Developing and analyzing framework for understanding the effects of GSCM on green and economic performance

Perspective of a developing country

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Abstract
Purpose – The concept of green supply chain management (GSCM) is gaining popularity in developing countries due to the environmental and economic impact along with increasing awareness of environmental safety. Enterprises are trying to express their sincere commitment toward green practices. The purpose of this paper is to examine the impact of GSCM on green and economic performance of the firm under the influence of leadership and institutional pressures.
Design/methodology/approach – Conceptual model was developed from previous research works to understand the driving forces of green and economic performance which had inconsistent findings in the literature. Data were collected from 174 leading ISO 14001 certified manufacturing firms in Pakistan by using a structured questionnaire. Partial least squares-structural equation modeling is used for testing the hypotheses.
Findings – The statistical results indicate that the leadership and institutional pressures influence the firm for adoption of internal green practices and external green collaboration. The statistical results also suggest that green practices significantly improve firm’s green and economic performance. However, firm’s external green collaboration does not significantly affect green performance, but it improves green performance significantly.
Research limitations/implications – This research is conducted on Pakistan as a case of highly populated developing country.
Originality/value – This research presents the empirical evaluation of the influence of leadership and institutional pressure on green practices and improved green and economic performance. The results offer useful understanding for SCM practitioners seeking to adopt GSCM practices. The results also provide policy insights for regulators, organizations and legislators to further promote GSCM.
Keywords Structural equation modelling, Green supply chain management, Institutional pressures, External green collaboration, Internal green practices
Paper type Research paper

1. Introduction
Traditionally supply chain management (SCM) was defined as the way that converts raw material into final products, and made it available to customers. According to Beamon (1999), SCM comprised of practices that are exclusively related to raw material acquisition, manufacturing and final product delivery, whereas environmental factor had been continuously ignored. In modern era, rapid environmental changes and growing attention toward them have developed the concept of GSCM strategies in the SCM (Govindan et al., 2014). GSCM consist of environmental-related factors that lead to develop an extended environmental supply chain and provide a procedure to achieve and maintain the environmental friendly supply chain (Carter and Rogers, 2008; VanALLE et al., 2017).
GSCM is the modern concept of traditional supply chain where various activities are performed to minimize the environmental impacts, such activities include: green purchasing, green design, saving of resources, reduction in the usage of harmful material, product recycle and others (Roehrich et al., 2017). Gilbert S. (2001) described that GSCM is the integration of environmental concerns in the process of commercial activities. Rao and Holt (2005) elaborated GSCM as involvement of green purchasing, green manufacturing, green packaging and reverse logistics while incorporating innovation in SCM. Srivastava S.K. (2007) defined GSCM as the combination of environmental thinking and SCM including procurement of material, product design, saving of resources, reduction in the usage of harmful material and product recycle.

GSCM has emerged as an organizational philosophy that is used to gain the objectives of the firm, i.e. firm’s revenue and market share by improving environmental efficiency and reducing its impact on environment accordingly (Govindan et al., 2014; Roehrich et al., 2017). The concept of GSCM has been gaining interest amongst practitioners and researchers who are involve in SCM’s logistic and operations. Developing countries like Malaysia (Zailani et al., 2012), India (Mathiyazhagan et al., 2014) and China (Zhu et al., 2017) have also begun to start the green practices in their supply chain network. Though little research in the context of developing countries has been made and still it needs further investigation. Particularly, greening the supply chain has been observed as a key issue of sustainable SCM (Large and Thomsen, 2011). Developing countries have to design their supply chain network which ensures environmental friendly production (Mudgal et al., 2010; Tseng et al., 2015). Region of developing countries is considered the top emitters of greenhouse gases (GHGs). According to GHG emissions 2016 report, Pakistan’s share in GHG emissions was 304.85 MTCO2 which is 0.7 percent of global total (percent). Similarly, neighboring countries’ share was around 35 percent of global total (percent). This is an alarming situation for the entire region.

To meet the environmental issues, different accords and pact have been signed by the developed countries. Among them one of the main and effective agreements is “Kyoto protocol” agreement signed by 130 countries (1992). Member countries agreed in this pact that they eventually have a cut in emission of 5 percent by 2012 as compared with emission level in 1997 and all countries were allotted a target to reduce emission. During the second Doha Amendment to the Kyoto Protocol Conference 2012, parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020.

GSCM is a value addition dimension for the researchers to explore and explain the relationship among different variables in the network of SCM (Fahimnia et al., 2015; Geng et al., 2017). Many studies have been conducted to analyze the impact of GSCM practices on firm’s environmental, operational and economic performance. In persuasion of green practices in supply chain network, especially in developing countries, the past research results have shown the mixed outcome on the economic performance of the firms (Vijayvargy et al., 2017; Tseng et al., 2015; Zhu et al., 2013).

Moreover, there is a scarcity of studies in developing countries which have found significant outcome on economic performance after the adoption of GSCM (Teixeira et al., 2016; Geng et al., 2017). Dubey et al. (2015) investigated the influential effect of leadership on green practices in GSCM networks and on the other hand, Zhu et al. (2013) explored the direct effect of institutional pressures on green practices, but the combined effects of leadership and institutional pressures on green practices have not been explored yet.

This study is being conducted to fill the gap and to assess the extent of adoption of green practices and to analyzed the impact by exploring the relationship between GSCM practices and environmental performance. There are many countries in all over the world that have shifted their supply line into GSCM. The findings of the research will help to shift the perception of manufacturers toward GSCM. Recent China Pakistan Economic Corridor (CPEC) pact is considered a game changer for the region because immense commercial and economic
activities are being expected in the region through CPEC pact (Bhattacharjee 2015). Therefore, if the outcome of this study picks out the relationship amongst influential variables and their impacts on GSCM exercise, environmental performance and economic performance, this can play a superb and motivational role for SCM managers in Pakistan to more proactively implement environmental sustainable practices that lead to green practices and firms better green and economic performance.

GSCM practices also help to improve green performance, reduce waste and save costs (Vachon and Klassen 2006a; Chavan, 2005; Geng et al., 2017). Manufacturing companies having an environmental management system (EMS) have shown positive impact on environment. Moreover, EMS has strengthened financial and economic performance of the firms (da Silva and Dumke de Medeiros, 2004). There are few firms in Pakistan having EMS and are ISO 14001 certified. In absence of EMS, rest of enterprises are facing difficulties in global arena. Therefore, the evidence for this research is collected from manufacturing firms based at Karachi, which is termed as the financial capital of Pakistan, where a little research has been carried out. Moreover, this study also indicates that how rapidly changing structure of international markets and demands has forced manufacturer to reshape their entire business processes in order to meet environmental requirement and needs.

2. Theoretical background and development of hypotheses

The concept of GSCM can be broadly classified into internal and external practices; both internal and external GSCM practices may be driven by leadership and institutional pressures. In this research, internal GSCM practices are defined as practices that can be implemented and managed independently by individual manufacturers. External GSCM practices typically require some level of cooperation with external stakeholders or partners such as suppliers and customers. Environmental-related issues discussed in previous studies (Rowland-Jones et al., 2005; Florida and Davison, 2001; Geffen and Rothenberg, 2000; Zhu and Sarkis, 2004; Roehrich et al., 2017; Vanalle et al., 2017) have emphasized on examining the association between environmental factors and their impact on firms' performance. The effect of environmental integration activities on performance was also identified by Zutshi and Sohal (2004) and Vachon and Klassen (2008). They have linked firms upstream and downstream practices with firms' performances. Findings indicate that the impact of horizontal practices is more closely associated with process-based performance, whereas downstream practices are linked with product-based performance.

In this finding, we have developed a theoretical framework model to explain the effects of influential forces and green practices on firm’s green and economic performance. Many organizational theories including transaction cost economics, agency theory and institutional theory have been used to understand how firms implement, incorporate and develop operations strategy initiatives such as TQM (Anderson and Sohal, 1999), GSCM (Lee et al., 2012; Zailani et al. 2012) and Six Sigma successfully within the circumstances of GSCM in a way to fulfill both the customer and legal requirements. Consequently, institutional pressures from national/international regulators and from the government agencies are the drivers to adopt the environmental responsible behavior (Delmas and Toffel, 2004; Zailani et al., 2012; Rivera, 2004). As stated by Scott (2005), institutional theory advised that external forces induce companies to assume similar strategic actions. Under suggested institutional theory, enterprises are not only profit-oriented entities, but also understand the importance of having social legitimacy. Institutional theory has two main forms, a social variant and an economic variant (Schroeder et al., 2005). Zhu and Sarkis (2007) and Geng et al. (2017) have identified a number of findings where institutional theory considered as a key driver that motivates firms to adopt GSCM and also reviewed that firms were mainly affected by the external drivers, including regulation issued by the state. The main concern in these studies is to how companies are being pressurized by the
institutions to implement GSCM. Therefore, institutional theory needs to be explored and studied particularly in developing countries. This study offers contribution to the literature on GSCM and calls for the acceptance of the need for a GSCM model for manufacturing firms in Pakistan.

2.1 Institutional pressures

Role of institutional theory has been increased in the field of organization management and SCM (Kauppi, 2013). Leading manufacturers in developing countries such as China are generally more sensitive to environmental regulations/policies (Zhu et al., 2017). According to Scott (2008), under the influence of institutional theory, external pressures motivate firms to follow and comply with similar strategic actions. Government agencies and regulatory bodies pressurize firms in compliance of their regulations (Delmas and Toffel, 2008).

Increasing concerns for environmental protection in view of the external pressures and market expectations for corporate social responsibility are necessary for social legitimacy (Boiral, 2007; Wu et al., 2012). A previous study determined that firms are likely motivated to adopt green practices in presence of the factors such as requirement of environmental and customer support, along with government pressures (Mathiyazhagan et al., 2014). GSCM is an environmental tool that helps firms to improve the environmental image of the firm and also gain competitiveness within the international business forum (Zhu et al., 2008; Geng et al., 2017).

On the basis of discussion, we therefore coined hypotheses as under:

**H1.** Institutional pressures have significant impact on firm’s external green collaboration.

**H2.** Institutional pressures have significant impact on firm’s internal green practices.

2.2 Leadership

Leadership’s role is very important and constructive in high-performing organization’s operations (Dubey et al., 2015). Kanji and Wong (1999) and Wong et al. (1999) have recognized the leadership’s importance in the model of total quality management. Internal practices such as quality management system, EMS, product design and packaging, etc., can be improved and re-designed with the help of leadership (Beer, 2003; Lakshman, 2006; Karaszewski, 2010). Leadership assists in shaping a quality culture and promoting alliance among partners (Gunasekaran, 1999). While taking initiatives of GSCM, leadership’s role is considered a key driver (Dubey et al., 2015). Sharif and Irani (2012) have highlighted the importance of leadership in achieving green performance in a SCM network. Leadership could help in developing green policies and also assists the firms in implementation of such practices. Therefore, we claim that:

**H3.** Leadership has significant impact on external green collaborations.

**H4.** Leadership has significant impact on internal green practices.

2.3 GSCM and external collaboration

GSCM is a new model for companies to achieve profit and market share objectives by reducing their ecological risks and effects, while improving their environmental efficiency (Zhu et al., 2005; Geng et al., 2017). However, different researchers suggested different dimensions and explanation of GSCM. Zsidisin and Siferd (2001) argued that GSCM includes policies and actions that need to be followed by the enterprises for the protection of natural environment. According to Skjoett-Larsen (2000), GSCM should include each link in the supply chain that starts from procurement of raw material, production, processing, packaging and so on.
Previous studies have shown that firms have high degree of collaboration among internal processes before having external integration (Stevens, 1989; Najmi and Khan, 2017). Few studies are available that establish the relationship between external green collaboration and internal green practices. High level of internal-external integration improves the relationships among the suppliers, partners and customers more effectively (Cohen and Levinthal, 1990; Hillenbrand and Biemans, 2004; Dubey et al., 2015). High level of external integration can be formed through strong internal coordination and interaction among the people (Swink et al., 2005, 2007; Najmi and Khan, 2017). Cross-functional integration is essential for firm’s performance. In cross-functional integration, inter-departmental coordination can be managed (Dubey et al., 2015). But if the businesses are not having cross-functional integration, the business operations will be disrupted and disconnected whereas the firm’s performance will also be affected (Zhang and Zhao, 2011). Internal coordination and teamwork may improve the firm’s capability to coordinate, interact and solve problems with external partners (Koufteros et al., 2005; Gimenez and Ventura, 2005; Zhang and Zhao, 2011). Hence, our findings claim that:

H5. Internal green practices have significant impact on firm’s external green collaboration.

2.4 Internal green practices and green performance
Internal green practices combination can play a pivotal role in improving firm’s performance (Carter and Carter, 1998). Internal green practices are the part of integrated process that is considered to be related to performance (Flynn et al., 2010; Vanalle et al., 2017). Many studies have examined the impact of cross-functional and cross-organizational integration on firm’s performance (Najmi and Khan, 2017). Droge et al. (2004) proved that there is a positive relationship between internal practices and firm’s performance. The impact of green practices can be seen in firm’s efficiency and financial performance and market share (Droge et al., 2004; Geng et al., 2017; Vanalle et al., 2017). Similarly, Pauli (1997) examined that enterprises in west have integrated TQM philosophy with green manufacturing practices and have shown remarkable performance. Thus, in this research we propose that:

H6. Internal green practices have significant impact on firms’ green performance.

2.5 External green collaboration and green performance
Companies usually strategically segment their highly collaborative relationships with supply chain members (Dyer and Singh, 1998; Gimenez and Ventura, 2005; Roehrich et al., 2017). External collaboration enables companies to form collaborative relationships with trading partners, and leverages their core competency while reducing transaction costs (Zhu et al., 2008). External green collaboration involves mutual understanding of environmental risk and responsibilities; conducting joint decision making in resolving environmental problems; sharing resources, skills and knowledge; and achieving environmental common goals, collectively among suppliers, partners, and customers in the supply chain (Roehrich et al., 2017; Vijayvargy et al., 2017). Seuring (2004) analyzed the concept of integrated SCM for reducing environmental burden in the textile industry and concluded that in order to achieve improvement in collaboration with business partners, transparency beyond organizational borders is required.

External collaboration represents a level of SCM (Stevens, 1989; Flynn et al., 2010). Vachon and Klassen (2008) mentioned that green collaboration specifically focused on inter-organizational interactions among supply chain members. Such interactions include joint environmental goal setting, shared environmental planning and working together to reduce pollution or other environmental impacts. These green collaborative activities can benefit supply chain members from an economic and environmental point of view.
Greater collaboration among the members of a supply chain might foster the development of improved environmental practices and reduce pollution (Vachon and Klassen, 2006b; Geng et al., 2017). Rao (2002) pointed out that organizations in South East Asia believe that greening the inbound logistics function has led them to use environmentally friendly raw materials, adopting eco-friendly manufacturing processes, prevention of pollution and waste at the source; whereas greening outbound logistics has led to environmentally friendly waste disposal and mitigation of the effects of pollution through wastewater treatment and abatement of emissions. Such initiatives lead to improvements in environmental performance. Thus, we propose our hypothesis:

\( H7. \) External green collaborations have significant impact on firm’s green performance.

### 2.6 GSCM practices and enterprises’ economic performance

Firm’s economic performance is generally the most important driver for companies to adopt green practices (Zailani et al., 2012). More importantly in developing countries, it is considered that better environmental management may explore new opportunities for exploring new ways to add value to core business programs (Hansmann and Kroger, 2001; Esfahbodi et al., 2016; Geng et al., 2017). The study of Bowen et al. (2001) revealed that economic performance is clearly not being obtained in short-term sales performance and profitability. Alvarez-Gil et al. (2001) identified that environmental management such as GSCM has a positive association with firm’s economic performance.

Based on the literature, we explain advantages that can be gained through GSCM as economic improvements, including decrease in cost of energy consumption, less material purchasing cost, decrease of fees for waste discharge and waste treatment, etc. (Vijayvargy et al., 2017). Hence, many of these GSCM practices are operationally focused and similarly, economic performance measures are also operationally focused, therefore our research hypotheses based on the literature are as follow:

\( H8. \) External green collaborations have significant impact on firm’s economic performance.

\( H9. \) Internal green practices have significant impact on firm’s economic performance.

### 2.7 Green performance and firm’s economic performance

Firm’s economic performance relates to the ability to minimize costs associated with energy consumption, purchased materials, waste treatment, fines for environmental accident and waste discharge (Zhu et al., 2008; Zailani et al., 2012). GSCM including internal and external practices can enhance environmental performance (Esfahbodi et al., 2016; Vijayvargy et al., 2017). Better external and internal linkages can lead to improvement in environmental performance since it is easier for suppliers and customers to interact with each other’s operational requirements (Dubey et al., 2015; Roehrlich et al., 2017). Improved environmental program and performance are the result of the internal and external various elements within GSCM (Darnall et al., 2008; Vijayvargy et al., 2017). Firm’s environmental management practices can enhance corporate image and consumer satisfaction which can bring economic performance (Geng et al., 2017). Combination of environmental management areas and strategic issues is linked with greater environmental and economic performance (Ameer and Othman, 2012). Hence, this study claims that:

\( H10. \) Green performance has a significant impact on firm’s improved economic performance.

### 2.8 Framework model of research

Figure 1.
3. Methodology

The approach used in this research is quantitative. There are several benefits of quantitative research such as development of testing hypotheses before data collection, generalization of results, ability to make quantitative predictions, less time consuming and independent nature of research (Tharenou et al., 2007). The reason behind adaptation of quantitative research is to test the hypotheses with the help of data, collected from respondents and to generalize the result to an entire population.

In order to carry out this investigation, the primary data have been collected from the manufacturing firms who have been experiencing environmental system management and following ISO 14001 standard to meet the environmental issues in their entire supply chain network.

The instrument that is used in this research is structured questionnaire. The questionnaire is adopted from past studies and few changes are made. It contains structured, organized and clear statement to collect response from supply chain experts. Clear and simple words are used to make it easy for respondents to understand the statements. Five-point Likert scale is developed ranging from strongly disagree = 1 to strongly agree = 5. For the validity of questions, approval from three professionals is taken before conducting research. Variables in this research are adopted from sources mentioned in Table I.

4. Data analysis

4.1 Demographic profile

Descriptive statistics (Table II) provides the description of demographic profile about the respondents. It includes: job title, industry classification, number of employees in the firm and their experience.

![Structural model](image)

Notes: LP, leadership; IP, institutional pressures; IGP, internal green practices; EGC, external green collaboration; GP, green performance; EP, economic performance
4.2 Structural equation modeling (SEM)

Structural equation modeling (SEM) is the improved method of multiple regression analysis. In multiple regression analysis, we noticed that the number of dependent variables constricted to one only, whereas in SEM, the number of dependent, mediator, moderator and independent constructs are not restricted. Therefore, it can clearly be perceived that SEM has more sophistication and advanced methodological rigor (Fornell and Bookstein, 1982; Hair et al., 2016; Wong, 2013).

4.2.1 Outer model measurement. Convergent validity. Convergent validity deals with the degree to which two measures of constructs that theoretically should be related are in fact related (Mehmood and Najmi, 2017; Ahmed and Omar, 2018). According to Campbell and Fiske (1959), it is based on the concept that theoretical underpinning for inter-related measures is in fact related statistically. Table III shows the results of average variance extracted (AVE) and composite reliability (CR) as indicators to evaluate the convergent validity.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Composite reliability</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>External green collaboration</td>
<td>0.801</td>
<td>0.575</td>
</tr>
<tr>
<td>Economic performance</td>
<td>0.804</td>
<td>0.577</td>
</tr>
<tr>
<td>Green performance</td>
<td>0.772</td>
<td>0.531</td>
</tr>
<tr>
<td>Internal green practices</td>
<td>0.811</td>
<td>0.518</td>
</tr>
<tr>
<td>Institutional pressure</td>
<td>0.847</td>
<td>0.734</td>
</tr>
<tr>
<td>Leadership</td>
<td>0.729</td>
<td>0.575</td>
</tr>
</tbody>
</table>

Source: Authors’ estimation

Table III. Convergent validity
Table III reveals the outcomes of convergent validity as stated by Hair et al. (2016). First, it is validated through CR which should be greater than 0.7. Second, AVE value should be greater than 0.5, considered as a recognized threshold for convergent validity (Hair et al. 2016; Fornell and Larker, 1981). Table III demonstrates that all the above limits confirm the assumptions of convergent validity.

Discriminant validity. The discriminant validity is defined as the extent to which set of items can distinguish a variable from other variable in the given model (Najmi and Ahmed, 2017). In other words, discriminant validity assesses the existence of variance among studied constructs to ensure their individuality and separate functionality as underpinned by the theory (Bagozzi, 1981; Campbell and Fiske, 1959; Fornell and Larker, 1981).

Discriminant validity can be analyzed through two criteria. First, all the items within the construct should be strongly loaded on their respective construct and the cross-loading must be higher than 0.1 (Gefen and Straub, 2005). Second, discriminant validity approach as suggested by Fornell and Larker (1981). Table IV confirms the discriminant validity as the difference of cross-loadings is exceeding the value of 0.1.

The correlation matrix in Table V has a italic diagonal line of elements representing the square root of AVE with the absolute value of their correlations of the construct in column and rows. The values in the diagonal line are greater than the row and column values confirming the discriminant validity. Therefore, the study constructs have validated Fornell

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>EGC</th>
<th>EP</th>
<th>GP</th>
<th>IGP</th>
<th>IP</th>
<th>LP</th>
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<tr>
<td>External green collaboration</td>
<td>EGC1</td>
<td>0.780</td>
<td>0.297</td>
<td>0.080</td>
<td>0.370</td>
<td>0.310</td>
<td>0.407</td>
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<td></td>
<td>EGC3</td>
<td>0.810</td>
<td>0.377</td>
<td>0.146</td>
<td>0.291</td>
<td>0.315</td>
<td>0.351</td>
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<tr>
<td></td>
<td>EGC8</td>
<td>0.678</td>
<td>0.308</td>
<td>0.254</td>
<td>0.345</td>
<td>0.408</td>
<td>0.365</td>
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<td>EP1</td>
<td>0.293</td>
<td>0.723</td>
<td>0.257</td>
<td>0.391</td>
<td>0.262</td>
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<td></td>
<td>EP4</td>
<td>0.325</td>
<td>0.781</td>
<td>0.377</td>
<td>0.457</td>
<td>0.254</td>
<td>0.319</td>
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<td></td>
<td>EP6</td>
<td>0.368</td>
<td>0.774</td>
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<td>0.471</td>
<td>0.276</td>
<td>0.333</td>
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<td>Green performance</td>
<td>GP5</td>
<td>0.115</td>
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<td>0.234</td>
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<td>GP7</td>
<td>0.197</td>
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<td>GP8</td>
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<td>IGP1</td>
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<td>0.309</td>
<td>0.204</td>
<td>0.714</td>
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<td>IGP3</td>
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<td>0.413</td>
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<td>IGP5</td>
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<td>0.487</td>
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<td>Institutional pressure</td>
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**Source:** Authors’ estimation

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<th>Constructs</th>
<th>EGC</th>
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<th>GP</th>
<th>IGP</th>
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<td>Economic performance</td>
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<td>Green performance</td>
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<td>Internal green practices</td>
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<td>Leadership</td>
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<td>0.192</td>
<td>0.475</td>
<td>0.320</td>
<td>0.758</td>
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</table>

**Source:** Authors’ estimation
and Larcker criterion for discriminant validity. This has also provided substantial foundation for correct factor loadings and constructs development.

4.2.2 The structural model (inner model) and hypotheses testing. After analyzing and establishing outer model, the next step is to examine proposed hypotheses by using SmartPLS 3.2.3 (Ringle et al., 2015). To estimate structural model, partial least squares analysis employs bootstrapping (Haenlein and Kaplan, 2004). Results have been reported in Figure 2 and Table VI, using bootstrap resampling procedure of 5,000 subsamples (Hair et al., 2016).

The results reported in Table VI revealed that external green collaboration has a statistically significant impact on economic performance ($\beta = 0.195$, $p < 0.05$), whereas external green collaboration has statistically insignificant impact on firm’s green performance ($\beta = 0.017$, $p > 0.05$). Moreover, external green collaboration has a statistically significant impact on internal green practices ($\beta = 0.261$, $p < 0.10$), green

![Figure 2. PLS results](image)

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Estimates</th>
<th>SE</th>
<th>t-Stats</th>
<th>$p$-Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGC $\rightarrow$ EP</td>
<td>0.195</td>
<td>0.092</td>
<td>2.117</td>
<td>0.034</td>
<td>Accepted**</td>
</tr>
<tr>
<td>EGC $\rightarrow$ GP</td>
<td>0.017</td>
<td>0.092</td>
<td>0.183</td>
<td>0.855</td>
<td>Rejected</td>
</tr>
<tr>
<td>EGC $\rightarrow$ IGP</td>
<td>0.261</td>
<td>0.14</td>
<td>1.874</td>
<td>0.061</td>
<td>Accepted*</td>
</tr>
<tr>
<td>GP $\rightarrow$ EP</td>
<td>0.199</td>
<td>0.057</td>
<td>3.489</td>
<td>0.000</td>
<td>Accepted***</td>
</tr>
<tr>
<td>IGP $\rightarrow$ EP</td>
<td>0.404</td>
<td>0.075</td>
<td>5.349</td>
<td>0.000</td>
<td>Accepted***</td>
</tr>
<tr>
<td>IGP $\rightarrow$ GP</td>
<td>0.405</td>
<td>0.076</td>
<td>5.315</td>
<td>0.000</td>
<td>Accepted***</td>
</tr>
<tr>
<td>IP $\rightarrow$ EGC</td>
<td>0.333</td>
<td>0.099</td>
<td>3.379</td>
<td>0.001</td>
<td>Accepted***</td>
</tr>
<tr>
<td>IP $\rightarrow$ IGP</td>
<td>0.185</td>
<td>0.111</td>
<td>1.676</td>
<td>0.094</td>
<td>Accepted*</td>
</tr>
<tr>
<td>LP $\rightarrow$ EGC</td>
<td>0.388</td>
<td>0.071</td>
<td>5.453</td>
<td>0.000</td>
<td>Accepted***</td>
</tr>
<tr>
<td>LP $\rightarrow$ IGP</td>
<td>0.286</td>
<td>0.074</td>
<td>3.867</td>
<td>0.000</td>
<td>Accepted***</td>
</tr>
</tbody>
</table>

**Notes:** *$p < 0.10$; **$p < 0.05$; ***$p < 0.001*
performance has significant impact on economic performance ($\beta = 0.199$, $p < 0.001$), whereas internal green practices has significant impact on economic performance ($\beta = 0.404$, $p < 0.001$) and on green performance ($\beta = 0.405$, $p < 0.001$). On the other hand, institutional pressure has a significant impact on external green collaboration ($\beta = 0.333$, $p < 0.05$) and on internal green practices ($\beta = 0.185$, $p < 0.10$). Furthermore, leadership has significant impact on external green collaboration ($\beta = 0.388$, $p < 0.001$) and on internal green practices ($\beta = 0.286$, $p < 0.001$).

The predictive power of construct is evaluated through predictive relevance as shown in Table VII. According to Cohen J. (1988), value of $R^2$ higher than 26 percent is considered to be substantial. Table VII provides somewhat satisfying relevancy of dependent variables to the structural model. It showed that economic performance has most predictive relevance and comprehends that 40 percent of the economic performance can be predicted by the combination of all independent variables. Similarly, external green collaboration showed 34.4 percent predictability by the combination of independent variables. Likewise, 33.7 percent predictability of internal green practices can be assessed by all the independent variables cumulatively. Lastly, green performance indicated lowest predictive relevance of 21.5 percent with the combination of all independent variables.

We have also tested the prediction relevance of our model through $Q^2$. As suggested by Henseler et al. (2009) that $Q^2$ values above 0 indicated that values are well reconstructed and that the model has predictive relevance. In the table $Q^2$ value of all variables is above 0; hence, our model has predictive relevance.

5. Conclusion and recommendations

5.1 Conclusion

In this research, we have empirically investigated the links among leadership, institutional pressure, internal green practices, external green collaboration and green and economic performance in GSCM network in Pakistan. In addition, we have further examined the firm’s economic performance with external green collaboration, internal green practices and firm’s green performance, respectively.

Our findings strengthen and refines empirical work on the integration of internal green practices and external green collaboration in the network of GSCM and on the application of institutional theory in the fields of SCM (Talib et al., 2011; Kauppi, 2013). We have gathered the required data from ISO 14001 certified manufacturing firms situated at Karachi. SEM was employed to test the research hypotheses. Findings indicate that there is significant influence of leadership and institutional pressures on firm’s green practices and all constructs of GSCM practices have significant impact on firm’s green and economic performance. Only one insignificant relationship was found between external green collaboration with green performance which is consistent with results of few past studies conducted by Zhu et al. (2013) and Laari et al. (2016). We have also found the significant relationship in firm’s green performance and economic performance. In short, the adoptions of green practices have improved firms green and economic performance.

<table>
<thead>
<tr>
<th>Variables</th>
<th>$R^2$</th>
<th>$Q^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>External green collaboration</td>
<td>0.344</td>
<td>0.175</td>
</tr>
<tr>
<td>Economic performance</td>
<td>0.400</td>
<td>0.216</td>
</tr>
<tr>
<td>Green performance</td>
<td>0.171</td>
<td>0.085</td>
</tr>
<tr>
<td>Internal green practices</td>
<td>0.337</td>
<td>0.157</td>
</tr>
</tbody>
</table>

Table VII. Predictive relevance
5.2 Managerial recommendations
This study provides practical implications for both manufacturers and policy makers. It also opens additional research avenues for GSCM and corporate environmental management, in general. For managerial implications, manufacturers are given some insights into how they can gain improved economic performance from implementing GSCM.

First, this research emphasized that institutional pressure together with external stakeholder collaboration and willingness with focused leadership is a best recipe to get ideal outcomes both financially and economically. In developing countries like Pakistan, institutional pressure often had a negative impact on financial measures due to lack of willingness and focus. This research enables the manufacturers to make strategies to implement internal green practices and external green collaboration capabilities in their supply chain network to achieve green performance and to improve firm’s economic performance. Second, internal green practices have positive impact on firms’ economic and on green performance. Therefore, we recommend to the supply chain managers and policy makers who intent to implement GSCM in their supply chain network that they should give more focus on internal green practices to achieve better economic and green performance. Third, institutional pressures have significant positive impact on external green collaborations. Therefore, we suggest related bodies to promote GSCM by creating an awareness of the benefits and sharing successful experience. Such promotion can help to alleviate the doubts of the followers about adopting GSCM and reduce their risks perception associated adoption of EMS. These research findings suggest that if firms adopt green supply chain practices this would not only achieve substantial cost savings, but it would also enhance sales, market share and exploit new market opportunities to lead greater profit margins, thus contributing to the economic performance of the firm. The finding also shows that firm’s environmental performance has significant impact on economic performance. Therefore, it is recommended that firms should adopt the culture of green supply chain management propelled by visionary leadership within the industry to overcome the misperception of manufacturer toward the green practices.

In this research, we have tried to highlight the variables such as internal green practices and external green collaboration that impact on green performance and firm’s better economic performance in supply chain of manufacturing industry. The emphasized variables enable manufacturers to make strategies to implement internal green practices and external green collaboration capabilities in their supply chain network to achieve green performance and to improve firm’s economic performance.

Overall, this study provided additional insight into the growing field of the relationships between leadership, institutional pressures, green practices and performance. Clearly, the field of GSCM has ample space to grow in terms of research and practice.

5.3 Future research
This study provides some research directions for the future researchers to explore further GSCM and to gain more insightful results and findings to contribute more extensively in the literature of GSCM and provide in-depth knowledge for the domain of GSCM practices and performance.

This study examines the adoption of GSCM practices for organizations of different sizes drawn from various industry segments. An industry-specific investigation may help these out additional information on industry practices and differences. In the present study, we have considered only two outcome constructs, i.e. green and economic performance, the present model can be further studied using other performance measures, e.g. financial performance, organizational performance and social benefits. A study may be replicated in a specific industry environment to understand the level of difficulty in adopting GSCM practices for organizations of different sizes in detail. As the framework proposed by this
research is generic, this can be used for other developing countries. Lastly, more dimensions of green practices can be considered in future studies so that the possible linkage among different variables in GSCM network can be identified more effectively.

References


Further reading


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