

## A CONCEPT PAPER OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES IN KENYA

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**ABSTRACT** *Green supply chain has emerged as proactive area in healthcare. The study examines relevant literature review that explains green supply chain practices especially in health in Kenya. The health sector is often a key sector in a developing society. This is due to its contribution to wellbeing among its citizens. The paper shall also propose a conceptual framework based on the literature to explain the relationship between greening practices in the supply chain and organizational performance. Firms involved in the supply chain of medical related supply are currently under pressure to supply environmentally conducive and biodegradable products. Findings from the paper indicate, that a firm's commitment to conserve the environment is driven by suppliers and consumers needs of the same.*

**Key words:** Green supply chain management, green procurement, green packaging, eco design, waste management reverse logistics and practices.

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## 1. Introduction

The term *green* is currently used to represent a holistic view of environmental, social and economic impact on a firm's activities (Rahimifard and Clegg, 2007). Green supply chain management (GSCM) is an emerging field propelled by the need to be environmentally conscious (Srivastava, 2007). Scholars and practitioners have recently developed interest in the science behind GSCM. The practitioners are using GSCM knowledge to reduce waste and preserving the quality of product life and the natural resources around the firm's premises (Guise and Srivastava, 2007).

Karliener and Gautier (2009) observe that globally, public health related risks and ecological challenges have emerged and become destructive than individual aspects. Ecological factors for example, climate change, unsustainable resource use, have fuelled ill health in the globally. They continue to observe that, hospitals consume a lot of energy in a quest to serve a sick population. There are many elements that pose danger unknowingly to the populace. For example intensive use of x-ray machines may produce emissions, improper disposal of lab waste, air pollution during incineration, heat emissions from computer use and other diagnostic tools.

Globally, countries like the USA have adopted a scheme, Environmentally Preferred Purchasing (EPP) that ensures the whole supply chain is green (Emmett and Sudd, 2010). In the African context, sustainable development is crippled by factors like Poverty, Poor Governance, Corruption, and lack of appropriate frameworks (Economic Commission for Africa, 2010).

Nixon (2011) observes that in Kenya in particular, strides have been made previously by the late Professor Wangari Maathai who

championed for environmental justice and won a Peace price for her work in creating awareness of environmental conservation (NEMA, 2012). The Government of Kenya launched the Kenya Vision 2030; that highlights the development goals to be archived by the year 2030. The vision does not mention the use of environmental criteria to be used to observe green supply chain practices in public healthcare.

## 2.0 Green Supply Chain Management in Kenyan Healthcare System

The current organization of health system mirrors the administrative division of the nation. This is following the implementation of the devolved system of governance that was promulgated on the 27<sup>th</sup> August 2010. Health system is thus organized around the 47 counties. Public healthcare facilities in Kenya are categorized into these categories (KEPI 2010):

Level 1- Comprises of community health services these facilities are mainly based within a community.

Level2 - These facilities offer primary healthcare and act as an interface between the community and the rest of the healthcare system. Dispensaries are in this category.

Level3 - These types of facilities offer primary healthcare with additional support. Some of them offer in-patient services.

Level 4 - Facilities are the first-level hospitals whose services complement the primary care level. Together with level 5 facilities, these form the county referral hospitals.

Level 5 - At this level, facilities are able to offer advanced services and expertise both for curative and diagnostic services. Referrals at this level are mainly from level 4 facilities and in emergency cases lower level facilities to this level are from levels 2 & 3. Facilities at this level offer in- and out-patient services and have larger laboratories that offer diagnostic services that otherwise would not be available at the primary care facilities.

Level 6 - These are the ultimate referral points, mainly national teaching referral hospitals. The entire cascade and network of referrals in the Kenyan health system is to this level where very specialized skills, expertise and services are offered and linkages with local and international universities, facilities, and staff are forged and maintained. (Kenya health sector referral implementation guidelines 2010)

Green Supply Chain Management practices in Kenyan healthcare system are fairly new. Some of the recent studies done in the area of GSCM may include; Yvonne (2013) who did a study on Green supply chain management practices and performance of pharmaceutical companies in Nairobi, Kenya. The study revealed that challenges to Greening practices are mostly due to ignorance by the stakeholders. The limitation in the study was that it only focussed on one aspect that is the pharmaceutical department. This is fully representative of the whole healthcare industry.

Chege (2012) did a study on Green Supply Chain Management Practices and supply chain performance of private hospitals in Nairobi, Kenya. The researcher found out that procurement managers ought to provide Eco Friendly and specifications to their suppliers in order to have a Green Supply Chain right

from the time the products enter the healthcare supply chain.

During the recent years, the government through NEMA have pushed for greater environmental controls within the healthcare setting. From energy conservation to the proper disposal of medical waste and the safe handling of highly potent pharmaceuticals, healthcare facilities are discovering that the adage “do no harm” is applicable not only to their patients but to the natural environment and communities around them. Healthcare facilities in the country are rising to this challenge by identifying and reducing the negative environmental impact of their operations. In particular, hospitals, clinics, and doctors’ offices are adopting formal environmental management systems and sharing best practices that have been successfully used by other organizations in the healthcare sector (Marege, 2013).

## **2.1 Green Supply Chain Management Practices**

Green or sustainable supply chain management is defined as the strategic, transparent, integration and achievement of an organization’s social, environmental, and economic objectives in the systemic coordination of key inter-organizational business processes for improving the long-term performance of the firm and its supply chain partners. This implies that specific criteria have to be applied by all supply chain partners. At the same time, responsible environmental and social behaviour must be promoted as well for the good of the entire chain (Wu and Dunn, 2012).

It has been observed that GSCM practices like recycling, repacking in environmental friendly packs helps avoid environmental degradation (Basu and Wright, 2008). The implementation of GSCM practices is

expected to result in improved environmental performance measured by reductions in air emissions, solid waste, effluent waste (Zelbst, 2012).

Green supply chain management practices, in healthcare encompass all efforts performed by hospital managers to ensure that their products and services conform to environmentally stipulated requirements, (Gopal 2012). The practices are continuous in nature and begin right from the entry point of an item or equipment into the health care facility. Guidelines on Green procurement are implemented. Throughout the supply chain process, the end products are thoroughly scrutinized and eventually their waste products are managed by effective waste management processes, (Waters 2010).

### **2.1.1 Green Procurement**

Brenner (2010) points out that the focal point of green procurement is to eliminate waste, and purchasing department will focus on value by comprehensive considering the total cost in the process of eliminating waste, that should focus on the business of waste disposal activities. Purchasing activity is the entry point of eliminating waste, so a key factor of the successful green purchasing is the condition of company recycling and reusing waste.

Muller (2011) proposed that reducing the emissions of exhaust and sewage not only is the premise of ensuring the implementation of green procurement system, but also is the important way to promote the development of green procurement.

Singh (2011) pointed out that close cooperation of suppliers and buyers would promote the successful completion of green purchasing activities. In the process of purchasing and procurement, suppliers must consider the ultimate disposition of the

materials and components that enter the firm, purchasing managers can ask upstream members of the supply chain to commit waste reduction and provide environmentally friendly product.

According to Min and Galle (2011) observed that, implementing a green purchasing policy, often does not require any organizational changes by the contracting authority. They further indicated that, in order for the policy to be implemented strategic planning, procurement employee training, access to environmental information and setting priorities are mainly required.

McKone-Sweet, Hamilton and Willis (2012), agree that when procuring for Hospital and medical products, certain parameters need to be enforced. These may include; inspection of presence of latex, PVC and other toxic substances in medical /surgical consumables. For medical hardware, it was observed that life endurance, energy endurance, spare part cost and the total financial and environmental impact be critically assessed. The scholars also noted that, procurement of foods stuff for hospital consumption should have least amount of food preservatives. Foods containing pigments and other aromatic substances should be avoided due to their limited shelf life.

### **2.1.2 Green Packaging**

Products for medical usage are often considered too delicate in nature. Green packaging involves having products being packaged in manner that conforms to well stipulated environmental guidelines. Willis, (2012), observes that a majority of Hospitals and healthcare units in Europe and Asia are using recycled paper instead of chlorine-bleached paper in packaging medical consumables.

Mustaffa, (2009) has categorized the purpose of Green packaging in health care, into the following categories;

**Packaging for distribution-** this is the primary packaging allowing for transportation and storage of the product until usage phase. Products in this category ought to have reusable packs.

**Packaging for transport-**This is secondary packaging for the purposes of transportations and storage. It recommended that there minimal, use of paper bags that at times get overheated and melt and therefore damaging the packaging.

**Packaging for treatment-** This involves the transportation and handling of product, for onsite use. It must meet biocompatibility standards that can be disposed as urban waste for example in saline solution bags. Due to their short shelf life, it is suggested to have only small dosages of each drug with the expiry dates clearly labelled.

**Disposables** –These are single use products for medication for example; Gauzes ,syringes, needles among others .This class of medications, whenever possible ought to have met ISO 13485 certified clean room production and well packaged in easy to tear blister packs.

**Biomedical devices-** These devices are mostly used in dialysis treatment. Their packaging requires a higher level of biocompatibility due to their hazardous nature.

Hamilton (2012) notes that benefits of green packaging in the healthcare industry has numerous benefits that include: cost saving through efficient use of materials, efficient regulatory compliance with government regulations ,it also brings about closer relationships with the supplier and customer and more importantly offers competitive advantage to the healthcare facility .

### **2.1.3 Eco Design**

Eco design involves the systematic consideration of design issues associated with environmental safety and health over the full product life cycle during new production and process development (Rao, 2008).

According to Kriesburg (2009) medications can be designed to be more ecological sensitive, this may include, being biodegraded quickly, more efficient in lower doses, packing in bio gradable packaging is also key. It was recommended that the shelf life could be brought closer to align with real time by refining the expiring dates.

Kriesburg (2009) also observed that, in terms of medications packing, recyclable materials can be used by adding more information on proper method of disposal .The packaging can also include shapes and sizes that would be appropriate for transport and returning for economic benefits.

### **2.1.4 Reverse Logistics**

It is the process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing or creating value or for proper disposal. Product recall requires organization to be able to reverse the normal logistics flow from suppliers to customers so that inventory deemed unsuitable can be located by customers and returned to suppliers in a timely and cost effective manner (Xie and Breen, 2012).

An increasing number of organizations in developed nations in, Europe, America and Australia engage in voluntary or mandatory end-of-life product management. These developments have a great impact on environmental and economic values. (Geyer and Jackson, 2009).

Khisa (2011) observed that regionally, parts of Southern Africa, Kenya, Rwanda, Uganda and Tanzania are catching up in developing policies that aim at improving product reusability once it has gone through the complete supply chain.

### **2.1.5 Waste Management**

Healthcare waste management includes all activities involved in waste generation, segregation, transportation, storage, treatment and final disposal of all types of waste generated in the healthcare facilities, stages of which require special attention. This will ensure that inputs (funds, equipment and facilities), activities and outputs (safe workplaces, healthy environment, healthy workers) for the safe handling and disposal of healthcare waste are in place (Sarkis, 2010).

Hospitals consume considerable amounts of energy, water and other renewable and non-renewable resources. Inevitably this consumption produces a wide variety of waste ranging from the comparatively benign outputs such as glass, cardboard and food wastes to the extremely hazardous persistent organic pollutants, heavy metals, radioactive materials and cyto-toxic drugs (Drake, 2011).

Zhu (2012) and Bohlen (2013) noted that health facilities can cut waste and emissions

through composting, recycling, better purchasing for example minimizing packaging, using reusable rather than disposable products, and buying recycled products, also including the minimizing of waste transport local treatment and disposal.

### **2.2 Literature Review on Green Supply Chain Management Practices**

The following is a review of previous literature on issues related Green Supply Chain Management and that has been summarized .Most researchers have used the manufacturing industries as their sample study in order to investigate the Green Supply Chain Management adoption . Manufacturing is believed to be the main cause to emerging environmental problems due to its traditional business operations.

Therefore the manufacturing sector often is the main ones to implement GSCM management practices. However, the purpose of the table is to highlight the possible environmental pollutants and how the various scholars have discovered implementation strategies employed by various firms to combat the challenge.

**Table 1: Summary of Literature Review on GSCM**

TITLE /AUTHOR	FINDINGS	VARIABLES	COUNTRY	KNOWLEDGE GAPS
The influence of suppliers and Green Innovations on environmental performance and competitive advantage in Taiwan (Chiuou, 2011)	Greening lead to innovations and competitive advantage.	<ul style="list-style-type: none"> <li>Green innovations.</li> </ul>	TAIWAN	The researcher only focussed on suppliers and innovations Taiwan. The experience was only limited to suppliers. The current study focused on overall Green Supply chain Management practices in public hospitals.
The participation of small and medium-sized suppliers in green supply chain initiatives. In Beijing, China (Su-Yol Lee,2008)	Buyer environmental Requirements and support have positive effect to their suppliers' willingness to participate in green Supply chain initiatives.	<ul style="list-style-type: none"> <li>Green supply chain management initiatives.</li> </ul>	CHINA	Findings from research were limited only to a few regions in China. The current, study is more interested in Green Supply chain Management practices in public hospitals
To determine the impact of ISO certification of organizations on environment and business performance in Brussels, Belgium. (Link & Niveh, 2008)	ISO Certification in organizations led to better environmental performance.	<ul style="list-style-type: none"> <li>ISO Certification.</li> <li>Organizational performance.</li> <li>Business performance.</li> </ul>	BELGIUM	The research limited only to entities with ISO certification .The current study researched on Green Supply chain practices in public hospitals.
Greening the automotive supply chain: a relationship perspective. (Simpson et al., 2007 )	Supplier commitment and customer environmental requirements have an impact on a firm's adherence to environmental regulations.	<ul style="list-style-type: none"> <li>Green supply chain practices</li> <li>Environmental requirements</li> </ul>	ITALY	The study only examined the automotive industry. The current was focussed on public healthcare.
Green supply chain practices and operational performance of personal care manufacturing firms	The study revealed that a number of manufacturing firms subscribed to	<ul style="list-style-type: none"> <li>Green supply chain practices.</li> <li>Firm's operational</li> </ul>	KENYA	The study was only limited to manufacturing firms. The current

in Nairobi. ( Amina Babu, 2011)/	environmental auditing bodies like NEMA and KEBS.	performance		study examined Green Supply chain practices in Public hospitals.
Green Supply Chain Management Practices and supply chain performance of private hospitals in Nairobi, Kenya (Chege 2012)	Hospital management should provide Ecofriendly specifications to their suppliers to jointly conserve the environment.	<ul style="list-style-type: none"> <li>• Supply chain performance</li> <li>• Green Supply chain management practices.</li> </ul>	KENYA	The research manly focussed on supply chain private hospitals in Kenya. The current study examined public hospitals.
Green supply chain management practices and performance of pharmaceutical companies in Nairobi, Kenya. (Yvonne, 2013)	Challenges to Greening practices are mostly due to ignorance of stakeholders.	<ul style="list-style-type: none"> <li>• Green supply chain practices.</li> <li>• Supply chain performance</li> </ul>	KENYA	The research was only limited to pharmaceutical firms. The current study encompassed all healthcare departments in a Public hospital.

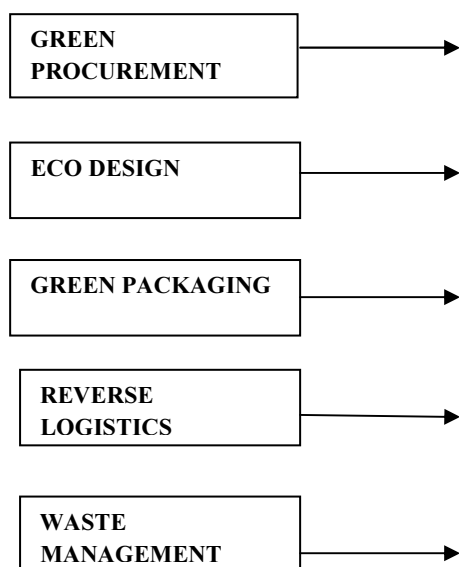
(Researcher 2016)

### Proposed Conceptual Model

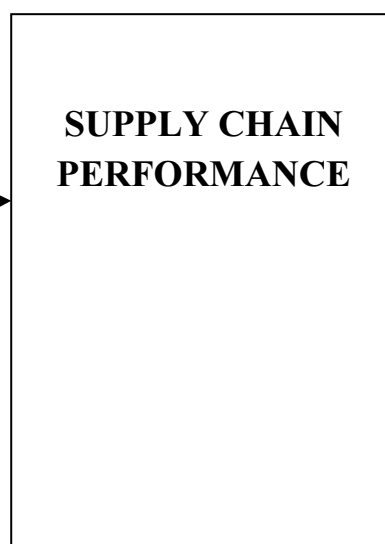
Based on informed literature from various studies, the paper came up with a proposed conceptual model below to illustrate various components of Green Supply chain Management practices and Supply chain

performance. This is a representation of the conceptualized relationship between the variables. Green Supply chain management Practices is the independent variable, while Supply chain performance is the dependent variable.

#### Independent variables



#### Dependent variables



**Figure 1: Conceptual Model - Green Supply Chain Management Practices**

Source: (Researcher 2016)



### 3.0 Implication of the Study

On contribution to theory, it is observable that Healthcare industry in Kenya is an integral part of the Kenyan economy. The objective of the paper is, to have a comb through existing literature and point out interlinking variables in health supply chains. The variables in the study have not received exhaustive interrogation in the field of procurement and supply chain management literature. It is anticipated that the findings of the paper shall contribute to the existing body of knowledge in the currently growing field of Green supply chain management. This has been augmented, by providing a clear reflection of the effects between practices of Green Procurement, Reverse Logistics, Green Packaging, Eco design and Waste on the management in healthcare supply chains. The research in the arena of Green Supply Chain is yet to be fully explored by scholars and replicated in future studies especially in the health care industry in Kenya. Hence the paper, is relevant to support future research in areas that have not been comprehensively been covered by the current research.

On Policy development, the paper seeks to provide knowledge to the industry regulators and government policy makers. To the extent in which laws and policies affecting Green Supply Chain Management in Health Supply chains, can be effectively implemented and religiously adhered to. Findings from the paper are expected to benefit policy makers, identify various opportunities arrived by executing well informed policies on GSCM practices in healthcare. The main aim being, to amend existing polices on environmental conservation target on improving existing GSCM policies. Consumers of healthcare services ideally, prefer services of Healthcare

institutions that have components of Greening in their supply chains. This enhances quality service delivery, fewer mortality rates, saving of costs and ultimately a healthy nation as postulated in Kenya's vision 2030.

On Practice, the paper is of importance in the sense that it will act as a powerful tool for Procurement and supply chain managers involved in Healthcare industry who believe in continuous improvement by adapting to newer Supply chain practices away from the traditional view .The paper shall provide business organizations that supply healthcare products, with useful environmental information on Green Supply Chain practices as applied to health industry. The framework shall also be useful to practising procurement and supply chain managers develop measurement parameters to assess a firm's position in competitive advantage when implementing GSCM practices. Implementing of suggested GSCM practices in firms by managers will elevate a firm's performance on being environmentally conscience and attracting and retaining of more consumers that desire green oriented products, eventually, medical products shall be repackaged to conform to various environmental requirements, translating to prosperity of firms through profits and competitive advantage.

### 4.0 Conclusion

The study culminates in a proposed conceptual framework for Green Supply Chain Management practices in healthcare. The identification and adoption of the practices would contribute to a better understanding and conceptualization of GSCM practices as a whole. The experiences from literature suggest that, integrating GSCM practices in healthcare has numerous benefits both to the firms involved and the service consumers as well. The paper makes a

contribution reinforcing and extending the argument about the importance of incorporating Green based activities in Health supply chains, for enhanced competitive advantage and ecological efficiencies.

## References

- Abuko, A.A. (2011). *The Impact of GSCM on the Performance of Oil Companies in Kenya*. Unpublished MBA Project, University of Nairobi.
- Allen Hu, Chia-Wei Hsu (2010) *Critical factors for implementing green supply chain management practices*. *Management Research Review*, Vol.33, No.6. Pp.586-608.
- Beamon, B. (2009). Measuring Supply Chain Performance. *International Journal of Operations and Production Management*, Vol.19, No 3&4, pp 275-92.
- Bowen, F.E., Cousins, P.D., Lamming, R.C. and Faruk, A.C. (2001). *The Role of Supply Management Capabilities in Green Supply*. *Production and Operations Management*, Vol. 10 No. 2, pp. 174-89.
- Chau, C.K., Chung, K.Y. & Tse, M.S. (2010). *A Choice Experiment to Estimate the Effect of Green Experience on Preferences and Willingness to Pay for Green Building Attributes*. *Building and Environment*, Vol.45, No. 11, pp 2553-61.
- Chege, E. (2012). *Green Supply Chain Management and Supply Chain Performance of Private Hospitals in Kenya*. Unpublished MBA Project, University of Nairobi.
- Chen, Y., Lai, S., and Wen, C. (2006). The Influence of Green Innovation Performance on Corporate Advantage in Taiwan. *Journal of Business Ethics*, 67(4), 331-339.
- Eltayeb, T. K. & Zailani, S.H.M., (2011) "Greening Supply Chain through Supply Chain Initiatives towards Environmental Sustainability.
- Gopal, P.R.C, & Jitesh, T. (2012). A Review of Supply Chain Performance Measurement *International Journal of productivity and Performance Management*, Emerald Article.
- Hervani & Sarkis (2008) "Performance measurement for green supply chain management benchmarking". Pergamon Publishing house 2008.
- Kaipia, R. (2008). Effects of Delivery Speed on Supply Chain Planning. *International Journal of Logistics Research and Applications*, Vol. 11 No. 2, pp.123-135.
- Khalfan, M.M.A., McDermott, P. & Swan, W. (2007). Building Trust in Construction Projects. *Supply Chain Management: An International Journal*, Vol. 12 No.6, pp.385-91.
- Khisa, J.N. (2011). *Green Procurement in Public Sector: A Case of Parastatals in Kenya*. Unpublished MBA Project, University of Nairobi.
- Lin, R-J., Chen, R-H. And Nguyen, T.H. (2011). Green Supply Chain Management Performance in Automobile Manufacturing Industry under Uncertainty. *Procedia-Social and Behavioral Sciences*, Vol. 25, pp. 233-245.
- McCurry, M., Moore, V., Kane, G. and Ledlow, G. (2009). Sisters of Mercy Supply Chain.
- McKone-Sweet, K., Hamilton, P. and Willis, S. (2012). The Ailing Healthcare Supply Chain: A Prescription for Change. *The Journal of Supply Chain Management*, pp. 4-17.
- Michel, P., Philippart, M., Verstraete, C., and Wynen, S. (2008). *Collaborative Sourcing: Strategic Value Creation through Collaborative Supplier Relationship Management*. Louvain-la-Neuve: UCL.
- Min, H. and Galle, W. P. (2011). Green Purchasing Practices of US Firms. *International Journal of Operations and Production Management*, Vol. 21, No. 9, pp 1222-1238.
- Mugenda, O. M., & Mugenda, A. G. (1999). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.
- Mustaffa, N. H. and Potter, A. (2009) 'Healthcare Supply Chain Management in Malaysia: A Case Study', *Supply Chain Management. An International Journal*, Vol. 14 No. 3, pp. 234 – 243.

- Ngechu. M. (2004). *Understanding the Research Process and Methods. An Introduction to Research Methods*. Acts Press: Nairobi.
- Rao, P. (2008). 'Greening the supply chain: a new initiative in South East Asia', *International Journal of Operations and Production Management*, Vol. 22, No. 6, pp 632-655.
- Singh, T. (2013). Modelling the Barriers of Green Supply Chain Practices: An Indian Perspective. *Int. Journal of Logistics Systems and Management*, 7(1), 81-107.
- Stock, J.R (2002). Investigation on the Drivers of Green Purchasing towards Environmental Sustainability in the Malaysian Manufacturing Sector. *International Journal of procurement Management*, 3(3), 316-337.
- Taticchi, P.T. and Cagnazzo, L. (2010). Performance Measurement and Management: A Literature Review and a Research Agenda. *Measuring Business Excellence*, Vol. 14.
- Wanjau, K. N., Muiruri, B. W., & Ayodo, E. (2012). Factors Affecting Provision of Service Quality in the Public Health Sector: A Case of Kenyatta National Hospital. *International Journal of Humanities and Social Science*, 114-125.
- Waters D. (2010). *Introduction to Supply Chain Management*, (2<sup>nd</sup> Edition). Palgrave: Macmillan, UK.
- Zailani, S.H.M., Eltayeb, T.K., Hsu, C.C. and Tan, K.C. (2012). The Impact of External Institutional Drivers and Internal Strategy on Environmental Performance. *International Journal of Operations & Production Management*, Vol. 32 No. 6, pp. 721-745.