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The role of environmental uncertainty, green HRM and green SCM in influencing organizations energy efficacy and environmental performance

International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Lee, Hoyoung (2020). The role of environmental uncertainty, green HRM and green SCM in influencing organizations energy efficacy and environmental performance. In: International Journal of Energy Economics and Policy 10 (3), S. 332 - 339. https://www.econjournals.com/index.php/ijeep/article/download/9221/5031. doi:10.32479/ijeep.9221.

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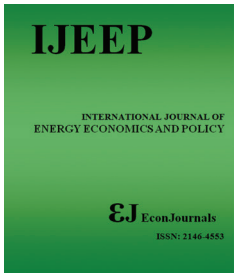

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2020, 10(3), 332-339.

The Role of Environmental Uncertainty, Green HRM and Green SCM in Influencing Organization's Energy Efficacy and Environmental Performance

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Received: 13 November 2019 **Accepted:** 01 February 2020 **DOI:** https://doi.org/10.32479/ijeep.9221

ABSTRACT

Environment sustainability is becoming a global issue which urge the organizations to transform their existing operations towards more environmental friendly. It is not just required by the regulatory bodies by the end consumers also demands manufacturer to produce more environment friendly goods. Hence the present research studies the role of Green Supply Chain Management (GSM), Green Human Resource Management (GHRM) and Environment Uncertainty was examined and their effect on Environment performance and energy efficiency was evaluated. By employing quantitative research methodology, by means of survey questionnaire the data was collected and the sample of 378 was driven on which PLS-SEM was applied as statistical technique. The results have shown the significantly positive role of GSM, GHRM and ENUN on ENPR and ENEF. The study conclude that the organizations should implement more green initiatives in the SCM, human resources and other financial resources for the human health and environment.

Keywords: Green Supply Chain Management, Green Human Resource Management, Environment Uncertainty, Environment Performance, Energy Efficiency
JEL Classifications: O13, O44, D20

1. INTRODUCTION

Environmental sustainability is becoming an emerging global problem which lead organizations to focus on it in order to persist competitive and survive in a rapid change business setting (Paillé et al., 2014). In addition to this, environmental concerns are also raised by the relevant stakeholders including customers, suppliers, regulatory and law enforcement agencies, which makes organizations to attentively manage their existing business operations efficiently, while mitigating the possible threats to the human health and environment (Burritt and Schaltegger, 2010; Rodrigue et al., 2013; Ahmed et al., 2018).

For the said purpose, different MoUs and agreements have been signed by the different countries across the world so that they can effectively counter the environmental threats caused by themselves (Ahmed et al., 2018). One of the most standing and reputed agreement from those MoUs and agreements signed is the "Kyoto protocol" which was signed in 1992 and of which 130 countries are signatories. All of the participants mutually agreed that they will improved their existing operations so that they can eventually reduce their emission level by 5% in comparison to their level at the year ended 1997. Moreover, all the participants were also given a targeted cut of emissions. In addition to this, when these countries meet in the second round of amendment at Doha at the conference on "Kyoto protocol" in the year 2012, they agreed to reduce the level of emissions by 18% as compared to the level they had in 1990 and they further agreed to do this within the span of 8 years starting from 2013.

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In such scenario, green supply chain management (GSCM) progressed as emerging concept among organizations with an objective to maximize the revenue and profits while improving the environmental performance, so that organizations can have their level of profits with a least possible threat to human health and environment (Roehrich et al., 2017; Govindan et al., 2014). In recent times, the philosophy of GSCM is gaining more attention by the researchers and academicians of logistics, operations, and supply chain (Feng et al., 2018). The GSCM has been defined as the managing the flows of goods and services in an efficient manner by reducing the adverse effects to the environment (Klassen and Johnson, 2004; Thun and Müller, 2010; Solér et al., 2010; Yu et al., 2014).

In addition to this, an organization capability to remain competitive in the business environment can be improved if the management has a quality information of the upcoming market trends and changes (Latan et al., 2018). This quality information can further improve a manager's tendency to predict the future needs timely which makes the execution process timely and easy (Cadman et al., 2016). Even though, the scenario pertaining environment uncertainty is always there. Such environment uncertainty either can be natural which includes natural disasters and climatic change etc., or it can be market oriented which includes change in human need and demands, challenges by the competitors, advancement in technology, in any case, these environment uncertainty forces organization to respond to it either in present or future (Pondeville et al., 2013). Moreover, responding to the existing environment uncertainty leads to further change the environment and therefore needed to monitor and required timely actions (Chang and Deegan, 2010). Nevertheless, in order to remain competitive, an organization capability to respond to the environment uncertainty also depicts the chances of the organizations of future growth and survival (Latan et al., 2018).

An organization can only become an environmental friendly when it has fully committed top management, which transforms the existing corporate strategy into environment friendly, re-allocate the resources for the betterment of both organizational and environment performance (Latan et al., 2018) and have an human resource that also equally committed to the green initiatives (Tang et al., 2018). Moreover, human resource are termed as fundamental element in achieving environment sustainability (Daily and Huang, 2001; Jackson et al., 2011). Since human resources is an essential element for achieving organizational competitiveness because of the exclusiveness and value (Wright et al., 2001), therefore in order to implement environmental management successfully, the role of human resource is of vital importance (Daily and Huang, 2001; Tang et al., 2018). Moreover, Mishra et al. (2014) urge the integration of green concepts into the domain of human resource and termed it as Green Human Resouce Management (GHRM). GHRM means the process of recruiting, selecting, training and performance evaluation of the human personnel with the environment friendliness objectives (Jabbour et al., 2013; Renwick et al., 2013). Moreover, according to Renwick et al. (2013), the focus of GHRM is the prevention and elimination of pollution from the organizational operations, which makes it different from the conventional HRM.

On the other hand, green practices and initiatives taken by the organizations helps them to improve their environmental performance by promoting green, reducing waste, maximizing efficient utilization of resources and saving costs (Geng et al., 2017; Vachon and Klassen 2006; Chavan, 2005). It has also been reported that organizations that successfully implement Environment Management System (EMS) within and across the supply chain helps them in strengthening their economic, financial and energy efficiency and performance (da Silva and Dumke de Medeiros, 2004). Organizations who fails to have EMS or taking environment initiatives found very difficult for themselves to compete in the global environment.

Many studies have been conducted across the globe that examines the role of green practices including GSCM, GHRM and the situation of environment uncertainty, on environment and energy performance and efficiency, however they have reported different and mixed results (Zhu et al., 2013; Tseng et al., 2015; Vijayvargy et al., 2017). Moreover, with the recent advancement in the environment there is still a need to explore the role of aforementioned green practices in environment and energy performance and efficiency that the present study intends to do. This leads to following research questions:

RQ1: What is the role of Green HRM practices, Environmental Uncertainty and Green Supply Chain Management in improving Environmental Performance?

RQ2: What is the role of Green HRM practices, Environmental Uncertainty and Green Supply Chain Management in improving Energy Efficiency?

In the rest of the study, review of related literature is discussed, followed by methodology, after that estimations are reported, findings are discussed and concludes the study by recommendations and directions for future research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The present study employs natural resource based view (NRBV) as the theoretical lens. NRBV is originally proposed by Hart (1985), according to whom, in order to remain competitive in the market, resources utilization should be done in a way that cannot be easily replicated by the competitors along with the integrating pollution elimination strategy that need to be implemented across the value chain (Hart and Dowell, 2011). Various researchers have employed the NRBV and concluded that integration of environmental orientation can help an organization to maintain the environmental sustainability both financially and ecologically (Aragón-Correa et al., 2008; Darnall and Edwards, 2006; Christ and Burritt, 2013; Journeault, 2016; Hofmann et al., 2012). Therefore, based on the literature findings the NRBV found to be most relevant in accordance with the objective of the present study.

2.1. Green Human Resource Management, Environment Performance and Energy Efficiency

GHRM refers to the human resource practices including staffing, selection, training, employee performance evaluation with the

further integration of environment orientation (Renwick et al., 2013; Mishra et al., 2014; Boiral, 2002). In addition to this, GHRM is different from the conventional HRM in a way that conventional HRM only deals with the efficient management of internal organizational processes by the human personnel whereas GHRM has an advantage of benefitting to the external stakeholders (Tang et al., 2018; Jackson et al., 2011). Precisely in GHRM, while recruiting potential candidates, only those will be attracted and selected that are devoted to the environmental issues (Ahmad 2015; Jackson et al., 2011; Jabbour et al., 2008). Green training which includes briefing and creating awareness among the employees for environmental management and possible pollution prevention (Jabbour, 2011; Fernández et al., 2003; del Brío et al., 2007). Green performance management which denotes the human personnel performance evaluations based on their contribution in environment management (Zibarras and Coan, 2015; Jackson et al., 2011). Green rewards which includes both financial and non-financial that are being awarded to the employees in order to keep them motivated while performing environmental management activities (Jabbour et al., 2013; Mandip, 2012). Thus all these GHRM practices have a common goal i.e. acheivneing environment sustainability, thus have a tendency to improve an organization environment performance and energy efficiency. Therefore it has been hypothesized as:

H_1: GHRM has a significant impact on environment performance

H_2: GHRM has a significant impact on energy efficiency

2.2. Environment Uncertainty, Environment Performance and Energy Efficiency

As mentioned earlier, Environment Uncertainty reflects to the situation involving both natural and/or un-natural, which have the tendency to affect organizational present and future financial performance and sustainability (Latan et al., 2018; Pondeville et al., 2013). Moreover, a firm lacking to respond timely to such environement ambiguity to majorly due to lack of quality information processing and sharing among supply chain partners which eventually cause disruptions across the supply chain (Şahin and Topal, 2019). According to Torkul et al. (2007) an organizational tendency to respond to the market uncertainty can be improved by strengthening responsiveness, organizational productivity and efficiency and supply chain agility which can be possible due to improvement in information processing and sharing. Moreover, researchers are in agreement that environmental uncertainty can have significant adverse effects over company's financial, operational and environmental performance unless information processing, information sharing, collaboration and coordination among supply chain stakeholders are being done (Baihaqi and Sohal, 2013; Erjiang et al., 2016; Zhang and Xiong, 2017; Lee and Rim, 2016; Hung et al., 2011; Tao, 2009). In addition to this, continuous mitigation of environment uncertainty through proper information sharing also leads an organization to improve their environment performance and energy effeciecny (Latan et al., 2018). This is because, when an uncertainty related to environment persist, an organization can efficiently utilize their resources to mitigate the potential threat whereas timely re-allocation of the resources can improve the energy efficiency as the energy usage generating more pollution can also be eliminated (Ninlawan et al., 2010; Latan et al., 2018; Feng et al., 2018; Sahin and Topal, 2019). Therefore following hypotheses are proposed:

H_3: Environment Uncertainty has a significant impact on environment performance

H_4: Environment Uncertainty has a significant impact on energy efficiency

2.3. Green Supply Chain Management, Environment Performance and Energy Efficiency

Researchers, academicians and practitioners have shown a great interest in the area of GSCM since last decade (Wittstruck and Teuteberg, 2012; Pagell and Wu, 2009; Harms et al., 2013; Carter and Rogers, 2008). GSCM is a subset of sustainable of supply chain management, where organization emphasized on implementing environmental orientation not just within the organization i.e. functional level but across the supply chain involving external stakeholders like customers, suppliers etc., (Wong et al., 2014; Rao and Holt, 2005; Green et al., 2012). Moreover, the desired economic benefits can only be attain when organization successfully coordinate and align the departments within the organization through cross functional integration and outside the organization through cross-company integration (Zhu and Sarkis, 2004; Yu et al., 2014; Walton et al., 1998; van Hoek, 1999). Despite of the need of GSCM for the environmental performance and energy efficiency, researchers are in disagreement with respect to the findings of the aforementioned relationships (Yang et al., 2011; Golicic and Smith, 2013; Eltayeb et al., 2011). Through GSCM the threat to the environment can be decrease because the coordination among the stakeholders will eventually coordinate and complement with each other and ensure the prevention of environment degradation across all the business processes (Zhu et al., 2010; Lai and Wong, 2012; Zhu and Sarkis, 2004; Ahmed et al., 2019; Zailani et al., 2012; Green et al., 2012). Therefore based on the discussion, following hypotheses are proposed:

H_5: GSCM has a significant impact on environment performance

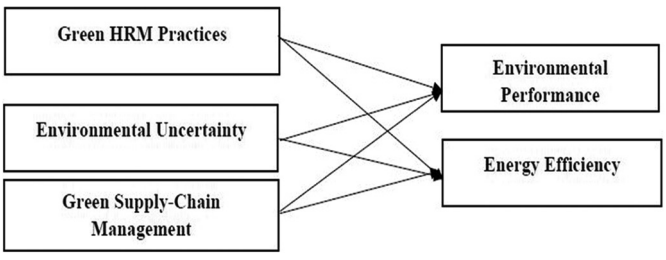
H_6: GSCM has a significant impact on energy efficiency

Based on the abovementioned discussion and hypotheses proposed, the framework of the study is shown in Figure 1.

3. METHODOLOGY

In the present study, the quantitative research approach was used in which survey methodology was employed. Through this methodology the data is collected from a sample which is a true representative of the population and then analyse, which helps

Figure 1: Framework of the study



in generalizing the findings from the sample to the population (Tharenou et al., 2007). For the data collection, a questionnaire was designed from the measuring scales that were adopted from the literature which have shown consistent results. All measuring items were measured on a 5-point Likert scale ranging from 1 for "Strongly Disagree" to 5 for "Strongly Agree." The sources of the measuring items are summarized in Table 1.

After developing the survey questionnaire, it was administered to the potential respondents who are the experts of their field, have the knowledge of the field and can understand the gist of the present study. Around 500 questionnaires were distributed of which 398 was received. After eliminating the outliers and the questionnaires having missing values, the final sample comprised of 378 respondents. The demographics of the respondents are depicted in Table 2.

Table 1: Source of instrumentation

Construct	Source
Green supply-chain management	Feng et al. (2018)
Green HRM practices	Tang et al. (2018)
Environmental uncertainty	Latan et al. (2018)
Environmental performance	Feng et al. (2018)
Energy efficiency	Ninlawan et al. (2010)

Table 2: Descriptive statistics (n=378)

	Frequency	Percent
Gender		
Female	213	56
Male	165	44
Age		
20-30 years	65	17
31-40 years	199	53
41-50 years	65	17
51 and above	49	13
Working experience		
1-5 years	123	33
6-10 years	145	38
11-15 years	76	20
More than 15 years	34	9
Education		
Undergraduate	98	27
Graduate	187	49
Post Graduate	73	19
Others	20	5

Source: Authors estimation

4. ESTIMATIONS AND RESULTS

Since the present study is a quantitative study therefore, in order to meet the objectives, and in accordance with the proposed framework, Partial Least Square-Structural Equation Modelling was applied as the statistical tool for the sake of estimations and findings. Based on the recommendations by Hair et al. (2016), two step approach was employed which states the evaluation of measurement model that deals with the evaluation of convergent and discriminant validity followed by the evaluation of structural model which involves hypotheses testing. The estimations and findings are further discussed as follows:

4.1. Measurement Model

As discussed above, the results of evaluation of convergent and discriminant validity are discussed below:

4.1.1. Convergent validity

Convergent validity reflect to the idea that all the measuring items of a construct should be converge enough that they should all come together within the same construct (Mehmood and Najmi, 2017). In the present study, it was evaluated by the values of Factor Loadings, Cronbac's Alpha, Composite Reliability and the Average Variance Extracted (AVE). The results of the evaluation of the convergent validity are shown in Table 3. The values of Factor Loadings, Cronbac's Alpha, Composite Reliability should be more than 0.7 as discussed Hair et al. (2016), whereas the value of AVE should be >0.5 as discussed by Fornell and Larcker (1981). As per Table 3, all of the aforementioned criteria meet the threshold limits.

Table 3: Measurement model results

Variables	Items	Factor loadings	Cronbach's alpha	Composite reliability	Average
Green supply-chain management	GSCM1	0.878	0.892	0.863	0.635
	GSCM2	0.834			
	GSCM3	0.864			
	GSCM4	0.859			
Green HRM practices	GHRM1	0.884	0.787	0.746	0.548
	GHRM2	0.754			
	GHRM3	0.796			
	GHRM4	0.823			
Environmental uncertainty	ENUN1	0.769	0.812	0.799	0.721
	ENUN2	0.757			
	ENUN3	0.863			
	ENUN4	0.789			
Environmental performance	ENPR1	0.878	0.848	0.832	0.621
	ENPR2	0.792			
	ENPR3	0.739			
	ENPR4	0.776			
Energy efficiency	ENEF1	0.748	0.759	0.723	0.585
	ENEF2	0.761			
	ENEF3	0.737			
	ENEF4	0.757			

Source: Authors estimation

4.1.2. Discriminant validity

Discriminant validity reflect to the idea that all the measuring items of a construct should be dissimilar enough from the measuring items of the other construct and they should all come together within their respective constructs (Mehmood and Najmi, 2017). In the present study, Discriminant validity was evaluated by the two approaches namely Fornell and Larcker criterion which was proposed by Fornell and Larcker (1981) and the correlation ratio of the Heterotrait-Monotrait (HTMT) which is most recent criteria for evaluation of discriminant validity proposed by Henseler et al. (2015). As per Fornell and Larcker (1981), the association among the constructs should be less than the square root of the AVE of a construct, which is shown in Table 4.

As shown in Table 4, the diagonal values represents the values representing square root of the AVE whereas off-diagonal values represents the values representing association among the constructs and further shows the meeting of the Fornell and Larcker (1981) criteria. Moreover, the HTMT ratio as proposed by Henseler et al. (2015) according to which the HTMT ratio of the construct should be less than the value of 0.85. The Table 5 shows that all the values of HTMT ratio meet the threshold values.

4.1.3. Structural model (hypotheses testing)

As proposed in the hypothesized framework, the hypotheses testing was done by employing PLS-SEM as done in the study by Khan et al. (2019a). The results of the hypotheses testing are summarized in Table 6.

As per Table 6, the GSCM has a significant positive impact on ENPR (B = 0.213, P < 0.001) and ENEF (B = 0.215, P < 0.001).

Table 4: Discriminant validity Fornell-Larcker criterion

	GSCM	GHRM	ENUN	ENPR	ENEF
GSCM	**0.796**				
GHRM	0.265	**0.740**			
ENUN	0.356	0.268	**0.849**		
ENPR	0.430	0.254	0.366	**0.788**	
ENEF	0.398	0.325	0.464	0.546	**0.765**

Source: Authors estimation

Table 5: Results of HTMT ratio of correlations

	GSCM	GHRM	ENUN	ENPR	ENEF
GSCM					
GHRM	0.745				
ENUN	0.316	0.646			
ENPR	0.465	0.464	0.544		
ENEF	0.434	0.452	0.135	0.464	

Source: Authors estimation

Table 6: Results of path coefficients

Hypothesized path	Path coefficient	CR	P-value	Remarks
ENPR←GSCM	0.213	4.213	0.000	Supported
ENEF←GSCM	0.215	5.425	0.000	Supported
ENPR←GHRM	0.232	4.435	0.000	Supported
ENEF←GHRM	0.231	4.113	0.000	Supported
ENPR←ENUN	0.421	3.315	0.000	Supported
ENEF←ENUN	0.241	3.215	0.000	Supported

Source: Authors' estimation

It means that, when an organization implement GSCM practices in their existing business processes and operations, it will not only improve their environment performance but also significantly contribute in optimizing energy efficiency. Therefore, organizations should considerably look for GSCM practices in order to sustain their competitive advantage. In addition to this, the GHRM also has a significant positive impact on ENPR (B = 0.232, P < 0.001) and ENEF (B = 0.231, P < 0.001). It means that, when an organization efficiently implement GHRM practices in their existing business processes and operations, it will not only improve their environment performance but also significantly contribute in optimizing energy efficiency. Therefore, organizations should also considerably look for GHRM practices in order to sustain their competitive advantage. Lastly, the impact of ENUN also found to have a significant positive impact on ENPR (B = 0.421, P < 0.001) and ENEF (B = 0.241, P < 0.001). It means that, when an uncertainty in an environment induces organization efficiently mobilize their resources and their existing business processes and operations, in order to improve their environment performance but also in optimizing energy efficiency. Therefore, organizations should also considerably consider ENUN in order to sustain their competitive advantage.

5. CONCLUSION AND RECOMMENDATIONS

Environment sustainability is becoming a global issue which urge the organizations to transform their existing operations towards more environmental friendly. It is not just required by the regulatory bodies by the end consumers also demands manufacturer to produce more environment friendly goods (Khan et al., 2019b). Therefore, in the present study the role of GSCM, GHRM and ENUN was examined and their effects on ENPR and ENEF were evaluated through the sample of 378 and PLS-SEM was applied as statistical technique. The results revealed the significant and positive role of GSCM, GHRM and ENUN on ENPR and ENEF. The study conclude that the organizations should implement more green initiatives in the SCM, human resources and other financial resources for the human health and environment. This philosophy is not just for the organizations itself, but they should motivate their supply chain partners also for the green initiatives. Moreover, as the organization are responsible for all the possible threats that may be given to the environment therefore they should also look for the programs and initiatives which can create awareness among the end consumer through which all of the participants of a supply chain can play their role for the betterment for human health and environment (Najmi et al., 2019).

Like other researches the present study also has limitations which give directions for the future researchers to further work in similar line. Firstly, the present study employs quantitative approach which is a deductive approach therefore, more exploration needed to be done. This can be possible by inductive approach which involves in-depth qualitative interviews through which more exploration can be done. Moreover, in the present study only 3 factors were studied which drives environment performance and energy efficiency. Literature have more factors that can examined

including supply chain integration, and coordination etc. Lastly, in the present study, GSCM and GHRM was consider as a single construct whereas in literature there are different GSCM and GHRM practices including green procurement green innovation, green recruitment etc., therefore the role of these practices should be studied separately which helps in making contribution to the existing literature.

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