

The Impact of Core Competencies and Green Innovation Performance on the Business Competitive Advantages: Investigating the Role of R&D Investments and Top Management Support

Title: The Impact of Core Competencies and Green Innovation Performance on the Business Competitive Advantages: Investigating the Role of R&D Investments and Top Management Support

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1 - 3: Knowledge Development (usually public organizations) e.g. basic research & lab-based experiments

Priority Area

Manufacturing

Executive Summary

Oman Vision 2040 stated that the Sultanate of Oman had made unremitting efforts to ensure that natural resources are protected and used safely and soundly. Hence, this study investigates the impact of green core competence on the firm's competitive advantages. Besides, this research aims to examine the mediating effect of green innovation performance in the relationship between green core competencies and a firm's competitive advantages and examine the moderation effects of R the R&D investment and top management support on the green core competence and green innovation performance. The proposed project will adopt a quantitative research approach. Accordingly, this project is based on primary data. The data will be collected through a survey using a self-administered close-end questionnaire. A questionnaire will be developed based on adopted a Seven-point Likert scale. A convenience sampling technique will be utilized to select the samples. The data of this project will be collected from (CEOs, managers, and directors) in Omani organizations. All the collected data will be analyzed using descriptive statistics and partial least squares based on structural

equation modeling (PLS-SEM). Thus, the findings of this project will reflect the result of the proposed conceptual framework. Therefore, this study will bridge the research gaps in theory and provide significant suggestions and guidelines for policymakers and decision-makers. This project will foster support mechanisms for green innovation performance in the Sultanate of Oman. Therefore, the expected theoretical and practical implications will be discussed to contribute to policymakers' decisions.

Keywords: Green Core Competence, Green Product Innovation Performance, Green Process Innovation Performance, R&D Investments, Firm Competitive Advantage.

Introduction and Statement of the Problem / Project

1. Introduction and Statement of the Problem/Project

Organizations are now exposed to a wide range of threats from various sources such as globalization, deregulation, environmental change, technological change, complex business model and reforms in corporate governance (Tekathen, & Dechow, 2013; Jones et al., 2018; Saeidi et al., 2019). In such a complex setting, raising the competitive advantage becomes one of the organization's biggest challenges.

Improving competitive advantage depends heavily on environmental protection and the rise of consumers' environmentalism (Fang et al., 2018; Chang, 2019). Organizations that take a proactive approach to environmental sustainability and environmental concerns when they relate to the economy and society's long-term viability will have a significant competitive advantage. As a result, green innovation has become a key indicator of a company's long-term competitive advantage (Chen et al., 2006; Fang et al., 2018; Song & Yu, 2018).

On the other hand, firms that do not neglect their obligations face strict environmental norms and the increasing environmental awareness of customers. These environmental developments could motivate them to strengthen their core green competencies and contribute to the development of green innovation. Therefore, focusing on managers' points of view and analyzing environmental management principles will help businesses improve their core competencies and ecological management to increase their green innovation (Chen, 2008; Chen et al., 2012).

Consequently, many businesses regarded corporate environmental management as a waste of money or were misled, obstructing their development and growth. On the other hand, several previous research suggested that pollution was concrete evidence of inefficient energy use. Green innovators will benefit from the first-mover advantage, which allows them to claim a higher price for green products and boost their competitive advantages as new markets emerge (Chen et al., 2006; Chen, 2008; Lin & Chen, 2017; Wang, 2019). Furthermore, businesses that actively participate in environmental sustainability and green innovation can not only minimize manufacturing waste and increase efficiency, but they can also boost overall profitability, corporate reputation, and therefore competitiveness in the face of widespread market awareness and needless foreign environmental regulations (Chen et al., 2006; Nanath, & Pillai, 2017; Dangelico et al., 2017). Nevertheless, companies need to be involved in environmental management and green innovation, capabilities, and competencies since it is considered essential and required (Chen et al., 2006).

Notably, core competencies refer to collective organizational learning, specifically managing diverse production skills and incorporating streams of technologies (Chen, 2008). Therefore, the core competencies entail a fundamental change in the structure of companies to learn from collaborations and focus on internal development. (Prahalad and Hamel, 1990). Furthermore, core competencies are essential to provide future access for a wide range of markets, contribute to the product's consumer benefits and are difficult for competitors to imitate (Prahalad and Hamel, 1990; Chen, 2008).

Due to the limited studies were examined the green core competence and green innovation performance. Hence, the current research will examine the impact of green core competence on green innovation performance in an unexplored context like Oman. Similarly, a few studies investigated the effect of green innovation performance on its competitive advantages (Chen et al., 2006; Chang, 2011; Chiou et al., 2011). Hence, more research in a different context appears necessary (Chiou et al., 2011).

In this context, the first objective of this research is to investigate a model of green innovation performance on competitive advantages in Oman. Most significantly, this research will

examine the moderating effects and shed light on the role of the R&D investment and top management support as a boundary condition (moderation) on the relations of green core competence and green innovation performance (i.e., green product innovation performance and green process innovation performance). Therefore, this study will bridge the research gaps in theory and provide significant suggestions and guidelines for policymakers and decision-makers. Particularly implications of our suggestions will foster support mechanisms for green innovation performance in the Sultanate of Oman.

Literature Review and Analysis of Related Work

2. Constructs and Hypothesis Developments

2.1 Green Core Competencies and Green Innovation Performance

Innovation is an essential tool to minimize or prevent harm to the environment. Green innovations provide companies with two key advantages: the economic benefits of producing environmentally friendly products and the financial benefits of improving productivity (Seman et al., 2019). Customers around the world are constantly buying and expecting environmentally friendly goods and services. Green innovation is a strategic necessity for businesses because it offers an outstanding opportunity to satisfy consumer needs while still protecting the environment (Liu et al., 2020). On the other hand, green innovation is an excellent tactic for businesses to maintain their competitive edge. As a result, companies must have the skills or ability to conduct re-use, recycling, re-manufacturing, and disposal activities while maintaining the recycling company's long-term environmental and financial efficiency utilizing ecological tech Green core competencies, as well as combinations of technical skills, expertise, values, and attitudes required in the workforce to build and promote sustainable social, economic, and environmental outcomes in business, industry, and the community, are of interest to businesses (Kumar, & Dixit, 2019; Wang et al., 2020).

As Prahalad and Hamel (1990), Businesses should shape and cultivate a group of core competencies, he said, because their performance is derived from their core competencies and core products (the observable outcomes of core competencies). Collective organizational learning is a core competency, particularly the ability to organize diverse production skills and incorporate technology streams (Prahalad and Hamel, 1990; Chen, 2008; Shvetsova, 2019). Previous research on "core competence" has discussed either the theoretical proposition of core competency or its helpfulness as a competitive tool for companies (Srivastava, 2005; Schaupp & Virkkunen, 2017; Le, 2019). Although traditional approaches to the study of competitive advantages are not sufficient to explain how companies can operate effectively in volatile and often unpredictable environments, a resource-based method is proposed that focuses on developing and applying core competencies to complement traditional approaches and can form the basis for competitive advantages (Hafeez et al., 2002; Gouillart, 2014; Jones et al., 2018).

Furthermore, Chen (2008) has extended the concept to 'green core competence' and defined the green core competence, "as the collective learning and capabilities about green innovation and environmental management in an organization" (p. 537). Chen (2008) stated that its environmental sustainability is determined by its green core competencies and green core products (tangible green core competencies). Furthermore, the green core competency principle has been advocated to satisfy three requirements: offering prospective access to meet a wide variety of consumer environmental needs, contributing to customer benefits through environmental contributions, and making it impossible for rivals to mimic. As a result, organizing around green core competencies necessitates a significant shift in a company's structure: the first phase is to define core competencies; the next step is to upgrade the company's infrastructure and promote improvement through partnerships and a focus on internal growth. (Hsiao et al., 2018; Ng et al., 2018; Chen, 2008). Furthermore, the green core competencies fulfill three criteria: they offer potential access to a wide range of markets, add to the product's consumer benefits, and are difficult to replicate by rivals (Michaelis, & Markham, 2017; Akhter, 2017; Hsiao et al., 2018). Developing green core competencies is critical to a company's performance and success (Goddard, 1997; Duysters and Hagedoorn, 2000; Chen, 2008). As a result, "green core competence" is described as an organization's collective learning and green innovation and environmental management (Chen et al., 2006; Chen, 2008).

Pollution is a physical manifestation of inefficient resource usage (Chen & Wu, 2018; Dakpo & Lansink, 2019). Businesses can offset environmental costs by increasing resource efficiency through green innovation (Chen et al., 2006; Kong et al., 2016; Gürlek & Tuna, 2018). On the other hand, green innovation is described as “hardware or software innovation related to green products or processes, including technology innovation in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management” (Chen et al., 2006, p. 332). As a result, green engineering is used to improve environmental management efficiency to meet environmental conservation criteria. Furthermore, Chen et al. (2006) separated “green innovation performance” into “green product innovation performance” and “green process innovation performance,” which is linked to energy conservation, pollution control, waste recycling, or no toxicity. Furthermore, Talke et al. (2006) established a competency-based model to understand the occurrence of innovation initiatives, arguing that competence growth could promote innovation. On the other hand, firms' competencies had a significant positive effect on their innovation performance (Ritter & Gemünden, 2003; Zaefarian et al., 2017; Jimenéz-Jimenéz et al., 2018). As a result, previous research has suggested that firms' green core competencies will drive green innovation and improve their innovation efficiency (Ritter et al., 2004; Talke et al., 2006; Chen et al., 2006; Ribeiro et al., 2018; Ardito et al., 2019). Chen et al. (2006), on the other hand, divides green innovation success into two categories: "green product innovation performance" and "green process innovation performance." As a result, green core competencies are positively linked to the green innovation process (Chen et al., 2006). As a result, we hypothesized the following in this review.

- **Hypothesis 1:** Green core competencies of firms have a positive effect on the green product innovation performance.
- **Hypothesis 2:** Green core competencies of firms have a positive effect on the green process innovation performance.

2.2 Green Innovation Performance and Competitive Advantage

Green innovation performance was defined as “hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management” (Chen et al., 2006, p. 332). This term was further broken down into two categories: "green product innovation performance" and “green process innovation performance”. Green product innovation performance, on the other hand, was described as “performance in product innovation that is linked to environmental innovation, such as energy-saving, pollution-prevention, waste recycling, no toxicity, or green product designs” (Chen et al., 2006, p. 334). As a result, "green product innovation" is used to improve environmental management efficiency in order to meet ecological protection goals. Chen et al. (2006) described ‘green process innovation performance’ as “the performance in green process innovation” as “the performance in process innovation that is linked to energy-saving, pollution-prevention, waste recycling, or no toxicity” (p. 334). As a result, green process innovation is being used to improve environmental management performance to meet environmental protection criteria. Traditional market constraints, such as consumer demand or product life cycles, as well as social and environmental pressures and/or opportunities, also drive green innovation (Hall and Mairesse, 1995; Chen et al., 2006; Chen, 2008). As a result, green innovation must provide value to all stakeholders interested in its implementation. To be considered eco-innovative, the new product or method's importance must contribute directly to the environmental and/or social realms (Ryszko, 2016; Chen & Wu, 2018). The company's technological skills and its ability to adapt to the advantages of new activities affect green innovations (Horbach, 2008; Flor et al., 2018). Though these words have some overlap in meaning (Schiederig et al., 2012; Rosenbusch et al., 2019), the term "climate innovation" refers to an environmental innovation that aims to increase both social and ecological performance (Ekins, 2010; Arfi et al., 2018; Ganda, 2019).

Green innovation, in a larger sense, has been described as hardware or software innovation that is related to green products or processes, such as energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management to meet the requirement of environmental protection (Chen et al., 2006; Chen, 2008).

As previously said, pollution is the visible manifestation of inadequate resource utilization (Chen et al., 2006; Chen & Wu, 2018). Businesses can offset environmental costs by

increasing resource efficiency by green innovation. Furthermore, companies that forge ahead in new markets will benefit from "first-mover advantages," which enable them to demand higher prices for green goods, boost their corporate advantages and credibility, sell their environmental innovations or services, and even build new markets (Lin, & Chen, 2017). Businesses that use aggressive environmental management techniques will use advanced environmental technologies to align environmental sustainability goals with various organizational divisions to solve environmental problems (Rossi et al., 2016; Fernando et al., 2019). Furthermore, incorporating environmental sustainability into proactive policies will help companies create new market markets and gain a competitive edge by avoiding environmentalist demonstrations or fines (Dangelico, 2016; Song et al., 2018).

On the other hand, companies should incorporate green environmental concepts into product designs and packaging to maximize the benefits of product differentiation (Leonidou et al., 2017; Huang et al., 2018; Chang, 2019). On the other hand, green innovation performance is divided into two categories: "green product innovation performance" and "green process innovation performance." As a result, we came up with the following hypothesis.

- **Hypothesis 3:** The performance of green product innovation has a positive effect on the firm competitive advantage.
- **Hypothesis 4:** The performance of green process innovation has a positive effect on the firm competitive advantage.

2.3 The Role of R&D Investments

This research considers that although the perspectives so far are rational, they are all one-sided and that we should not restrict ourselves to the study of a linear relation. In other words, the impressive effect of environmental regulation on green product innovation may be more nuanced and non-linear. As a result, environmental regulation impaired industrial development but had a significant long-term promotional effect, corroborating the claims made above. The corporate goal of an organization is to maximize profits. Whether it will increase investment in green product innovation depends on whether the green product will have substantial benefits compared to the costs of environmental regulation (Yuan & Xiang, 2018; Song et al., 2020).

Significantly, the innovation evidence strongly suggests that a crucial supplement to co-innovation is the internal R&D initiative, which enhances the efficacy of incoming knowledge and information for innovation growth.

R&D investment not only produces new information and ultimately inventions but also enhances the company's "absorptive power," that is, the ability to recognize, assimilate and leverage knowledge from external sources. (Estrada, et al., 2016; Anzola-Román, et al., 2018). In this respect, the company's internal capacities dynamically adapt and influence the capabilities of external partners, mainly customers and suppliers (Dangelico et al., 2017; Janssen et al., 2018). The effect of adsorption efficiency on innovation performance is larger in contexts characterized by high market uncertainty and technological turbulence. The selection and development of external inputs for the successful development of innovations become even more essential (Ali et al., 2016; Liu et al., 2019).

Environmental innovations' complexity and structural nature and the market and technological uncertainties that characterize many environmental technologies suggest that they represent such a background. Internal R&D strategies complement each other in important ways (Janssen et al., 2018). As a result, eco-innovation can be described as developing unique, long-term green capabilities as part of a sustainable development strategy backed by top management support, eco-technologies, and R&D investment. Many of the company's green activities, including suppliers, government departments, and the industry, are covered by green innovation. Internal innovation refers to business practices for efficiently and effectively managing eco-innovation processes, especially new product creation (Cheng et al., 2014), when environmentally-friendly innovation in terms of products and processes can be further described (Lee and Kim, 2011, Lee & Min, 2015).

Moreover, as previously mentioned, green organizational responses (research and development investments) positively impact green innovation results. First, R&D investments affect green innovations because they help improve the capacity needed for green innovations (Huang et al., 2016; Bai et al., 2019). R&D investments, on the other hand, are important for developing the technological capabilities needed for green innovation. Further R&D personnel and higher investment suggest a broader range of improved absorptive capabilities, speeding the technological innovation cycle (Simpson and Samson, 2010; Huang et al., 2016; Hu & Liu,

2019). Environmental advances are meaningfully triggered by R&D investment, according to Huang et al. (2016) and Jiang et al. (2018), by building and leveraging the knowledge base needed to develop cleaner production and technologies. As a result, R&D investments are likely to aid developments in the performance of green technologies. Training, in particular, will encourage staff to reorient their conventional views of the world and adjust their behaviors to enhance their ability to learn about the environment, resulting in improvements in green innovation quality. On the other hand, a company that invests less in research and development would have less interaction and incentive to engage in green innovation (Huang et al., 2016).

- **Hypothesis 5:** The positive relationship between the green core competencies and the green product innovation performance is moderated by R&D investments such that it is more robust for high than low R&D investments.
- **Hypothesis 6:** The positive relationship between firms' green core competencies of firms has a positive effect on the green process innovation performance moderated by R&D investments. It is more robust for high than low R&D investments.

2.4 The Role of Top Management Support

In strategic decision-making, top management is a key player. Companies can introduce different environmental strategies in the same political and economic context depending on the attitudes and principles of top management (Jansson et al., 2017). As a result, we expect the green innovation strategy to be influenced by external pressure and internal driving forces, assuming top management support. This is because upper management's understanding of external pressure and self-sufficiency would affect its environmental protection policies (Burki et al., 2019). As a result, top management with heightened environmental consciousness will continue to see green innovation's advantages and business opportunities.

On the one hand, top management with such a thorough understanding of environmental issues is much more likely to accept the government's incentive scheme (Peng & Liu, 2016; El-Kassar, & Singh, 2019). On the other hand, companies are no longer bound by environmental regulatory standards (end-of-pipe governance). Nonetheless, they are constantly looking out for government-sponsored business development opportunities to cover green innovation costs further. Top management with a high degree of environmental awareness, on the other hand, sees the importance consumers, vendors, and rivals place on green innovation as a business opportunity. They conduct research and development to meet customer needs, collaborate with suppliers to share innovation issues, focus on strategic strategies, and compete for market share. Finally, all of the tactics outlined above lead to a competitive advantage (Wijethilake, & Lama, 2019).

As a result, upper management plays a critical role in innovation development by creating a conducive atmosphere and making decisions that increase information production and execution (Al Shaar et al., 2015; Hamdi et al., 2016). Proper top management demonstrates a keen understanding of its followers' needs and offers an opportunity for them to innovate and solve problems. Top management helps employees meet their empowerment needs by enhancing personality, achieving success, and increasing self-efficacy (Ryan and Tipu, 2013; Singh et al., 2019). Several studies have shown that top management has an important impact on organizational outcomes (Ruiz-Jiménez et al., 2016; Huang et al., 2016). Besides, top management's encouragement has a significant impact on an organization's innovation implementation and activities (Hsu et al., 2019; Villaluz et al., 2019).

Furthermore, according to the nature of the resource-based view (RBV), beneficial organizational approaches allow companies to develop dynamic capabilities in strategically controlling their standardized property and improving their ability in innovation (Hart and Dowell, 2010; Huang et al., 2016). Improving the company's sustainability skills, which can be reinforced by evoking green responses, is critical for achieving green innovation goals. Any green organizational response, it is suggested, will affect the organization's green innovation performance. It is well known, for example, that top management's support is critical in promoting green technology as a significant strategic resource. Top management will increase green innovation success by actively communicating and implementing programs to support green innovation policies, contributing to environmental issues, and having adequate resources to continue these initiatives. On the other hand, even though a company has the capabilities and willingness to engage in green innovation, the likelihood of success is extremely poor if top management does not endorse it (Chang, 2016; El-Kassar et al., 2019).

- **Hypothesis 7:** The positive relationship between the green core competencies and the green product innovation performance is moderated by top management support. It is stronger for high than low top management support.
- **Hypothesis 8:** The positive relationship between firms' green core competencies of firms has a positive effect on the green process innovation performance and is moderated by top management support. It is stronger for high than low top management support.

Objectives

The main research objective is **To investigate the impact of green core competencies on a firm's competitive advantages.**

Based on the main objective, three sub-objectives can be highlighted as follow:

To examine the mediating effect of green innovation performance in the relationship between green core competencies and a firm's competitive advantages.

1. To examine the moderation effects of the R&D investment and top management support on the green core competence and green innovation performance.

Research Methodology [Describe your Implementation Plan, Time-line and Milestones]

3. Method

3.1 Research Design

The proposed study will adopt a deductive and quantitative research approach (McDonald, Gan, Fraser, Oke, & Anderson, 2015). Accordingly, this project is based on primary data. Therefore, the target population of this research is CEOs, chairmen, environmental managers, and directors working at manufacturing, logistics, IT, and services firms in Oman. The data will be collected through a survey using a self-administered close-end questionnaire. A questionnaire will be developed based on adopted items and scales (items will be modified to suites Omani culture).

This research will also be using Structural Equation Modeling (SEM) for the statistical analysis. According to the SEM requirements, the targeted sample size for this study is 250-300 (Kock & Hadaya, 2018). A convenience sampling technique will be utilized to select the samples (Lucky & Minai, 2017), SPSS and SmartPLS3.2.8 software will be used in the computation of the collected data (Hernández-Perlines, 2016). The measurement modeling and tests of hypotheses will be undertaken using SmartPLS 3.2.8 (Ringle et al., 2015), which executes partial least squares-based structural equation modeling.

3.2 Measurement and Questionnaire Development

All variables will be measured by self-report on multi-item scales derived from previous studies. Therefore, seven-point Likert-scale measures will be assessed as one representing Strongly Disagree and seven representing Strongly Agree.

3.2.1 Measurement Scales

As previously stated, all the items will be adapted from the previous studies. Therefore, to measure green core competence, five-items will be adapted from prior research (Chen, 2008). Four-items will measure both, Green product innovation performance and green process innovation performance measured by four-items for each variable will be adapted from (Chen et al., 2006). We measured R&D investments with five-items that will be slightly borrowed from the prior studies (Clausen, 2013; Huang et al., 2016). To measure management support, four-items will be taken from (Menguc et al., 2010; Huang et al., 2016). Eight-items are taken from the firm's competitive advantage (Chen et al., 2006; Saeidi et al., 2015). Finally, we used firm's size and age as control variables for their potential relation to firms' competitive advantage. Firms' size will be measured with the number of full-time employees and age measured with the number of years in business.

Benefits to Oman

The results of this study will be revealed from a strategic standpoint in terms of practical implications. Policymakers and administrators in developed countries will profit from the findings of this study. Environmental awareness among consumers is low, and mandatory environmental regulations are critical in promoting green technologies.

At the first point, this research would show that green core competence is significantly linked to green product innovation performance and green process innovation performance among Omani firms. Manufacturing, logistics, IT, and service are all included in this study. As a result, it can convey two meanings: **first**, there will be the advantage of firm size for the green core competence in these firms; and second, these organizations will need to build and establish their green core competencies to improve their green product and process innovation results, as green core competence necessitates collective learning and skills for better green innovation and environmental management within an enterprise. As a result, this research would show that its green core competencies determine its environmental competitiveness. Furthermore, green core competence is a requirement: it provides future access to meet a wide range of consumer environmental needs, links environmental benefits to customer benefits, and is difficult to mimic by rivals (Prahalad and Hamel, 1990). As a result, Omani businesses must concentrate on this concept to gain a competitive edge and role among local and international businesses.

Second, this study will concentrate on environmental management concerns and core competencies in response to the current "green management" paradigm, which considers ecological and economic development considerations. As a result, most Omani companies have limited capital to deploy and, as a result, often fail to meet environmental protection standards and regulations. This will expose Omani businesses to the serious consequences of failing to comply with international environmental conventions and regulations. Nonetheless, the findings of this study show that investing more money and resources in green core competencies will help companies not only follow the patterns of strict international environmental legislation and conventions, as well as the rise of consumer environmentalism but also boost their efficiency in green innovation, such as products and processes. To comply with international environmental conventions and legislation, and, most specifically, to improve productivity. As a result, the results of this study could serve as a guide for those businesses.

Third, Green core competence, green product innovation performance, and green process innovation performance, as previously stated. As a result, this can be explained by the fact that responses may be more reliant on resource input, such as R&D spending. R&D intensity and investment are critical in practice. They assist in reducing the risk of 'failures' due to various factors and the risk of innovation projects being halted or delayed due to difficulties (Noailly, & Ryfisch, 2015). As a result, companies should prioritize and invest in R&D as a critical component. Finally, the link between green core competence and green process innovation performance relies on top management support, as upper management plays a critical role in innovation construction by creating the right environment and making decisions that improve knowledge creation and execution.

Furthermore, top management shows a keen understanding of the needs of its employees and encourages them to innovate and solve problems (Burki et al., 2019). As a result, top executives are crucial in advancing the green innovation process as a critical force. As a result, businesses should address top executives' environmental responsibilities to provide additional support for the effective implementation of green technologies.

Academic, Scientific and/or Innovation Significance

This study will make several substantial contributions to the knowledge. **First**, the current study built on previous studies that looked at the effect of green core competence on green product and green process innovation results. As a result, previous research was carried out in Western and East Asian countries. Chen (2008), for example, looked into this relationship in the Taiwanese context. Therefore, as a result, these findings are confined to a specific context. To help generalize the theoretical implications, this study applies established knowledge to a new and unique context with a diverse feature element, such as Middle Eastern Oman.

Second, this research is a positive for confirming the reliability and validity of the (green core competence, green product innovation performance, green process innovation performance, R&D expenditure, top management support, and competitive advantage) scales, which is an important contribution. These concepts are entirely tested in Western-cultural contexts (Taiwan, Chen, et al., 2006, Chen, 2008; China, Huang et al., 2016; Spain, Albort-Morant, et al., 2016). Hence, our study is one of the first that used this scale in a non-Western context (i.e., Oman), and the results will be confirmed the reliability and validity of the scales. As

a result, our research adds to the rigor of the theory that underpins the phenomenon of (green core competence, green product innovation performance, green process innovation performance, R&D investment, top management, and firm competitive advantage) and confirms the applicability of its conceptualization as the degree to which companies with a strong approach to environmental conservation and environmental concerns regarding the economy and society's sustainable development through green innovation perform.

Third, the most important element is that, as previously stated, this study will build on previous research that has found a positive impact of green core competence on the green product and process innovation performance (e.g., Chen, 2008) by indicating that these effects may be contingent on the situation (Huang et al., 2016) so rely on environmental advances mostly dependent on the technological capacity of the organization, as well as other general developments such as investment in R&D. Particularly, R&D investment is identified as a key boundary condition for the impact of green core competence on green innovation performance in this study (e.g., green product innovation performance and green process innovation performance). According to Huang et al. (2016), R&D investment boosts green innovation efficiency. Therefore, as a result, our research will go a step further and show how R&D investment interacts with a green core competence to improve the positive impact of green core competence on the green product and process innovation performance, thereby shaping its competitive performance advantage. Thus, this research contributes to the argument that R&D investment embedded in workplace procedures (i.e., green core expertise, green product innovation efficiency, and green process innovation performance) provides a firm with a significant competitive advantage.

Fourth, our second interaction of green core competence and top management supports green product innovation performance and green process innovation performance. As anticipated, the positive effect of green core competence on the green process innovation performance is conditioned by top management support. When top management is high, the relationship is better than when it is low. As a result, this research will demonstrate the impact of top management support and the crucial role that top management plays in creating a positive organizational environment for innovation. Top management is dedicated to establishing the infrastructure needed to facilitate innovative activities, such as providing an adequate educational atmosphere for workers, funding training programs, and encouraging teamwork (Weng et al., 2011; Fadhilah & Ramayah, 2012).

A list of outcomes of this research project includes but is not limited to the following:

1. Contribute to the body of knowledge and bridging the existing knowledge gap in the green core competencies and firm's competitive advantages literature.
2. Evaluate the variables included in the conceptual study.
3. Develop a valid and tested embedded model that can understand competencies and the firm's competitive advantages.
4. Recommend a valid and suitable plan to policymakers in Oman.
5. Suggest recommendations for policy and regulation consideration to raise competencies and the firm's competitive advantages and the role of R&D investments and top management support.
6. Complete the project report with significant results and the outcome of the study.
7. Present the results and sharing the findings of our research at both local and international conferences.

Articulate the research outcomes in an official report available to CEOs, chairpersons, environmental managers, and directors working at manufacturing, logistics, IT, and services firms in Oman and the Oman Chamber of Commerce & Industry, and other policy decision-makers.

Is this project going to result in a patent?

No

Patent Review (e.g. any previous similar patents in literature, the potential of this project to result in a patent ...)

nil

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Budget Summary:

Administration cost	250	250	500
Data Collection/ Analysis	500	1,500	2,000
Dissemination	200	300	500
Equipment and Facilities	250	250	500
International Conference	500	500	1,000
Local Conference	250	250	500
Local travel	250	250	500
Materials and Supplies	500	1,000	1,500
Research Assistants (Post Graduate)	2,000	3,000	5,000
Research Assistants (Technician)	1,000	2,000	3,000
Research Assistants (Undergraduate)	500	1,000	1,500

Duration in months

24

Overall TRC Requested Funding (OMR)

16,500.00

Collaborative Partners:

Within Oman	Oman	Management	conceptual framework development and Data collection,
Within Oman	Oman	Management	Data collectinon
Within Oman	Oman	Management	Data collection
Abroad	Malaysia	Management	Consultation and developing the tested model
Abroad	United Kingdom	Management	Consultation and developing the tested model

Total number of Collaborative Partners:5

Expected Outcomes:

	Omani	Non Omani
Post-Doc	0	
Technician (Bachelor Holder)	4	0
Technician (Master Holder)	2	1
Technician(PhD Holder)	1	0
Postgraduate(Master)	2	1
Postgraduate(PhD)	1	0
Undergraduate	2	0

No.Expected Publications: 4

No.Expected Patents: 0

Additional KPIs: proposed research project expected to produce the followings:

- # four (4) refereed journal publications.
- # Two (2) conference paper presentations.
- # One (1) international collaboration with researchers from Malaysia.
- # One (1) international collaboration with researchers from Malaysia.

Similarity score: 11 %

Submission ID:e74c49a9-e274-44a3-8134-9936aa773ba7