**BEING GREEN IS BEING SUSTAINABLE: THE ROLE OF CRITICAL ENABLERS**

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**1. Introduction**

As a consequence of increased in environmental awareness and interest in environmental protection, there is a growing pressure on manufacturing industries to adopt a manufacturing philosophy that seeks to apply environmental sound practices in their operations to help reduce impact of their operations on the natural environment (Wycherly 1999). In order to respond to the growing concern of environmental pollution, GSCM been adopted by manufacturing firms as a potential machinery to restore sustainability to the natural environment (Noci 1997). Recent growing awareness and the pressures on manufacturing industries create a necessity for industries to restructure and reshape their operational process to enhance their strategy to sustain their business and profitability while also staying competitive in the market (Zailani et al 2012). To achieve this enhancement in business strategy, manufacturing firms must go beyond their internal operations, monitoring, auditing their supplier’s environmental objectives, and meet the environmental demands of their customers (Porter and Kramer 2006).

GSCM demands that practices, such as eco design, green manufacturing, green purchasing and reverse logistics enhance the achievement of sustainability (Zhu et al 2005). However, there are certain critical enablers that need to be present to support successful implementation of GSCM (Diabat et al 2014).

This paper is interested in investigating the need to adopt GSCM by manufacturing industries and some key GSCM practices. The study then identifies and clarifies various potential enablers that ensure successful implementation of GSCM practices and how they relate to firm performance.

**2. Literature Review**

**2.1 Green supply chain management**

Green supply chain management according to Srivastava (2007) is the integration of environmental consciousness into the traditional supply chain management, including product design, material sourcing and selection, manufacturing process, delivery of the final product to the consumers as well as end-of-life management of the product. Beamon (1999) defines green supply chain management as the extension of traditional supply chain management that integrates processes such as reuse, remanufacturing, green design and reduction of raw material usage with the aim at minimizing operational impact on the environment.

GSCM is considered to be the elimination and minimization of negative environmental effects on air, water, and land degradation; waste of resources such as energy, materials, product and management of the end –of-life of the product (2005; Eltayeb et al., 2011).

Roa and Holt (2005) describe GSCM as environmental improvement strategy that comprises inbound logistics, production or internal supply chain, outbound logistics and in some cases reverse logistics including materials suppliers, service contractors, distributors and end user.

**2.2 Need for GSCM implementation**

GSCM has emerged as an important business strategy that many industries are using to enhance their corporate profit and achieve environmental objective by reducing waste generation while improving ecological efficiency (Azevedo et al., 2011; Ruiz-Benitez 2017). Dou et al (2018) indicate that the integration of suppliers in product development results in reduced cost and time, improved environmental image and achievement of competitive advantage. GSCM implementation improves differentiation thereby increasing the market share and significant financial improvement of the firm (Porter 1995). Many manufacturing firms such as automobile firms engage in GSCM implementation in order to reduce pressures and for building better corporate image. GSCM implementation results in reduction or eradication of environmentally hazardous materials such as lead, mercury, chromium and cadmium (Zsidisin and Siferd, 2001; Singhal, 2013).

**2.3 GSCM Practices**

In this research, the main activities involved in GSCM are eco design, green manufacturing, green purchasing and reverse logistics. **Eco design** is a very crucial operational level in supply chain management. This is the stage where decision of the environmental impact of the product is taking. Whether a product would have a positive or negative repercussion on the environment is determined by the decisions taking at the designing of the product stage. Eco design therefore is an approach to design a product to have enhanced biological quality through reduction of hazardous substances that affect the environment negatively throughout the life cycle of the product (Sharma et al., 2017). This stage involves designing the product to avoid hazardous substances, excessive use of energy, excessive use of raw materials and design to encourage recycling, reuse and remanufacturing to perpetuate the life cycle of the product (Green et al., 2012). **Green manufacturing** includes application of proper technology and waste management strategy in production process with the aim to reduce environmental burden lower raw material usage, production efficiency, reduced environmental safety cost and improved public image (Ninlawan et al., 2010). Zhu et el (2005) posit that green manufacturing demands practitioners to design product that enable the reuse, recycle, recovery of materials; avoid the use of hazardous substance in production, reduced consumption of materials and energy.

**Green purchasing** can be described as integrating environmental consciousness into purchasing activities that certifies the products and materials purchased do satisfy the environmental objective of the buying company (Min and Galle 1997; Kafa et al., 2013). In other words, green purchasing consists of activities aim at reducing, reusing and recycling of materials. The process of engaging in green purchasing includes selecting suppliers based on the environmental objectives of the buying company, collaborating with suppliers and ensuring that the purchased materials could be re-used, recycled and above all reduced the consumption of materials (Kafa et al., 2013).

**Reverse logistics**

Reverse logistics is opposite of traditional forward logistics (Beamon, 1999). Dowlatshahi (2000) and Carter and Ellram (1999) posit that revers logistics is a process where a manufacturer takes back previously shipped products sent from the point of production to a point of consumption with the aim to remanufacture, recycle reuse or resell. If reverse logistics concept is effectively and efficiently implemented, it leads to cost saving for possible enhancement of the firm’s profitability and customer satisfaction (Balon et al., 2016). Research indicates that reverse logistics has been widely been used by automobile such as BMW, and General Motors (Lakshmimeera and Palanisamy, 2013).

**2.4 Analysis of Enablers of GSCM practices**

Industries are under intensive pressure from government regulations, customers, suppliers and global competitions on their environmental strategies; this pressure has forced many industries to implement GSCM to enhance their business performance (Lpez-Gamero et al., 2009). However, for industries to implement GSCM, certain potential enablers must be identified and analysed (Diabet et al., 2014). In the past three decades researchers have published several papers on GSCM practices, pressure, barriers and performance (Zhu and Sarkis, 2004; Green et al., 2012; Chiou et al., 2011) but very little studies have investigated the potential enablers of GSCM implementation (Diabet et al., 2014). For this reason, the focus of this research is to analyse major enablers for GSCM implementation.

Enablers are variables that enhance the capacity and capability of firms to implement green supply chain management (Diabet et al., 2014). According to Grzybowska (2012), enabler is one that enables another to achieve an end. This means that enabler refers to the ability of one variable giving the other the power and competence to function to attain the sustainable development. Diabet et al (2014) posit that enablers in practice are not the same regarding their impact on sustainable adoption. The study further explains that it is essential that industries identify the best practices suitable for their sustainable objectives. It is in this respect that industries can have full fledge and successful GSCM implementation (Santos et al., 2013). Based on literature review, this study has classified potential enablers as discussed below.

|  |  |
| --- | --- |
| **Enablers** | **References** |
| Supplier relationship/support | Dubey et al. (2015) ;Pauli (1997; Dubey et al. (2014); Kumar et al (2014); Vachon and Klassen (2006); Hsu and Hsu (2009); Zhu et al. (2006) |
| Top management commitment | Zhu et al (2005); Dou et al. (2018); Dubey et al. (2015); Jabbour and Jabbour (2015); Sharif and Irani, (2012); Berkel (2007) |
| Customer relationship management | Dubey et al. (2015); Li et al. (2006); Jayram and Avittathur (2015); Seuring et al. (2004); Zhu et al. (2008); Lee and Klassen (2008) |
| Information sharing | Li et al. (2006); Towell (1997); Mentzer et al (2000); Childhouse and Towell (2003); Balsmeir and Voisin (1996); Chizzo (1998); Holmberg (2003); Muduli (2013) |
| Government regulations | De Britol et al (2002); Chan et al 2016; Lee (2010); Diabet et al. 2014); Hoffman (2000) |
| ISO 14001 certification | Frankel (1998); ISO (2015); Hoffman (2000) |

Table 1: Enablers of GSCM practices

**Supplier relationship and support**

For a firm to implement green supply chain management successfully to achieve the desire sustainable development, alignment of suppliers and their preparedness to adhere to focal company’s environmental objectives is very essential. Recent research findings have indicated that customers are unable to dichotomise the relationship or the role of a supplier and a manufacturer and therefore any environmental liability of a supplier is borne by the manufacturer. The constant training, auditing and monitoring of suppliers is essential to enable these them to understand how to become cleaner and greener. Supplier relationship has therefore been identified as the most dominant and relevant enabler of GSCM ( Bai and Sarkis, 2010; Ku et al 2010; Van Hoof and Lyon, 2013; Kumar et al., 2014; Dubey et al., 2015). Therefore, a long-term relationship between focal firm and its suppliers leverages the strategic and operational efforts and capacities of the supply chain partners and this helps them to achieve their business objectives.

**Top management commitment**

Management commitment is a vital variable for successful implementation of GSCM (Zhu et al., 2005; Dou, Zhu and Sarkis, 2018). According to Dubey et al (2015), top management of supply chain partners must always align their business objective to the direction of customer’s interest, therefore ensuring the environmental factor in their business strategic decisions. Management beliefs, practices and commitments are pivotal for GSCM implementation (Abdulrahman et al., 2014; Jabbour and Jabbour 2015). If top management due to their commitment to GSCM implementation spells out environmental policy, it makes every employee aware of the focal company environmental strategies. Further, GSCM implementation would be successful if top management set aside special fund for green technology investment. Top management ought to show positive attitude towards green practices (Dubey et al., 2015). Management commitment is all about establishing environmental policies and goals to provide materials, resources and training to stimulate improvement (Sharif and Irani, 2012; Dubey et al 2015).

**Customer relationship management**

Over the last three decades, customers have become more aware and informed of the environmental impact of the product they purchase. They want to ensure that the final disposal of the product is done in a way that will not negatively affect the natural environment. More especially, customers in developed world are more conscious on environmental impact of the product they buy hence firms must be more proactive in adopting practices that seek to protect the natural environment (Dubbey et al., 2015). Customer relationship for the purpose of GSCM implementation comprises the overall practices that ensure the management of customer complaint, building long-term relationships with customers and improving customer satisfaction (Li et al 2006). According to Dubey et al (2015), the interface with customers by firms provides valuable input, which helps to implement GSCM. Study by Jayram and Avittathur (2015) that focused on Indian manufacturing sector linked environmental policies to customer actions and sustainability strategies.

**Information sharing**

The extent to which appropriate information is communicated to supply chin partners is very crucial for successful implementation of GSCM (Li et al., 2006). For GSCM to be successfully implemented partners in the supply chain should operate in an environment in which information relevant to effectively operating the total environmental management systems on time and in undistorted form is available (Towell, 1997). Information within an organisation could be either strategic or tactical in nature and could include information about logistics activities to general marketing and customer information (Mentzer et al., 2000; Li et al., 2006). Research available supports the notion that the key to successful GSCM implementation is making available undistorted and up-to-date data to every member of the supply chain (Childhouse & Towill, 2003; Balsmeier & Voisin, 1996). While information sharing is appropriate, the extent of the impact on GSCM implementation depends on what information is shared, when and how it is shared, and with whom (Chizzo, 1998).

**Government Regulations**

Government Regulation is one of the key enablers that influences successful implementation of GSCM (De Brito et al., 2008; Chan et al., 2016). Global environmental and social concerns have caused governments to enact laws regulating the operations of industries. Manufacturing industries are held accountable for their environmental liabilities such as air pollution, greenhouse gas emission, water pollution and toxic waste generation (Lee 2010). Due to government regulations and, many Indians textile-manufacturing companies have started to adopt green supply chain management to sustain and maintain their business position in the competitive market (Diabet et al., 2014). In a national survey on environmental protection conducted in United State of America, many respondents believe that without government regulations many corporations would not attend to environmental issues and possible implement environmental protection strategy (Hoffman, 2000

**ISO 14001 Certification**

Established by International Organisation for Standardisation (ISO), based in Geneva Switzerland, ISO 14001 is a set of voluntary standards that integrate environmental responsibility into firm’s management procedure (Frankel, 1998). Achieving the balance between environment, society and economy is very crucial in order to achieve sustainability. Societal expectations from sustainable development, transparency, and accountability have evolved with introduction of strict legislations, pressure from pollution and waste, inefficient use of resources, climate change deforestation and degradation of the ecosystems (ISO, 2015). These difficulties have influenced organisations to adopt a systematic approach to environmental management by implementing a set of green GSCM practices with the aim of protecting the natural ecology (ISO, 2015). By 1998, more than 5500 organisations worldwide had obtained certification (ISO, 1998). Many banks and insurance companies in Europe including Deutsche Bank AG have made it a policy to give preferential treatment to organisations with ISO 14001 certification. Major focal companies such as Daimler-Chrysler are demanding all their suppliers be certified (Hoffman 2000).

**2.5 Significance of the sector considered in this study**

Manufacturing sector plays a very significant role in UK economy and therefore the reason for it consideration in this study. Various industries make up the manufacturing sector in UK such as; food, tobacco and beverage, metal and metal product, furniture and wood related product, pharmaceutical, plastics, glasses and cement, wood and paper product, petroleum product, textile product, electrical equipment, chemical and chemical product, automobile and auto- parts. All these sectors contribute to UK unparalleled economic growth. UK is now the ninth world leading manufacturing country with output totalling $244 billion in 2015. Manufacturing sector in UK accounted for 2% of world manufacturing output (House of Commons, 2018). The sector also accounts for 1% of UK gross domestic product (GDP). All the various industries in the manufacturing sector have long-term relationship with international business through either exporting or importing or as suppliers of parts and components.

**3. Sustainability performance**

Extant literature has investigated the relationship between GSCM implementation and performance implications including environmental social economic and operational.There is still diverse opinion as far as literature is concerned with respect to this relationship. However, there is strong argument within literature supporting positive relationship between GSCM implementation and performance. For example, Lee et al. (2012) posit that inter-organisational linkages and collaboration could bring about enhancement in environmental performance. Chiou et al. (2011) argued that greening the suppliers and green innovation has a positive relationship on environmental performance and competitive advantage in Taiwan manufacturing firms. Esfahbodi et al (2016) argued that the adoption of SSCM has higher levels of environmental performance, but does not necessarily lead to improved cost performance in Chinese and Iranian manufacturing sectors. On the other hand, studies such as Bowen et al (2001) argued that SSCM practices do not bring forth short-term profitability and economic performance.

**4.1 Research sample size and data collection**

This study aims to examine the relationship between GSCM practices and sustainability performance. Further, this study examines the critical enablers that influence implementation of GSCM by UK manufacturing industries. Qualtrics dataset was used as a survey sources for this study. The use of qualtrics as an intermediary organisation was informed by previous studies that highlights the challenges uncounted in adopting representative sampling techniques where a general mistrust of outsiders results in low response rate to mail based survey ( Zhenge et al., 2006; Abdulrahman & Subramanian 2012). The intermediaries introduced the researcher and the aim of the research to the respondents and assured them that their replies are for the purposes of academic excise and that their confidentiality would be kept. An online questionnaire survey is the research instrument used in this study and was solely target at manufacturing sector in UK. Initial invitations to participate in the survey were sent by email. The questionnaires were developed based on literature presented in the previous section (Rogers and Tibben-Lembke, 1999; Lau and Wang, 2009; Abdulrahman and Subramanian, 2012). This study identified key respondents such as first level managers, assistant managers, CEO and directors who are knowledgeable about the company’s internal and external operations strategies. The survey was administered by online email sent to 250 manufacturing managers on 8th march, 2018. The initial email resulted in 93 usable responses. Follow up mails were sent five weeks after the first emails and no more completed questionnaires were returned. This brought the total usable questionnaire for this study to 93, which brought overall response rate to 37.2%. This study did not deal with non-response bias since all the usable response came at the same time without any late responses.

**4.2 Sample Characteristics**

This section provides an overview of the characteristics of the respondents and their organisations. This section is important because as the study’s outcomes will be drawn based on these information. Industry type, size of the firm and the type of the respondents generally present the main charateristics of the sample in operations and supply chain management research (Forza, 2002; Esfahbodi, 2016).

Among the respondents, 14.4 % represented food and beverage industry, 14.4 % from metal, 13.4% from electrical and computer industries. 5.2% from motor vehicle and auto parts, 6.2% from clothing and textile, 6.2% from wood industry. 6.2% from chemical industries, 5.2% from paper making industries, 6.2 from rubber and plastics industries. 2.1 % from pharmaceutical industries, 3.1 from minerals and metallic industries, 9.3% from other related manufacturing industries. With respect to firm size characteristics, this study measured the firm size using the annual turnover obtained from the demographic questions. The study also relied on the EU criterial for measuring firm’s size. This measurement classifies firms as large if the number of turnover is greater than 500 million pounds or more, and small if the annual turnover is less than 100 million, medium if the annual turnover is more than 100 million but less than 500 million (Gimenez et al 2012; Esfahodi 2016). With this in mind and based on table 4 below 47.8% were classified as small (43) 23.3% were classified as medium (21) and 28.9% classified as large (26). Drawing on table 2, the questionnaires were mainly answered by senior managers who represented 64.5% (60). 33.3% represented first level managers (31) and 2.2% represent those who are neither managers nor supervisors (2) based on the information captured in table 2.

**4.3 Respondent Profile**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | First level manager/supervisor | 31 | 32.0 | 33.3 | 33.3 |
| Manager/Supervisor higher than first level (Senior lead  ership included) | 60 | 61.9 | 64.5 | 97.8 |
| Not a manager or supervisor | 2 | 2.1 | 2.2 | 100.0 |
| Total | 93 | 95.9 | 100.0 |  |
| Missing | System | 4 | 4.1 |  |  |
| Total | | 97 | 100.0 |  |  |

Table 2: The role of respondents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Food and Beverage | 14 | 14.4 | 15.6 | 15.6 |
| Clothing and Textile | 6 | 6.2 | 6.7 | 22.2 |
| Wood and related product | 6 | 6.2 | 6.7 | 28.9 |
| Paper and paper product | 5 | 5.2 | 5.6 | 34.4 |
| Petroleum and Gas product | 1 | 1.0 | 1.1 | 35.6 |
| Chemicals and chemical product | 6 | 6.2 | 6.7 | 42.2 |
| pharmaceutical product | 2 | 2.1 | 2.2 | 44.4 |
| Rubber and plastic product | 6 | 6.2 | 6.7 | 51.1 |
| Mineral and non-metallic product | 3 | 3.1 | 3.3 | 54.4 |
| Metal | 14 | 14.4 | 15.6 | 70.0 |
| Electrical and computer product | 13 | 13.4 | 14.4 | 84.4 |
| Motors vehicle and auto parts | 5 | 5.2 | 5.6 | 90.0 |
| Others, Please specify | 9 | 9.3 | 10.0 | 100.0 |
| Total | 90 | 92.8 | 100.0 |  |
| Missing | System | 7 | 7.2 |  |  |
| Total | | 97 | 100.0 |  |  |

Table 3: Activities of Respondents Company

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Less than or equal to 100 | 43 | 44.3 | 47.8 | 47.8 |
| 101-500 | 21 | 21.6 | 23.3 | 71.1 |
| 501-1000 | 9 | 9.3 | 10.0 | 81.1 |
| 1001-5000 | 6 | 6.2 | 6.7 | 87.8 |
| Above 5001 | 11 | 11.3 | 12.2 | 100.0 |
| Total | 90 | 92.8 | 100.0 |  |
| Missing | System | 7 | 7.2 |  |  |
| Total | | 97 | 100.0 |  |  |

Table 4: Annual turnover of respondents firms (millions in pounds)

**5. Date analysis and result**

In order to test the appropriateness of the data collected to check whether the data is normally distributed, the following steps were followed. First, the 90 collected data set powered by qualtrics software was transferred into an IBM statistical package called SPSS package version 23.0. The values of the research construct were then computed using their measurement items. These values were picked for descriptive statistics to demonstrate the characteristics of the data set. Further, in order to test the appropriateness and the normality of the data distribution, skewness and kurtosis test were undertaken (Field, 2009; Esfahbodi 2016). Two analyses were carried out to examine the impact of GSCM on sustainable performance and the role of critical enablers in GSCM implementation. Descriptive statistics, alpha coefficients were used to analyse the survey data and its consistency. The skewness and the kurtosis coefficients were used to determine the data normality.

Field (2009) posits that, for a data set to be classified as appropriate and achieve normality, the recommended coefficient should be within the range of -2.00 to two. Table 5 shows that the collected data for all the variables is normally distributed with the skewness and kurtosis coefficient falling within the recommended range. This goes to show that the data distribution. Drawing on the table 5 above it is very clear that the entire construct have high reliability value ranging from 0.860 to 0.962, well above the recommended level by (Churchill, 1997; Nunnally and Bernstein, 1994). The reliability value (Cronbach’s Alpha values) of the entire construct exceeded the recommended value of 0.70 indicating high reliability (Hair et al 2011). The Cronbach’s Alpha is the measure of internal consistency (how closely related the items are as a group). If the questions related to the same issue, participants will be expected to get similar scores on each question (Hair et al 2011). The overall reliability of the study was considered satisfactory. This further explains that internal consistency exists among the variables thereby supporting that the measurement items used in the study actually represented their correspondent variables (Hiar et al 2010).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **N** | **Mean** | **Std. Deviation** | **Cronbach’s**  **Alpha** | **Skewness** | **Kurtosis** |
| Eco Design | 82 | 3.436 | 1.3394 | 0.953 | -.546 | -.528 |
| Green Manufacturing | 82 | 3.69 | 1.1790 | 0.953 | -.697 | -.287 |
| Green Purchasing | 82 | 3.415 | 1.3340 | 0.953 | -.471 | -.607 |
| Reverse Logistics | 82 | 3.66 | 1.2017 | 0.954 | -.693 | -.665 |
| Environmental Performance | 82 | 3.574 | 1.2868 | 0.961 | -.731 | -.436 |
| Social Performance | 82 | 3.432 | 1..2752 | 0.961 | -.509 | -.673 |
| Economic Performance | 82 | 3.311 | 1.2786 | 0.962 | -.414 | -.549 |
| Gov. legislation | 82 | 3.78 | 1.197 | 0.873 | -.935 | .066 |
| Management commitment | 82 | 3.80 | .999 | 0.883 | -.812 | .612 |
| Suppliers support | 82 | 3.37 | 1.329 | 0.872 | -.480 | -.914 |
| Customer support | 82 | 3.67 | 1.197 | 0.869 | -.659 | -.301 |
| ISO certification | 82 | 3.84 | 1.202 | 0.875 | -.912 | .088 |
| Information sharing | 82 | 3.70 | 1.193 | 0.860 | -.946 | .259 |
| **Valid No** | **82** |  |  |  |  |  |

Table 5: Descriptive statistics

**5.1 Factor analysis**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
| Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.901 | 65.013 | 65.013 | 3.901 | 65.013 | 65.013 |
| 2 | .630 | 10.505 | 75.518 |  |  |  |
| 3 | .577 | 9.617 | 85.135 |  |  |  |
| 4 | .334 | 5.564 | 90.699 |  |  |  |
| 5 | .323 | 5.385 | 96.084 |  |  |  |
| 6 | .235 | 3.916 | 100.000 |  |  |  |
| Note: Extraction Method: Principal Component Analysis  Kaiser-Meyer-Olkin Measure of Sampling Adequacy= 0.861  Bartlett’s Test of Sphericity= 259.945; p˂ 0.0000. | | | | | | |

**Table 6: Factor analysis of Critical Enablers**

Factor analysis was conducted to further confirm the groupings of the critical enablers from the survey data. The critical enablers comprises six measurement items. The Kaiser-Meyer-Olkin (KMO) measure confirmed the sampling adequacy required for principal component analysis (CPA). KMO is used to test the appropriateness of data for factor analysis (Field, 2009; Esfahbodi, 2016). Table 6 above shows KMO value as = 0.861 exceeding the recommended minimum value of 0.60 required for conducting factor analysis (Field, 2009). In addition, the sig. is .000, which indicates that the strength of the relationship between variables is strong and therefore the variables are suitable for factor analysis. Furthermore, the eigenvalue for the critical enablers measure was 3.901 exceeding the recommended value of 1.

**5.2 Correlation**

Correlation values indicate the strength of the association between any two metric variables with the sign (+ or -) indicating the nature of the relationship (Hair et al 2014) the values range from -1 to +1 with +1 indicating a perfect relationship, 0 indicating no relationship and -1 indicating a perfect negative relationship. The bivariate results using Pearson correlation coefficient is shown in table 7. The results below show significant relationship between critical enablers and GSCM (eco design, green manufacturing, green purchasing and reverse logistics) implementation. The correlation between critical enablers and GSCM implementation is shown in the table below showing the direction and nature of relationship. For GSCM to be implemented the tables below have shown that critical enablers measure by management commitment, supplier support, customers support, ISO certification, information sharing and government regulations when properly addressed could enhance and serve as power and energizer for successful implementation of GSCM.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | **GSCM Practices** | **Correlation coefficient** | **Sig.(2-tailed) P- values** | | Eco design | .671⃰⃰⃰⃰⃰⃰ ⃰ | .000 | | Green production | .559⃰ ⃰ | .000 | | Green purchasing | .743⃰ ⃰ | .000 | | Reverse logistics | .617⃰ ⃰ | .000 |   \*\*. Correlation is significant at the 0.01 level (2-tailed). |

**Table 7: Correlation coefficients of relationship between critical enablers and GSCM**

The result of table 7 above shows that the relationship between critical enablers and four GSCM implementation is significant. From the table it can be seen that sig. (p values) for all the GSCM practices = 0.000. Since p˂ 0.05, it is concluded that critical enablers such as management commitment to sustainability, government regulations, ISO 14001 certification, information sharing, supplier support and customer pressure have a strong positive linear relationship with four GSCM implementation namely eco design, green production, green purchasing, and reverse logistics.

**Conclusion**

This paper gives empirical justification for a conceptual framework that identifies critical enablers and describes the relationship among GSCM implementation. The research objective of finding out whether critical enablers and GSCM implementation have relationship, the data above have provided justification for that. Based on empirical study of 82 respondents across manufacturing sector in UK, this study has justified that certain variables that enhance the capacity, capabilities and serve as a driving force for GSCM implementation must be present. So for green supply chain management to lead to sustainability performance, enablers such as ISO 14001 certification demanded by either suppliers or manufactures, sharing of quality information among departments and supply chain partners, management commitment and government regulations are key to ensure successful implementation of GSCM.

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