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The Impact of Green Innovation on Organizational Performance, Environmental Management Behavior as a Moderate Variable: An Analytical Study on Nuqul Group in Jordan

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Abstract

Purpose: The purpose of the study is to examine the impact of green innovation (green product innovation, green process innovation) on organizational performance. The study was applied on Jordanian industrial companies, specifically on Nuqul Group in Jordan.

Design/Methodology/Approach: The questionnaire was developed and distributed by 143 questionnaires to the higher managerial employees and the middle managerial employees (General Manager, Assistant General Manager, head of department, assistant head of department and supervisors). The researchers used the Simple regression and stepwise analysis to measure the effect of Green Innovation on Organizational Performance, and Environmental Management Behavior as a Moderate Variable.

Finding: The most important finding of the study is having impact of moral green innovation in organizational performance, and also there is impact of the environmental management behavior as a moderator variable between green innovation and performance organizational.

Implications: This study confirms the presence impact of green innovation in organizational performance, and this confirms that the practices of green economic and green management have significant benefits at the level of the national economy and achieve significant savings at the level of the Industrial sector.

Keywords: innovation, green marketing, environment, performance

1. Introduction

Many companies nowadays are taking in to confederation green practices in every aspect of business due to emerging of environment concerns worldwide. Such practices have been regulated in many developed countries where code of conducts, laws, and regulations has been imposed. Unfortunately this is not the case in most of the developing countries, and Jordan is no different where only guidelines and incentive are available. And most of the green practices in Jordanian enterprises are self imposed by the top management, reflecting the importance of environmental management behavior in determining the degree of environmental concerns within the enterprise. Innovation is relatively a new concept that deals with untraditional approaches to conduct different business activities. Green innovation is normally seen as a way to evaluate the degree green commitment in general, Green innovation is important in organizations because it saves environment from pollution, save energy, and recycling the useless materials. When it comes to save energy, using the alternative energy such as using the machines and tools that work by solar system we save the environment from using chemicals. Green innovation could in the form of product innovation and process innovation (Chen et al., 2006). This study will examine both forms and there impact on the organizational performance as many studies showed the relation between these dimension. Green product innovation is positively associated with better organizational performance, however these studies where conducted in well-developed and developed countries, very few studies can be found in developing countries, giving the stage of the green adoption in Jordan, this study will try to find the nature of green innovation impact on the organizational performance through testing the study model over one of the largest group in Jordan (Nuqual Group) (Pillania, 2012).

2. Theoretical Background

2.1 Green Innovation

Green innovation can be defined as hardware and software innovation that is related to green products or process, through energy–saving, pollution-prevention, waste recycling, green product designs, and corporate environmental management (Chen et al., 2006). Green innovation can leverage the product value and, thus cover the cost of improving environmental impact. This study divides green innovation in to two aspects green product innovation and green process innovation. Companies require the motivation and ability to produce creative and innovative ideas to develop new products or process (Chen, 2009).

2.1.1 Green Product Innovation

Green product innovation is a multi-faceted process wherein three key types of environmental focus-materials, energy, and pollution are highlighted based on their major impact on the environment at different stages of the products physical life-cycle- manufacturing process, product use, and disposal. The green product innovation measurement consists of three main elements related to new product development. First, the company has to choose the materials that produce the least amount of pollution, second, the company has to use the fewest amount of materials to manufacture products, and third the company has to circumspectly deliberate whether the product is easy to recycle, reuse, and decompose (Utterback & Abernathy, 1975; Guoyou et al., 2013).

2.1.2 Green Process Innovation

Green process innovation is defined as the application of innovative ideas leading to the adaption of product process and management practices that create less or no negative impacts on environment (Chen, 2011). The green process innovation measurements consist of three elements. First, the manufacturing process effectively reduce the emission of hazardous substances or waste, second, the manufacturing process reduces the consumption of water, electricity, coal, and oil, and third, the manufacturing process reduces the use of raw materials (Utterback & Abernathy, 1975; Guoyou et al., 2013).

2.2 Organizational Performance

Because of its importance in developing organizations, organizational performance has been discussed in many researches from different angles. The definition of organization performance started as an instrument and measurement that used to evaluate and assess the successfulness of organizations to create and deliver value to their external and internal stakeholders Antony & Bhattachatyya (2010). Moullin (2007) defined organizational performance as a measure used by organizations to well manage their effectiveness, and deliver value to stakeholders and customers, where the main goal of the research is to find the influences generated by green innovation on organizational performance.

2.2.1 Financial Performance

By eliminating the pollution, and the reuse of waste materials, Green management can generate many opportunities to cut costs and in the end increase profit (Hart, 1997; Taylor, 1992). There are three opportunities to increase revenues through (better access to certain market; differentiating product; and selling pollution-control technology) (Ambec & Lanoie, 2008).

2.2.2 Environmental Performance

Environmental performance relates to the abilities of manufacturing plants to reduce air emissions, effluent waste, and solid waste and the ability to decrease consumption of hazardous, toxic materials, decrease in frequency for environmental accidents, and improvement in an enterprises' environmental situation (Zhu et al., 2008).

2.2.3 Operational Performance

Operational performance relates to the manufacturing plants capabilities to produce and deliver products to customers more efficiently, where it consists of increase in the amount of goods delivered on time, decrease in inventory levels, decrease in scrape rate, increase in product quality and line, and improved capacity utilization (Zhu et al., 2008).

2.3 Environmental Management Behavior

Environmental management is defined as an element of general management behavior that involves organizational chart, planning, responsibilities, codes of practice, procedures, processes and necessary means for developing, implementing, managing, reviewing and maintaining of environmental policy (Riccio, 2001). The

environmental management behavior promotes continues improvement in organizational performance by concentrated on the following activities (Riccio, 2001):

- Designing and implementing environmental policy.(environmental planning);
- To active the environmental objectives;
- To validate and to prevent waste materials (measurement and assessment of effects);
- To scan (permanent evaluation and control);
- To review management activity (continuance improvement of system).

3. Literature Review

In recent years, green innovation is a hot topic to study where there is many research concentrated on the relation between green innovation through green product innovation and green process innovation and its effect on the company green product competitive advantage to gain positive organizational performance. Wong mentioned in his study that there is a positive causality among the constructs that green product innovation is demonstrated to have a positive stronger influence on both green product competitive advantage and green new product success than green process innovation (Wong, 2012). Where (Chen, Lai, & Wen, 2006) focused in their study on exploring the positive effect of green innovation performance on the competitive advantage. Also Lee and Choi (2012) found a direct relation and link between green supply chain management practice implementation and business performance, their findings indicate that business performance will be improved when green supply chain management enhance operational performance. Azorin, Cortes, Gamero and Tari (2009) focused on green management and financial performance, the study found there is a good effect of environment factor on financial performance. Organizational performance is one of the impost important factors in business, where the researchers found that low carbon-based marketing innovation plays a complete role in mediating the relationship between green complex orientation and organizational performance. Also Doran & Ryan (2012) focused in the study on Eco-innovation and how it is important to determine firm performance.

4. Research Model and Hypotheses

4.1 Research Model

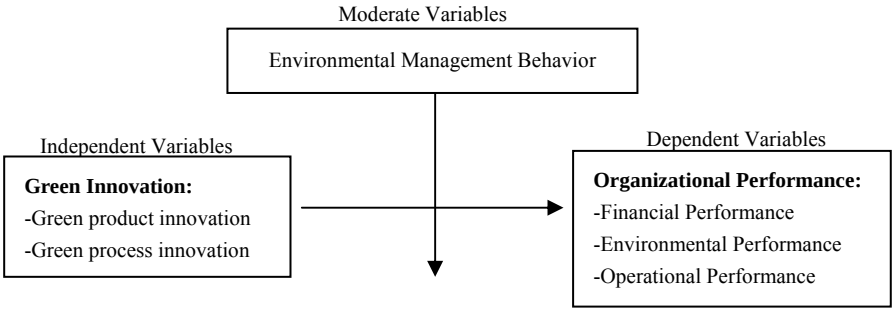

Figure 1. Research model

4.2 Hypotheses

This research is based on two main hypotheses in null format as below:

Hypotheses 1: Green Innovation has no significant impact on overall dimensions of Organizational Performance.

Hypotheses 2: whenever the Environmental Management Behavior is high, the impact of Green Innovation on Organizational performance is low.

5. Methodology

5.1 Population and Data Collection

The populations of this study represented by companies under Nuqul Group Companies which are consist of 31 companies inside and outside Jordan, Nuqul Group runs different investments and industries led by an empowered 5100 team members spanning several continents where it holds ISO14000. while The Promise Holding includes diverse investments in different sectors and modes, where Nuqul group applies green

manufacturing concept, our sample of the study was (10) Jordanian Companies from Nuqul Group and covered a wide range of industries one of them is industry of converting, paper mills, constructions, printing and packaging, stationery, also health industry, and this activity is the most applied for green manufacturing and represent of 32% of Nuqul group companies (MIT, 2013). The unit sample was the higher managerial employees and the middle managerial employees (General Manager, Assistant General Manager, head of department, assistant head of department and supervisors) and there were (143) surveys distributed.

5.2 Data Collection Method

The study depends on questionnaire as a main tool, which consist of four parts. The first part gathered demographic information. The second part covered the green innovation (the green Product innovation and green Process innovation) through nine questions adopted from previous studies (Utterback & Abernathy 1975, Chen, 2011). The third part covered organizational performance in three dimensions (environmental performance, operational performance, and financial performance) through 19 questions adopted from previous studies (Antony & Bhattachatyya, 2010; Moullin, 2007; Hart, 1997; Taylor, 1992; Ambec & Lanoie, 2008; Zhu et al., 2008). The fourth part covered environmental management behavior through five questions related to practices of eco-friendly, green procurement, the partnership with the customer, the interior design of the company and environmental sustainability, (Riccio, 2001; Wong, 2012) , and all questions have been asked based on 5_Likert scale.

6. Validity and Reliability

Factor analysis was firstly used to assess the underlying relationships of a large number of items and to determine whether they can be reduced to a smaller set of factor. The validity test relies on face and content validity, where both the questionnaire and the study model has been distributed to a number of professors in the department of business and marketing to be evaluated. Based on their valuable notes, adjustments to the questionnaire were made.

Cronbach alpha coefficient was used to test the reliability, the results show that the overall instruments Cronbach alpha coefficient is 0.825, the green innovation coefficient is .0.89, the organizational performance coefficient is 0.86, and environmental management behavior coefficient is 0.87. Table 1 (Sekaran & Bougie, 2009).

Table 1. Results of measure validation

items	Factor loadings	Cronbach alpha
Green Product Innovation (GPI)	0.658-0.725	0.687
Green Process Innovation (GPCI)	0.589-0.689	0.720
Eco-friendly (EF)	0.745-0.869	0.655
Partnership with the customer (PC)	0.561-0.620	0.740
Green procurement (GP)	0.425-0.739	0.698
Interior design of the company (IDC)	0.537-0.825	0.771
Environmental sustainability (ES)	0.365-.610	0.882
Environmental Performance (EP)	0.460-0.755	0.720
Financial Performance (FP)	0.398-0.660	0.655
Operational Performance (OP)	0.499-0.780	0.799
All items		0.825

7. Data Analysis

The descriptive statistics and correlation matrix for all variables represented in Table 2. Simple and stepwise regression analysis was used to evaluate the effect of Green Innovation on Organizational Performance, and Environmental Management Behavior as a Moderate Variable. Where stepwise analysis was used to measure the prediction of Green Innovation factors (Green Product Innovation, Green Process Innovation) on Organizational Performance Table 3 reflect the stepwise results. Hierarchy regression analysis was used to measure the prediction of Environmental Management Behavior as a moderate variable between Green Innovation and Organizational Performance as presented in Table 4. The demographics are also presented in Table 5.

Table 2. Descriptive statistics and correlation matrix

Variables	GPI	GPCI	EF	PC	GP	IDC	ES	EP	FP	OP
Mean	3.561	4.021	4.011	3.012	3.987	3.910	3.427	3.001	3.427	3.001
S.D	0.652	0.520	0.468	0.529	0.625	0.758	0.804	0.621	0.714	0.542
GPI	1									
GPCI	.425**	1								
EF	.568**	.601**	1							
PC	.721**	.529**	.709**	1						
GP	.365**	.625**	.627**	.817**	1					
IDC	.401**	.604**	.597**	.531**	.458**	1	1			
ES	.521**	.451**	.465**	.402**	.729**	.615**	1			
EP	.398**	.459**	.569**	.425**	.898**	.775**	.729**	1		
FP	.654**	.400**	.587**	.326**	.578**	.698**	.322**	.359**	1	
OP	.389**	.329**	.623**	.570**	.621**	.708**	.421**	.410**	.725**	1

Note. **P<0.05.

7.1 Major Hypothesis Testing

The results indicate that there are significant impact of Green Innovation on Organizational Performance (R^2= 0.774, $p < 0.05$). Table 3 show that Green Product Innovation and Green Process Innovation have more impact on Organizational Performance (the Beta value for the predicted variables respectively are β=0.452, β=0.325, $p < 0.05$). Hence, the null hypothesis is rejected. Also for testing the second hypothesis in Table 4, the Hierarchy regression analysis was used. The results concluded that the direct impact of overall dimensions of green innovation on organization performance were (β=0.325), while the impact of environmental management behavior as a moderate variable were (β=0.425) and (R^2 change = .193) which it mean 19.3% from the change of the organizational performance depend on environmental management behavior, and then the null hypothesis rejected and accept the alternative hypothesis.

Table 3. Regression results: green innovation factors on organizational performance

Variables	Beta	t	Sig.*
Green Product Innovation	.452	2.073	.000*
Green Process Innovation	.325	1.397	.002*

Note. (R^2 = .774; F=9.324); * $p \leq 0.05$.

Table 4. Hierarchy regression results: environmental management behavior as a moderate variable between green innovation and organizational performance

Variables	Beta	t	Sig.*
Green Innovation	.325	3.124	.000*
Interaction between Green Innovation and environmental management behavior	.425	2.021	.002*

Note. (R^2 = .635; F=11.235; R^2 change = .193); * $p \leq 0.05$.

Table 5. Respondents demographic characteristics

Age	
30 Years and below	0.14%
31–40	25.5%
41–50	32.9%
51–60	17.4%
61 Years and more	10.2%
Gender	
male	82.3%
female	17.7%
Education	
High School	16.6%
After H. School	31.4%
Bachelor	39.8%
PhD	12.2%
Job Title	
General Managerial	6.9%
Assistance General Managerial	14.2%
Head of Department	13.9%
Assistance Head of Department	17.5%
Supervisor	47.5%
No. of respondents	**143**

8. Conclusion and Implications

8.1 Conclusion

The study aim is to measure the impact of green innovation practices in the Jordanian industrial specifically Nuqul Group's companies to enhance organizational performance. And also to measure the environmental management behavior for companies as a moderator variable on the relationship between the green innovation and organizational performance. Based on the findings of statistical analysis green product innovation and green process innovation positively impact the organizational performance which is consistence with international previous studies (Chen et al., 2006; Azorin et al., 2009). The hypotheses testing showed that green product innovation has a higher impact on organizational performance compared to green process innovation, apparently its easer to develop new green product than altering the manufacturing process itself. As for the moderate variable environmental management behavior, it is clear that the environmental management behavior deeply effect the relationship between green innovation and organizational performance since in Jordan green adoption is self imposed as mentioned previously there for it is logical to say that the higher the environmental management behavior toward green practices the better the outcome for organizations (Wong, 2012).

8.2 Recommendations and Future Researches

This study confirms the presence of impact of green innovation in organizational performance, and this confirms the practices of green economic and green management have significant benefits at the industrial level and the national economy by achieving significant savings. Green innovation in products and processes require deepen principle of practices and behaviors in industrial enterprises, as the management is the main driver in this application through the adoption of practices and behaviors of environmentally friendly policies. The findings of the study can be added to the field of encourage industrial companies in Jordan to adopt the green manufacturing practices where the government of Jordan encouraging to adopt the green investment by offering incentives to green adopter. This study recommends that future researches examine other industrial sectors in Jordan and other developing countries to allow the possibility of comparing the results

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