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Examining the effect of green management on firm efficiency: Evidence from Jordanian oil and gas industry

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C H R O N I C L E

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A B S T R A C T

Green management is fundamentally referred to the environmental practices and the implementation of the appropriate eco-friendly activities, which improve the level of people's awareness about the environmental protection. Such green management practices have been investigated namely, redesigning of operation and production processes, innovation and R&D functions, use of technology to save energy and reduce waste, environmental awareness of stakeholders through seminars and training, investment in equipment and technology, and improvement in products or services towards improving firm efficiency in Oil and Gas industry in Jordan. The design of this study has a quantitative approach. Three hypotheses have been developed through literature review and tested using descriptive statistical analysis performed by SPSS. The number of population was 250 employees from different departments that include HR, environment, operation, maintenance, and marketing, a total of 208 completed questionnaires were analyzed as a final sample. The results show a moderate implementation of Green management practices, redesigning of operation and production processes indicated the strongest influence, while innovation and R&D functions indicated the weakest influence. Statistical positive association also was indicated between green management practices and firm efficiency. This study contributes to support the literature of Green management and environment protection that is little in developing countries like Jordan. And it urges firm management to develop effective green innovation culture to improve the implementation level of Green management which may in turn create a high level of environmental efficiency outcome in the medium and long run. Also, it's very significant for firm management to invest more money in green innovation and R&D functions in order to improve the level of efficiency/ performance.

1. Introduction

During the past few years, both developed and developing countries have paid more attention to the influence of Eco variables and sustainable development (Shama & Gupta, 2015). This has come as a result of the industrial revolution that brought many changes to the environment (Jabbour & Santos, 2008a; Teixeira et al., 2012). These changes have generated more pressure urging business firms to adopt eco-friendly products and practices through developing and implementing green management (Prasad,

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2013; Rawashdeh, 2018). Green management concept is recognized as a proactive environmental strategy that aims to create positive business performance and the effects will be viewed in the firm environmental, social and financial issues. This concept plays a vital role in developing more effective and efficient forms of organizations, leading to minimize their noxious effects on the environment, while practicing business activities (Skibińska & Kott, 2015). Nowadays, green management is becoming a popular management paradigm adopted by business firms to achieve their goals effectively (Pal & Dey, 2013). They have concentrated more successfully on the environment protection, taking into account both business ethics and corporate social responsibility perspectives. The business ethics perspective, states that green management helps firms stimulate their performance as it supports them protect or preserve the natural environment (Yang et al., 2015). From another perspective, the corporate social responsibility viewpoint and the green management can create positive organizational environmental performance to satisfy stakeholders' needs and expectations (Sathyapriya et al., 2013). Thus, it sounds that both standpoints have invited organizations to implement green management practices in order to create and sustain environmental performance. Empirical studies show that successful implementation of green management practices with respect to these perspectives help organizations increase efficiency and competitive advantage (Roy & Khastagir, 2016; Zhang et al., 2008; Yang et al., 2015; Skibińska & Kott, 2015).

Nowadays, business organizations have become more concerned about the significance of environmental management and green management and they have included them in their culture and strategy (Ahmad, 2015). It has believed that green management practices enable organizations to produce the best activities across the world and even in order to be more adaptive to the environment uncertainty. Process development is recognized as a crucial strategic success factor for green management (Roy & Khastagir, 2016; Dhull & Narwal, 2016). In this regard, understanding the effect of green management on firm efficiency of oil and gas industry is important because the range of products and the production processes have a great environmental influence. Conceptualizing the corporate performance within the green management framework, this research study investigates the implementation of the green management practices in oil and gas sector. In Jordan, green management is under review, and its effect on organizational performance of oil and gas industry has not already been investigated. Thus, there is a research gap in this area and this study tries to fill this gap. Hence, the main objective of this study is to investigate the effect of green management practices on firm efficiency of oil and gas industry in Jordan.

2. Literature Review

Green management approach is fundamentally referred to the environmental practices and it is about implementing appropriate eco-friendly activities, which improve the level of people's awareness for environmental protection or minimizing the firms' negative effect on environment (Rawashdeh, 2018). This approach has appeared in the second half of twentieth century, as a response to increase consumer awareness in the ecological conservation area (Ahmad, 2015). Green management is considered as a relatively new term. Therefore, there is no consistent and comprehensive definition (Loknath & Azeem, 2017). It came to light in 1990s and became a recognized slogan worldwide in 2000s (Lee, 2009). Most studies have concentrated on environmental management and environmental management system as essential tools to create environmental firm performance, while some studies have addressed the exact term "green management" (Darnall et al., 2008). Since creating environmental performance is the main goal of green management, we do recognize that a more certain and comprehensive conceptualization is warranted. In literature, Subramanian et al. (2016) defined green management as a pool of strategic practices designed to constantly improve the foundation of environmental management, like environmental communication, environmental management system, and conservation biodiversity as well as stimulating employees' behavior towards environment. On the other hand, Ho et al. (2016) defined green management as a set of initiatives that provide eco-friendly products and reduce the negative effect on environment through green marketing, green human resources management, and green production. Furthermore, for the reason that green management is a new concept, researchers and practitioners have perceived it from different perspectives. Some of them consider green management as a compliance with organization policy and

procedures or a positive behavior of people towards reducing waste and paper consumption. Others considered green management as a new organizational strategy, firm reengineering, or an overarching modification of manufacturing processes. It sounds that there is a big difference between these two perspectives, indicating that there is a great continuum or spectrum consisted of several green business activities ranged from simple and easy to the complex and challenging (Loknath & Azeem, 2017). Bobby Banerjee (2001) insists that firms' eco-based strategies may develop from reactive to proactive, that firms can consider eco-challenges as an opportunity to create positive performance, or they can accept or oppose the environmental standards. Other scholars such as Freeman et al. (2000) proposed similar continuums of eco models, classifications, strategies, and typologies. It has accepted that firms may differ along a continuum ranging from low to high levels of green management, according to the definition that involves the concept of green management. Searching literature improves our perception of green management, as we found that one basic definition may not describe the concept comprehensively, which may include different types of green management practices. For the purpose of this study, the researcher defines green management as a collection of green practices adopted by firm in order to improve its efficiency/performance, which include redesigning of operation and production processes, innovation and enhances R&D functions, use of technology to save energy and reduce waste, environmental awareness of stakeholders through seminars and training, investment in equipment and technology, and improvement in products or services, as they fit us as a developing country.

Now, the effective implementation of green management practices may help firms create positive efficiency and gain competitive advantage (Schniederjan et al., 2006). Intense competition in global market force organizations to develop the best green activities and production processes to retain and create competitive advantage over competitors. Therefore, business firms endeavor to build and promote a productive green activities over time in order to achieve positive performance and stay competitive (Mellat-Parast et al., 2006). This means that clear understanding of themselves core competencies as well as their counter parts, and paying much closer attention to the changes of the environment are very important. Green management and innovation associated with effective adoption of green activities can provide firms with competitive environment. This may enable build and develop organizational structures, corporate strategies, valuable activities, and assess new processes which can produce positive firm performance (Chen, 2008). Business firms contribute largely to the environmental management troubles as they are part of our community and cannot be detached from the environment, and in reality, they play a big role in the pollution of the environment (Liu, 2010). Adoption of new technology may enhance the environmental degradation by developing, for instance, eco-friendly products and by looking for alternative energy to minimize the scarce resources consumption. Business firms should strongly stress to evaluate a new technology to reduce the effects of eco-devastation through lunching less pollution products (Liu, 2010; Özen and Küskü, 2008). Success of green management practices broadly requires environmental knowledge and commitment from all employees at all levels. It has gained a crucial significance in business organizations with certain concentrate on innovation in technology, green product design and design of production processes (Tseng, 2013). Intense competition in global market also force firms to maintain developing their core competencies measured by green innovation, product improvement and process improvement (Smith et al., 2005). Empirical findings (Lin et al., 2011; Klaseen & Vachon, 2003; Melnyk et al., 2003; Yang et al., 2015) indicate that well designed corporate strategy through implementing green activities towards environmental friendly technology and equipment supports the key competency which in turn improves performance and competitiveness. Some main goals of green management conceives decrease in production excessive processes, in consumption of water and energy, in exploit of infinite natural resources and in minimization of noxious materials sent to the environment thereby establishing a good firm reputation and improving the market efficiency (Brust & Liston-Heyes, 2010). Proactive eco-activities and strategies are involved in implementation of eco-friendly technologies, goods and services differentiation, production of environmental-friendly products, decreasing of production cost by reduction of energy and raw materials consumption and by reduction of loss of energy and material product. Innovation in processes and product ultimately can improve firms' both competitive edge and market efficiency (Amores-Salvadó et al., 2015).

The above mentioned literature leads author to formulate the following hypotheses:

H1. Green management positively affects Green product improvement in Oil and Gas industry.

H2. Green management positively affects Green process improvement in Oil and Gas industry.

H3. Green management positively affects firm innovation in Oil and Gas industry.

3. Method

The research hypotheses were tested by means of a questionnaire survey. Our design choice to focus on a single sector was because of our intention to diminish the confounding effects of non-controllable factors in our research study, such as legislative, culture, and economical contexts. The researcher identified the best key respondents for the questionnaire as similar previous works have accomplished (e.g. Yang et al., 2014). Permanent employees from different departments; including human resources, environment, operation, maintenance, and marketing were selected to fill in the questionnaire as they had a considerable knowledge about the implementation level of green management practices in their organization. This study was exclusive on Jordan petroleum Refinery Company as it runs the only oil refinery in Jordan. As many as 250 questionnaires were submitted directly by researcher to the study population. A total of 213 responses were collected until the end of survey, and after deep investigation a number of 5 questionnaires were found unfit for the statistical analysis process. Therefore, a total of 208 questionnaires were used in the statistical analysis process which were considered as the study sample, giving a response rate of 83% which is considered highly satisfactory. All the constructs were measured by adapting previously published scales. The questionnaire was in three segments. Segment A captured information about the respondents, such as information regarding, their organizational tenure, education, age, gender, and length of service. Segment B captured information on independent variable-green management practices (redesigning of operation and production processes, innovation and R&D functions, use of technology to save energy and reduce waste, environmental awareness of stakeholders through seminars and training, investment in equipment and technology, and improvement in products or services). Segment C tackled questions on dependent variable- firm efficiency (product improvement, process improvement, and firm innovation). To answer the questionnaire, respondents were asked to indicate their responses to the questions on a five point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The items used in this study were adapted from different studies (Roy & Khastagir, 2016; Ho et al., 2016; Yang et al., 2015; Loknath & Azeem, 2017; Skibińska & Kott, 2015). Cronbach's Alpha was used to test the internal consistency of the instrument, the values ranged from 0.78-0.92. The reliability of all constructs of the instrument was above 70%, and the total reliability of the survey was above 86% which is considered as excellent (Hair et al., 1998).

Table 1
Scale determine the relative importance of the mean

The level of effect	The mean
Low	2.33 and less
Medium	2.34-3.67
High	3.68-5

These categories were derived according to the following equation:

Interval length = (highest weight -lowest weight)/ (three levels) = (5-1)/3 = 1.3

4. Results & Discussion

This section shows the results of the empirical analysis. Data was analyzed through descriptive statistical methods with mean, standard deviation, percentage, Pearson correlation coefficient, t-test and regression performed by SPSS. Table 2 reports the means, standard deviations, and the application degree of the study variables. The results of descriptive statistics have indicated general agreement of respondents to

green management practices. The total implementation of green management is 2.92, which is considered as a moderate level.

Table 2
The mean and standard deviation for survey items

Category	Mean	Std. Dev.	Level
redesigning of operation and production processes	3.52	0.86	Medium
innovation and R&D functions	2.41	0.99	Medium
use of technology to save energy and reduce waste	3.15	1.02	Medium
investment in equipment and technology	2.61	1.06	Medium
improvement in products or services	2.57	0.92	Medium
Environmental awareness of stakeholders through seminars and training	3.28	0.98	Medium
Green management practices	2.92	0.97	Medium
Product improvement	3.64	0.71	Medium
Process improvement	4.02	0.76	High
Firm innovation	3.85	0.68	High

The mean values ranged from the highest number of 4.02 to the lowest number of 2.41. The results of green management practices, redesigning of operation and production processes indicated highest conformity (Mean = 3.52, Standard Deviation =0.86); and innovation and R&D functions as the lowest indicator (Mean = 2.41, Standard Deviation = 0.99); for firm efficiency, process improvement indicated the highest conformity (Mean = 4.02, Standard Deviation = 0.76) and product improvement as a low indicator (Mean = 3.64, Standard Deviation = 0.71). The mean score and standard deviation reflected conformity of respondents' perception about these items. To test the study hypotheses, Pearson's correlation coefficient and full linear regression analysis were used. Table 3 indicates that there was a positive correlation between green management practices and the three facets of firm efficiency (product improvement, process improvement and firm innovation), as the values ranged from 0.76 to 0.84.

Table 3
The correlation between survey items

	Product improvement	Process improvement	Innovation	Green management practices
Product improvement	1	0.51**	0.56**	0.81**
Process improvement		1	0.62**	0.84**
Firm innovation			1	0.76**
Green management practices				1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4
Summarized Full Regression between Dependent variable and independent variable

Relationship	R Square	Adjusted R Square	F-test	Sig. F	B	Std. Error	T	Sig. T
Product improvement & Green management					0.720	0.061	13.263	0.000
Process improvement& Green management	0.718	0.701	104.524	0.000	0.188	0.068	2.542	0.028
Firm innovation & Green management					0.162	0.064	2.486	0.040

These correlations can be considered as positively strong since all of the Pearson's correlation coefficient values are above (p= 0.50). Furthermore, the F-value (104.524) indicates that there is a positive relationship between green management practices and firm efficiency as the value of the significance level (0.000) related to f value was less than 0.05, suggesting the presence of the relationship. The innovation and R&D functions showed the weakest influence while, redesigning of operation and production processes showed the strongest influence. To test hypothesis 1, the t-value (13.26) indicates that there is a significant relationship of green product improvement with green management practices as the value of the significance level (0.000) related to T value was less than 0.05 suggesting the presence of the relationship. To test hypothesis 2, the t-value (2.54) indicates that there is a significant relationship of green

process improvement with green management practices as the value of the significance level (0.028) related to t-value was less than 0.05 suggesting the presence of the relationship. To test hypothesis 3, The t-value (2.48) indicates that there is a significant relationship of firm innovation with green management practices as the value of the significance level (0.040) related to t-value was less than 0.05 suggesting the presence of the relationship. In conclusion, the three developed hypotheses of this study have been supported, as the findings of the statistical analysis show that green management practices had a strong positive impact on the three facets of firm efficiency outcome (product improvement, process improvement and firm innovation). The above mentioned results are in congruence with other studies (Roy & Khastagir, 2016; Chin Ho et al., 2016; Yang et al., 2015; Loknath, & Azeem, 2017; Smith et al., 2005). The results have revealed that green management has become a valuable approach to achieve positive firm efficiency/ performance in oil and gas industry. This is supported by the environmental policy of the company that believes in achieving positive environmental performance to enhance the financial performance and the maintainability of the company as well. Also, the company concentrates on conducting training and seminars in order to improve the employees' environmental awareness that emphasizes on reducing the negative eco- effects resulted from the company activities. Schniederjans et al. (2006) suggest that the effective implementation of green management practices may help firms create positive efficiency and gain competitive advantage. Tseng (2013) insists that the success of green management practices broadly requires environmental knowledge and commitment from all employees at all levels. Roy and Khastagir (2016) concluded that the adoption of green management practices enable organizations to produce the best activities across the world and even in order to be more adaptive to the environment uncertainty. Also, the implementation of green management practices is at a moderate level. Innovation and R&D functions have recorded the weakest influence. This means that firm management did not invest enough money in innovation and R&D functions as most of Jordanian organizations adopted cost reduction strategy due to the economic crisis affecting the country. Therefore, firm management is invited to invest more money in green innovation and R&D functions in order to improve the performance/efficiency level. Firm management also should link green innovation initiatives to effective rewards system that can improve the implementation level of green management. Furthermore, management should develop effective green innovation culture in order to improve the implementation level of green management which may in turn produce high level of environmental efficiency outcome in the medium and long run. Shama and Gupta (2015) assured that investment in innovation and R&D conducted by firms are essential inputs for success and efficiency. Amores-Salvadó et al. (2015) proposed that firm management is considered as the key driver of eco-activities as it strongly affects the corporate culture and motivational disposition of the proposed unit to adopt and integrate green innovation initiatives. Redesigning of operation and production processes have recorded as the top most practice. This means that firm management regarded environmental efficiency as a priority in their production and operation, and they have applied well-designed processes to produce eco-friendly products to meet customers' needs and expectations which in turn deliver positive firm efficiency and completive advantage. Roy and Khastagir (2016) argued that redesigning production process would result in higher quality products at lower unit costs which in turn provide positive firm performance/ efficiency. In general, top management has the power and visibility to develop effective plans needed to engage people in eco-friendly activities in order to improve their awareness which in turn create positive environmental performance.

5. Conclusion

The future of green management appears promising for firms' efficiency/performance. It plays a vital role for the balancing of natural environment and people development. The core value of green management is primarily concert initiatives undertaken with the intention of protecting the environment. Most of previous studies on green management practices were conducted in western countries. To the best of author's knowledge, very few studies have examined the relationship between green management and firm efficiency in eastern countries particularly Arab countries. In Jordan, green management is under researched area, and its effect on organizational performance of oil and gas industry has not been investigated. This study contributes to support the literature of green management and environment protection

that is little in developing countries like Jordan. Also, it offers a clear understanding on how green management practices affect firm efficiency in oil and gas industry in Jordan. The findings of this study have revealed that the implementation of green management practices is at a moderate level, also there was a positive association between green management practices and firm efficiency outcome (product improvement, process improvement and firm innovation). Redesigning of operation and production processes has recorded the strongest influence, while innovation and R&D functions practice have recorded the weakest effect. On the ground of these results, it is significant for firm management to invest more money in green innovation and R&D functions in order to improve the level of efficiency. Also, management should develop effective green innovation culture in order to improve the implementation level of green management which may in turn produce high level of environmental efficiency outcome in the medium and long run. The study was exclusive on Jordan petroleum Refinery Company as it runs the only oil refinery in Jordan. However, future studies should investigate green management practices and firm efficiency in another industries based on these variables or examine different green management practices in the same industry.

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