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How Do Firms Achieve Green Innovation? Investigating the Influential Factors among the Energy Sector

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Abstract: This research aims to examine the direct impact of green innovation strategies and the green dynamic capability on green innovation. The indirect effect is also tested, using green organizational identity as a mediator. A cross-sectional and quantitative research approach was used to collect data from energy firms. The results show that green innovation strategies and green dynamic capabilities positively affect the green innovation. The findings also proved that a green organizational identity acts as a mediator. The research outcomes suggest that the role of green organizational identity needs to be verified by firm managers who want to boost green innovation. In the advance era, society is more conscious about the green environment. Managers need a green innovation strategy to achieve green innovation within their firm. This study will help to manage the environmental issues, environmental degradation reductions, and establishment of green programs and products, which will all benefit society in the terms of improving resource efficiency, enhancing quality of life, and encouraging economic development.

Keywords: green innovation strategy; green dynamic capability; green innovation; green organizational identity; energy firms



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1. Introduction

Green Innovation is an upcoming topic, to which the research has paid special attention. Firms inclined towards green innovation face strict environmental issues and aim to stimulate economic development and the firm's innovative performance [1]. All over the world, greater attention has been paid to laws and policies that are favorable to the green environment. Government institutions have launched green production programs through legal constitutions on environmental protection [2]. Society is conscious about the green environment at present, and consumers are rapidly moving toward greener products [3]. Green innovation plays a key role in the improvement of the green environment. Energy firms are a key contributor to environmental damage, as this sector extracts natural resources [4]. Energy firms need to protect the environment, using innovative ideas to achieve sustainable competitive benefits and develop green innovation [5,6]. The researchers have highlighted numerous determinants of green-innovation, such as green image, core-competence [7], green creativity [8], quality management [9], stakeholders' influences [10], green transformational leadership and green human resource management [11], political capital [12], corporate governance and green innovation [13]. However,

there is still a missing link in literature in the context of the energy sector, i.e., the role of green innovation strategies and green dynamic capability in achieving green innovation. Moreover, the literature has not provided any evidence of a comprehensive framework showing the mediating role of green organizational identity to date.

The objective of this study is to empirically test the direct effect of a green innovation strategy and capabilities on green innovation and also explore the indirect effect through a green organizational identity. Arabian energy firms play a key role in the global energy industry; they are manufacturers and exporters of oil, petroleum products and natural gases in the energy market and global economy. This is why they are a major contributor to environmental problems due to gas discharge and excessive oil extraction, which raise the global temperature, reduce the ozone layer and increase air pollution with a high carbon dioxide emission rate. This study overcomes this research gap and suggests a green innovation model for energy firms to overcome the rising environmental issues. This research is conducted to overcome environmental pollution and related issues through the implementation of a green innovation model in the energy sector.

Energy firms can reduce the terrible effects of their manufacturing methods through the implementation of green innovation [12]. Green innovation mitigates the adverse outcomes for the environment through the use of green processes and innovative green methods [7,14]. Various researchers have provided empirical evidence of the internal and external factors affecting the competitive benefits and green innovation performance of energy firms [15–17]. However, these previous studies overlooked the impact of both green innovation strategies and green dynamic capabilities on green innovation, i.e., the subjects investigated in this research. A green innovation strategy develops green receptiveness policies that can be carried out to prevent pollution and ensure the development of green products in the firm. This helps to achieve competitive advantages through the latest environmentally friendly products and programs [18]. Besides this, the present study shows how a green organizational identity is necessary to link both green innovation strategies and green dynamic capabilities with green innovation. A green innovation strategy combines the resources of organization and internal stakeholders that can mitigate the risks of the manufacturing process negatively impacting the environment; this behavior can strengthen the green organizational identity [16]. Organizational identity is the impression the firm has of their stakeholders and management [19]. Green innovation facilitates first-movers that perform better and demand high prices for novel, eco-friendly products [20]. This research provides a better understanding of the mechanisms by which a green innovation strategy and green dynamic capability impact green innovation through the mediating role of the green organizational identity [21].

The reasons that firms respond to and are motivated by environmental issues are addressed in this study. The firm manager understands that the firm will enjoy an improvement in green innovation through the effective execution of a green innovation strategy and green dynamic capabilities [22]. The most exciting contribution of this study is the empirical testing of how green organizational identity is source of inspiration to increase green innovation using both green innovation strategies and dynamic capabilities. Next part discusses literature review, while the next section explains the methodology and measurements. The results and analysis are presented in the fourth section. Lastly, the final section consists of the conclusions and the limitations for future research. Figure 1 is shown as:

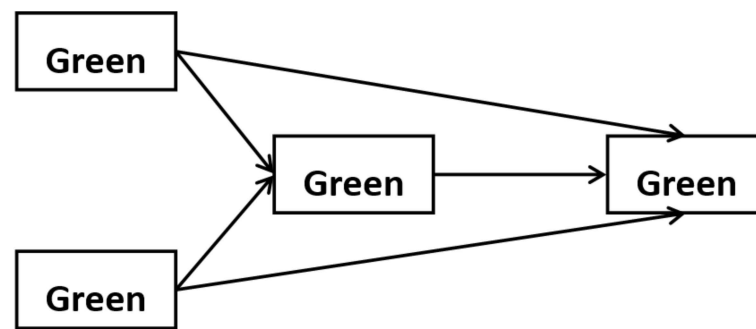


Figure 1. Research Model.

1.1. GreenInnovation Strategy

A green innovation strategy emphasizes a reduction in waste, prevention of pollution and management of the environmental system [8]. Organizations require a green innovation strategy to encourage green innovation [10].

1.2. Green Innovation

Green innovation refers to the innovation that is carried out to reduce adverse outcomes for the environment using green products and methods [7]. Green innovation is these kinds of the innovation, which add to the creation of products and services to reduce the damage to the environment while optimizing the utilization of natural resources [5,23]. This reduces the environmental harm and ensures that the natural resources are used in appropriate and efficient way [8].

1.3. Green Dynamic Capability

Green dynamic capabilities are the firm's ability to renovate and exploit their green organizational capacity and act in a vibrant context [22,24]. This ability helps the firm to obtain a green sustainable development in the changing environment. These abilities are critical drivers of the development of green products and services [25]. Green dynamic capability is the construction, reconfiguration and integration of the external and the internal resources, which are related to protection of the environment [21,26]. This helps in the transformation of the traditional business processes into green operative activities [6].

1.4. Green Organizational Identity

Green organizational identity refers to the general beliefs concerning green innovation and the management of the environment, which connects individuals and the organization [23,27]. These are the distinctive, core unique features of the organization, which stimulate the actions of firm members [28,29].

1.4.1. Green Innovation Strategy and Green Innovation

Green innovation is the improvement in the organization's software and hardware related to green processes and products [24]. It includes the latest technologies for the prevention of pollution, wastage recycling, and the development and design of green product processes that promote sustainability [30]. Previous studies reveal common beliefs about greening suppliers and their unique competences, which act as drivers of increased green innovation [31]. Therefore, in this research, we suggest a positive relationship between green innovation strategy and green innovation. Green innovation refers to the development of processes that improve the environmental performance of the organizations, to satisfy the prerequisites of environmental protection [32]. A green innovation strategy emphasizes the prevention of pollution, recycling of wastage and the adaptation of the management system to environmental protection [21]. To acquire green innovation and its goals, organizations must make full use of their technical and the human abilities [33]. The firm's resources form its potential foundation for green innovation; organizations that focus on green innovation

strategies will increase the resources and processes needed to develop green products, which boosts their green innovation [34]. A green innovation strategy reduces the impact of government policies on the firm. As an alternative to the restrictions imposed by the government, organizations can take a proactive approach by using a green innovation strategy that provides a context for environmental innovation [18]. Firms can organize diverse resources to implement a green innovation strategy that helps to implement green innovation [11]. A green innovation strategy enhances the firm's ability not only to bear the economic and social costs of environmental destruction, but also facilitates development of novel business opportunities for the market and boosts their reasonable advantages [35]. Consumers are likely to pay more for green, environmentally friendly products because of their environmentalist attitudes [36]. The green innovation strategy is the most essential technique to improve green innovation and meets the needs of the customers [37]. A firm can use a green innovation strategy to provide ideas for green environmental packaging and product design, which enhances the level of green innovation [5]. Firms create different green innovation strategies, which reduce the negative impacts of the firm's operating activities on the environment [10]. Green innovation strategies involve a reduction in the different negative impacts on the environment, providing an opportunity for the firm to achieve environmental benefits and meet their targets to increase green innovation [20]. Firms have carried out green innovation strategies to achieve competitive advantages, meet market needs and fulfil the stakeholders' expectations regarding the implementation of green innovation [38]. At present, people are aware of and concerned about the environment; therefore, firms create green innovation strategies to design environmentally friendly products, and want to achieve green innovation to meet the expectations of consumers and the society [8].

Hypothesis 1 (H1). *Green innovation strategies are positively associated with green innovation.*

1.4.2. Green Dynamic Capability and Green Innovation

Green dynamic capabilities help organizations to integrate the available resources for the development of the green environment and to achieve sustainability through their operating activities [39]. It is the firm's ability to identify the key opportunities for creating green business products and processes, and to utilize their resources for the safety of the environment, which increases green innovation [40]. The green innovation in the firm is mainly dependent on the green dynamic capability of the firm to quickly adopt the required changes for the management of the green environment [22]. The environmental sustainability is the essential element of the business that directs the organization's efforts toward adopting a process that protects the ecosystem [41]. Green dynamic capabilities need to be increased due to the increasing awareness and concerns about the environmental sustainability and green innovation [42]. A firm which uses green dynamic capabilities has a high level of adoption of new, innovative and sustainable solutions for its customers; thus, green innovation is increased [43]. Firm management focuses on raising employees' abilities to discover novel innovative ideas in the business and find solutions to the development of the green environment, increasing green innovation [19]. Green dynamic capabilities certify the green innovation related to products and processes involved in the enhancement of technologies that help in the recycling of waste, management of the environment, energy-saving, designing green products and processes and preventing pollution [44]. This helps business firms to use fuel and energy in efficient and effective ways to acquire green innovation [7]. Green dynamic capabilities are major requirements in organizations, which help in the development of innovative ideas for the enhancement of green innovation [22]. They are concerned with the generation of useful new ideas for the development of green products, green practices, green services and green processes, and help to stimulate and increase green innovation [44]. Customers are now concerned and aware about environmental issues. They are willing to pay high prices for green products and services, so firms are forced to create ideas for green innovative products to meet and

fulfill the consumers' needs [19]. Firms are implementing innovative green ideas for better practices, products and procedures to enhance and boost green innovation [25].

Hypothesis 2 (H2). *Green dynamic capabilities are positively related with green innovation.*

1.4.3. Green Organizational identity Mediates between Green Innovation Strategies and Green Innovation

A firm can create green innovation strategies for internal stakeholders and managers to organize the organization's resources to alleviate the risks in the manufacturing outputs and the processes and their impacts on the environment and green innovation; hence, this type of behaviour can be made stronger through a green organizational identity [25]. A green organizational identity is created by the members to provide significance to the behaviours regarding the protection and management of the green innovation environment and the development of green innovative strategies, because the environment is becoming a crucial issue worldwide [45]. A green organizational-identity supports the development of a green innovation strategy and the enhancement of green innovation processes by combining various skill sets and areas of expertise within the firm to stimulate innovation that emphasizes decreasing pollution and wastage, managing the environmental system, and implementing green products and practices [29]. A green organizational identity stimulates the organization's management to develop new green innovation strategies and implement the latest technologies for green innovation, as required by the market [46]. A firm develop green innovation strategies to encourage the prevention of pollution, reduce wastage and emphasize a management system for the environment to enhance green innovation [47]. Firms need to integrate all these sources in the organization and management, and the employees' behaviour to focus on the issue of the environment; this relationship will grow stronger through a green organizational identity [8]. When a firm has a stronger green organizational identity, it will be capable of acquiring more resources, and the support of external and the internal stakeholders [48]. Through these available resources and the strong societal support, the firm will easily create green innovation strategies and attain green innovation [45]. A green organizational identity is the firm's collective behavioural framework, which affects the employees' actions and helps in the development of green innovation strategies to design green innovation practices, services and procedures to achieve green innovation [49].

Hypothesis 3 (H3). *Green innovation strategies and green innovation are mediated by the green organizational identity.*

1.4.4. Green organizational identity Mediates between Green Dynamic Capabilities and Green Innovation

Many business firms are involved in improving their green dynamic capabilities to acquire a number of potential advantages [50]. The benefits comprise consumer loyalty and the increased attractiveness of business services and products [39]. The result of green dynamic capabilities is a green organizational identity, which drive green innovation and develop a green, environmentally friendly ecosystem [51]. Therefore, our study suggested that a green organizational identity could serve as a mediator between the green dynamic capabilities and green innovation. Organizations' competitive benefits are influenced by their management of the environment, integration, and internal functional flows, such as logistics, finance and the information and the relationship between the supply chains in the organization [52]. These factors are related with the green dynamic capabilities. A firm's environmental facets, such as marketing, participation, packaging, green manufacturing, eco-design and supply, are elements of the green dynamic capabilities in the terms of their supply chain; these components play a critical role in the expansion of a green organizational identity through the customers' involvement [53]. A green organizational identity is important for the enhancement of green innovation [54]. The green dynamic capabilities create a green organizational identity to lead green innovation with the support

of green, environmentally friendly products, practices and processes [55]. Hence, green dynamic capabilities increase the green organizational identity through the implementation of novel, innovative green ideas and information related to green, environmentally friendly activities [56]. A firm's net resources play a vital role in this, due to their excessive use by customers [57]. Firms with green dynamic capabilities alleviate pollution and wastage and emphasize network-based resources, which could potentially rise expediently and with no waste material, helping in the achievement of a green organizational identity [58]. However, a direct relation between environmental concerns and the customers, using web-based resources, has increased the involvement of customers, leading to the development of a green organizational identity to determine and increase green innovation [55]. The implementation of green dynamic capabilities in an organization helps the development of green innovation, and a green organizational identity is a by-product of these green dynamic capabilities [40]. A firm using green, environmentally friendly objects in the production of products creates value in the customers' mind, helping the firm to create a green organizational identity and enhancing green innovation. Accordingly, this research focused on the mediation effect of the green organizational identity. A green organizational identity plays a critical role, with green dynamic capabilities helping to achieve green innovation. Customer understanding helps in the achievement of long-term green innovation, which is initiated through the green dynamic capabilities. This helps in the improvement of the green organizational identity, which eventually fulfils the health needs of the customers and effectively helps in waste management [57]. Green dynamic capabilities support the introduction of the latest packing materials, which aid in the protection of the environment, resulting in a green organizational identity and green innovation. Thus, in this manner, a green organizational identity acts as a basis for green innovation [58]. The pollution-prevention activities of the business firm show consumers that the firm is worried about the environment. As a result, customers' loyalty increases [27]. Therefore, businesses are focused on prevention-based green innovation; for instance, finding new solutions for the disposal of products that are achievable by green dynamic capabilities and the green organizational identity [45]. Therefore, we propose that green organizational identity should play a mediating role between the green dynamic capabilities and green innovation [59,60].

Hypothesis 4 (H4). *Green organizational identity mediates between green dynamic capabilities and green innovation.*

2. Methodology

2.1. Research Design

This research is based on a quantitative design. In this research, we used a quantitative method to provide a comprehensive view, improve the generalization of the result and deal with the final sample size of 323 respondents to obtain the correct results.

2.2. Data Collection

Data were collected from 17 different energy firms located in Saudi Arabia. Data collection was carried out through questionnaires. Questionnaires were distributed among respondents working in different posts, such as CEO, research-development manager, top management, and senior employees working in energy firms. The random sampling method was used for data collection and respondents were asked to return the complete questionnaires. These respondents have more than 3 years of experience, field knowledge and also more than 14 years of education. Hence, only 323 out of 430 responses were useable for analysis, and the rate of valid responses was the 58.72 percent. (Appendix A shows questionnaire).

2.3. Measurements of Constructs

Before the questionnaires were distributed, we checked the comparability of our research with prior research, looking at all the variables calculated through the scale that were previously used and designed. Questionnaires were confirmed through a pilot test to ensure the accuracy, validity, and reliability of the measures. A five-point Likert-scale was used, ranging from strongly disagree = 1 to strongly agree = 5 to measure the items in the questionnaire. The measurement of the variables in the questionnaire is discussed below.

2.3.1. Green Innovation Strategy

Green innovation strategy refers to the implementation of green innovation to obtain competitive benefits, and fulfil the stakeholders' and the market needs and expectations. We adapt the revised 6-item scale to evaluate green innovation strategy from Chan [15], as well as that of Song and Yu [8].

2.3.2. Green Innovation

Green innovation refers to an innovation that emphasizes the prevention of pollution, management of the environmental system and the reduction in wastage. We used 6-item scales for green innovation measurements, adapted from Chen et al. [7].

2.3.3. Green Dynamic Capabilities

Green dynamic capabilities are measured through the 5-item scale adapted from Chang and Chen [20].

2.3.4. Green Organizational Identity

Green organizational identity is the interpretive system concern regarding management and protection of the environment, which organization members construct to provide significance to the behaviours. Green organizational identity measurement was conducted through a 4-item scale adopted from Chen [7].

3. Analysis

3.1. Confirmatory Factory Analysis Validity

A CFA was conducted to examine the individuality of following variables: Green Innovation Strategy, Green Dynamic Capability, Green Organizational Identity and Green Innovation. The indices proved the model's fitness, $X^2 = 167.35$, CFI = 0.92, GFI = 0.95, RMSEA = 0.045. The results show that both GFI and CFI > 0.90, and RMSEA was less than 0.05. The results proved that the threshold value was satisfied. Model fitness confirmed the utilization of the procedures Table 1 shows that the values of convergent validity and discriminant validity were not an issue (FL > 0.70, AVE > 0.50). The composite reliability (CR) were initiated, with a CR greater than 0.60, and alpha value > 0.70. All the values are presented in Table 2.

Table 1. Respondents' Details.

S.N	Position	Respondents	
		Total Response	Percentage
1	CEO	55	17.02
2	Research and development manager	73	22.60
3	Top level management	65	20.12
4	Senior manager	35	10.83
5	Senior employee	95	29.41

Table 2. Results of FactorLoading, Cronbach Alpha, CR, AV.

Measurement Details	F-L	t-Value	Alpha	CR	AVE
Green Innovation Strategy			0.86	0.92	0.76
GInS-1	0.82	15.66			
GInS-2	0.86	14.56			
GInS-3	0.83	13.78			
GInS-4	0.75	15.25			
GInS-5	0.79	14.74			
GInS-6	0.72	13.68			
Green Dynamic Capability			0.85	0.94	0.78
GDC-1	0.74	15.42			
GDC-2	0.83	14.52			
GDC-3	0.85	13.52			
GDC-4	0.78	14.87			
GDC-5	0.86	15.22			
Green Organizational Identity			0.88	0.96	0.75
GOI-1	0.83	15.78			
GOI-2	0.86	14.56			
GOI-3	0.78	15.66			
GOI-4	0.82	14.57			
Green Innovation			0.83	0.93	0.74
GI-1	0.77	15.63			
GI-2	0.84	13.22			
GI-3	0.85	14.55			
GI-4					
GI-5	0.84	15.77			
GI-6	0.86	15.77			

To examine Hypothesis (H1–H4), Structural Equation modelling was utilized and for mediation test Preacher and Hayes [60]’ technique was utilized. This technique permits the identification of the significance of variances among total-effect and direct-effect. Table 3 shows the correlation results. There was no multi-collinearity, i.e., VIF < 10.0.

Table 3. Descriptive and Correlation Results.

Variable	Mean	SD	Alpha	1	2	3	4	5	6	7	8
1 Business Age	3.05	1.02	0.82	1.00							
2 Business Size	1.34	0.44	0.86	0.116 **	1.00						
3 Respondent Experience	1.78	0.32	0.85	0.215 **	0.86 *	1.00					
4 Respondent Education	1.24	0.58	0.87	−0.03	0.07	1.00	1.00				
5 Green Innovation Strategy	3.69	0.46	0.86	−0.02	−0.18	0.01	−0.10	1.00			
6 Green Dynamic Capability	3.58	0.47	0.85	0.04	−0.05	0.093 *	−0.02	0.164 **	1.00		
7 Green Organizational Identity	3.79	0.63	0.82	−0.09	−0.15	−0.04	0.085 *	0.347 **	0.367 **	1.00	
8 Green Innovation	0.45	0.49	0.84	0.03	−0.12	−0.05	−0.12	0.260 **	0.389 **	0.325 **	1.00

Note: * = sig 0.005; ** = sig 0.001.

The results of the direct impact are shown in Table 4. It is proved that GIS positively predicts GI ($B = 0.268, p < 0.000$); (H1) was accepted. Green dynamic capability predicts GI ($B = 0.42, p < 0.000$); (H2) was accepted. GIS predicts GOI ($B = 0.326, p < 0.000$); (H3) was accepted. GDC has a positively significant GOI ($B = 0.24, p < 0.000$); (H4) was accepted.

Table 4. Results of direct-effect testing (H1, H2).

Model	Hypothesis Description	R ²	F	Beta	T	Sig	Remarks
Model.1	GIS-Green Innovation	0.178	16.087	0.268	4.560	0.000	H1. Accepted
Model.2	GDC-GI	0.324	42.071	0.424	3.730	0.000	H2. Accepted

3.2. Testing Green Organizational Identity as a Mediator between GIS and GI

(H3) was confirmed by utilizing Preacher and Haye's [60] analysis technique with bootstrap at the 95% level. The results of indirect effect are presented in Table 5, along with the bootstrapping results.

Table 5. Results of Mediation Analysis GIS → GOI → GI.

Paths Detail			Model	Beta	t-Value	SE	Sig
GIN → GOI (Path a)			GIS-GOI	0.423	7.225	0.053	0.000
Direct effect GOI → GI (Path b)			GOI-GI	0.385	7.064	0.044	0.000
Total effect GIS → GI (Path c)			GIS-GI	0.264	3.633	0.067	0.000
Direct effect GIS → GI (Path c')			GIS-GI	0.124	1.365	0.043	0.1318
Indirect Effect (Bootstrap) GIS → GOI → GI “ab Path”							
Model Detail	Data	Boot	Bias	SE	Lower	Upper	Sig
GIS → GOI → GI	0.185	0.20	0.002	0.43	0.1040	0.2780	0.0000

Table 5 also showed a significant indirect effect of GIS on GI through the green organizational identity ($B = 0.185, CI = 0.1040$ to 0.2780). Thus, GOI fully mediates between GIS and GI; (H3) is accepted. The results proved that, in the energy sector, GIS offered a platform to establish a green organization identity, which leads to green innovation.

Testing Green Organizational Identity as a Mediator between GDC and GI.

Table 6 also showed that a green organizational identity mediated between GDC and GI ($B = 0.167, CI = 0.1234$ to 0.2674). H4 accepted and it was proved that a green organizational identity mediated between GDC and GI. The results proved that the green innovation is achieved through green dynamic capability through the mediator of green organizational identity.

Table 6. Results of Mediation Analysis GDC → GOI → GI.

Paths Detail		Model	Beta	t-Value	SE	Sig	
GDC → GOI (Path a)		GDC-GOI	0.435	7.665	0.055	0.000	
Direct effect GOI → GI (Path b)		GOI-GI	0.257	7.052	0.032	0.000	
Total effect GDC → GI (Path c)		GDC-GI	0.365	3.536	0.057	0.000	
Direct effect of GDC → GI (Path c')		GDC-GI	0.247	1.365	0.043	0.000	
Indirect Effect (Bootstrap) GDC → GOI → GI “ab Path”							
Model Detail	Data	Boot	Bias	SE	Lower	Upper	Sig
GDC → GOI → GI	0.167	0.285	0.003	0.53	0.1234	0.2674	0.0000

4. Discussion

In our study, we searched for a mechanism by which firms can increase their green innovation through a green innovation strategy, green dynamic capabilities and a green

organizational identity. First, our research outcomes propose that the green innovation strategy facilitates various kinds of green innovation, which permits organizations to achieve sustainable competitive benefits. The H1 of research continues with the work of previous scholars, stating that a green innovation strategy positively affects green innovation and emphasizes the prevention of pollution, recycling of wastage and the adaptation of the management system to environmental protection [21]. To achieve the goals of green innovation, organizations must make full use of their technical and human capabilities [33]. The firm's resources are its potential foundation for green innovation; organizations that focus on their green innovation strategy will increase their resources for green products and processes, which will consecutively boost their green innovation [34].

Second, (H2) of our study suggests that green dynamic capabilities are positively interrelated with green innovation. The results proved that a green dynamic capability is a major determinant of green innovation. This is an organization's ability to integrate the available resources for green environmental development and to achieve sustainability through their operating activities [39]. It is the firm's ability to identify the key opportunities to create a green business product and process and utilize their resources to enhance environmental safety, which increases green innovation [40]. The green innovation in the firm is mainly dependent on the firm's green dynamic capabilities to quickly adopt the required changes concerned with green environmental management [22]. H3 of this research focused on the mediating role of the green organizational identity between the green innovation strategy and the green dynamic capabilities. Almost every business firm faces various difficulties in obtaining the title of a socially responsible firm. However, firms which emphasize green innovation remain unbeaten and are successful in stimulating their customers. This study confirms that the green organizational identity plays a mediating role between the green innovation strategy and the green dynamic capabilities. The results of our research support the previous studies' findings that a firm can create green innovation strategies for internal stakeholders and managers to organize the organization's resources to alleviate the risks of the manufacturing outputs and processes and their impacts on the environment and green innovation; hence, this type of behaviour can be strengthened through a green organizational identity [25]. A green organizational identity is created by the members to provide significance to the behaviors ensuring the protection and management of the green innovation environment and the development of green innovative strategies, as the environment is a crucial issue worldwide [45].

The findings of (H4) prove that the green organizational identity mediates between the green dynamic capabilities and green innovation. The green dynamic capabilities help firms to adopt the required changes regarding environmental concerns in a timely manner. These adaptations help the firm to attract customers and acquire a green organizational identity. These research findings are consistent and support the prior researchers findings that many business firms are involved in improving their green dynamic capabilities to acquire the potential advantages [50]. The benefits include consumer loyalty and increasing the attractiveness of the firm's business services and products [39]. Green dynamic capabilities lead to a green organizational identity, which, in turn, helps to drive green innovation and develop a green, environmentally friendly ecosystem [51].

5. Conclusions

5.1. Contribution to the Theory

Our study contributes to the theoretical perspective in different ways. The theoretical contribution of this study is the extension of the previous work of Teece, Pisano, and Shuen, and Mansi [61,62] on dynamic capability theory, which present firms' ability to become flexible to achieve a high performance. This study extended their work and linked green dynamic capabilities with green innovation in the energy sector. The current study extended the theory of innovation presented by Coenen and Lopez [63] through empirically testifying the antecedents of green innovation. This study provides an empirical confirmation of the theory, particularly in the environmental management context. A green innovation strategy

positively affects green innovation. This theory is helpful for business firms aiming to adopt good social behavior for their employees through developing a green innovation strategy. This study contributes to the theory work on green dynamic capabilities, and their link with green innovation. This research also adds to the literature demonstrating that a green organizational identity mediates between green innovation strategies and green innovation. Our study proves that a green organizational identity is an imperative aspect of the link between green innovation strategies and green innovation, as well as green dynamic capabilities and green innovation links.

5.2. Contribution to the Practice

According to the practical perspective, our study model provides a broad guideline to managers looking to enhance their firm's green innovation performance. The research outcomes propose that green organizational identity roles need to be verified by firm managers who want to boost green innovation. In the advance era, society is more conscious about the green environment, and managers need a green innovation strategy to achieve green innovation in their firm. Managers also need to understand that green dynamic capabilities are important, and the leading source of the achievement of green innovation. Therefore, our study suggests that Arab energy firms should develop their green innovation strategy and also equip themselves with advanced green dynamic capabilities. A green organizational identity should be adopted to maintain and enhance the green innovation performance and improve the environment.

5.3. Contribution to the Society

Environment issues are a serious problem worldwide. The outcomes of this study provide an important approach to improving environmental management, providing a new way to improve quality of life worldwide. Energy firms are the main contributors to environmental damage. As society is now conscious of the environment, energy firms need to reduce greenhouse gases and use their resources efficiently. This study helps in the management of environmental issues, reducing environmental degradation, and the development of green programmes and products. These will all benefit society in terms of improving the efficiency of resources, enhancing quality of life, and developing the economy.

5.4. Limitations and the Future Research

This research has the following drawbacks. The first primary limitation is that the structural equation model was used in this study for hypotheses-testing. This could remove the difficulty of causality; therefore, future research could address this issue through case studies or using different experimental approaches to check the results. Second, this research did not examine the penalties of green innovation and their performance in non-financial and financial terms. However, this research also provides practical and theoretical support for the understanding of the critical role of green organizational identities in the green innovation strategy and the green innovation association. This study can be extended by considering green innovation businesses as a determinant of economic development [61,62].

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Variable	Item No	Construct
Green innovation strategy	GIS1	Our businesses practices are meant to enhance green innovation through saving/minimizing loss of nature and animal species
	GIS2	We take voluntary actions to develop green environment & green innovation
	GIS3	Our main focus is to adapt new ideas and green practices to improve waste recycling
	GIS4	Reduction in the use of fossil fuels and their replacement with environment friendly-fuels.
	GIS5	Adaption of green programmes and products
	GIS6	Reduction in use of the energy consumption during the business practices.
Green innovation	GI1	Using of environment friendly objects and material in the development of product
	GI2	Using of the material that consume a lesser amount of energy in the product development
	GI3	Choosing products which are easily recycle, used and decompose in the product development process
	GI4	Reduction of the water consumption effectively
	GI5	Recycling of the waste product and the emission in the production process
	GI6	Effectively reduction in the employment of the electricity and oil
Green organizational identity	GOI1	Firm develop objectives and the emissions about the environment
	GOI2	Firm is the compliance of the environmental protection and the management
	GOI3	Firm has knowledge about firm cultures and the traditions about environment
	GOI4	Firm should attentive to the protection and management of environment
Green dynamic capabilities	GDC1	Firm must have ability to fast monitor green opportunities for the environment
	GDC2	Firm can adopt the effective routine for green ideas and knowledge development Firm has ability to adopt green technology
	GDC3	Firm has ability to generate, learn, share, apply and transform the green new knowledge
	GDC4	Firm has been capable to successfully allot
	GDC5	Resources for green environment

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