technological resource orientation	0.729	6
Relational resource orientation	0.709	4

4. Results and Discussion

The data was tested for multicollinearity using the variance inflation factor (VIF), with non-orthogonality among independent variables inflates standard error. Table II, shows that the variance inflation factor ranges between 2.26 to 2.43 which was below the recommended cut-off value of 10 (Halcoussis, 2005). The independent variables were thus not correlated among themselves. This showed that there was no substantial problem of multicollinearity encountered in the study.

Table 2: Test for Multicollinearity

Item	VIF
Constant	
AvPHY	2.42
ComHR	2.43
ComTEC	2.34
ComREL	2.26

Table 3: shows the correlation matrix for all variables.

		ComImple	Av Phy	Com HR	Com Tec	Com REL
ComImple	Pearson's correlation	1.000	.162**	.199**	.289**	.292**
	Sig (2-tailed)		.002	.000	.000	.000
	N	288	290	290	290	290
AvPhy	Pearson's correlation	.162**	1.000	.717**	.642**	.581**
	Sig (2-tailed)	.002	.000	.000	.000	.000
	N	288	290	290	290	290
ComHR	Pearson's correlation	.199**	.717**	1.000	.601**	.638**
	Sig (2-tailed)	.000	.000	.000	.000	.000
	N	288	290	290	290	290
ComTec	Pearson's correlation	.289**	.642**	.601**	1.000	.696**
	Sig (2-tailed)	.000	.000	.000	.000	.000
	N	288	290	290	290	290
ComREL	Pearson's correlation	.292**	.581**	.638**	.696**	1.000
	Sig (2-tailed)	.000	.000	.000	.000	.000
	N	288	290	290	290	290

Correlation is significant at the 0.01 level (2-tailed). **

Table III shows that there is positive correlation between the independent variables. It reveals that the design and configuration of physical resources is influencedby the design and configuration of human resources (0.717), technological resources (0.642) and relational orientation (0.581). Moreover, relational orientation in the form of collaborative relationships and supplier alliances had positive influence on human resource orientation (0.638) and technological orientation (0.696) towards sustainability implementation. Therefore the study shows that appropriate human resource, IT and relational orientation determines the designing and configuration of physical resources in line with human resource sustainability mission and the objectives of collaborative and supply alliances. In sustainability strategy, human resource in form of top management support determines the policies for sustainability design and use of physical resources (Bhardwaj, 2016). In addition, for collaborative and supplier alliances aimed at creating greater supply chain integration for sustainability performance requires compatibility and marching of physical resource design and orientation not just within the focal firm but among supply chain partners (Xu, Huo & Sun, 2014). Information technology through technical resources influences the sustainability design, functionalities and performance of logistics physical resources such as buildings, material handling equipment and transportation equipment (Ooko, 2017).

The hypothesised relationship for the variables were tested by regression analysis. Because all the relationships were established using correlation analysis, all the variables were accepted for undertaking regression analysis. Simple regression model was developed and tested for the four independent variables.

Table IV indicates a relationship between orientation of various logistics resources and implementation of supply chain sustainability initiatives in which R^2 = 0.104 implying that 10.4% of implementation of supply chain sustainability was explained by appropriate orientation physical, human, technological and relational resources. This suggests that appropriate orientation of key resources, capabilities and competences in the focal firm's supply chaintowards sustainability is key in the implementation supply chain sustainability in the logistics industry in Kenya. The findings support empirical studies by Parotiet *al.* (2014); Mack (2012) and Pique *et al.* (2013) which concluded that orienting key organizational resources appropriately leads to operational cost reduction and customer growth, enable social well-being of employees and conserve the natural environment

Table V gives ANOVA summary for logistics resource orientation and implementation of supply chain sustainability among logistics service providers in Kenya. The F-Statistics value=9.095 and p<0.05 meaning that the model of implementation of supply chain sustainability initiatives with logistics resource orientation was significant. This in0.085X_1dicates that there was a significant relationship between logistics resource orientation and implementation of supply chain sustainability among logistics service providers in Kenya.

From the beta coefficient summary Table VI the t-values range between 0.275 and 12.283 and with p-values being less than 0.05 hence it was concluded that the model was statistically significant. The model was defined as $Y = 2.531 + 0.085X_1 + 0.017X_2 + 0.157X_3 + 0.141X_4 + \varepsilon$ indicating that every unit change in physical resources orientation lead to 0.085 or 8.5% increase of implementation of SCS initiatives, whereas a unit change in human resource orientation leads to 0.017 or 1.7 percentage improvement in sustainability implementation. Again, design for sustainability and supply chain integration and collaborative relationships will improve sustainability implementation by 15.7% and 14.1% respectively.

The results the regression of logistics resource orientation on implementation of supply chain sustainability initiatives depicts a clear positive relationship. In addition to the results of this study confirming assertions of Maack, (2012) and Piquer et al. (2013) that, firms seek environmental sustainability orientation of their physical, informational, human, relational and organizational resources and dynamic capabilities in order to achieve stakeholder compliance, efficiency and competitiveness, not only at present but also in future. These findings are also in agreement with the views of other scholars such as Huge-Brodin and Isaksson (2013) (2007); Peters, Hofstetter and Hoffsmann (2011), who found a positive significant relationship between quality and commitment of human resources, orientation of buildings and offices towards energy conservation, application of technology tools and technology innovation in vehicles and sustainability adoption.The findings are also consistent with empirical studies by Baumann and Tillman (2011) that found evidence that logistics service providers can use IT and ICT related resources to manage material usage, energy consumption and waste management in logistics system by load factor, Technical vehicle features, routing and packaging.

Hypothesis testing was done using the regression analysis. The results shows that in physical resource orientation, t value of the test was 1.211 with p= 0.000 while for human resource orientation, the t value of the test was 0.275 and p= 0.004. For technological orientation, t value was 2.517 and p=0.002 while for relational orientation, t value was 2.406 and p=0.001. All the p values were less than 0.05, hence all the hypotheses were held.This corroborates the view that the orientation and configuration of logistics resources coupled with shared fundamental inter and intra-firm sustainability culture will positively influence implementation of sustainability practices. The design and the redesign for sustainability must be strategic in nature and calls for the support of the top management within supply chain organizations (Marshall. McCarthy, McGrath & Claudy, 2015). Also supported is the view that focal firm's resource design for sustainability is reflected in its planning and innovative approach to aligning the same objectives across a cross its supply chain for major and strategic material sources.

Table 4: Model Summary of Regression Analysis

Model	R	R Square	Adjusted R Square	Standardised error of estimate
1	.323[a]	.104	.093	.372

a. Predictors: (Constant), ComRE, AvaPHY, ComTec, ComHR
b. Dependent variable: ComImple

Table 5: ANOVA of regression analysis for the independent variables and the dependent variables.

Model		Sum of Squares	Df	Mean Squares	F	Sig.
1	Regression	5.026	4	1.256	9.095	.000[b]
	Residual	43.101	283	.138		
	Total	48.127	287			

a. Dependent variable: ComImple
b. Predictors: (Constant), ComRE, AvaPHY, ComTec, ComHR

Table 6: Coefficient of regression analysis.

Model		Unstandardized Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.531	.206		12.283	.000
	AvaPHY	.085	.071	.101	1.211	.000
	ComHR	.017	.062	.023	.275	.004
	ComTec	.157	.062	.206	2.517	002
	ComRe	.141	.059	.194	2.406	.001

a. Dependent variable: ComImple

5. Conclusion

Firm resource configuration, design and orientation is touted as the panacea for implementing sustainability practices in supply chains (Maack, 2012; peters et al., 2011). In putting efforts to design and configure resources for re-use, to use less energy and water and to improve welfare of the community and the workers inside companies and across supply chains, logistics companies can reduce regulatory and environmental compliance costs, scale competition, reduce costs of absenteeism, health-care costs, training costs and replacement costs (Pfeffer, 2010, Pullman et al., 2009). Business organizations want to relate positively with all stakeholders in the sustainability front, but there is still limited research in this area. Furthermore there is still lack coherence between academic findings and practical implementation (Ehrgott et al., 2011; Hutchins and Sutherland, 2008). This study has contributed to the debate by providing evidence of how various firm resources and capabilities features and these leads to implementation of sustainability practices in the logistics industry.

6. Implications for theory

This research has made interesting findings with clear and important implications for supply chain sustainability theory and the interaction with other related theories (Pagell & Wu, 2009). First, the study has found support for the proposition that the design and configuration of key supply chain resources, capabilities and processes is imperative for the adoption of sustainability supply chain practices. This means that similar to the findings for environmental sustainability supply chain practices (Maack, 2012) implementation of sustainability supply chain practices are impacted by the design and configuration of the key resources, processes and capabilities. Second, the natural resource based view suggest that the interaction between the firm resources must be inherently innovative (Barney, 1991). The alignment of the physical resources, human resources technical resources and the relational resources at firm level should be highly integrated for optimal implication on sustainability implementation.

Future directions for research are that the research could be replicated in a number of industries within the east African region with different sustainability variables including firm size in order to determine their impacts. In addition, firm resource orientation and the various dimensions of could bested as distinct variables rather than a whole construct. This may give more insight into the changing aspects and the effects of sustainability and firm resource orientation.

References

[1] Ammenberg, J. (2004). Do Standardized Environmental Management Systems Lead to Reduced Environmental Impacts? Linköping Studies in Science and Technology, Dissertation, No. 851. Linköping University, Linköping, Sweden.

[2] Ayoub, N., T. Kefeng Wang, K. H. Seki, and Y. Naka. (2006). A Planning Support System for Biomass-Based Power Generation. *In Computer Aided Chemical Engineering*, Vol. 21, edited by W. Marquardt and C. Pantelides, 1899– 1904. Amsterdam: Elsevier.

[3] Bansal, P. (2005). Evolving sustainably: a longitudinal study of corporate sustainable development. *Strategic Management Journal*, Vol. 26 No. 3, pp. 197-218.

[4] Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, Vol. 17, Issue 1, p. 99-120.

[5] Barney, J. (1995). Looking inside for competitive advantage. *The Academy of Management Executives.* Vol 9 (4), pp 49-61

[6] Barney, J.B. (2012). Purchasing, supply chain management and sustained competitive advantage: the relevance of resource-based theory. *Journal of Supply Chain Management*, Vol. 48 No. 2, pp. 3-6.

[7] Barney, J.B., & Clark, D.N. (2007). *Resource-Based Theory. Creating and Sustaining Competitive Advantage.* Oxford University Press, Oxford.

[8] Bharadwaj, A.S. (2000). A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS Quarterly*, Vol. 24, Issue 1, pp. 169-196.

[9] Bhardwaj, B. R. (2016). Role of green policy on sustainable supply chain management benchmarking. *An International Journal*, Vol 23 Iss 2 pp 456-468

[10] Bosona, T., Nordmark, I., Gebresenbet, G., and Ljungberg, D., (2013). GIS-Based Analysis of Integrated Food Distribution Network in Local Food Supply Chain. *International Journal of Business and Management*, Vol 8 (17) pp13–34.

[11] Brundtland, G.H., Khalid, M., Agnelli, S., Al-Athol, S.A., &Chidzero, B. (1987). Report of the world commission on environment and development: our common future. UN General Assembly, available at: www.un-documents.net/our-common-future.pdf (accessed 8 April 2016)

[12] Castka, P., &Balzarova, M. (2008). Social responsibility standardization: guidance or reinforcement through certification*? Human Systems Management*, Vol. 27 No. 3, pp. 231-242.

[13] Chen, M.-K., Tai, T.W., and Hung, T.Y. (2012). Component Selection System for Green Supply Chain. *Expert Systems with Applications*, Vol 39 (5), pp 5687–5701.

[14] Clausen, U., Geiger, C., and Behmer, C. (2012). Green Corridors by Means of ICT Applications. *Procedia - Social and Behavioral Sciences*, Vol 48: 1877–1886.

[15] Cohen, E., Taylor, S., & Muller- Camen, M. (2012). *HRM's role in corporate social and environmental sustainability.* SHRM foundation.

[16] Colicchia, C., Marchet, G., Melacini, M., &Perotti, S. (2014). Building environmental sustainability: empirical evidence from Logistics Service Providers. *Journal of Cleaner Production*, Vol. 59 No. 1, pp. 197-209.

[17] Connelly, B., Ketchen, D., Jr., & Slater, S. (2011). Toward a 'theoretical toolbox' for sustainability research in marketing. *Journal of the Academy of Marketing Science*, Vol. 39 No. 1, pp. 86-100.

[18] Cousins, P. D., Benn L., Squire, B. (2008). Performance measurement in strategic buyer supplier relationships: The mediating role of socialization mechanisms. *International Journal of Operations & Production Management*, Vol. 28 Issue: 3, pp.238-258.

[19] CSCMP, (2014). *Council of Supply Chain Management Professionals, CSCMP's Glossary*. Available: http://cscmp.org/digital/glossary/glossary.asp, Accessed on the 28 of September 2015.

[20] Davies, I., Mason, R., and Lalwani, C. (2007). Assessing the Impact of ICT on UK General Haulage Companies. *International Journal of Production Economics*, Vol, 106 (1) pp 12 27.

[21] Day, G. (1994). The capabilities of market-driven organizations, *Journal of Marketing*, Vol. 58, Issue 4, pp. 37-52.

[22] De Giovanni, P. (2012). Do internal and external environmental management contribute to the triple bottom line? *International Journal of Operations & Production Management*, Vol. 32 No. 3, pp. 265-290.

[23] Dos Santos, M. A.O. (2011). Minimizing the business impact on the natural environment. *European Business Review*, Vol. 23 (4 pp). 384 - 391

[24] Dyer, J.H. (2000). *Collaborative Advantage: Winning through Extended Enterprise Supplier Networks*. Oxford University Press, Oxford.

[25] Earnest & Young (2013). *Role of HR in driving sustainable business practices*. NHRD networks.

[26] Ehrgott, M., Reimann, F., Kaufmann, L. and Carter, C.R. (2011). Social sustainability in selecting emerging economy suppliers. Journal of Business Ethics, Vol. 98 No. 1, pp. 99-119.

[27] Erdogan, B., Bauer, T., & Taylor, S. (2012). Creating and maintaining environmentally sustainable organizations.

[28] Fozza, S., and Recagno, V. (2012). Sustainable Technologies and Innovation for Green Corridors: Survey and Application. *Transport Research Arena*, Vol 48 (0), pp 1753 1763.

[29] Freeman, R.E. (1984), Strategic Management: A Stakeholder Approach, Pitman, Boston, MA.

[30] García-Arca, J.; Prado-Prado, J.C.; González-PortelaGarrido, A.T. (2014). Packaging logistics:

Promoting sustainable efficiency in supply chains. *International Journal of Physical Distribution & Logistics Management*, Vol 44, 325–346.

[31] García-Arca, J.; Prado-Prado, J.C.; González-PortelaGarrido, A.T. (2017). *Sustainability Packaging Logistics.* Research Gate.

[32] Gold, S., Seuring, S., &Beske, P (2010). Sustainable Supply Chain Management and Inter- Organizational Resources: A Literature Review. *Corporate Social Responsibility and Environmental Management.* Vol. 17, pp. 230–245

[33] Gonzales-Benito, J., & Gonzales-Benito, O. (2006). The role of stakeholder pressure and managerial values in the implementation of environmental logistics practices. *International Journal of Production Research*, Vol. 44 No. 7, pp. 1353-1373.

[34] Granovetter, M.S. (1985). Economic action and social structure: the problem of embeddedness. *American Journal of Sociology*, Vol. 9 No. 3, pp. 481-510.

[35] Guenther, E., &Farkavcová V. G. (2010). Decision Making for Transportation Systems as a Support for Sustainable Stewardship: Freight Transport Process Evaluation using the ETIENNE-Tool. *Management Research Review* 33 (4): 317–339.

[36] Halcoussis, D. (2005). *Understanding Econometrics*. Thomson South Western.USA

[37] Hart, S.L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, Vol. 20 No. 4, pp. 986-1014.

[38] Hasle, G. (1999). Transportation Management in Distributed Enterprises. *Human Systems Management* 18 (3–4): 203–212.

[39] Hsu, C.W., & Hu, A.H. (2009). Applying hazardous substance management to supplier selection using analytic network process. *Journal of Cleaner Production*, Vol. 17 No. 2, pp. 255-264.

[40] Hunt, S.D., & Davis, D.F. (2002). Grounding supply chain management in resource-advantage Theory. *Journal of Supply Chain Management*, Vol. 44 No. 1, pp. 10-21.

[41] Hutchins, M.J. and Sutherland, J.W. (2008). An exploration of measures of social sustainability and their application to supply chain decisions. *Journal of Cleaner Production*, Vol. 6 No. 15, pp. 1688-1698.

[42] Iacob, M. E., Van Sinderen, M. J., Steenwijk, M., and Verkroost, P. (2013). Towards a Reference Architecture for Fuel-Based Carbon Management Systems in the Logistics Industry. *Information Systems Frontiers*,Vol 15 (5) pp 725–745.

[43] Iakovou, E. T. (2001). An Interactive Multi-objective Model for the Strategic Maritime Transportation of Petroleum Products: Risk Analysis and Routing. *Safety Science*, Vol 39 (1–2), pp 19–29.

[44] IPCC. (2008). *IPCC technical paper VI*. IPCC Secretariat, Geneva.

[45] Isaksson, K., & Huge-Brodin, M. (2013). Driving forces and barriers when pricing the environmental service offering, a cross case study of logistics companies, in Whiteing, T. (ed.)

[46] Kenya National Bureau of Statistics (2015). *The National Economic Survey, 2015*. GOP

[47] Kenya National Human rights Commission. (2015). *The state of human welfare in the logistics industry, Kenya.*

[48] Ketchen, D.J., &Hult, G.T.M. (2007). Bridging organization theory and supply chain management: the case of best value supply chains. *Journal of Operations Management*, Vol. 25 No. 2, pp. 573-580.

[49] Koh, S. C. L., Genovese, A., Adolf, A., Acquaye, P.B., Rana, N., Kuylenstierna, J., and Gibbs, D. (2013). Decarbonising Product Supply Chains: Design and Development of an Integrated Evidence-Based Decision Support System - the Supply Chain Environmental Analysis Tool (Scenat). *International Journal of Production Research*, Vol 51 pp 7.

[50] Kohn, C., &Brodin, M. H. (2008). Centralised distribution systems and the environment: How increased transport work can decrease the environmental impact of logistics. *International Journal of Logistics*, Vol. 11 No. 3, pp. 229-245.

[51] Kothari, C.R. (2004). *Research Methodology: Methods and Techniques.* New Delhi,

[52] Kuehne+Nagel (2015). *Incorporating the Environment into Logistics Operations: One company's approach*. Kuehne+Nagel Management AG.

[53] Lieb, K. J., &Lieb, R. C. (2010). Environmental sustainability in the third-party logistics (3PL) industry. *International Journal of Physical Distribution and Logistics Management*, Vol. 40 No. 7, pp. 524-533.

[54] Linnenluecke, M.K. and Griffiths, A. (2010). Corporate sustainability and organizational culture. *Journal of World Business*, Vol. 45 No. 4, pp. 357-366

[55] LVCT (2014). *The state of HIV/AIDS infection among truck drivers and workers in Kenyan long distant trucking*. Annual reports

[56] Maack, C. (2012). Logistics Service Providers' Environmental Management. Department of Management and Engineering, Linköping University. Doctoral thesis

[57] Mani, V., Agrawal, R., and Sharma, V. (2014). Supplier Selection Using Social Sustainability: AHP Based Approach in India. *International Strategic Management Review*Vol 2 (2), pp 98 112.

[58] Marett, K., Otondo, R.F., & Stephen T. G. (2013). Assessing the Effects of Benefits and Institutional Influences on the Continued Use of Environmentally Munificent Bypass Systems in Long-Haul Trucking. *MIS Quarterly* 37 (4): 1301–1312.

[59] Marshall, D., McCarthy, L., McGrath, P., &Claudy, M. (2015). Going above and beyond: how sustainability culture and entrepreneurial orientation drive social sustainability supply chain practice adoption. *Supply Chain Management: An International Journal*, Vol. 20 Iss 4 pp. 434 - 454

[60] Meacham, J., Toms, L. K., Green, W. and Bhadauria, V. S. (2013). Impact of Information Sharing and Green Information Systems. *Management Research Review*Vol 36 (5) pp 478–494.

[61] Ndegwa, P.W. (2015. Perceptual Measures of Determinants of Implementation of Occupational Safety and Health Programmes in the Manufacturing Sector in Kenya Unpublished PhD thesis. Jomo Kenyatta University of Agriculture and Technology

[62] Nunnally, J.C. & Bernstein, l.H. (1994). *Psychometric Theory*. McGraw-Hill, New York, NY.
[63] Nunnally, J.C. (1967). *Psychometric Theory*. McGraw-Hill, New York, NY.
[64] Ooko, V.O. (2014). The impact of sustainability on firm performance in Kenyan logistics companies. IJBR. 3 (3). Pp 210-223
[65] Otieno, M.N. (2013). Implementation framework for sustainability practices in Kenya . NEMA.
[66] Pagell, M., Wu, Z., & Wasserman, M.E. (2010). Thinking differently about purchasing portfolios: an assessment of sustainable sourcing. *Journal of Supply Chain Management* 46(1): 57–73.
[67] Pazirandeh, A., &Jafari, H. (2013). Making Sense of Green Logistics. *International Journal of Productivity and Performance Management*, Vol. 62, No. 8, 889-904.
[68] Perotti, S., Zorzini, M., Cagno, E., &Mucheli, G.J.L. (2012). Green supply chain practices and company performance: the case of 3PL's in Italy. *International Journal of Physical Distribution & Logistics Management*, Vol. 42 No. 3, pp. 640-672.
[69] Peters, J.N., Hofstetter, J.S., & Hoffmann, V. H. (2011). Institutional entrepreneurship capabilities for interorganizational sustainable supply chain strategies. *The International Journal of Logistics Management*, Vol. 22 Iss 1 pp. 52 - 86
[70] Piquer, S. G., &Teraphongphom, N. (2013). Innovative Logistics Practices for Sustainable Transportation: Drivers and Barriers. Department of Technology Management and Economics Division of Logistics and Transportation. Chalmers University of Technology. Master's Thesis.
[71] Priem, R.L., &Swink, M. (2012). A demand-side perspective on supply chain management. *Journal of Supply Chain Management*, Vol. 48 No. 2, pp. 7-13.
[72] Pullman, M.E., Maloni, M.J., & Carter, C.R. (2009). Food for thought: social versus environmental sustainability practices and performance outcomes. *Journal of Supply Chain Management*, Vol. 45 No. 4, pp. 38-54.
[73] Qi, G., Zeng, S., Yin, H., & Lin, H. (2013). ISO and OHSAS supply chain process/product certification. *Management Decision*, Vol. 51 Iss10 pp. 1983 – 2005
[74] Rao, P., & Holt D. (2005). Do green supply chains lead to economic performance? *International Journal of Operations and Production Management*, 25(9), pp. 898-916.
[75] Razali, N.M., &Wah Y.B. (2011). *Power comparisons of Shapiro-Wilk, Kolmogorov-Sminorv, Lolliefors and Anderson-Darling tests*.Journal of statistical modeling & analytics. Vol. 2 (1) pp. 21-33
[76] Rizzo, J. (2006). Logistics distribution &warehousing: green building: a new priority", area developments, available at: www.areadevelopment.com/specialPub/aug06/greenbuilding. shtml (accessed 15 November 2016).
[77] RoK (2012). *Kenya Vision 2030. A globally competitive and prosperous Kenya. GoK press. Nairobi Kenya*
[78] RoK (2015). *The State of Business Sustainability in Kenya. GoK press. Nairobi Kenya*
[79] Russo, A., &Perrini, F. (2010). Investigating stakeholder theory and social capital: CSR in large firms and SMEs. *Journal of Business Ethics*, Vol. 91 No. 2, pp. 207-221.
[80] Russo, M.V. (2002). Institutional change and organizational strategy: ISO14001 and emissions in the electronics industry. *Academy of Management Proceedings*.
[81] Sarkis, J., Zhu, Q., & Lai, K.-H. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, Vol. 130 No. 1, pp. 1-15.
[82] Savitz, A.W., & Weber, K. (2006). The Triple Bottom Line: How today's best-run companies are achieving economic, social, and environmental success- and how you can too. 1st Edition, Jossey-Bass, San Francisco.
[83] Schaltegger, S., & Burritt, R. (2014). Measuring and managing sustainability performance of supply chains. *Supply Chain Management: An International Journal*, Vol. 19 Iss 3 pp. 232 - 241
[84] Shang, K.C., Lu, C.S. and Li, S. (2010). A taxonomy of green supply chain management capability among electronics-related manufacturing firms in Taiwan. *Journal of Environmental Management*, Vol. 91 No. 5, pp. 1218-1226.
[85] So, S., Parker, D., &Xu, H. (2014). *A conceptual framework for adopting sustainability in the supply chain.* The University of Queensland Business Schools. Lucia Campus, Brisbane
[86] Society for Human Resource Management. (2011). *advancing sustainability: HR's role: A research report by SHRM, BSR and Aurosoorya.* Alexandria, VA: SHRM;
[87] Sourirajan, K., Centonze, P., Helander, M. E., Katircioglu, K., Ben-Hamida, M., and Boucher, C. (2009). Carbon Management in Assembly Manufacturing Logistics. IBM Journal of Research and Development. Vol 53 (3) pp 433–448.
[88] Suh, K., Smith, T., & M. Linhoff. (2012). Leveraging Socially Networked Mobile ICT Platforms for the Last-Mile Delivery Problem. *Environmental Science & Technology* 46 (17): 9481–9490.
[89] Tabachnick, B.G. and Fidell, L.S. (2007). *Using Multivariate Statistics*, 5th ed., Allyn and Bacon, New York, NY.
[90] TAK. (2015). *Status report on implementation of sustainability by members.*
[91] Thompson, J., (2012). PM introduces carbon price legislation. available at: www.abc.net.au/news/ 2011-09-13/pm-introduces-carbon-tax-legislation/2897250 (accessed 21 August 2016).
[92] Thoni, A., &Tjoa, A. M. (2015): Information technology for sustainable supply chain management: *a literature survey, Enterprise Information Systems.*
[93] TI. (2014). *Corruption perception index*. TI
[94] Transparency International (2014). *The status of corruption in Kenya: multi-sectoral analysis*
[95] UNEP (2015). *UNEP annual report, 2015*
[96] UNEP (2015). *UNEP annual report, 2015*
[97] Uwe, F. (2007). *Designing Qualitative Research;* London: Sage publications.
[98] Vannieuwenhuyse, B., Gelders, L., and Pintelon, L. (2003). An Online Decision Support System for

Transportation Mode Choice. *Logistics Information Management*Vol 16 (2), pp 125–133.
[99] Wang, Y., &Lalwani, C.S. (2007). Using e-business to enable customised logistics sustainability. *The International Journal of Logistics Management*, Vol. 18 Iss 3 pp. 402 – 419
[100] Warnier, V., Weppe, X., &Lecocq, X. (2013). Extending resource-based theory: considering strategic, ordinary and junk resources. *Management Decision*, Vol. 51 Iss 7 pp. 1359 – 1379.
[101] Weinstein, M., Henn, M., Foard, N. (2009).*A Critical Introduction to Social Research*, California: SAGE Publications.
[102] Wernerfelt, B.(1984). A Resource-Based View of the Firm. *Strategic Management Journal*, 5 (2), 171-180.
[103] World Commission on the Environment and Development (WCED). (1987)*Our Common Future*, United Nations Environment Programme, Nairobi.
[104] Zailani S., Amran A., &Jumadi H. (2011). Green innovation adoption among logistics service providers in Malaysia: an exploratory study on the managers' perceptions. *International Business Management*, 5(3), pp. 104-113.
[105] Zhu, Q., &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, pp. 265-289.
[106] Zografos, K. G., Sedlacek, N., and Bozuwa, J. (2012). A Comparative Assessment of Freight Transport and Logistics Policies in Europe. *Procedia - Social and Behavioral Sciences* Vol 48, pp 2523–2532.