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# INSTITUTIONAL PRESSURES FOR IMPLEMENTATION OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES AMONG ISO 14001 CERTIFIED MANUFACTURING FIRMS IN EAST AFRICA

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## ABSTRACT

**Increasing levels of environmental degradation by manufacturing firms has resulted in heterogeneous pressures from various organizational groups on the need for them to conduct environmentally friendly operations. A viable option for these firms has been the implementation of green supply chain practices. The key concern however is what drives organizations to implement these practices. The main objective of this study therefore was to investigate the key institutional pressures that cause firms to implement these practices. To achieve the objective, three hypotheses were formulated. The study employed descriptive cross-sectional research design. Based on the objective, the study established that coercive and normative pressures are significant in causing the firms to implement GSCM practices while mimetic pressures are not significant. Since the study finds that government laws and policies on the environment are critical and main drivers of GSCM practices implementation, it recommends that the government should take steps in making the environmental regulations more stringent. This research adds to knowledge by advancing the evidence of the existence of heterogeneity of pressures for GSCM practices implementation. The findings also extend understanding of the pressures of GSCM in East Africa and also in the context of a developing country where the level of GSCM practice diffusion is still low. Future researchers' are therefore provided with a useful conceptual and methodological reference to pursue further studies in this area especially in the African context.**

**Key Words:** Institutional Pressures, Green Supply Chain Management Practices, ISO Certified Firms in East Africa.

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## BACKGROUND

Firms have found themselves receiving heterogeneous pressures from various organizational groups to conduct environmentally friendly operations. This has been occasioned by environmental problems such as air pollution, changing water quality and quantity, discharge of toxic substances and chemicals, increase in solid waste and climate change (Esty & Winston, 2009; Gutowski, Allwood, Herrmann &Sahni, 2013). Green supply chain management (GSCM) has therefore emerged as a key concept for firms seeking to become environmentally sustainable and globally competitive (Rao & Holt, 2005). Srivastava (2007) defines green supply chain management as the integration of environmental thinking in product design, material sourcing and selection, manufacturing processes, delivery of the final product to the final consumer as well as end-of-life management of the product after its useful life. GSCM practices comprise activities in green procurement, environmentally responsible design, green manufacturing, green packaging, green distribution and reverse logistics. The synergistic interaction of these practices with one another is very important if maximum environmental benefit is to be attained (Kung, Huang & Cheng, 2012).

The Manufacturing sector plays a respectable role in the economies of the five East African countries which include Kenya, Tanzania, Uganda, Rwanda and Burundi. On average, this sector accounts for 9.8% of the region's Gross Domestic Product (World Bank, 2013). It is also responsible for 12.4% of total labour force in formal employment (United Nations Statistics Division, 2013; United Nations Industrial Development Organization, 2014). In addition, manufactured goods account for 12.5% of total exports (Kenya Institute for Public Policy Research and Analysis, 2013; UNSD, 2013). Over the past few years, the manufacturing sector in the five countries in East Africa has grown. This growth has been accompanied by increasing pressure on the environment. United Nations Environmental Programme (2006, 2014) noted that environmental pollution and resource depletion levels in the region is emerging as a problem and has identified manufacturing industries as one of the primary sources of this problem. This has resulted in pressures from various groups on the need for these firms to conduct environmentally friendly operations. Researchers are also showing growing interest in the area. This is revealed in literature by the mounting number of studies that investigate the pressures for GSCM implementation (Golicic & Smith, 2013; Ngniatedema & Li, 2014). Further, consideration of these institutional pressures is essential for a better understanding of the relationship between implementation of GSCM practices and organizational performance (Chien & Shi, 2007).

Institutional pressures are pressures that cause firms to implement certain strategies in order to be considered legitimate by the society (Zhu & Sarkis, 2007). Three sources of institutional pressures as identified by DiMaggio and Powell (1983) include coercive, mimetic and normative pressures. Coercive pressures come from the influence of those in power (Rivera, 2004). The fear of repercussions for non compliance causes firms to engage in

proactive environmental practices. These include environmental regulations enacted which various scholars classify as domestic environmental regulations, government environmental policies and international environmental agreements (Sarkis, 1998; Hall, 2000; Zhu & Sarkis, 2006). Chien and Shi (2007) assert that domestic environmental regulations are a key source of pressure that prompts firms to implement strategies and practices that improve their environmental performance. Hui, Chan and Pun (2001) argue that governments have been forced to come up with policies and regulations on the environment because of the increasing environmental conscience of the public. This is a major force that has swayed firms to start implementing environmentally responsible practices such as GSCM practices. International agreements such as the Climate Change Treaty, the Kyoto Agreement and the Montreal Protocol have also influenced very many firms to start implementing GSCM practices (Chien & Shi, 2007).The net effect is that local firms that serve global markets have been forced to adopt rigorous environmental standards in order for them to stay competitive.

Mimetic pressures occur when a firm imitates the actions of competitors considered successful. These competitors may be local, national, regional or global. Advances in technology have elevated competition to a new level. Firms have found themselves competing with other firms at the global level irrespective of their size. This has intensified competition forcing firms to search for new opportunities such as excellence in environmental management in order to remain competitive (Arimura, Hibiki & Katayama, 2008). Zhu and Sarkis (2007) argue that mimetic pressures are a key driver for firms to adopt GSCM practices.

Normative pressures are exerted by stakeholders who have vested interest in the firm (DiMaggio & Powell, 1983). These stakeholders exert pressures to firms which lead them to implement GSCM practices. Firms that conform to these pressures are perceived to be more legitimate (Darnall, Henriques &Sadosky, 2008; Sarkis, Zhu & Lai, 2011).These stakeholders include customers, social groups, shareholders and suppliers (Chien & Shi, 2007). Sarkis et al. (2011) identify the customer as the core normative pressure to manufacturers to implement GSCM practices. This position is also supported by Doonan, Lanoie and Laplante (2005). The relationship between a firm and its suppliers is also a key determinant of sustained competitive advantage for the firm (Sheth & Sharma, 1997; Cannon & Homburg, 2001). Henriques and Sadorsky (1999) argue that environmentally conscious suppliers may shun firms that are not environmentally conscious in order to protect their own reputation. Other stakeholders who exert pressure on the firm to adopt GSCM practices include emplyees, environmental organizations, community groups, labor unions and trade associations(Darnall et al., 2008). Environmental and community groups draw the public's attention on the negative environmental effects of firms' operations by leading protests and boycotts. Labor unions also put pressure on these firms in order to ensure the safety of their union members from harm that may result from environmental accidents. Similarly, trade associations have begun to take a more active role in managing their members' environmental actions (Darnall et al.,

2008).Another level of institutional pressure may come from its shareholders (Henriques &Sadorsky, 1996). A firm with a good environmental reputation is likely to attract investors.

## LITERATURE REVIEW

The institutional theory argues that enterprises may adopt certain practices in order to gain legitimacy or acceptance within society (Zhu & Sarkis, 2007). GSCM is one such practice. Coercive, mimetic and normative pressures have been identified as possible channels through which isomorphic change can occur (DiMaggio & Powell, 1983).Studies that have looked at the pressures of GSCM implementation by firms in Africa and specifically in East Africa largely remain unknown. This is partly due to the fact that GSCM is a relatively new concept in this region. Previous research on this topic is currently skewed to the developed countries, mostly in Asia, North America and Europe in spite of the fact that there is growing concern for environmentally sustainable supply chain practices throughout the world (Golicic & Smith, 2013).

With many firms increasingly implementing GSCM practices, research on these practices have mostly focused on outcomes, rather than antecedents. Chien and Shih (2007) argue that for a better understanding of the effect of implementing GSCM practices on organizational performance, it is important to understand the pressures that bring about these practices. Very few academic researchers have attempted to empirically investigate the institutional pressures behind implementation of such practices. Zhu and Sarkis (2007) concentrated on the institutional pressures on Chinese manufacturing firms. Their study looked the institutional pressures as a moderating variable. Chien and Shih (2007) focused on coercive and normative pressures on electrical and electronic firms in Taiwan but completely ignored mimetic pressures.

Additionally, these studies do not adequately cover all the facets of the GSCM construct. Zhu and Sarkis (2007) covered internal environmental management, green purchasing, eco-design, cooperation with customers and investment recovery. Chien and Shih (2007) concentrated only on green procurement and green manufacturing. Wu and Dunn (1995) argue that as firms use resources to produce desired goods and services, pollutants are inherently produced as by products during each stage of the supply chain process. Hart (1995) noted that every activity at every step of the supply chain has an effect on the environment. Van Hoek (1999) argues that it is important for firms to focus on the entire supply chain in order to fully comprehend the effect of their operations on the natural environment. Consequently, every element in the supply chain should be considered in minimizing the firm's total environmental impact (Wu & Dunn, 1995; Kung et al., 2012).

It is also possible that institutional pressures for GSCM practices implementation may differ from context to context. Chien and Shih (2007) found out that firms in Taiwan adopt GSCM practices as a result of coercive pressures mainly from government environmental policy and normative pressures mainly from customers and community stakeholders. Aerts, Cormier and

Magnan(2006)cited mimetic pressures as a main driver for firms in developed countries like Germany, Canada and France to implement GSCM practices. Zhu and Sarkis (2007) established that normative and coercive pressures cause adoption of GSCM practices among Chinese manufacturers. Ball and Craig (2010) established that normative pressures are the key institutional driver for firms in developed countries specifically England and Canada. Therefore, this study sought to advance similar research into the East African context and collect more data to determine the institutional pressures for implementation of GSCM practices among manufacturing firms. It proposed that all the three institutional pressures are significant in encouraging a firm to implement GSCM practices. This leads to the following hypotheses:

***$H_1$:*** *Coercive institutional pressures encourage a firm to implement GSCM practices*

***$H_2$:*** *Mimetic institutional pressures encourage a firm to implement GSCM practices*

***$H_3$:*** *Normative institutional pressures encourage a firm to implement GSCM practices.*

The hypotheses presented leads to a suggestion of the conceptual framework in figure 1.

**Conceptual Model**


Figure 1: Conceptual Model

## RESEARCH METHODOLOGY

Cross-sectional survey research design was employed to study all ISO 14001 certified manufacturing firms operating in East Africa. The list was obtained from institutions which offers ISO 14001 certification in East Africa. These organizations include Bureau Veritas, SGS, KEBS, NEMKO, DQS UL Kenya, and Quality Austria. In total 108 manufacturing firms were considered making the study a census study. Primary data was collected using a semi structured questionnaire. The questionnaire was administered to the senior manager responsible for environmental management. Cronbach's Alpha was used to verify the reliability of each construct and items used in the study. All constructs and items used in this research were found to have Cronbach's Alpha of at least 0.7

implying that reliability was established (Nunnally, 1978; Nunnally & Vernstein, 1994).Additionally, item to total correlation for all the indicators in the constructs were determined using SPSS version 21 to examine reliability of the measurement scale.

To ensure content validity, the measurement instrument was developed in two stages. First, it was developed from literature in consultation with academic experts. Secondly, a pretest was done on five experts who have direct experience of managing a GSCM effort. To achieve the objective of the study the data was analyzed using ordered probit technique. Greene (2003) argues that ordered probit model is the best data analysis technique when the dependent variable is defined on an ordinal scale. The dependent variable in this case was the extent of GSCM practices implementation, assumes values which are ordinal in nature. The explanatory variables included coercive pressures, mimetic pressures, normative pressures and a set of firm specific exogenous variables that are expected to affect GSCM implementation.

## FINDINGS

Out of the 108 questionnaires sent to the respondents, 67 questionnaires were received with, three having missing data on institutional pressures variable. This means that 64 questionnaires were therefore considered for further analysis resulting in a response rate of 59.3%.The organizations' demographic characteristics of the 67 firms are shown in table 1.

**Table 1: Firm's Demographic Characteristics**

| Features | Category | Frequency | Percent |
|---|---|---|---|
| Ownership status of the firm | Fully locally owned | 20 | 29.9% |
| | Fully foreign owned | 13 | 19.4% |
| | Joint locally and foreign owned | 34 | 50.7% |
| | Total | 67 | 100% |
| Scope of the market that is served by the firm | Local | 7 | 10.4% |
| | Global | 60 | 89.6% |
| | Total | 67 | 100% |
| Manufacturing sub-sector | Building, Construction & Mining | 8 | 11.9% |
| | Chemical & Allied | 6 | 9% |

| | | |
|---|---|---|
| Electrical & Electronics | 3 | 4.5% |
| Food Beverages & Tobacco | 30 | 44.8% |
| Metal & Allied | 8 | 11.9% |
| Motor Vehicle & Accessories | 1 | 1.5% |
| Paper & Board | 3 | 4.5% |
| glass and glass products | 2 | 3% |
| Imaging and phogrametry | 1 | 1.5% |
| General merchandise | 3 | 4.5% |
| Brush manufacturing | 1 | 1.5% |
| Fertilizer manufacturing | 1 | 1.5% |
| Total | 67 | 100% |

**Construct Unidimensionality**

To evaluate construct unidimensionality, the indicators of each sub construct were subjected to reliability and exploratory factor analyses. Exploratory factor analysis (EFA) was done using principal component analysis with varimax rotation. Before assessing the factor loadings, Kaiser-Meyer-Olkin Measures of sampling adequacy and p-values for Barlett's Test of Sphericity were evaluated to check the factorability of the items. All KMO Measures were found to be above the threshold of 0.6 (Kaiser, 1974).Bartlett's Test of Sphericity revealed that all latent constructs have values of chi-square that are significant at a level less than 0.001 (Barlett, 1954). These two tests imply that it was proper to subject the items representing the latent constructs to factor analysis. This information is presented in Table 2.

**Table 2: Results of KMO and Bartlett's Tests**

| Latent construct | KMO measure | Approx. Chi-Square | df | Sig. |
|---|---|---|---|---|
| Coercive pressures | 0.608 | 43.399 | 3 | 0.000 |
| Mimetic pressures | 0.803 | 98.407 | 6 | 0.000 |
| Normative pressures | 0.786 | 204.959 | 36 | 0.000 |
| Green Procurement practices | 0.821 | 718.050 | 231 | 0.000 |

| | | | | |
|---|---|---|---|---|
| Environmentally responsible design | 0.803 | 270.623 | 55 | 0.000 |
| Green manufacturing practices | 0.790 | 527.283 | 171 | 0.000 |
| Green packaging practices | 0.745 | 151.239 | 28 | 0.000 |
| Green distribution practices | 0.749 | 125.392 | 28 | 0.000 |
| Reverse logistics practices | 0.800 | 337.681 | 78 | 0.000 |

Factor loadings for all the items of each construct in the study were then assessed. Items that were found to have factor loadings below 0.4 were dropped from further analysis.. The following subsections explain in detail how scale purification was done for each of the constructs.

**Institutional Pressures for GSCM Implementation**

The institutional pressures that cause firms to implement GSCM practices were categorized into three groups; coercive pressures, mimetic pressures and normative pressures. Each of these pressures was treated as a separate indicator for the latent variable, institutional pressures in ordered probit analysis. Before this analysis each of these sources of pressure was analyzed for reliability and construct validity. The following subsections discuss the results obtained for each of the sources of pressures.

Coercive pressures were conceptualized as originating from three sources. The respondents were asked to indicate the extent to which each of the three coercive pressures had influenced them to implement GSCM practices on a Likert scale. The scale ranged from 1 representing “not at all” to 5 representing “to a very large extent.” Government environmental policy was rated as the greatest source of pressure with a mean of 4.13 (SD = 0.864, N =64). Domestic environmental regulations was ranked second with a mean of 3.84 (SD = 0.963, N = 64). The least rated source of pressure was international environmental agreements (for example, Kyoto Agreement, The Climate Change Treaty, The Montreal Protocol, etc) with an average of 3.61 (SD = 1.093, N = 64). The Cronbach Alpha for the scale was high at 0.725. Exploratory factor analysis using principal component analysis with Varimax rotation revealed that all the factor loadings were above the acceptable threshold of 0.4(they ranged from 0.508 to 0.777). Item to total correlations scores ranged from 0.443 to 0.670. Therefore, all the items under coercive pressures were retained for further analysis since reliability and construct validity was confirmed. These results are shown in Table 3.

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**Table 3: Coercive Pressures**

| CP | | N | Mean | Std. Dev. | Factor loadings | Item-Total Correlation | Alpha if Item Deleted |
|---|---|---|---|---|---|---|---|
| 1 | Domestic environmental regulations | 64 | 3.84 | 0.963 | 0.650 | 0.552 | 0.630 |
| 2 | Government environmental policy (e.g. NEMA, WRMA) | 64 | 4.13 | 0.864 | 0.508 | 0.443 | 0.750 |
| 3 | International environmental agreements (e.g. Kyoto Agreement, The Climate Change Treaty, The Montreal Protocol, etc) | 64 | 3.61 | 1.093 | 0.777 | 0.670 | 0.471 |

Cronbach's Alpha = 0.725

Mimetic pressures originates from four sources; local, national, regional and global competitors. Since most of the firms served global markets, global competitors was cited as the largest source of pressure that influenced the implementation of GSCM practices with mean of 4.11 and standard deviation of 0.857 from 64 responses. National competitors was ranked second with a mean of 3.98 (SD = 0.826, N = 64). This was followed by regional competitors and local competitors with means of 3.95 and 3.78 respectively. Loadings ranged from 0.544 to 0.730 and all item to total correlation values were above the required threshold of 0.3, indicating convergent validity. The Cronbach's Alpha for the scale was high at 0.840, a confirmation of high reliability of the construct. Consequently, all the four pressures were considered in the ordered probit model. These results are shown in Table 4.

**Table 4: Mimetic Pressures**

| MP | | N | Mean | Std. Dev. | Factor loadings | Item-Total Correlation | Alpha if Item Deleted |
|---|---|---|---|---|---|---|---|
| 1 | Local competitors | 64 | 3.78 | 0.806 | 0.544 | 0.566 | 0.841 |
| 2 | National competitors | 64 | 3.98 | 0.826 | 0.730 | 0.720 | 0.777 |
| 3 | Regional competitors | 64 | 3.95 | 0.898 | 0.726 | 0.712 | 0.780 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | Global competitors | 64 | 4.11 | 0.857 | 0.707 | 0.699 | 0.785 |

Cronbach's alpha = 0.840

Eleven sources of pressures were theorized under normative pressures. The results from Table 5 indicate that the responses ranged from a mean of 2.86 to 3.66. The least rated normative pressure was non management employees with a mean of 2.86 (SD = 1.096, N = 64). The highest ranked was pressure from management employees with a mean of 3.66 (SD =0.912, N = 64). This means that management employees are a major source of normative pressure for manufacturing firms in East Africa to implement GSCM practices. Cronbach Alpha was high at 0.815. Factors loadings ranged from 0.499 to 0.803. Two items; commercial buyers and shareholders had item to total correlation scores of 0.198 and 0.129 respectively. Since these are below 0.3, they were not considered for further analysis. The remaining 9 sources had item to total correlation values of 0.486 to 0.649 and an improved Cronbach's Alpha of 0.845. All factor loadings were also above the 0.4 (ranged from 0.480 to 0.793). These are the items that were subjected to ordered probit analysis.

**Table 5: Normative Pressures**

| NP | | N | Mean | Std. Dev. | Factor loadings | Item-Total Correlation | Alpha if Item Deleted |
|---|---|---|---|---|---|---|---|
| 1 | Household consumers | 64 | 3.30 | 1.019 | 0.542 | 0.628 | 0.786 |
| 2 | Commercial buyers | 64 | 3.47 | 0.992 | 0.499 | 0.198 | 0.826 |
| 3 | Environmental groups or organizations | 64 | 3.56 | 0.924 | 0.585 | 0.435 | 0.805 |
| 4 | Community groups or organizations | 64 | 3.14 | 1.139 | 0.649 | 0.547 | 0.793 |
| 5 | Labor unions | 64 | 3.13 | 0.968 | 0.581 | 0.621 | 0.787 |
| 6 | Trade associations | 64 | 3.05 | 0.898 | 0.650 | 0.529 | 0.796 |
| 7 | Shareholders | 64 | 3.50 | 0.854 | 0.623 | 0.129 | 0.828 |
| 8 | Management employees | 64 | 3.66 | 0.912 | 0.589 | 0.550 | 0.794 |
| 9 | Non-management employees | 64 | 2.86 | 1.096 | 0.803 | 0.573 | 0.791 |
| 10 | Suppliers of goods and services | 64 | 3.11 | 1.071 | 0.674 | 0.568 | 0.791 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11 | Banks and other lenders | 64 | 3.23 | 1.065 | 0.540 | 0.495 | 0.799 |

Cronbach's alpha = 0.815

**Green Supply Chain Management Practices**

GSCM practices construct was measured using six subscales each with several practices. These include green procurement practices, environmentally responsible design practices, green manufacturing practices, green packaging practices, green distribution practices and reverse logistics practices. These subscales were first reviewed for reliability and construct validity before ordered probit analysis were done. Table 6 shows the results of that review.

**Table 6: Green Supply Chain Management Practices**

| NP | | N | Mean | Std. Dev. | Factor loadings | Corrected item-Total Correlation | Alpha if Item Deleted |
|---|---|---|---|---|---|---|---|
| 1 | Green procurement practices | 64 | 3.68 | 1.019 | 0.756 | 0.615 | 0.908 |
| 2 | Environmentally responsible design practices | 64 | 3.53 | 0.992 | 0.519 | 0.635 | 0.839 |
| 3 | Green manufacturing practices | 64 | 3.70 | 0.924 | 0.485 | 0.602 | 0.883 |
| 4 | Green packaging practices | 64 | 4.18 | 1.139 | 0.537 | 0.610 | 0.773 |
| 5 | Green distribution practices | 64 | 3.57 | 0.968 | 0.737 | 0.742 | 0.748 |
| 6 | Reverse logistics practices | 64 | 3.12 | 1.065 | 0.661 | 0.693 | 0.853 |

Cronbach's alpha = 0.815, Grand mean = 3.63

**Institutional Pressures and GSCM Practices Implementation**

The objective of this study was to establish the institutional pressures that caused the manufacturing firms to implement GSCM practices. In order to achieve this, the ordered probit model was used. Using this model, the following explanatory variables were included: coercive pressures, mimetic pressures, normative pressures and a set of firm specific exogenous variables that are expected to affect GSCM implementation. These include; size of the firm in terms of number of employees, age of the firm in years, spatial scope of market served by the firm (dummy variable), whether a firm has an environmental department (dummy variable) and perceived negative effect on environment in firm's sector of operation

(dummy variable).After scale purification, the descriptive statistics for these variables are shown in Table 7.

**Table 7: Descriptive Statistics for GSCM practices, Institutional Pressures and Firm Characteristics**

| Variable | Mean | Std. Deviation | Minimum | Maximum | N |
|---|---|---|---|---|---|
| GSCM practices | 3.63 | 0.678 | 1 | 5 | 64 |
| Coercive pressures | 3.81 | 0.794 | 1 | 5 | 64 |
| Mimetic pressures | 4.11 | 0.758 | 2 | 5 | 64 |
| Normative pressures | 3.38 | 0.766 | 1 | 5 | 64 |
| Control variables | | | | | |
| Number of full time employees | 1437 | 1908 | 25 | 7300 | 64 |
| Length of operation (years) | 42.86 | 20.09 | 4 | 120 | 64 |
| Market scope | 0.91 | 0.294 | 0 | 1 | 64 |
| Environmental department | 0.11 | 0.315 | 0 | 1 | 64 |
| Manufacturing sub-sector | 0.39 | 0.492 | 0 | 1 | 64 |

These explanatory variables were used to predict the probabilities of extent of implementation of GSCM practices as shown in the following model:

$$y_i^* = \beta_0 + \beta_1 \text{COERCIVE}_i + \beta_2 \text{MIMETIC}_i + \beta_3 \text{NORMATIVE}_i + \beta_4 \text{SIZE}_i + \beta_5 \text{AGE}_i + \beta_6 \text{MKTSCOPE}_i + \beta_7 \text{ENVDEPT}_i + \beta_8 \text{ SECTOR} + \varepsilon_1$$

Where,

$y_i^*$ = unobserved extent of implementation of GSCM practices.

$y_i$ = extent of implementation of GSCM practices.

$y_i = 1$ if $y_i^* \leq u_1$, indicating that the firm has not implemented GSCM practices at all.

$y_i = 2$ if $u_1 < y_i^* \leq u_2$, indicating that the firm has implemented GSCM practices to a small extent.

$y_i = 3$ if $u_2 < y_i^* \leq u_3$, indicating that the firm has implemented GSCM practices to a moderate extent.

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$y_i$= 4 if $u_3 < y_i^* \leq u_4$, indicating that the firm has implemented GSCM practices to a great extent.

$y_i$=5 if $y_i^* > u_4$, indicating that the firm has implemented GSCM practices to a very great extent.

$\mu_1$, $\mu_2$, $\mu_3$ & $\mu_4$ are jointly estimated threshold values which establish extent of implementation of GSCM practices.

$COERCIVE_i$ = extent to which coercive pressures have influenced implementation of GSCM practices.

$MIMETIC_i$ = extent to which mimetic pressures have influenced implementation of GSCM practices.

$NORMATIVE_i$ = extent to which normative pressures have influenced implementation of GSCM practices.

$SIZE_i$ = the number of full time employees.

$AGE_i$ = the number of years the firm has been in operation.

$MKTSCOPE_i$ is a dummy variable. It equals 0 for firms that serve local markets and 1 for firms that serve global markets.

$ENVDEPT_i$ is a dummy variable. It equals 0 for firms that do not have an environmental department and 1 for firms that have an environmental department.

$SECTOR_i$ is a dummy variable. It equals 0 for firms in sub-sectors whose perceived negative effect on environment is low and 1 for firms in sub-sectors whose perceived negative effect on environment is high.

$\varepsilon_i$ = error term which is normally distributed with a mean of zero and standard deviation of one.

Correlation analysis was done to establish significance of individual relationships among the variables included in the model. The results reveal that both coercive and normative pressures have statistically significant individual relationship with extent of GSCM practices implementation with spearman's rank correlation coefficients of 0.734 and 0.708 respectively. Mimetic pressures variable was found to have an insignificant relationship with GSCM practices implementation with a correlation coefficient of 0.267. The correlation matrix shown in Table 8 was obtained.

**Table 8: Correlation matrix (Spearman correlation)**

| | GSCM | CP | MP | NP | SZ | AG | MS | ED | ST |
|---|---|---|---|---|---|---|---|---|---|
| GSCM | 1 | | | | | | | | |
| CP | 0.734** | 1 | | | | | | | |
| MP | 0.267* | 0.144 | 1 | | | | | | |
| NP | 0.708** | 0.723** | 0.393** | 1 | | | | | |
| SIZE (SZ) | 0.203 | 0.054 | 0.238 | 0.137 | 1 | | | | |
| AGE (AG) | 0.128 | -0.161 | -0.102 | -0.08 | 0.256* | 1 | | | |
| MKTSCOPE (MS) | -0.175 | -0.449** | 0.076 | -0.22 | 0.171 | 0.13 | 1 | | |
| ENVDEPT (ED) | -0.224 | -0.133 | -0.164 | -0.07 | -0.08 | -0.02 | -0.06 | 1 | |
| SECTOR (ST) | 0.028 | -0.063 | 0.235 | 0.07 | -0.04 | 0.2 | 0.148 | -0.08 | 1 |

***p<0.001; **p<0.05, *p<0.1

StataSE 12 computer package was used to estimate the ordered probit model. The predictor variables were first checked for multicollinearity by running the 'quietly regress' command in Stata. The results in Table 9 shows that for this model, multicollinearity would not be a problem since all the predictor variables had VIF values of less than 5 (Hair, Ringle &Sarstedt, 2011).

**Table 9: VIF Values for Predictor Variables in the Model**

| Variable | VIF | 1/VIF |
|---|---|---|
| COERCIVE | 2.91 | 0.343935 |
| NORMATIVE | 2.70 | 0.369736 |
| MIMETIC | 1.43 | 0.701504 |
| MKTSCOPE | 1.34 | 0.746009 |
| SIZE | 1.20 | 0.830730 |
| ENVDEPT | 1.13 | 0.881897 |
| AGE | 1.10 | 0.909555 |

| | | |
|---|---|---|
| SECTOR | 1.09 | 0.921093 |
| Mean VIF | 1.61 | |

Next the 'oprobit' command was executed. This resulted in the estimated ordered-probit model results in Table 10.

**Table 10: Ordered Probit Model Predicting GSCM Practices Implementation**

Ordered probit regression Number of obs= 64

LR chi2 (8) = 83.21

Prob> chi2 = 0.0000

Log likelihood = -18.29326 Pseudo $R^2$ = 0.6946

| GSCM | Coef. | Std. Err. | Z | P>\|z\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| COERCIVE | 2.79371 | 0.956784 | 2.92** | 0.004 | 0.91845 | 4.66897 |
| MIMETIC | 0.45512 | 0.489753 | 0.93 | 0.353 | -0.50478 | 1.41502 |
| NORMATIVE | 2.08948 | 0.883157 | 2.37** | 0.018 | 0.35852 | 3.82043 |
| SIZE | -0.00004 | 0.000166 | -0.22 | 0.823 | -0.00036 | 0.00029 |
| AGE | 0.05283 | 0.021403 | 2.47** | 0.014 | 0.01088 | 0.09478 |
| MKTSCOPE | -0.50093 | 0.967395 | -0.52 | 0.605 | -2.39699 | 1.39513 |
| ENVDEPT | -1.82776 | 1.001909 | -1.82* | 0.068 | -3.79147 | 0.13594 |
| SECTOR | -0.13515 | 0.565061 | -0.24 | 0.811 | -1.24265 | 0.97235 |
| /cut1 | 8.21582 | 14.296630 | | | -19.80505 | 36.23669 |
| /cut2 | 14.18893 | 4.767684 | | | 4.84444 | 23.53342 |
| /cut3 | 20.09912 | 6.061534 | | | 8.21873 | 31.97950 |
| /cut4 | 27.44227 | 7.815498 | | | 12.12418 | 42.76037 |

***p<0.001; **p<0.05, *p<0.1

From Table 10, it is seen that the final log likelihood is -18.29326. It can also be observed that all the 64 observations in the data set were used in the analysis. The likelihood ratio chi-square of 83.21 with a p-value of 0.0000 shows that the model as a whole is statistically significant and shows some association between the

variables, as compared to the null model with no predictors. This probability value indicates that the explanatory variables used in the ordered probit model are appropriate. The pseudo-R-squared of 0.6946 is considered satisfactory. The cut points shown at the bottom of the output indicate where the latent variable is cut to make the five groups that can be observed in the data.

Further examination of Table 10 indicates that coercive and normative pressures are the dominant institutional pressures which cause GSCM practices implementation with the z statistics of 2.92 (p-value = 0.004) and 2.37 (p-value = 0.018). Both are statistically significant at the level of 0.05. Mimetic pressures are insignificant with a z-value of 0.93 (p-value = 0.353). For coercive pressures, a one unit increase in coercive pressures (i.e., going from 1 to 2), would result in a 2.79 increase in the log odds of being in a higher level of GSCM practices implementation, given all of the other variables in the model are held constant. For a one unit increase in normative pressures, a 2.09 increase in the log odds of being in a higher level of GSCM practice implementation is expected, given that all of the other variables in the model are held constant.

Of the control variables, a manufacturing firm's age is significant with a z-value of 2.47 (p-value = 0.014) at 0.05 level. This indicates that firms that have been in operation for a long time are likely to be advanced in implementing GSCM practices. The dummy variable, whether a firm has an environmental department is partially significant at the 0.1 level. The estimated coefficients for the variables firm's size, market scope and sub-sector of operation are insignificant. This is because all their p-values are greater than the significance levels of 0.1 and 0.05. Because these control variables were found to be insignificant, they were dropped from the model. The resulting model is shown in Table 11.

**Table 11:Ordered Probit Model with Insignificant Control Variables Dropped**

Ordered probit regression Number of obs= 64

LR chi2(5) = 82.85

Prob> chi2 = 0.0000

Log likelihood = -18.473156 Pseudo R2 = 0.6916

| GSCM | Coef. | Std. Err. | Z | P>\|z\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| COERCIVE | 2.68257 | 0.853178 | 3.14** | 0.002 | 1.01037 | 4.35476 |
| MIMETIC | 0.35215 | 0.419232 | 0.84 | 0.401 | -0.46953 | 1.17383 |
| NORMATIVE | 2.03955 | 0.859943 | 2.37** | 0.018 | 0.35409 | 3.72501 |
| AGE | 0.04693 | 0.016159 | 2.90** | 0.014 | 0.01525 | 0.07860 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ENVDEPT | -1.79389 | 0.979896 | -1.83* | 0.067 | -3.71445 | 0.12668 |
| /cut1 | 8.01043 | 9.724396 | | | -11.04903 | 27.06990 |
| /cut2 | 13.74525 | 4.292126 | | | 5.33284 | 22.15767 |
| /cut3 | 19.44379 | 5.507016 | | | 8.65024 | 30.23735 |
| /cut4 | 26.21873 | 6.929121 | | | 12.63790 | 39.79956 |

***p<0.001; **p<0.05, *p<0.1

To determine the effect of removing the three control variables from the model the likelihood ratio test was conducted to establish whether the observed difference in model fit is statistically significant. This test does this by comparing the log likelihoods of the two models, if this difference is statistically significant, then the less restrictive model (the one with more variables) is said to fit the data significantly better than the more restrictive model (Johnston&DiNardo,1997). The formula for the likelihood ratio test statistic is:

LR = 2(log likelihood for model 1 - log likelihood model 2)

Where model 1 is the less restrictive model and model 2 is the more restrictive model. The resulting test statistic follows a chi-square distribution with degrees of freedom equal to the number of variables removed from the model. The log likelihood for the model with all the control variables was -18.29326 and that of the model without the three control variables is -18.473156, the test statistic is computed as follows:

LR = 2 * (-18.29326 + 18.473156) = 0.359792

The likelihood ratio test statistic is therefore 0.360 (distributed chi-squared), with three degrees of freedom. The critical chi-square at 5% level of significance, three degrees of freedom is 7.815. Since the computed likelihood ratio test statistic (0.360) is less than the critical chi-square value (7.815) it can be concluded that the model fit does not change significantly when the three control variables, size of the firm, the scope of the market served by the firm and the manufacturing subsector are dropped. This means that the more restrictive model can be used for further analysis.

**Results of Tests of Hypotheses**

**Influence of Coercive Pressures on GSCM Practices Implementation**

The following hypothesis was tested.

*$H_1$: Coercive institutional pressures encourage a firm to implement GSCM practices.*

The hypothesis predicted that coercive institutional pressures are significant in pressurizing firms to implement GSCM practices. Review of literature identified three sources of these pressures. These include domestic environmental regulations, Government environmental policy and international environmental agreements (for example, Kyoto Agreement, Climate Change Treaty,

Montreal Protocol). Preliminary correlation analysis using Spearman's correlation revealed a significant relationship between coercive pressures and GSCM practices implementation ($r = 0.734$, $p< 0.01$). Further analysis using ordered probit analysis indicated that the coefficient for coercive pressures was statistically significant with a z statistic of 3.14 and p-value of 0.002.

To determine the effect of removing the coercive institutional pressure variable from the model, the likelihood ratio test was conducted to establish whether the observed difference in model fit was statistically significant. The log likelihood for the model with all the three institutional pressure variable and two control variables was found to be -18.473156. The log likelihood for the model when coercive institutional pressure variable is dropped is -28.833458. The log likelihood test statistic value is 20.721. If this likelihood ratio test statistic is compared to the critical chi-square at 5% level of significance, one degree of freedom which is 3.841, it is found that the model fit will change significantly when coercive pressures is dropped from the model since its log likelihood test statistic (20.721) is much greater than the critical chi-square of 3.841. ***These findings provide support for hypothesis 1 which states that coercive institutional pressures encourage a firm to implement GSCM practices.***

**Influence of Mimetic Pressures on GSCM Practices Implementation**

The hypothesis which states as follows was tested:

*$H_2$: Mimetic institutional pressures encourage a firm to implement GSCM practices.*

The hypothesis predicted that mimetic institutional pressures are significant in pressurizing firms to implement GSCM practices. The respondents were asked to indicate the extent to which local, national, regional and global competitors had influenced them to implement GSCM practices. The relationship between mimetic pressures and GSCM practices implementation was found to be insignificant with a Spearman's rank correlation coefficient of 0.267. Further analysis using ordered probit analysis indicated that the coefficient for mimetic pressures was statistically insignificant with a z statistic of 0.84 and p-value of0.401.

When mimetic institutional pressure variable is removed from the model, the log likelihood for the model changes from -18.473156to -18.843669. This change resulted in a log likelihood test statistic value of 0.741. If this likelihood ratio test statistic is compared to the critical chi-square at 5% level of significance, one degree of freedom which is 3.841, it is found that the model fit will not change significantly when mimetic pressures is dropped from the model since its log likelihood test statistic (0.741) is less than the critical chi-square of 3.841. ***From these findings, hypothesis 2 which states that mimetic institutional pressures encourage a firm to implement GSCM practices is not supported.***

**Influence of Normative Pressures on GSCM Practices Implementation**

The following hypothesis was tested:

*$H_3$: Normative institutional pressures encourage a firm to implement GSCM practices.*

This hypothesis predicted that normative institutional pressures are significant in pressurizing firms to implement GSCM practices. Preliminary correlation analysis revealed a significant Spearman's Rank correlation coefficient in a relationship between normative pressures and GSCM practices implementation ($r = 0.708$, $p< 0.01$). The ordered probit model further revealed that normative pressures variable was statistically significant with a z-statistic of 2.37 and p-value = 0.018.

In order to establish if the observed difference in model fit would change significantly as a result of dropping the normative institutional pressures variable from the model, the likelihood ratio test was conducted. The log likelihood for the model changed from -18.473156 to -23.806006. This resulted in a log likelihood test statistic value of10.666. This value is greater than the critical chi-square at 5% level of significance, one degree of freedom (3.841). This implies that the model fit will change significantly when normative pressures is dropped from the model. ***Thus, hypothesis 3 which states that normative institutional pressures encourage a firm to implement GSCM practices is supported.***

**Table 12: Summary of Test of Hypotheses Results**

| Hypotheses | Results | Interpretation and Remark |
|---|---|---|
| **Objective:** Institutional pressures encourage a firm to implement GSCM practices | Ordered probit model is statistically significant model with a likelihood ratio chi-square = 82.85, p-value of 0.000 and pseudo-R-squared = 0.6916. | |
| **$H_1$:** Coercive institutional pressures encourage a firm to implement GSCM practices | Spearman's r = 0.734, p< 0.001, coefficient is significant with z statistic of 3.14 and p-value of 0.002, LR statistic = 20.721 > 3.841 implying that model fit significantly changes if variable is dropped from model. | Hypothesis 1 is supported implying that coercive pressures are significant in causing a firm to implement GSCM practices. |
| **$H_2$:** Mimetic institutional pressures encourage a firm to implement GSCM practices | Spearman's r = 0.267, p> 0.05, coefficient is insignificant with z statistic of 0.84 and p-value of 0.401, LR statistic = 0.79<3.841 implying that if variable is dropped, model fit does not change significantly. | Hypothesis 2 is not supported implying that mimetic pressures are not significant in causing a firm to implement GSCM practices. |
| **$H_3$:** Normative institutional pressures encourage a firm to implement GSCM practices. | Spearman's r = 0.708, p< 0.001, coefficient is significant with z statistic of 2.37 and p-value of 0.018, LR statistic = 10.666 > 3.841, implying if variable is dropped, model fit significantly changes. | Hypothesis 3 is supported implying that normative pressures are significant in causing a firm to implement GSCM practices. |

**Discussion of Findings**

The findings of the study present that coercive and normative pressures are the key sources of pressures that sway manufacturing firms in East Africa to implement GSCM practices with coercive pressures being the stronger of the two. These findings agree with those of Chien and Shi (2007) who established that coercive pressures from domestic environmental regulation, government environmental policy and international environmental agreements were the most significant forces behind implementation of environmental management practices. Normative pressures mainly from suppliers, customers and community stakeholders were also found to be significant. This study extends knowledge by looking at other additional sources of normative pressures.

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The study also emphasized on the need to target all the elements in the supply chain for green practices as advocated by Hart (1995). Chien and Shi (2007) only concentrated on the procurement and manufacturing elements. The results of this study also partly supports the results of Ball and Craig (2010) who established that normative pressures are the key institutional drivers for GSCM implementation for firms in developed countries, specifically England and Canada.

The study also looked at the influence of mimetic pressures on GSCM implementation. On this it established that mimetic pressures were not significant in causing the firms to implement GSCM practices. This finding goes contrary to the finding of Aerts et al. (2006) who cited these pressures as the main driver for firms in developed countries like Germany, Canada and France to implement GSCM practices. This difference in findings may be explained by the fact that in developing countries, competition among firms is not as intense as it is in the developed world. Studies have also shown that environmental conservation is taken more seriously in the developed world and that it is regarded as one of the key competitive priorities alongside other priorities like quality, cost, delivery, flexibility and innovation (Krause, Vachon &Klassen, 2009).

## CONCLUSION

The objective of this study was to establish the institutional pressures of GSCM practices implementation among ISO 14001 certified manufacturing firms in East Africa. The relationship between extent of GSCM practices implementation and the extent to which the various institutional pressures influenced their implementation was tested through ordered probit model. Details of the hypotheses and results are presented in Table 12. Coercive and normative pressures were found to be significant in causing the firms to implement GSCM practices. Of the two sources, coercive pressures had the strongest influence on GSCM practices implementation. Mimetic pressures were not significant. Government environmental policy was determined as the key coercive pressure while environmental groups and management employees were the dominant sources of normative pressures. National competitors were determined as leading source of mimetic pressures followed closely by regional competitors. Additionally, age of the firm was found to be a significant control variable which influenced implementation of GSCM practices. The implication was that firms that have been in operation for a long time are likely to be advanced in implementing GSCM practices.

### Implications of the Study

This study adds to knowledge by advancing the evidence of the existence of heterogeneity of pressures for GSCM practices implementation. It looks at these pressures as antecedents of GSCM practices implementation adding to limited investigations on the issue since most past research has focused on outcomes of implementing GSCM practices. This research also

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extends knowledge by looking at other additional sources of normative pressures which include environmental groups, labour unions, trade associations, shareholders, employees, bank and other lenders all of which were found to play a role in prompting firms to implement GSCM practices.

Secondly, the findings also advance understanding of the pressures of GSCM in East Africa. It is one of the earliest studies on GSCM practices in East Africa and also in the context of a developing country where the level of GSCM practice diffusion is still low. It is therefore expected that the findings of this study would scale up the level of implementation of GSCM practices by firms in this region. The study further demonstrates the significance of the institutional theory in comprehending the influence of the existence and type of external institutional pressures on the implementation of GSCM practices.

The findings of this research also have direct implications for policy and practice. The research demonstrates that not all institutional pressures influence the implementation of GSCM practices equally and that careful thought of the operational practices and manufacturing context is vital for managers in these different circumstances. This study also revealed that very few firms are environmentally conscious in East Africa. This is evidenced by the fact that less than 2% of manufacturing firms are ISO 14001 certified. One of the reasons is that environmental regulation in these countries is still less stringent. The findings of this study indicated that government laws and policies on the environment are critical and main drivers of GSCM practices implementation. Therefore, the governments can increase the scale of GSCM practices implementation by taking steps in making the environmental regulations more stringent in line with the same in developed countries. To encourage the implementation GSCM practices, governments of these East African countries should introduce and promote ideas such as extended producer responsibility. Further efforts by governments and manufacturers are also required to encourage the firms to extend GSCM practices implementation beyond manufacturer boundaries.

**Suggestions for Future Research**

This study employed survey based, cross-sectional research design. The firms that were surveyed are considered early adopters of GSCM practices since most were certified recently. As these and more organizations become more mature adopters of GSCM practices, future research should employ longitudinal research design to evaluate the change in the implementation of GSCM practices and causal relationships in supply chains. This is especially crucial given that an argument has been advanced that it takes long for GSCM practices to be fully implemented.

The study only concentrated on a small sample of manufacturing firms in East Africa that are ISO 14001 certified. The focus on these firms leaves out the

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ones with no formal environmental management accreditation, but may have well established non-accredited environmental programs. To increase generalizability of the research, other firms in the same and/or different countries in this region or around the world should be studied. A large sample would also allow comparisons among sectors, which was not possible in this study since the sample size was relatively smaller and some sectors were under represented.

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