

Ecological Aspect of Green Supply Chain Management a Framework of Manufacturing Industry

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Abstract

The purpose of this paper is to test the impact of green supply chain management (GSCM) and enterprise resource planning (ERP) on environmental performance under the impact of procurement policies (PP) and the moderation effect of regulatory pressure (RP). To investigate the relationship among variables pre-tested questionnaire is used. Data was collected from manufacturing oriented organizations of Pakistan. In this study 202 manufacturing organizations of Pakistan from 24 sectors were selected for data collection. The reliability of the data is checked before testing the hypothesis. Correlation and regression analysis is used to test the significance of hypothesis and all hypothesis are accepted. Our study presents a unique contribution in the theories and practices of supply chain management and environment. This paper helps the managers and regulatory bodies in making decision about the designing of organizational policies in order to improve the environmental performance.

Keywords: Green supply chain management; Enterprise resource planning; Procurement policies; Regulatory pressure; Environmental performance

1. Introduction

Green Supply Chain is one of the most emerging areas in the field of management sciences (Fahimnia, Sarkis, & Davarzani, 2015). The processes of manufacturing or production create great quantities of wastes, in the form of solids, liquids and gases, which are harmful to the earth and to life supported by the earth. According to a report released by (UNEP, 2011), global manufacturing industry consumes 35 per cent of the total electricity consumed worldwide and is responsible for 20 per cent of the world's CO₂ emissions. According to (WHO, 2015) almost 60,000 Pakistanis died from fine particles in the air and that is the highest death rate observed in the world caused by air pollution and manufacturing industries have a dominant role in creating air pollution. The exhaustion of natural resources and environmental protection are the biggest concern now a days, through green supply chain practices contributes in environmental benefits (Zhuo & Wei, 2017).

Top manufacturing organizations of developed countries are more concerned about environmental practices and they proactively take measure to protect the environment (Zhu, Qu, Geng, & Fujita, 2017) but what about developing countries like Pakistan, India and Bangladesh which are more suffered from environmental pollution? By adopting green supply chain management CO₂ emissions can be minimized (Kamal, Irani, Sharif, & Love, 2017). Green supply chain management considers environmental impacts but most of the time organizations failed to implement GSCM because of some difficulties in implementation process (Kaur, Sidhu, Awasthi, Chauhan, & Goyal, 2017). Sari (2017) proposed a framework for the evaluation of GSCM practices which helps in decision making. Green supplier selection drives the performance of GSCM (Roehrich, Hojmosse, & Overland, 2017).

This study specifically focused on green supply chain management practices and its impact on environment in the context of Pakistan along with the role of procurement policies. Most of the researches have proved the relationship supplier selection and supplier relationship between GSCM and environmental performance. Supplier relationship management and TQM integration under the influence of leadership and moderation effect of institutional pressures may help firms as one of their goals to achieve environmental performance (Dubey, Gunasekaran, & Ali, 2014). Aslan, Stevenson, and Hendry (2014) constructed a framework to investigate the links between ERP functionality and performance at a planning stage. Extraordinary growth in human population has been observed in India and other developing countries putting pressure on available natural resources (Luthra, Garg, & Haleem, 2014).

Ince, Zeki, Keskin, and Akgun (2013) integrates all the activities of the SCM and ERP systems and links these activities with competitive advantage and firm performance. Enterprise resource planning (ERP) systems have

been used in integrating information and distribution across functions and departments with the aim to increase organizations operational performance (Shen, Chen, & Wang, 2015). Igel and Kanjanasanpetch (2017) developed a scale to measure the benefits of ERP in developing countries. Environmentally sustainable activities have received an increasing interest among the firms to improve their practices in the supply chain (Rostamzadeh, Govindan, Esmaeili, & Sabaghi, 2014). So, in our research we empirically test the relationship of ERP and environmental performance. We also test the mediating role of procurement policies and environmental performance on manufacturing oriented organizations of Pakistan.

Commitment to corporate social responsibilities are mostly motivated by regulatory pressure (Achabou, Dekhili, & Hamdoun, 2017). Regulatory policies have a substantial impact on GSCM (Zhu, Sarkis, & Lai, 2017). Corporate profitability surely moderates the relationship between legitimacy pressure and green product innovation along with process innovation (Li et al., 2017). In our research we examine the moderating relationship of regulatory pressure between procurement policies and environmental performance.

The objective of our research is to investigate the relationship of GSCM and ERP on environmental performance through the mediation impact of procurement policies and the moderation impact of regulatory pressure on environmental performance in the context of Pakistan. In this study we proposed a comprehensive framework for improving environmental performance and that research could provide a benchmark for those manufacturing oriented organizations who wants to improve their environmental performance. Our contribution will also help regulatory bodies in developing and aligning policies for the improvement of environment.

To complete the investigation of our research the paper is organized as follows. In next section we will discuss the background of related research about GSCM, ERP and environmental performance. In section 3 we will describes the data collection methods and measures for this study. In section 4 we will describes the results in findings, in section 5 we discuss the results and suggestions and in last section we will summarize the issue related to our research and future directions for further researches.

2. Related Research

Over the last few years a rapid interest in the area of environment has been witnessed the fact behind that attention is the environmental legislations in some countries (Glasson, Therivel, & Chadwick, 2013). Organizations are expecting high environmental regulations in coming years and cost cutting is an inspiration aspect from these legislations. (Horbach, Rammer, & Rennings, 2012). The study and management of industrial pollution has been a critical issue for society in these days (Lun, Lai, Ng, Wong, & Cheng, 2011). Environmental management and innovation are predicted to be the most important performance indicators for the competitive advantage of firms in the future (Chiou, Chan, Lettice, & Chung, 2011)

2.1. Supply Chain Management Practices

Supply chain management is defined as "Supply chain management is the design and coordination of a network through which organizations and individuals get, use, deliver, and dispose of material goods; acquire and distribute services; and make their offerings available to markets, customers, and clients" (LeMay, Helms, Kimball, & McMahon, 2017). An efficient supply chain aligns the strategic planning processes with procure, design and deliver the resources (Melnyk, Narasimhan, & DeCampos, 2014). Christopher (2016) refers supply chain management as a core source of competitive advantage. Green supply chain management is considered as a dimension of supply chain management and that concept must be extended to other supply chain partners (Green Jr, Zelbst, Meacham, & Bhadauria, 2012).

2.2. Green Supply Chain Management

According to Zelbst, Green Jr, Sower, and Baker (2010) supply chain management is the integration of logistics, manufacturing, purchasing and marketing through rapid information sharing. The implementation of green supply chain management improves environmental performance and that have a significant impact on operational performance (Green Jr et al., 2012). Sarkis, Zhu, and Lai (2011) defines green supply chain as "integrating environmental concerns into the inter-organizational practices of SCM including reverse logistics". Hu and Hsu (2010) proposed some factors which are critical for employing green supply chain management these factors were supplier management, product recycling, organization involvement and life cycle management. According to Tseng and Chiu (2012) "redefine operation and production processes to ensure internal efficiency that can help to implement GSCM, redesigning and improving the product or service in environmental directives, reduction of hazardous waste, emission, etc., less consumption of e.g. water, electricity, gas and petrol, install EMS and ISO 14000 series, providing environmental awareness seminars and training for stakeholders, advanced green production technology, recycle,

reuse and remanufacture material, use of cleaner technology such as energy, water and waste, sending in-house auditor to appraise environmental performance of supplier, process design and innovation and enhances R&D functions, Low cost green provider: unit cost versus competitors' unit cost, degree of new green product competitiveness understand customer needs, evaluation of technical, economic and commercial feasibility of green products, recovery of company's end-of-life products and recycling, innovation of green products and design measures, investment in green equipment and technology, implementation of comprehensive material saving plan, management of documentation and information". The concept of green supply chain comprised on the bases of multiple flows like materials flows, services flows, financial flows, information and waste flows (Sarkis, 2012). Wu, Ding, and Chen (2012). Jia and Bai (2009) argues about the importance of information system and its contribution in GSCM. According to above statements this research assumes that procurement policies contributes in the accomplishment of GSCM practices as the supplier evaluation, selection and development processes purely depends on the procurement policy of the organization, this research presents the following hypothesis:

H1: The green supply chain management practices positively related to the environmental performance of the manufacturing oriented organizations in Pakistan.

2.3. Enterprise Resource Planning

ERP belongs to a multi-dimensional area along with exceptional growth rate is observed. ERP system is a tool which can be used for competitiveness in multiple industries. ERP system is an enterprise-wide information system that integrates and controls all the business processes in the entire organization (Addo-Tenkorang & Helo, 2011). It is difficult to retrieve the benefits of ERP systems most of the researches covers the implementation and technical issues faced by the organizations (Abugabah & Sanzogni, 2010). ERP cloud is a new invention in the field of information technology and that can be a good opportunity for SME's to take benefits from that development without any significant cost but ERP adoption decision is not influence by competitive pressures and stakeholders (Seethamraju, 2015). Morris (2011) claim that through the use for ERP system internal organization control can be improved. The tangible benefits of ERP are reduction in procurement cost, financial cycle time reduction, improvement in productivity; cost saving through personnel reduction and cost reduction in IT (Annamalai & Ramayah, 2011). Present study investigates the influence of ERP system on the procurement policies of manufacturing sector of Pakistan. ERP system is a fundamental element of supply chain management as the performance of supply chain can be improved by the adoption of ERP system (Su & Yang, 2010). ERP allows the organizations to reduce the transaction costs of the business and improve its productivity, customer satisfaction and profitability (Beheshti & Beheshti, 2010). Seethamraju (2015) stated the multiple benefits of ERP like standardized and integrated information, data capturing, automation and improve information visibility. The above mentioned facts comprehensively conclude the internal benefits of ERP system but they cannot retrieve the external benefits of ERP especially in the area of environmental performance. Our research investigates the impact of ERP on environmental performance of manufacturing sector of Pakistan. So on the behalf of above argument our research derives the following hypothesis:

H2: The enterprise resource planning positively related to the environmental performance of the manufacturing oriented organizations in Pakistan.

2.4. Procurement Policies

Supplier's environmental performance evaluation is almost a mandatory part in current times. Reduction in environmental harmful wastes having green products and technologies are now part of supplier selection criteria. Organizations have implemented several checks to confirm the material which they acquiring came those suppliers which follow environmental standards (Awasthi, Chauhan, & Goyal, 2010). Growing concerns towards environmental issues make customers more conscious which intern lead towards the purchasing from those suppliers which follows environmental regulations. Buyers and supplier have to work collaboratively for the improvement of product design and manufacturing processes in compliance with environmental protection (Chiou et al., 2011). The sustainable procurement policy has more impact on green procurement practices in most of the countries (Walker & Brammer, 2012). Wong, Lai, Shang, Lu, and Leung (2012) declared the moderating role of environmental management capability of suppliers on pollution reduction. Environmental management capability of suppliers is based on their ability to respond to the environmental concerns of their buying firms those competence of suppliers are consists on their adoption of an environmental management standard assessment of their suppliers environmental performance and environmental policy that in return minimizes the negative impacts on environment (Corbett & Kirsch, 2001; Klassen & Vachon, 2003; Lu & Weng, 2007). A single organization cannot meet the expectations of the customer; it can be done through

collaborative efforts of suppliers. Vonderembse and Tracey (1999) stated the mediating role of supplier performance between supplier selection criteria and manufacturing performance. Management must focus on supplier evaluation and selection criteria by considering multiple dimensions which can include quality and performance of product and delivery reliability. Thus the manufacturing organizations of Pakistan considering the environmental management capabilities of suppliers as a part of their supplier selection criteria in procurement policies if not then how can suppliers environmental capabilities will improve. Awasthi et al. (2010) proposed an approach for evaluating environmental performance of suppliers and they suggest approach should be a part of supplier selection criteria but how can we know that manufacturing sector of Pakistan is adopting these approaches as part of their procurement policies. Our research exploring the procurement policies of manufacturing oriented organization in Pakistan and their impact on the environmental performance. Through all the above arguments our research considers the following hypothesis:

H3: Mediating role of procurement policies between green supply chain management and environmental performance.

H4: Mediating role of procurement policies between enterprise resource planning and environmental performance.

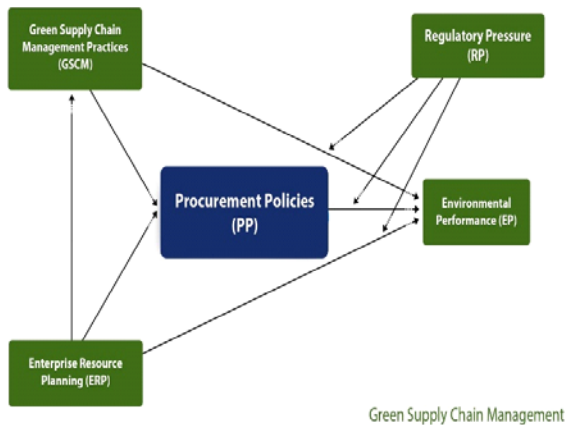
2.5. Regulatory Pressure

The regulatory pressure increases the attention of management towards regulations; the regulatory pressure has positive moderating effects on the relationships between green supply chain management practices (Wu et al., 2012). Institutional theory influences the organizations strategies and policies in managing supply chains (Kauppi, 2013). Strong Political parties influence the organizations towards formal compliance with government institutions, the firms which operates on mass geographical areas are more likely to compliance with institutions (Berrone, Cruz, Gomez-Mejia, & Larraza-Kintana, 2010). Yalabik and Fairchild (2011) examines the regulatory and competitive pressures on the corporate sector investment in environmental innovation organizations face pressure from consumers as well as from regulators. Environmental management capability suppliers moderates the relationship between process stewardship and financial performance (Wong et al., 2012). Clemens and Douglas (2006) quantified the institutional pressures had moderating effects between superior firm resources and environmental management practices. Wu et al. (2012) stated that the regulatory pressure and social capital have significant impact on green purchasing. ERP adoption decision is not influence by competitive pressures and stakeholders (Seethamraju, 2015). According to above arguments and evidences regulatory pressure has significant moderating impacts on many multiple extents, that research will examine the role of regulatory pressure towards the deployment of ERP system and their impact on environmental performance. Manufacturing oriented organizations of Pakistan must align their procurement policies in accordance with regulatory pressure which in return improves the environmental performance. The moderating role of regulatory pressure drives the supply chain members towards the implementation of GSCM (Darnall, Jolley, & Handfield, 2008). This study examines the intensity of regulatory pressure on green supply chain management practices in Pakistan and their impact on environmental performance. On the bases of above statements this research conceives the listed hypothesis:

H5: Regulatory pressure moderates the role of environmental performance and procurement policies.

2.6. Environmental Performance

Lean manufacturing has positively relation with environmental practices and environmental performance significantly condense the negative impact of environmental practices on market performance, organizations need to measure environmental performance so, business related performance outcomes would observed (Yang, Hong, & Modi, 2011). Jacobs, Singhal, and Subramanian (2010) analyzes the value effects of shareholder on environmental performance through stock market response related to the declarations of environmental performance. Organizational citizenship behavior of employees towards environment leads to positively affect environmental performance (Paillé, Chen, Boiral, & Jin, 2014). External institutional drivers can influence the environmental performance of an organization (Hanim Mohamad Zailani, Eltayeb, Hsu, & Choon Tan, 2012). Incorporation of HR, SCM, and IT is mandatory for firms to develop sustainability capacity which in return provides them competitive advantage (Dao, Langella, & Carbo, 2011). Information systems and other functional areas have to work towards the achievement of environmental sustainability (Elliot, 2011).



3. Methodology

This section describes the questionnaire design, data collection, data characteristics, factor analysis and descriptive statistics analysis.

3.1. Instrument development

This research explores the ecological aspects of GSCM practices of manufacturing oriented organizations of Pakistan. To test the hypothesis as discussed in previous section we conduct extensive literature review for the adoption of different questionnaires from previously conducted related researches. After finalizing the questionnaire we pre-tested it with seven experts (four from industry and three from academia) to ensure the questions are relevant to their operations, well-understood, interpreted consistently and content validation. All the suggestions from the experts are incorporated in the questionnaire before data collection. All the items of the questionnaire are measured by the five point Likert scale.

3.1.1. Independent variables

Green supply chain management practices are conceptualized as internal environmental management, green purchasing, cooperation with customer, eco-design and investment recovery. Total 18 item measurement scale is adopted from Zhu, Sarkis, and Lai (2008). We asked respondents to assess their firms on these items using a five-point scale: 1 = not considering it, 2 = planning to consider, 3 = considering it currently, 4 = initiating implementation and 5 = implementing successfully (Zhu et al., 2008).

Enterprise resource planning is conceptualized on the bases of 10 items adopted from Esty and Winston (2009). Green Jr et al. (2012) also used the same adopted item is their research for the construct of information systems. We asked respondents to assess their firms information system by using a 5-point Likert scale, from strongly disagree to strongly agree.

3.1.2. Mediating variable

Procurement policy of the organization in relationship with environmental performance consist of environmental performance of supplier, environmental collaboration with suppliers, technological integration with suppliers, training and education of suppliers in implementing ISO 14001, environmental audit of suppliers, suppliers comply with child labour laws and purchases from minority/women-owned business enterprise (MWBE) suppliers. Procurement policy is measured with seven items from environmental performance of supplier to environmental audit are adopted from Dubey et al. (2014) and two items are child labour laws and MWBE and adopted from Carter and Jennings (2004). All the items are measured on five point Likert-scale with 1 = strongly disagree and 5 = strongly agree.

3.1.3. Moderating variable

Regulatory pressure performs a moderating role in our research it is based on six items “the green environmental management of our firm will be influenced by central government’s environmental regulations”, “the green environmental management of our firm will be influenced by regional government’s environmental regulations” and “the green environmental management of our firm will be influenced by buyers environmental regulations” are adopted from Wu et al. (2012). The remaining three item are adopted from Dubey et al. (2014) consists on “is regional pollution control board pressurizing the firm to adopt green practices”, “does

Government regulations provide clear guidelines in controlling pollution level” and “does green practices decrease incidence of penalty fee charged by pollution control board”. All the items are measured on five point Likert-scale with 1 = strongly disagree and 5 = strongly agree.

3.1.4. Dependent variable

Environmental performance is conceptualized on eight items e.g. “our firm reduce air emissions”, “our firm reduce effluent waste”, “our firm reduce solid wastes”, “decrease in consumption for hazardous/harmful/toxic materials”, “decrease in frequency for environmental accidents” and “improvement in an enterprise’s environmental situation” are adopted from Zhu et al. (2008). The remaining two items are adopted from Wagner and Schaltegger (2004) which are “reduction in use of water” and “reduction of noise”. All the items are measured on five point Likert-scale with 1 = strongly disagree and 5 = strongly agree.

3.2. Data and sample characteristics

Industry Category	Number
Textile spinning	42
Textile composite	25
Sugar & allied industries	16
Chemical	14
Cement	11
Power generation & distribution	10
Food & personal care products	10
Engineering	10
Textile weaving	8
Pharmaceuticals	6
Oil & gas companies	6
Automobile assembler	6
Synthetic & rayon	5
Paper & board	5
Glass & ceramics	5
Automobile parts & accessories	5
Cable & electrical goods	4
Vanaspati & allied industries	3
Fertilizer	3
Tobacco	2
Refinery	2
Leather & tanneries	2
Woolen	1
Jute	1
Total	202

The data used in this research is comprised of survey questionnaire responses from managers and senior managers in Pakistan manufacturing and processing industries. These industries were selected because they are witnessed to have the most direct and observable impact on the environment. There are over 400 listed goods manufacturing firms with 24 sectors in Pakistan based on the information provided by Pakistan stock exchange (PSX). Last census of manufacturing industries was done in 2005-06 by federal bureau of statistics Pakistan. The recent census on manufacturing industries was done in 2015-16 but the report of current census is not published yet by Pakistan Bureau of Statistics as mentioned on their website. So, to avoid ambiguous information we have to rely on the information provided by PSX. We estimated our target sample size by using the formula of Yamane (1967), according to that we determined a sample size of roughly 202 to give a 95 per cent confidence level. 160 complete and usable questionnaires we received back and the response rate is 79% which is surprisingly high. However, other recent studies in the field of SCM have validated that a sample size of 150 is sufficient to test research hypotheses (Braunscheidel & Suresh, 2009; Hair, Halle, Terry-Humen, Lavelle, & Calkins, 2006; Schoenherr & Mabert, 2008).

4. Results and Findings

In this section we will interpret the results and findings of our study. Table 1 shows the mean and standard deviation of each variable. All the variable has mean about the 3, which means that average responses of the respondents are in the agree region. Standard deviations of all the variables are below 1 which means that there is small variation in the responses with respect to mean.

Correlation table provide us initial support that either our hypothesis is going to be supported or not. GSCM has its degree of association with EP because $p < 0.05$, and person correlation value is close to +1, which means that their association is strong, in the same way association of ERP-EP, GSCM-PP, ERP-PP, PP-EP, and RP-EP has degree of association due to $p < 0.05$ and its strong association because Pearson correlation value is close to +1

Table 1: Mean Standard Deviation and Correlation Coefficients

	Mean	S.D.	1	2	3	4	5
GSCM	3.57	0.85	(0.798)				
ERP	3.59	0.84	.593***	(0.796)			
PP	3.60	0.96	.505***	.564**	(0.756)		
RP	3.66	0.85	-.93 ^{n-s}	-.126 ^{n-s}	-.88 ^{n-s}	(0.715)	
EP	3.32	0.93	.511**	.53**	0.60**	0.577**	(0.826)

GSCM= Green supply chain management, ERP= Enterprise resource planning, PP= Procurement policy, RP= Regulatory pressure, EP= Environmental performance, ***shows $p=0.000$, **shows $p < 0.05$

Table 2 shows the regression analysis of the study variables. Table 2 shows direct relation (simple regression) of the variable which shows that Green supply chain management has significant positive impact on Environmental performance which is shown by $\beta=0.573^{**}$, This means that $p= 0.000$, and β has positive sign which means that they are positively correlated with each other. So H1 of our study is being supported by the data which is Green supply chain management has significant positive impact on Environmental performance. This means that by enhancing the Green supply chain management of the brand the Environmental performance is also rise up.

Table 2 shows that ERP is significant and positively related to the Environmental performance ($B=0.515$, $p < 0.05$). So the H2 of the study is also supported by data. Table also shows that regulatory pressure also has a significant ($P < 0.05$) and positive ($B=0.545$) relation to environmental performance. Table also shows that procurement policy also has significant positive related to environmental performance ($B=0.651$, $p < 0.05$).

Table 2 also shows that procurement policy mediates the relationship of Green supply chain management and environmental performance because after placing procurement policy in this relationship the relations remain significant which means procurement policy partially mediates the relationship of Green supply chain management and environmental performance, So H3 of our study also get supported by our data. Table also shows that procurement policy also mediates the relationship of Enterprise resource planning and environmental performance, because after placing procurement policy in this relation, this relation remains significant so it means procurement policy partially mediates the relationship of Enterprise resource planning and environmental performance, so H4 of our study get supported from our data.

Table 2: Regression analysis of study variables

	β	EP	R Square	Change in R Square
Step 1 Controls			0.038	
Step 2				

GSCM	0.573**	0.369	0.332
ERP	0.515**	0.262	
RP	0.545**	0.33	
Step 1			
Controls		0.046	
Step 2			
PP	0.651**	0.414	
Step 3			0.222
GSCM	0.343**	0.112	
ERP	0.223**	0.239	

GSCM= Green supply chain management, ERP= Enterprise resource planning, PP= Procurement policy, RP= Regulatory pressure, EP= Environmental performance, **shows p=0.000, *shows p<0.05

In order to prove the moderation firstly, we have to make the interactional term (Procurement policy x Regulatory pressure) and then apply simple regression on Interactional term (PP*RP) and dependent variables (Environmental performance). Table 3 shows that interactional term (PP*RP) is also significant with Environmental performance which shows that regulatory pressure moderates between the relationship of procurement policy and environmental performance so our H5 of the study also supported by our data which means that regulatory pressure moderates between the relationship of procurement policy and environmental performance.

Table 3: Moderation

	β	R Square	t	F
PP*RP	0.072**	0.261	9.158	83.87

Graph 1

In moderation analysis when moderation proves then we have make graph. Above graph shows that when the regulatory pressure is higher than the regression line of PP and EP is more steep which shows that at High regulatory pressure, this PP-EP relationship becomes stronger while the relationship becomes weaker in case of low regulatory pressure as the PP-EP relationship become weaker which is shown by the less steepness of regression line.

5. Discussion of results and suggestions

Green supply chain management has a significant positive relationship with environmental performance in the context of Pakistan, if a firm wants to improve its impact on environment then that firm has to adopt the philosophy of green supply chain management. The relationship between green supply chain management and environmental performance was also proved in previous research in multiple countries (Green Jr et al., 2012; Zhu & Sarkis, 2004; Zhu et al., 2008). Enterprise resource planning has a significant impact on environmental performance and that outcome of our research is a unique contribution in previously tested theoretical models. However the relationship between green information system and environmental impact was tested in (Jenkin, Webster, & McShane, 2011). ERP perform a substantial role in environmental performance, firms can improve the environmental performance by implementing ERP system.

Procurement policies perform a mediating role between green supply chain management practices and environmental performance. So, organizations have to revise their procurement policies to gain a better control on the environment. Environmental practices of the suppliers has been considered before selecting a supplier (Zhu, Qu, et al., 2017), develop collaborative relationship with existing suppliers by making a cross organizational teams (Berntsen et al., 2017) with the object of environmental improvement, encourage supplier to implement ISO 14001 and conduct environmental audit of the suppliers. These suggested procurement policies have an immediate impact on environmental performance.

If an organization wants to optimize the impact of ERP on environmental performance then they have to redesign their procurement policies because procurement policies perform a mediating role between environmental performance and ERP. By integrated their ERP system with the information systems of suppliers environmental performance can be improved (Vargas & García, 2017). With the help of integrated ERP system with suppliers can improve information flows (Eid & Abbas, 2017) and through improved information flow wastages can be reduced and eventually environmental performance will be improved.

Our research investigates that the regulatory pressure moderates the role of procurement policies and environmental performance. Currently many cities of Pakistan wedged with heavy pollution which is consider as smog (Arif, 2016). 60,000 Pakistanis died from the high level of fine particles in the air and that is the world's highest death rate caused by air pollution (WHO, 2015). Air pollution is caused by road dust, construction dust, vehicle emissions and industrial emissions (bank, 2014). According to the findings of our research environmental performance can improved by deploying stringent regulatory standards for procurement policies, with the help of that industrial emissions can be reduced.

6. Limitations and future research

We proposed a comprehensive model to improve environmental performance through green supply chain management but our study have some certain limitations. We collect data only from those organizations which are registered in Pakistan stock exchange, a large number of manufacturing organizations specially small and medium size organizations were not targeted in our research. Our research is based on adopted items from previously conducted researches that are another limitation of the study. In our research only large size manufacturing organizations were targeted, service oriented organizations as well as small and medium size organizations have to be target for future researches. In our research we only use two independent variables like GSCM and ERP in future multiple dimensions can be explored by using manufacturing practices, logistics

in term of warehouses and transportation. Different moderators can also be used in future research like social pressure and customer pressure.

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