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College of Science

Environment and

Sustainable Development Program

**Green Innovation's Antecedents and its impact on
firm's financial performance: the case of Bahrain**

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy (Ph.D.) in Environment
and Sustainable Development

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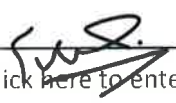
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Abstract

The study sought to prove the relationship between green innovation (GI) and the financial performance of companies in the Kingdom of Bahrain and to identify what enhances this relationship by testing Managerial Concern (MC), Competitive Intensity (CI), Green Organisational Culture (GOC) and Absorptive Capacity (AC). The study also aimed to determine what enhances the performance of GI in Bahraini companies through management-based concepts such as Green Innovation Strategy (GIS), Green Organisational Identity (GOI), Environmental Organisational Legitimacy (EOL) and Green Creativity (GC). Thus, this study can be the basis for future studies in GI and to find a self-regulatory mechanism that will support the Bahraini government's attempts to defend and protect the environment.

Through a sample of managers, supervisors, and environmental specialists amounting to (350) individuals from 46 companies in Bahrain and using Partial Least Squares- Structural Equation Modelling PLS-SEM, the study was able to prove the direct relationship between GI and financial performance as represented by the Return on Assets (ROA) and Return on Equity (ROE), as well as the improving effects of the moderator variables except for CI. The ineffectiveness of CI is due to the weak competitiveness of some companies, and customers do not consider environmental concerns as one of the selection criteria for a company. The study also concluded that GIS, EOL, and GC are determinants of GI within Bahraini companies. However, GOI was not a statistically significant determinant. This lack of influence may be because of the failure of management to form a green interpretation method to document the connection between organisational identity and green innovation by creating and improving green knowledge and providing a mechanism for the employees to provide technical expertise for innovation and green product development. The study also proved that EOL and GC transfer the GIS impact to GI, except for GOI, which does not convey this effect unless it is united with EOL.

Keywords: Green Innovation, Green Innovation Strategy, Green Organisational Identity, Environmental Organisational Legitimacy, Green Creativity, Managerial Concern, Competitive Intensity, Green Organisational Culture, Absorptive Capacity, Kingdom of Bahrain.

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Dedication

To...

my father, mother & stepmother
for their prayers and satisfaction

my beloved wife
for being with me all the way

my little princess, my daughter ^{SARA}
For your love and faith in me, which always makes me happy.

my sons
for your courage and morals

my family & friends
those who have supported, encouraged and inspired me.

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List of Acronyms

AC	Absorptive Capacity
AVE	Average Variance Extracted
CI	Competitive Intensity
CSR	Corporate Social Responsibility
EOL	Environmental Organisational Legitimacy
EPA	Environmental Protection Agency
ER	Externality Reducing Innovations
EREI	Energy and Resource Efficiency Innovations
GC	Green Creativity
GDP	Gross Domestic Product
GI	Green Innovation
GIS	Green Innovation Strategy
GOC	Green Organisational Culture
GOI	Green Organisational Identity
IMD	Institute for Management Development
MC	Managerial Concern
NRBV	Natural-Resource-Based View
OLS	Ordinary Least Square
PLS	Partial Least Squares
POP	Population
ROA	Returns on Assets
RoCE	Return on Capital Employed
ROE	Return on Equity
ROI	Return on Investment
SEM	Structural Equation Model
SS	Sample Size
URL	Uniform Resource Locator
VIF	Variance Inflation Factor

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Chapter One

Introduction to the study

Chapter One:

Introduction to the study

1.1 Introduction

The protection and preservation of the environment have become one of the essential features of the new world order. Interest in the environment emerged when countries began to think of reconciling the environment and development, and this led to the holding of many international conferences and symposia. This growing global interest in environmental issues was a result of the increasing volume of ecological risks. Although there are other sources of this type of risk, the finger of accusation was initially pointed at businesses as the primary cause of environmental degradation. This is because they did not consider the harmful damage they cause to the environment. Hence, firms found themselves bearing responsibilities for the tangible and intangible damage they cause to the environment due to the practice of their activities.

In 1996, the Kingdom of Bahrain issued an environment law aimed at protecting the environment, preserving its natural balance and combating pollution in its various forms. Recently the government issued a more expanded law for the Environment titled law no. (7) for 2022. In 2018, Bahrain's National Information Committee issued the first voluntary report on the 2030 Sustainable Development Goals, which consisted of 17 goals, seven of which were directly attributed to environmental issues. This reflects the government's interest in environmental issues and combating all forms of pollution caused by companies operating in Bahrain. Companies in the Kingdom of Bahrain cannot overlook a commitment to protect the environment and prevent pollution. Companies are also subject to increasing pressure from stakeholders and organisations towards environmentally responsible behaviour that may have distinct impacts on green innovation activities. There is no doubt that companies in the Kingdom of Bahrain

can significantly impact achieving the seven environmental goals mentioned earlier.

In recent years, consumers, employees and the government have encouraged companies to invest in corporate social responsibility and environmental activities in particular. As a result, several organisations decided to devote a portion of their budgets to environmental research and development. Many disagreed with this, saying it would conflict with their desire to maximise profits if some of their resources were invested in environmental technologies. One of the targets that we want to achieve in this study is to assess the relationship between green innovation (GI) and profitability.

In general, GI is a sort of innovation with minimal negative environmental effect. The environmental literature has used four notions to describe the innovations related to the environment: Sustainable innovation, Eco-innovation, Environmental innovation and green innovation, which show minor differences in their descriptive precision. Regarding the content, they seem to examine the same topic and can be mainly used interchangeably.

Huang (2011) defines green innovation as the innovation of products or production processes to address environmental problems arising in the product life cycle. Weng et al. (2015) define it as new or modified products and processes that include technical, managerial, and organisational innovations that help preserve the surrounding environment. Sterbrink & Westerberg (2016) explained that GI is innovation related to green processes and products, including technologies that contribute to energy saving, waste recycling, pollution prevention, green product designs or corporate environmental management. Although these definitions give the impression that the motive behind GI is the environment only, there is an economic motive behind it. For example, reducing the materials used in the development of a new product may have economic and environmental reasons at the same time. Any company that adopts a policy of

reducing the use of papers in communications would have an environmental impact and at the same time have economic benefits. Proving the relationship between GI and financial performance would create the company's internal motivation to adopt the concept of green innovation, not merely to improve the company's image to green consumers or submit to government-imposed regulations.

There is a need to identify factors that would improve the relationship between GI and financial performance. The study will test the impact of Managerial concern MC, Absorptive capacity AC, Competitive intensity CI and Green Organisational Culture GOC. Managers who are more concerned with environmental concerns are more likely to spend additional time, attention, and support to them, possibly increasing the possibility that green innovation will benefit firm performance (Papagiannakis et al., 2014). The term "absorptive capacity" refers to a business's ability to recognise the value of new knowledge, assimilate it, and apply it to commercial objectives. Previous studies have established a significant correlation between absorptive capacity and innovation consequences.

Competitive intensity is a term that relates to how much competition a business faces in the industries in which it operates. Earlier research indicates that when competition is fierce, firms' value capture operations become crucial. Additionally, utilising green management practices by adopting an appropriate strategy enables businesses to fend off market competition. Organisational culture refers to a standard set of views, values, concepts, ideas, and attitudes that influence how an organisation behaves. A management team can establish an organisational culture to communicate values that will guide the organisation's goals (Gao, 2017). Accordingly, GOC may encourage employees to embrace green innovation as a core value of the organisation and become more engaged in environmental issues.

While green innovation has the potential to generate value for businesses in a competitive market, businesses must have an effective strategy to capture this potential value. Accordingly, we will discuss Green Strategy as an antecedent of Green Innovation. The purpose of this discussion is to determine whether a strategy for green innovation has a beneficial influence on green innovation. Additionally, the research explains how the green strategy affects GI by examining whether green organisational identity, environmental, organisational legitimacy and Green Creativity are mediating factors in the link between green innovation strategy (GIS) and green innovation (GI).

1.2 Research Problem

This research investigates the role of green innovation strategy (GIS) as an antecedent to green innovation in Bahraini firms. A GIS enhances a company's environmental sensitivity and generates competitive advantages, leading to better financial performance (Hart, 1997; DeBoer et al., 2017; Chen, 2011). However, studies on this topic in Bahrain are scarce. This study aims to fill this gap by examining the mediating effects of green organizational identity, environmental organizational legitimacy, and green creativity between green strategy and green innovation. Ultimately, it seeks to understand how a GIS can drive green innovation in Bahraini firms.

Organisational identity is crucial for Bahraini firms as it shapes their relationship with stakeholders, including customers and investors. In Bahrain, as in many other places, environmental sustainability has become a priority for many stakeholders, and firms with a green organisational identity are better positioned to meet these expectations. By adopting eco-friendly technologies and practices, Bahraini firms with a green organisational identity can promote green innovation and align their values with those of society on environmental issues. This alignment can enhance their credibility and legitimacy as environmentally responsible firms. Therefore, exploring green organisational identity is essential

for understanding how Bahraini firms can promote environmental sustainability and gain environmental legitimacy, which is essential for long-term success.

There is a need to explore whether green innovation strategy affects Bahraini firms' organisational identity, environmental organisational legitimacy, and financial performance. Previous research found a direct positive impact of green identity on Green Creativity, which affects GI. This study will examine the impact of GI on financial performance, considering mediators such as Managerial concerns, Green Organisational Culture, Absorptive Capacity, and competitive Intensity. Unlike Al-Sartawi et al.'s (2020) study, which was limited to companies listed on the Bahrain Stock Exchange and did not consider mediators, this study aims to provide a more comprehensive understanding of GI's impact on Bahraini firms' financial performance. Including such variables enables Bahraini firms to poster the impact of GI on financial performance.

1.3 Research Questions

The research will answer the following questions:

- 1- Is green innovation strategy an antecedent of green innovation within the context of Bahraini companies?
- 2- Are green organisational identity, Environmental organisational legitimacy and Green creativity valid mediators between GIS and GI?
- 3- Is there a direct impact of GI on financial performance within the context of Bahraini firms?
- 4- Do Managerial concerns, Green Organisational Culture, Absorptive Capacity, and competitive Intensity have any intersection effect on the relationship between GI and financial performance?

1.4 Research Objectives

Environmental problems have become a severe problem; therefore, we need to give ecological issues special attention. These problems impact the

overall economic growth and performance of firms (Tseng et al., 2013). Firms are under pressure to meet new environmental requirements. Governments around the world are enacting stricter environmental laws and legislation to protect the environment. Firms should not just use some green innovation tools; they should have a green innovation strategy (GIS) that will lead to a better green innovation performance and, in turn, will lead to better financial performance. Accordingly, the aims of the thesis will be as follows:

- 1- To identify main Green Innovation determinants in firms throughout green innovation Strategy, environmental organisational legitimacy, green organisational identity, and green creativity as mediators between green innovation strategy and green innovation.
- 2- To check how Green Innovation in the Bahraini Companies will affect the Financial Performance of firms and the combined effect of managerial Concerns, Absorptive Capacity, Competitive Intensity and Green Organisational Culture on the link between GI and financial performance.

When achieving these two targets, we can answer how firms' culture may affect the green innovation strategies of firms which in turn affects sustainable development in a community that relatively is not so much concerned with the environment. Also, we can prove that building a green innovation strategy will generate a reward in the form of improved performance.

1.5 Research Importance

Until now, there has been a lack of empirical research discussing the link between GI and financial performance, as well as the factors that decide the incorporation of GI into goods and processes. A few studies focused on the factors that moderate the relationship between GI and Financial performance. The studies about green strategy and GI are also few.

This study is trying to close the gap by establishing a robust foundation for future research about GI and GIS in the Bahraini context, more precisely, the influence of GIS on GI and the impact of GI on financial performance. This research will contribute to the development of research models in the areas of GIS, GI, and financial performance by providing valuable data on the relationships between the following: first, the relationship between GIS and GI, and between GI and financial performance; second, the mediating role of green organisational identity, environmental organisation legitimacy and green creativity in the relationship between GIS and GI; and third, the moderating role of managerial concern, absorptive capacity, competitive intensity and green organisational culture on the association between GI and financial performance.

This study is crucial because it will provide factual information that will benefit Bahraini businesses where this problem is still relatively new. Additionally, this research will add to the body of knowledge concerning GIS and GI notions as innovative concepts. Additionally, this study benefits academics and researchers by expanding their understanding of how the GIS facilitates GI practices and contributes to financial success. By including managerial concern, absorptive capacity, competitive intensity, and green organisational culture into the green innovation concept, it is possible to present the entire innovative activities that may benefit financial performance.

The current study's findings may also serve as a reference for the government's decision to provide incentives or particular training to Bahraini businesses to increase their involvement in the GI as a component of a GIS inside their operations. The research findings will also contribute to a more profound knowledge of and new insights into sustainability management, where GI practices are critical for organisations to enhance their environmental performance, directly benefiting researchers and practitioners.

Finally, numerous methodological innovations made in this work are generalisable. It may also shed light on the application of Partial Least Squares-Structural Equation Modeling PLS-SEM in finance and environment research. This project aims to create and implement a PLS path modelling application to analyse higher-order constructs. Additionally, this work adheres to the fundamental concepts of using best practices analytical processes when modelling higher-order structural relationships. For such models, the relevance of mediators and moderators in recognising path effects is also demonstrated. This is especially true for academics interested in the results of mediators and moderators in their research. This study provides methodological direction to experienced and novice researchers working with PLS structural models with higher-order interaction effects. The analytical technique employs multiple method analysis strategies, which assists in cross-validating the findings and minimising any bias that may arise due to subjective analytical selection.

1.6 The study's Setting

This study is conducted at the University of Bahrain about Green Innovation practiced by Bahraini firms, so the study population represents all big firms working in Bahrain. There are two types of large companies in Bahrain, those listed in the Bahrain bourse and those not. Companies that are not listed include Babco, Asri, PanGas, and Gepic. The sample will consist of companies from both types, and it will not be limited to manufacturing companies as large companies usually are considered the major pollutant in the economy. The method of data collection used for this study is the quantitative approach. The study will use a questionnaire to measure the study variables distributed to those who know GI or GIS. Those included executives, managers, supervisors, and those directly involved with environmental issues inside the company. The questionnaires will be distributed to the respondents, a total of 350.

In Chapter Two, the study discusses sustainability in Bahrain because the country has been actively promoting sustainable development and environmental preservation. Within its sustainability plan, the country has implemented various initiatives and policies to promote renewable energy, reduce carbon emissions, and conserve natural resources. The discussion of sustainability provides a context for understanding the importance of green innovation in Bahrain and can highlight potential opportunities and challenges for green innovation in the country.

The study will use the SEM-PLS method to test the relationships the study Model shows. The best method for complicated Models such as the one suggested by this study is the SEM-PLS method called the Path analysis. This method will be used to test the fifteen hypotheses suggested by this research, which will be discussed in more detail in Chapter 4.

The study will focus on Bahrain as a single country since focusing on more than one country might cause differences in economic structure, regulatory frameworks, and cultural norms to impact the research findings across multiple countries. Limiting the sample to Bahraini companies allows the study to control for some of these differences and provide more specific insights into the Bahraini context. Also, conducting research across multiple countries can be challenging due to practical considerations such as data availability and legal requirements. Therefore, selecting a single country for the study, such as Bahrain, maybe a practical decision based on the available resources and expertise of the researchers.

1.7 Research Terminology

- **Green Innovation:** is the innovation that focuses on environmentally friendly products and processes, such as energy conservation, the prevention of pollution, recycling of wastes, designing green products, and company environmental management. (Chen et al. 2012).

Procedural definition: Methods, techniques and procedures used by Bahraini firms that reduce the adverse effects of production processes and products on the environment to ensure the sustainability of the environment and its resources in the interest of current and future generations.

- **Green Innovation Strategy:** “a strategy that emphasises the reduction of waste, pollution prevention and environmental management system” (Eiadat et al., 2008).

Procedural definition: The strategy established by Bahraini businesses to promote the use of Green innovation activities in products and processes and reflected in their core values.

- **Green Organisational Identity:** a jointly constructed interpretive framework concerning environmental management and conservation that members use to provide meaning to their behaviours. (Chen, 2011).

Procedural definition: a collaboratively developed interpretative framework for environmental concerns that members in Bahraini firms use to provide meaning to their activities, decisions, and behaviours.

- **Environmental Organisational Legitimacy:** the degree to which an organisation's activities conform to the underlying conventions, attitudes, values, and stakeholder expectations about environmental issues. (Chang and Chen, 2013).

Procedural definition: generalised perception or assumption of stakeholders that Bahraini firm's corporate environmental behaviour is desirable, proper, or appropriate.

- **Green Creativity:** The generation of unique and beneficial ideas that positively impact the products, services, processes, and practices of companies. (Zhang et al. 2020).

Procedural definition: the creation of creative, innovative, and beneficial ideas about green products, green processes, green services, or green practices within Bahraini businesses.

- **Managerial Environment concern:** Attitudes of top management toward environmental innovation (Cordano and Frieze, 2000).

Procedural definition: The top management's attitudes in Bahraini firms toward Green innovation.

- **Absorptive capacity:** is an organisation's capacity for the identification, assimilation, transformation, and application of external knowledge, research, and practice. In other words, absorptive capacity quantifies the rate at which an organisation can acquire and apply scientific, technological, or other external knowledge. It is a proxy for an organisation's ability for learning. (Cohen and Levinthal, 1990; Naqshbandi, MM, Kamel, Y, 2017).

Procedural definition: The ability of Bahraini firms to learn about how to introduce green Innovations in products and processes?

- **Competitive intensity:** “The degree of competition a company encounters in the industry in which it is involved”. (Chen and Liu, 2019).

Procedural definition: The degree of competition a Bahraini company encounters in the industry in which it is involved and force it to differentiate by practising GI innovations.

- **Green Organisational Culture:** a shared system of beliefs, ideas, values, and attitudes related to the environment that shape organisational behaviour, particularly behaviour towards the environment. (Wang, 2019).

Procedural definition: The standard set of beliefs, values, ideas, and attitudes among employees that may drive them to adopt GI as an essential value of the organisation and to become more engaged in environmental issues.

- **Financial performance** is the financial status of a business over a specified time period, as evaluated by many indicators such as Assets utilisation ratios, liquidity, leverage, solvency, and profitability. (Fatihudin, & Mochamad, 2018).

Procedural definition: The performance of ROE, ROA and EPS for the last three years compared to the industry.

Chapter Two

Green Innovation Impact on Financial Performance

Chapter Two:

Green Innovation Impact on Financial Performance

2.1 Introduction

The importance of environmental protection for companies has increased due to strict regulations, environmental agreements, and consumer pressures. Research has shown that a lack of green innovation results in environmental degradation (Jackson et al., 2012; Al-Sartawi et al., 2020; Chien et al., 2021; Khattak et al., 2022). Therefore, companies must integrate green innovation into their operations to minimize adverse environmental impacts and improve sustainability. Green innovation can improve a company's reputation, increase competitiveness, and emphasize ecological responsibility in an era of regulatory and consumer sensitization, which can ultimately impact firms' profitability.

Many studies have investigated the relationship between financial performance and green innovation. Farza et al. (2021) examined the relationship between green innovation and the financial performance of German HDAX companies from 2008 to 2019. They used a green innovation measure and found a linear beneficial effect of green innovation on financial performance, which improved the company's reputation and economic performance.

Aastvedt et al. (2021) found that green innovation positively impacted the financial performance of US and European oil and gas businesses using panel data from 2010 to 2018. Both regions saw a positive relationship between innovation scores and financial performance. However, the environmental pillar score had a curvilinear effect on financial performance in the US and only negatively moderated financial success for European firms. US firms perform better financially at lower levels of green innovation, while European companies perform better at higher levels. This difference in willingness and attitudes towards environmental performance leads to more volatile financial performance

for European businesses. Policymakers can use these findings to establish effective policies and support structures that improve environmental performance while retaining financial success.

Xie et al. (2019), Using text analysis to collect data from 209 listed firms polluting manufacturing industries, discovered that green processes and product innovation could increase a firm's financial performance. They also demonstrated that a firm's green image moderates the association between green product innovation and financial performance. The study found no evidence that green subsidies moderate the relationship between green product innovation and financial performance.

The comprehensive studies related to this relationship between green innovation and profitability have not been adequately examined in Bahrain, as there is only one study conducted by Al-Sartawi et al. (2020) on companies registered on the Bahrain Stock Exchange, which focused on the direct relationship between green innovation and profitability. What highlights the importance of studying this relationship in Bahrain is that it may provide the most effective instrument for achieving sustainability, which we will discuss in the next section.

2.2 Sustainability in Bahrain

The Kingdom of Bahrain's first voluntary national report for the 2030 SDG indicated that the most critical challenge facing the Kingdom of Bahrain is the pursuit of sustainability for a small island state in a changing climate, where population growth and urbanisation and the accompanying demand for land, resources and services create pressures on the limited natural resources. The concentration of population and development facilities on coastal areas and the possibility of sea-level rise due to climate change threaten to sustain Bahrain's rich coastal ecosystems at an economic, social and environmental cost. Pursuing future urbanisation/growth areas and adaptation measures to sea level rise are

critical to sustainable development and the maintenance of massive investments in coastal development facilities, ecosystem services and human well-being.

Bahrain established the Protection of the Environment Committee through Amiri Decree No. 7 which was promulgated in August 1980. The Technical Secretariat for the Protection of Environment in Bahrain was established as the Committee's executive arm. This indicates the political leadership's early concern with environmental issues. The Kingdom's rapid economic expansion demonstrated that solid ecological management and regulation of natural resources' sustainable use guaranteed long-term economic development, an increase in the standard of living, and an improvement in the quality of life for inhabitants. On this basis, legislative - Decree No. 21 of 1996 was promulgated, which stated in Article 3: "The environmental authority shall be responsible for issuing decisions and instructions on all matters of the environment and shall exercise all powers and authorities necessary for this purpose" .

Starting from this decree, the companies' interest in environmental issues became binding. The Bahraini government began to exercise a kind of control over the companies' practices that are harmful to the environment. The environmental issues for some executives become a source of expenses that must be incurred because of this government oversight. This study is an attempt to study the relationship between green innovations and financial performance, representing an attempt to look at the concern for the environment by companies as a source of profitability.

2.3 Why is the Environment important to companies?

Today, there have been mounting environmental issues related to pollution and overexploitation of resources; thus, businesses and companies are faced with enormous pressure to conduct their operations in an environmentally friendly manner (Mathu, 2019). A sustainable perspective constrains organizations to accede that they are a component of the social and natural system that requires

them to be accountable while exploiting natural resources. Therefore, these firms have developed alternative ways of conducting their businesses with minimal detrimental effects on the environment, requiring them to implement radical changes in management policies and product development.

A new strand of researches support that integrating environmental issues into production and operation's activities can be described as a process that is pushed by economic and regulatory pressure and pulled by competitive and ethical concern (Munoz et al. 2022).

The majority of environmental laws adopted by governments worldwide, regardless of its different forms, including standards, fees, and pollution permits, are designed to apply legal and, more importantly, economic pressure on industries. Compliance with environmental standards frequently becomes a significant financial burden for the majority of businesses. For example, the United States Environmental Protection Agency (EPA) estimated that the cost of complying with federal air and water pollution management rules in 1981 was \$52 billion. Between 1981 and 1990, the United States spent about \$640 billion on clean air and water (Portney 1990). By incorporating environmental considerations into manufacturing and operation's processes, most businesses can alleviate the financial burden associated with complying with environmental requirements. For example, the 3M Company believes that its "Pollution Prevention Pays" program has saved \$482 million since 1975 by reducing over 500,000 tons of waste and pollutants from its manufacturing operations, and another \$650 million through energy conservation (Bringer and Benforado 1993).

Environmental stewardship has become one of the most critical corporate strategies in today's global marketplace (Porter 1996). Apart from the enormous potential cost savings associated with compliance, many manufacturers have been pursuing the first-mover advantage by introducing environmentally-friendly products to so-called green consumers, such as the electric vehicles introduced

by the majority of major automobile manufacturers worldwide. Around 700,000 enterprises are expected to be already committed to some type of environmental commerce, which competes with businesses that are unable to change (Hawken 1996). Some argue that the recent trend toward adoption of international environmental standards, such as ISO 14000, may eventually become a trade barrier. As a result, including environmental issues into manufacturing and operations processes may become a must for businesses that wish to compete and prosper on a global scale (Kuhre 1997).

Perhaps the most compelling reason to integrate environmental protection into manufacturing and operations management is a straightforward ethical one: it is the right thing to do. Since the industrial revolution, production and operations activities have had a serious negative impact on the global environment, and this impact must be decreased to a level that is environmentally sustainable (Welford 1996). Sustainable production, which refers to the process of reducing material and energy throughput to a level that preserves the regenerative and assimilative capacities of environmental sources, is now practised by major companies across a range of industries, including 3M, Du Pont, AT&T, McDonald's, Chevron, The Big Three, and Toyota (Gladwin 1991). The general public's support and acclaim for these corporations' initiatives confirms their credibility and relevance. When all these components are merged, a new mindset toward corporate responsibility and performance is created, necessitating the integration of Operations and Environmental Management.

2.4 Green Innovation

Scholars and environmental strategists have argued for and recognised the critical role of green innovation methods in advancing sustainability practices (Frenken and Faber, 2009; Shu et al. 2016). They feel that embracing a green innovation philosophy is critical to addressing environmental uncertainties in today's corporate activities. Stakeholders (consumers, suppliers, civil society

organisations, and others) have contributed their voices to the call for enterprises to adopt green innovation methods as a crucial driver of a balanced approach to economic growth and a sustainable environment. This strategy, in turn, can help them improve their business image (Weng et al., 2015). Green innovation, according to Yim et al. (2010), is a creative manner of executing tasks or giving positive direct benefits to the environment. GI is required to create and implement corrective methods to mitigate environmental damage (Boons and Ludeke, 2013). GIs role in addressing environmental concerns like industrial pollution, climate change, energy security, and waste material recycling has become increasingly critical for enterprises and society in today's hyper-competitive world. To be sure, businesses that include green innovation in their strategic plans increase their organisational and environmental efficiency (Cheng et al., 2014).

Green innovation makes a more significant contribution to achieving the economic and environmental dimensions of sustainable development through a process called environmental efficiency (Basuki, 2015). The concept encompasses the providing of goods and services at a competitive level of prices which satisfy human needs and contribute to a high quality of life while gradually reducing environmental impacts and intensive use of resources during a person's life and at a level that is commensurate with the land's carrying capacity.

According to the World Business Council for Sustainable Development, institutions must work on the following to achieve environmental efficiency:

- Reducing the material density of products;
- Reducing the energy density of the products;
- Reducing the leakage of toxic products;
- Improving the material recycling;
- Maximising the permanent use of renewable resources;
- Extending the product sustainability (Lehni, 2000).

Environment efficiency within organisations includes designing products that respect the principles of sustainable development and restructuring the entire production activities using environmental management. (Li et al., 2020).

2.5 Green Innovation and Profitability

Sustainability theory prioritizes and integrates social responses to environmental and cultural problems. Several types of research on this theory attempt to examine the impact of environmental issues on firms' performance. Businesses seek green innovation for various reasons, most notably the benefits to themselves and their stakeholders. Companies that successfully implement green innovation methods can enhance their business practices, processes, and financial performance (Ma, Zhang, et al. 2021, Junaid et al. 2022). Additionally, they can contribute to their stakeholders and the global community. (Karabulut, 2019).

A substantial amount of research has been devoted to analysing the financial performance effects of enhancements in environmental performance or the inclusion of green innovation at several levels of analysis, where financial performance is defined in terms of short-term metrics like profitability or even longer-term metrics as firm competitiveness. Though no definitive answer has been forthcoming, the research topic of whether it pays to go green has persisted for an extended period of time.

According to the firm's natural-resource-based view (NRBV), profitability is positively influenced by the competitive advantages provided because of the adaptation of green innovation, as this proactive behaviour promotes developing strategic resources that generate good financial rates of returns (Hart, 1995). Degradation of the ecosystem and resource depletion poses a threat to enterprises' resources, and firms can respond by adopting a proactive environmental strategy, which can be interpreted as the creation of a dynamic capability (Hart and Dowell, 2011). In this regard, corporations facing more climate change risks face greater

incentives to create green strategies. Additionally, the notion that it pays to be environmentally conscious became even more appealing when connected to the NRBV since it is a hypothesis of how an individual organisation might earn a competitive advantage by being green. Porter and Van der Linde, (1995) mentioned that managers frequently underestimate the economic benefits of pollution reduction, resulting in suboptimal levels of environmental efforts if innovations can more than balance the expense of complying with severe environmental regulations. This underestimation can be attributed to the expenses associated with gathering accurate information regarding values and returns of various pollution reduction variables, since firms may be hesitant to pay these costs and hence underutilize or abuse certain "greener" manufacturing practices. Waste avoidance procedures, for example, have been underutilised due to their intangible benefits. (King and Lenox, 2002) Finally, the literature about Corporate Social Responsibility (CSR), primarily concerned with environmental stewardship, sheds light on the possible benefits of socially responsible behaviour. According to Ambec and Lanoie, (2008), regardless of whether the implementation of cleaner technologies occurs as a result of a strategy aimed at improving firms' market evaluation, gaining entry to new (green) markets, or used in a cost-cutting strategy, such adoption may still have a beneficial effect on business performance.

With this analytical framework in place, various empirical studies have been conducted to examine the relationship between financial and Green Innovation at the corporate level (Jaggi and Freedman, 1992). These investigations painted a very diverse picture of the indicators of this relationship and the appropriate empirical procedures. According to Horváthová (2010), 15% of those studies discovered a negative influence, 55% discovered a positive effect, and 30% discovered no effect of environmental performance on financial performance. Bragdon and Marlin (1972) discovered that it pays to be green by

examining the profitability implications of environmental performance ratings on the pulp and paper sector, as assessed by Returns on Equity (ROE). The same positive sign, although using different financial performance metrics, may also be observed in Russo and Fouts (1997), who use Returns on Assets (ROA), King and Lenox (2002), who use the Tobins'q index, and Salama (2005), who uses Corporate Financial Performance. King and Lenox (2002) added to this understanding by demonstrating that the positive association between financial and environmental performance is due to a specific type of practice, namely waste avoidance strategies. Hart and Ahuja (1996) provide additional evidence that firms with less pollution benefit from improved financial performance. They also noted that operating performance (profit margin and ROA) improved immediately following the implementation of pollution prevention strategies, whereas financial performance in terms of Return on equity ROE improved two years later. Different types of analysis can be used to overcome the simultaneity issue that arises in a cross-sectional study, where environmental and economic performance is typically co-determined and dependent on the unobservable companies' management strategy. Research done by Al-Tuwaijri et al. (2004) found support for a positive relationship between environmental and financial performance using the estimations of a three stages Least Squares.

In contrast to those findings, Cordeiro and Sarkis (1997) discovered evidence of short-term negative impacts, which was stronger for pollution prevention techniques than for end-of-pipe solutions, when they examined the impact of environment on financial performance measured as the profit margin on a cross-section of US firms. Also, a negative impact on the Return on Capital Employed "RoCE" was observed in the European context, specifically in the European paper industry, when a simultaneous structural model was used, but the effect was no longer significant when alternative financial performance measures such as ROE or ROS were used (Wagner et al., 2002). Similarly, Jaggi and

Freeman (1992) observed a neutral impact. Elsayed and Paton (2005) concluded, however, that earlier mixed results were caused by misspecification concerns caused by previous contributors' inability to adequately account for unobserved businesses' fixed effects. When they compared static and dynamic panel analyses on UK data, they discovered that environmental performance has a negligible impact on financial performance according to their dynamic specification. However, the cross-section specification showed larger (biased) relationships. Coherently, Telle (2006) suggested that the conclusion "going green pays" is premature because when using a panel random effect model instead of a pooled ordinary least square (OLS) model, the economic benefits of environmental performance ceased to be substantial.

These disparate findings concluded that the question is not about whether it pays when being green but for whom and when it pays (King and Lenox, 2002).

Ghisetti and Rennings (2013) pointed out that the subject needs to be more precisely defined regarding the kind of GIs that should be evaluated, as they anticipated that different GIs will have varied competitive consequences at the business level. As a result, they phrased their research question as "How does going green pay"?

Ghisetti and Rennings (2013), classified GI into two categories: Energy and Resource Efficiency Innovations (EREI), which are those that result in a decrease in material and energy consumption per unit of output, and Externality Reducing Innovations (ER), which are those that aim to reduce production externalities such as noise, water, air, and hazardous materials. At the same time, both EREI and ER face what is called the "double externality problem" associated with GI. In that, they continue to generate innovation spillover while reducing negative production externalities. The empirical evidence indicates that the two typologies are fundamentally distinct, whether in terms of drivers (for example, EREI benefit more from using external information sources), in terms of

productivity (sales by employees), or obstacles to innovation, which are supposed as more intense than ER (Rennings and Rammer, 2011). Additionally, evidence indicates that the benefits of a firm's green investment strategies increase a firm's productivity efficiency only when the company's investment in cleaner production equipment focuses on concurrently reducing externalities and raw material consumption. (Antonietti and Marzucchi, 2013). Additionally, Russo and Fouts (1997) argued that depending on enterprises resource bases, their ability to make profits might differ between those who respond to regulatory compliance by bringing end-of-pipe GI and those that restructure their production processes and services. End-of-pipe technologies do not substantially affect manufacturing processes and so do not affect enterprises' resources or capabilities. As a result, it is unlikely to influence enterprises' competitiveness positively but may act as a cost burden, resulting in negative outcomes. Improved environmental performance is projected to result in good competitive gains when a redesign of the manufacturing process is followed by a change in the resource bases and capabilities (Russo and Fouts, 1997). Because EREI results in a decrease in physical resource consumption, they represent an essential source of competitive advantage for firms. They are likely to have a favourable influence on enterprises' profitability. Instead, investments in end-of-pipe technology are associated with worse performance (Klassen and Whybark, 1999), implying that ER will have a different sign.

Due to these contradictory findings, green innovation as well as its link to financial performance, remain a question for debate and so demands more examination.

2.6 Moderating Effect between Green Innovation and financial performance

In Bahrain, Al-Sartawi et al. (2020) tested the direct relationship between GI and Financial performance. The results revealed a positive and statistically

significant association between return on assets and green innovation methods and strategies. This has significant consequences for managers and governments seeking to improve business performance through environmental innovation metrics and practices.

The literature is full of studies that examine this direct relationship. Unfortunately, many of these studies showed inconsistent results among the variables, as discussed earlier. This creates the need to establish a coherent, logical foundation or framework illustrating the causal mechanisms by which green innovation boosts company performance.

There is also a need to discover those variables that might affect activating GI, which in turn enhances firm performance. In the following parts we will discuss each of the moderators that might have an impact on the link between GI and financial performance.

Moderators typically assist in determining the external validity of our study by highlighting the constraints associated with when a relationship between variables holds. In our study, by including moderators, we can check whether the relationship between GI and Financial Performance will hold with or without managerial concerns, high absorptive capacity, low comparative intensity, inadequate green organizational culture.

2.6.1 Managerial Environmental Concern

Managerial environmental concern (MC) is a term that refers to the attitudes of top management toward environmental innovation. According to planned behaviour theory, management environmental attitudes are crucial for the adoption of good environmental initiatives aimed at reducing pollution (Ashford, 1993). Managerial environmental perspectives have a significant impact on applying environmental management techniques, particularly for enterprises facing environmental challenges (Roxas and Coetzer, 2012). To begin, top

management is critical in establishing a firm's environmental management expectations and standards, which can foster green innovation. Thus, top management's concerns are crucial to their organisation's ability to reflect on and handle environmental challenges swiftly. Second, top managers place a higher premium on environmental management and share their thoughts and standards with employees to influence their behaviours and attitudes toward environmental protection and push them to produce green innovation (Chen and Huang, 2009). Thirdly, because top executives affect organisational resources and employment, they can also allocate corporate resources to environmental initiatives (Song et al., 2021).

By focusing on the following actions, environmental management concerns enable continuous improvement in organizational performance (Riccio, 2001):

- To develop and enforce environmental policies. (Planning for the environment).
- To promote environmental stewardship;
- To validate and prevent the use of hazardous compounds (by measurement and assessment of their effects);
- To scan (for the purpose of permanent evaluation and control);
- To conduct a management activity review (continuance improvement of system).

Business executives and management can help mitigate possible environmental issues by implementing solid environmental management practices and policies across all business activities. According to this tendency, executives' pursuit of the environmental problems can be considered as a choice between continuing environmental destruction or continuing environmental protection, based on the business's prospective profits from either environmental protection or environmental destruction. To assist organizations in making this vital decision, a cognitive framing perspective provides a better grasp of

sustainability challenges to management or executives (Hahn, et al., 2014). To be sure, cognitive frameworks assist CEOs in sorting through available data and selecting the optimal decision (Porac, and Thomas, 2002). Businesses that are committed to promoting green innovation prioritize environmental protection or concern and develop management and environmental policies to enhance organizational performance.

Businesses can address environmental risks in one of two basic ways control or prevention (Fernandez et al., 2003). For instance, an organization's management team can mitigate or prevent an environmental threat by utilizing all available talent within the organization to prepare themselves against environmental problems (Cheng et al. 2014), alongside the ongoing development of existing production processes and the introduction of new technical techniques (Cheng et al., 2014), in addition to total quality management. Environmental management issues of businesses might be classified as high or low in this regard. A management environmental concern firm is expected to be more proactive concerning environmental problems (for example, environmental rules and regulations) and to propose new solutions for developing green innovation activities. In comparison, a low-managed environmental firm is assumed to be indifferent or reactive to environmental issues (for example, showing resistance to change).

Environmental awareness among executives is critical for decision-making in ecologically sensitive industries. Proper comprehension opens up channels for filtering all available information and enables executives to make the most significant choices for the organisation's benefit. Upper management's inspiration for the organisation demonstrates significant effects on the degree to which green innovation approaches are willing to be approved (Qi et al. 2016). Indeed, management environmental awareness is a critical aspect that might influence an organisation's embrace of green innovation. Qi et al. (2016) investigated the effect

of managerial concern on green innovation adoption in the Chinese industry of construction and discovered that managerial concern is the primary driver of green innovation adoption. Przychodzen et al. (2016) argue that businesses should examine management's influence on the conversion of green practices associated with company success. Managerial concern for the environment can spur green innovation, which ultimately improves business performance. In this regard, enterprises require robust environmental policies that are ingrained in norms, attitudes, and values to accelerate the adoption of green innovations and increase their competitiveness.

2.6.2 Absorptive Capacity

Cohen and Levinthal (1989) coined the term "absorptive capacity" to refer to one of a firm's essential learning processes: its ability to detect, assimilate, and exploit knowledge from its surroundings.

Absorptive capacity enables a business to adjust to changes in the business environment and focuses on a manager's ability to reorganise a business's resources and procedures (Hashim and Cooper, 2015). Facts, opinions, ideas, theories, concepts, models, experiences, values, contextual information, expert insights, and intuitions about business organisations are all examples of knowledge (Mitri, 2003). Knowledge has explicit and tacit dimensions; the tacit dimension is based on personal experience, thought, and emotion in a particular context, whilst the explicit dimension is expressed, codified, and communicated through symbols (Nonaka & Takeuchi, 1995).

Scholars have rarely examined how absorptive capacity affects the association between GI and company financial performance. Absorptive capacity is a term that relates to a firm's capability to detect, integrate, and hunt for knowledge in its changing environment to facilitate organisational learning (Cohen and Levinthal, 1990). Thus, absorptive capacity enables enterprises to identify and acquire external resources for optimal performance through

collaboration and partnership. Firms with advanced absorptive capacity tend to expand their competitive advantage through innovation and enhanced performance (Hashim and Cooper, 2015). To be sure, the concept of absorptive capacity affects how a firm's resource base varies. The absorptive capacity of firms can be classified as high or poor. A firm with a robust absorptive capability is thought to be more proactive, more innovative, and perpetually prepared to access and use external knowledge resources necessary for generating green innovation (process, product, and organisational). On the other hand, a firm with low absorptive capability is assumed to occupy a sedentary position in pursuing external discoveries such as information and technological activities, both of which are crucial for generating GIs.

The implementation of green practices within an organisation serves as the link between businesses and the external environment. Certainly, it is the merging of internal and external resources that enables enterprises to adapt to and differentiate in a volatile environment (Cheng et al., 2014). Stanovcic et al. (2015) underline that acquiring external knowledge promotes green innovation processes and that enterprises should take necessary actions to increase their absorptive capacity. According to (Hashim and Cooper, 2015), enterprises should emphasise the process by which information drives green innovation. Huang and Li (2017) revealed a substantial positive correlation between absorptive capability and green innovations. We suggest that an organisation's configuration of absorptive capacity and green innovation strategies is critical for performance enhancement. Thus, a firm's incorporation of external information into organisational processes, particularly in green innovation activities, can influence the organisation's overall performance.

2.6.3 Competitive Intensity

The other external component that may function as a moderator in the GI-financial performance relationship is market competitive intensity, defined as the

number of rivals in a market and the intensity of the marketing strategies to compete in an industry (Leónidas et al. 2013).

Competitive intensity is described as an environment in which competition is intense due to the presence of multiple rivals and a lack of growth prospects (Auh & Menguc, 2005). It has long been viewed as a significant factor in the operational environment's hostility (Zahra & Covin, 1995). According to this view, marketing researchers have argued that in a low-competition environment, a firm's performance may not suffer significantly if it cannot pay that much attention to client requirements.

This is because clients are compelled to adopt the firm's products owing to a scarcity of alternatives (Cadogan et al., 2003). In contrast, because customers in a competitive marketplace have greater freedom to switch suppliers, a business that better meets customer requirements than its competitors are likely to dramatically improve its performance (for example, in terms of increased sales). This means that, in comparison to enterprises operating in less competitive markets, those operating in more competitive markets are likely to achieve greater performance provided they can successfully manage client expectations. Consistent with the preceding type of reasoning, Murray et al. (2011) argued that firms must be more market-responsive in order to counter rivals' aggressive behaviour in a highly competitive marketplace. Those pursuing market-oriented strategies that meet client needs in such a setting are supposed to perform even better than firms pursuing similar strategies in a less competitive market.

Additionally, this position reflects the existing innovation literature, which argues for the more immediate competitive gains businesses facing increased rivalry might obtain from adding value to their consumers (He & Nie, 2008). Taken together, the preceding discussion demonstrates that competitive intensity has a positive moderating influence on the link between customer-oriented strategy practice and business performance. Customers are increasingly

expecting environmentally responsible manufacturing and goods from their suppliers in an era of growing worldwide environmental concerns (Banerjee et al., 2003). Thus, if a business can work closely with its customers to identify methods to mitigate the negative environmental consequences of its operations and/or goods, the positive performance implications of this customer collaboration should be even more apparent in a high-competition context.

According to Menon and Menon (1997) in times of intense competition, customers have the option of selecting items from a diverse range of suppliers, and those distinguished by environmental marketing attributes provide this option. Additionally, in such a competitive market, environmental purchasers can more readily transfer suppliers. Businesses that take a more eco-friendly stance are perceived as likeable, and their product is more appealing, particularly among environmentally conscious clients (Tsai, et al., 2008). Thus, severe market competition increases the possibility of GI producing superior financial results. In comparison, low competitiveness fosters apathy and passivity toward environmental issues in markets (Menon et al. 1999).

2.6.4 Green Organisational Culture

Today, there have been mounting environmental issues related to pollution and overexploitation of resources; thus, businesses and companies are faced with enormous pressure to conduct their operations in an environmentally friendly manner (Mathu, 2019). A sustainable perspective constrains organisations from acceding that they are a component of the social and natural system that requires them to be accountable while exploiting natural resources. Therefore, these firms have developed alternative ways of conducting their businesses with minimal detrimental effects on the environment, requiring them to implement radical changes in management policies and product development.

Green culture can be termed as the common principles toward an environmentally friendly way of production shared by most organisational

members. Green organisational culture (GOC) is instrumental in enhancing green performance and firms' competitive advantage. Environmental change has become a vital policy issue for many countries since the increase in the rate of global warming is posing threats to humanity. Organisations have been blamed for contributing to environmental degradation and pollution through their activities, either directly or indirectly (Wang, 2019). This has forced industries to start preparing for a carbon-constrained world as governments and scientists are working together to avoid the impact of climatic changes.

GOC is simply a set of values, assumptions, symbols, and organisational artefacts that reflect the desire or obligation to be an environment-friendly firm. Therefore, firms tend to have a set of shared beliefs, values, and assumptions about environmental issues and the management of the environment (Yang et al., 2017). These shared beliefs and norms shape the standard behaviours of firms, and they take steps towards implementing green technology to save the world from climate change.

Environmental culture, in all its stages and preparations, is the essence of the cultural process in organisations that seek to protect the environment and nature through the acquisition of cognitive, emotional and behavioural components. Through the continuous interaction of individuals with the environment, they will transfer this behaviour to others around them. Through learning processes and systematic and programmed education, a generation can be created with high efficiency and willingness to deal expertly and responsibly with environmental issues.

The relationship of the concept of culture to the environment expresses several things including: (Tepe, 2018).

First: The process of awareness of environmental problems is formed through understanding gained from various institutions, the most important of which are governmental bodies, organisations, the family and the school, and this

connection between them expresses an important aspect that is an essential entry point for the development of environmental awareness.

Second: Culture relates to an essential aspect of personality, which is the behaviour on which the success of awareness and education programs depends for actual conduct, and represents the system of thought, customs and traditions that reveal fundamental aspects of the human relationship with the environment, and culture may represent an obstacle to the development of environmental awareness.

Third: The concept of culture and environment expresses the idea of transmission and acquisition. Culture, as is well known, describes acquired aspects transmitted through generations, and it is one of the critical development entry points.

The Kingdom of Bahrain has made a great effort to ensure sustainability in the development process in various sectors of its economy. The National Charter, approved by over 98 percent of the citizens, has provisions for environmental protection, the balance of development requirements and the vision and strategy of Bahrain Economic Vision 2030 (AlZgool et al., 2020). The country has also created various institutions, commissions, and agencies that participate in development programs, policies, and strategies essential to attaining sustainability. This Charter has also enacted various laws linked to sustainable development applications that can be achieved through public awareness and national capacity building.

Also, the Kingdom has implemented various tasks and initiatives suitable for supporting environmental protection and conservation. Some of these initiatives are directed towards energy conservation, such as the green policy, optimal utilisation of resources and reducing the usage of materials that can negatively impact the environment. The government has also formed a committee to research alternative environment-safe energy. For example, the Kingdom has

the electricity and water authority and National Oil and Gas Authority that help in energy conservation (AlZgool et al., 2020). Based on this, the Kingdom is geared towards protecting the sustainability of water resources, air quality, achieving biodiversity, and protecting the coastal regions from pollution. The country has also designed a waste management system to control waste, such as the national contingency plan containing oil spills, electronics recycling, and hazardous waste management. All these initiatives are geared towards achieving a green culture that will enhance environmental protection and sustainability.

2.6.4.1 Green Organisational Culture and Green Innovation

A green organisational culture can be regarded as a tool that allows for creating an atmosphere suitable for creating new ideas that can lead to green innovations within an organisation. This implies that the move in many organisations to promote environmental promotion and sustainability leads to the creation of an organisational culture supported by all firm members (Bulińska-Stangrecka & Bagieńska, 2021). Therefore, this culture allows the organisation to develop initiatives and policies suitable for adopting green innovations to facilitate its environmental conservation strategies .

Besides, GOC can be tied to green organisational performance, which provides essential information about the impact of the environment, compliance with regulations and organisational systems. How an organisation interacts with its environment describes its green performance (Liu & Lin, 2020). This involves a firm adopting eco-environmental values that facilitate the production of environmentally friendly products. Therefore, green innovation (GI) strategies can be derived from an effective GOC that influences managers attitudes towards GI. This implies that when the managers are aligned towards preserving the environment, they design policies to protect the environment, thus enhancing the organisational GI (Weng et al., 2015). For example, the development of green

supply chains management practices such as green purchase and green manufacturing are GI that arises from GOC.

2.6.4.2 The Competitive Advantage of a Firm in Relation to Green Organisational Culture

It is evident that GOC impacts the competitive advantage of an organisation. To achieve this, a company must create a positive value that surpasses that of rival competitors. This can be attained when a company is in a position to develop new resources in response to the changing environmental issues (Liu & Lin, 2020). This implies that a company's strong GOC allows its workers to understand its environmental strategy. This can make it easier to include GOC in the organisation's core values, thus in a position to influence environmental preservation values through policies and initiatives of the company. By doing this, the firm enhances its competitive advantage in consumers' minds, which can be attributed to the green orientation of the firm's culture (Tahir et al., 2019). Therefore, supportive GOC in companies can influence employees' behaviour, thus increasing its competitive advantage.

2.6.4.3 Green Organisational Culture, Green Innovation and Green Performance

Organisations supporting GI can attain green performance essential in boosting their corporate image and creating new markets. Firms with a GOC that is well designed can effectively influence their GI, which reduces production waste, environmental pollution, and strengthens the firm's corporate green reputation and image (Aguilera & Ortiz 2013). This, in turn, enhances the organisation's green performance since it will focus more on accomplishing its corporate social responsibility, which is to conserve the environment. The change and innovation that is realised in the organisation can all be attributed to GOC influence in creating a shared vision within the organisation which drives its

mission (Tepe, 2018). Organisations are likely to adopt a green innovation strategy if their management share and care for the environment and its sustainability. Therefore, GOC is responsible for organisations' green innovation and green performance.

2.6.4.4 How do Green Organisational Culture Influence Green Innovation and Financial Performance

Green workplace practices are essential in the conservation of natural resources such as energy. Employees of an organisation play a crucial role in their institution's green practices since they reduce energy consumption and other resources in their daily implementation of green behaviours. Employees' green behaviour ranges from minimising energy consumption, reducing water usage, recycling and participating in environmental programs (Aguilera & Ortiz 2013). These green work practices can lead to the adoption of green innovation programs within the institution meant to reduce wastage. For example, green manufacturing and green packaging can be a consequence of green workplace practices that ends up helping the organisation reduce the consumption of materials and energy during production. This improves the financial performance of the organisation. Therefore, green workplace practices can be attributed to a strong GOC within the institution that leads to the adoption of GI, which helps boost the organisation's financial performance (Wang, 2019). Green innovations allow organisations to minimise their negative impact on the environment during their operations. It also allows the organisation to use its production resources more efficiently by minimising wastage. On the other hand, organisational culture is essential in making the institution realise its green innovation activities .

If the organisation culture tends to support its employee's green behaviour, it can increase the employees' emphasis on creating new ideas for environmental conservation. This will allow the organisation to enhance its total value which can be essential in helping it realise its goals. For example, GOC can lead to the

adoption of GI strategies such as green manufacturing that can be incorporated and integrated into the total quality management of firms, thus leading to the superior performance of an organisation (Tahir et al., 2019). Green manufacturing effectively reduces harmful manufacturing since the overall production process produces less waste, thus improving efficiency and performance. This gives an organisation a competitive edge over its competitors since it can produce more quality goods, using fewer materials at a relatively low cost (Tepe, 2018). This makes the organisation save more of its resources. Therefore, it is true that green organisational culture helps the company adopt green innovation that helps reduce production costs and increase the firm's reputation and image, which translates to an increase in financial performance.

2.7 Financial Performance

Financial performance represents the dependent variable in this research. Still, for this study, it has a broader functionality as it means the motivation that would motivate businesses to take care of the environment. The noblest goal is enhancing the environment in Bahrain because its impact is more comprehensive. Still, without a doubt also, financial performance is essential.

The performance of companies is measured in two ways, one of which is more appropriate according to the content of the study. Some studies divide the so-called operational performance into dimensions such as efficiency, effectiveness, quality, innovation, development and employee satisfaction. Other studies use financial indicators such as return on assets and return on equity, Tobin Q.

According to Rogers & Wright (1998), the study of organisational performance is still ambiguous and consists of a set of 'loose constructs.' As better organisational performance will lead to better financial performance, this study will use financial performance directly to exclude what might affect organisational performance leading to the financial one.

The financial success may be measured using a variety of proxies, such as capital growth, debt rate, and Return on Investment (ROI) (Fatihudin, & Mochamad, 2018). In addition to sales revenue and earnings per share, these were two more frequent metrics. It has been used in the literature to examine the interests of various stakeholders in the marketplace by using financial measurements like ROS, ROA, ROE, and ROIC to measure a company's profitability (Mashovic, 2018). Additionally, Tobin Q is utilized as a possible indicator of a company's worth from an investor's standpoint. To get this number, you must divide the market value of the company's assets by their replacement value. Return on Equity (ROE) and Return on Assets (ROA) is the most commonly used proxies for gauging a company's profitability, despite the availability of several performance metrics (Al-sartawi, 2020). As a result, these two variables will be used as proxies in this analysis.

Chapter Three

Antecedents of Green Innovation

Chapter Three:

Antecedents of Green Innovation

3.1 Introduction

The primary purpose of this chapter is to develop a research framework to investigate the determinants of GI. The main antecedent that will be discussed is GIS. An essential part of the mechanism of GIS is the use of factors such as environmental organisational legitimacy, green environmental identity and green creativity. Despite that, we are going to test the mediating role of those three variables between GIS and GI. The three variables will also be tested as antecedents of GI.

Scholars have seldom studied how green innovation strategy influences green innovation performance, which is the purpose of this study. A developing country's environmental challenges are an excellent case study for testing the theories of organisational legitimacy and organisational identity and creativity. The focus is on examining and assessing the mediating roles of environmental organisational legitimacy, green organisational identity and green creativity on the link between GIS and GI in Bahraini enterprises.

A company that wants to improve its green innovation performance should begin by creating a green innovation strategy. An organisation's strategy, according to Johnson et al., (2005), points to the long-term scope and direction necessary to meet market demands and satisfy stakeholder expectations. Porter (1996) claimed that a strategy is built on specific activities, and hence organizations must deliberately select a set of activities that deliver a unique mix of value. When businesses create a strategy to preserve the environment, they create green innovation strategies. A GIS strengthens environmental sensitivity through pollution prevention, product supervision, and non-polluting technology (Hart, 1997). By producing a variety of environmentally friendly initiatives, the

green innovation strategy becomes an essential source of competitive advantages, which eventually will be reflected on firm profitability (DeBoer et al., 2017).

This sort of conduct may boost an organisation's sense of identity when management and internal stakeholders adopt a strategy for green innovation to reduce the environmental hazards of manufacturing processes and product outputs (Song and Yu, 2018). An organisation's "identity" is a snapshot of how stakeholders inside and outside, such as employees, customers, and investors, perceive the company's leadership. Organisational identity and image have a crucial role in comprehending and responding to strategic change (Gioia, 1998). Green organizational identity was proposed by Chen (2011) as an interpretative structure for environmental management and preservation constructed by company members. Environmentally-friendly technologies will be implemented by companies that have a green organisational identity.

Firms with a green organisational identity will have an easier time gaining acceptance in the green community. In order for an action to be legitimate, it must be based on a common set of values (Parsons, 1960). Legitimacy, according to Dowling and Pfeffer (1975), occurs when a company's value system aligns with the broader social value system. In order to better understand how businesses, interact with their surroundings, legitimacy theory provides a useful framework for doing so. Additionally, the legitimacy theory is used to describe how businesses respond to social and environmental crises, such as when they make public disclosures about their goals, plans, and disclosures to the public (Mousa and Hassan, 2015). This means that if the values of a company are in line with society's expectations on environmental issues, then the company has gained environmental organisational legitimacy. Legitimacy and trust in the eyes of the public may also serve as motivation and inspiration for an eco-friendly product or program development in the future. Since green innovation is a first-mover advantage, pioneers have reaped the rewards by charging more for their

environmental products, strengthening their corporate image, and entering new markets (Lin et al., 2014; Chen et al., 2006).

It is possible for an organisation that has a strong sense of green organisational identity to create unique and helpful ideas when it is subjected to external pressure to solve environmental challenges (Chen and Chang, 2013, Chen, 2011). Those fresh and effective green concepts might, in turn, aid in the advancement of green innovation.

3.2 Green Innovation Strategy

GIS is a company strategy that actively reduces environmental effects across all business operations and incorporates environmental stewardship into strategic planning. Implementing the GIS is a critical instrument for ensuring organisations sustainable growth in the face of rising environmental pressure. The use of GIS represents the concept of environmental protection in terms of product design and packaging, as well as enhancing differentiation-related advantages (Li et al. 2019). GIS deployment has the potential to greatly boost a business's resource productivity (Porter and Van der Linde, 1995). As a result, GIS development would aid in resolving tensions between environmental conservation and economic development.

Bahrain's government has taken a variety of legislative and administrative actions to correct environmental deterioration. As a result, environmental regulations have been tightened by the government. Bahrain's leaders have taken several steps to show that they are serious about solving environmental deterioration. Businesses have been obliged to face these issues because of growing government obligations and the tightening of national environmental rules (Al-Sartawi, 2020). Corporations are increasingly required to include environmental problems into their strategic planning processes to deal with the rising governmental and social awareness of environmental deterioration. To achieve this, they must view the actions of their companies from the perspective

of natural resources (Hart and Ahuja, 1996; Chan, 2005). Because of this, many scholars are examining how corporations formulate their environmental policies and the connections between these variables (Qi et al., 2013; Chen et al., 2006).

One of the most significant environmental initiatives is the green innovation strategy. Changes to production processes such as adopting environmental management systems, reducing resource use, and stopping pollution, are all part of green innovation (Eiadat et al., 2008). GIS has been studied in the past for its impact on business performance and competitive advantage. Some researchers have looked at the connection between green innovation strategies, organisational competencies, and competitive advantages, such as Sharma & Vredenburg (1998). Stakeholder demands, managerial environmental concerns, absorptive capacity and government environmental restrictions were examined by Eiadat et al. (2008) in their study of the development of green innovation strategy.

There are two essential benefits of utilising GIS in any industry. To begin with, it comprises monetary incentives for developing ecologically sustainable goods, as well as financial benefits that boost competitiveness. In general, clients desire ecologically sustainable services and goods. As a result, GIS is viewed as a critical necessity for businesses, as it increases the likelihood of meeting client expectations without negatively impacting the environment. Historically, corporations saw investment in environmentally friendly activities as an unnecessary expense; but, in light of current ecological conditions and a growing sense of environmental consciousness, firms have begun to alter their policies, competitive tactics, and business practices (Porter & Reinhardt, 2007). Second, the "green" designation is viewed as an incentive that promotes ongoing innovation and aids in the development of innovative market prospects for businesses that may meet consumer expectations, create value, and improve performance (Chen, 2008). For instance, Newsweek announced in 2017 that

Toyota, the Japanese carmaker, was dubbed the world's greenest corporation and rated 16th on Newsweek's Global 500 list of the world's greenest firms in 2017. It was, nonetheless, ranked first in the automobile category. Toyota launched the automobile industry's first green bond backed by assets in 2014. Green bonds are financial instruments whose revenues are used only to support climate and ecologically sustainable programs, enabling the development and marketing of green automobiles, and also contribute to Toyota's environmental commitment. (Lin et al., 2019).

3.2.1 Green Innovation Strategy and Policy pressure

The primary source of policy pressure is government regulation. Due to green innovation's "dual externality" firms lack the initiative to pursue green innovation (Deng et al., 2021). As a result, the government develops and enforces environmental rules that influence businesses' decisions to pursue green innovation strategies (Liu et al., 2016). Obligatory environmental legislation depends heavily on coercion to compel businesses to pursue green innovation strategies (Ford et al., 2014). To begin, environmental rules must be pre-approved and in this way the government influences enterprise production habits through the formation of environmental plans, the evaluation of environmental effect, and other means, compelling firms to include environmental considerations into their strategic planning and design. Then comes environmental regulation's process control: environmental rules restrain firm conduct by imposing limits on manufacturing technology standards and pollutant emissions. Additionally, businesses undertake deliberate alterations to comply with regulatory mandates. Finally, but certainly not least, the government can exert its disciplinary authority by implementing environmental regulations and laws, thereby increasing the enterprise's environmental compliance costs. Thus, businesses engage in green innovation in order to protect themselves from economic fines and obtain cost benefits (Berrone et al., 2017).

Market-based environmental regulation depends on the potential benefits of green innovation to persuade businesses to pursue green innovation methods. To begin, the government provides incentives in the form of tax deductions, favoured procurement, and financial subsidies, which can partially offset the cost increases associated with green innovation. According to Cao, and Chen, (2019) the flexibility of market-based environmental regulations encourages businesses to innovate beyond regulatory constraints and to their advantage. Additionally, the government directs the green innovation technology, expertise, and other resources within the sector via incentive-based regulations in order to mitigate the uncertainty associated with green innovation.

Environmental policy pressures are the primary driver of green innovation. The more stringent the environmental restrictions of the government, the more eager businesses are to embrace green innovation initiatives. (Berrone et al. 2017). Frondel et al. (2007) study indicates that market motivation rules have a greater influence on green innovation than obligatory restrictions.

3.2.2 Green Innovation Strategy and Market pressure

Bahraini environmental governance is still in its infancy. Additionally, poor rules have resulted in the emergence of gaps in government monitoring. Consumers, suppliers, and rivals all play a role in the market mechanism that is most closely related to company production and management. Consumers and supplier's commitment to environmental stewardship is the primary source of market pressure (Tang and Tang, 2012; Lin et al., 2014).

Consumers have the greatest effect on businesses' green innovation strategy through their right to product choices. Consumers are more aware of the importance of environmental preservation and choose ecologically friendly items (Li, 2014). Businesses pursue GI (researching low-carbon, environmentally friendly goods, lowering raw material usage, and so on) in order to expand their market potential. This activity not only addresses consumer wants, but also

promotes a positive green image. Simultaneously, items might be marketed at a premium to provide a differentiating advantage (Sarkar, 2013). Customer demand for green products and services may assist firms not only overcome market uncertainties but also increase their excitement for green innovation. Suppliers' emphasis on environmental protection has a direct influence on strategic decisions of both upstream and downstream firms via the system of supply chain. To begin with, by serving as an entry point to a broader supplier networks, suppliers may supply organisations with expertise and resources that support green innovation. Then, collaborative innovation between suppliers and organisations may significantly cut the R&D expenses of new goods. Finally, suppliers have the choice to halt supply to firms that jeopardise their image and reputation (Lin et al., 2014).

Competitors primarily put environmental pressure on businesses as a result of their competition for resources, customers and markets. To begin, rivals provide new green products in order to gain customer favour and government funding. Enterprises will follow their rivals' lead in developing green innovation strategies in order to gain market competitive advantages and resources (Hojnik and Ruzzier, 2016; Menguc et al., 2010). Secondly, a favourable competitive environment helps firm's transference green innovation technologies and expertise in order to boost revenue and lower innovation-related external expenses.

3.2.3 Green Innovation Strategy and Innovation resources

According to resource-based theory, a firm's diverse resources and organisational capacities lead to improved performance and competitive advantage (Barney et al., 2001). External spillover and high risk are inherent in the green innovation approach. As a result, thoroughly examining and comprehending the enterprise's resources and capabilities is a vital step in developing the enterprise's strategy. The abundance of resources creates the room

and basis for businesses to pursue green innovation methods. Innovation capabilities define the ease with which a green innovation plan may be implemented. The financial and human resources that have been allocated by management for innovation are critical for an organisation to adopt a green strategy (Leonidou et al., 2017). The availability of resources is essential to create environmentally friendly new products and technologies that reduce environmental impact. Leonidou et al. (2017) found that innovation resources are necessary to offer a solid foundation for an organization to adopt a green innovation strategy while also allowing the organization to create protection against regulatory and market pressures.

When innovation resources are plentiful, it is easy to support the green innovation approach. When resources are few, firms prioritise initiatives that will expand production capacity and create a quick return on investment; on the other hand, when resources are plentiful, they prioritise projects that will yield long-term advantages. External spillovers from green innovation efforts ensure they will not have preferential resource distribution rights. From this vantage point, abundant innovation resources enable businesses to get greater autonomy in project selection, avoid resource rivalry across internal divisions and teams, and concentrate on GI (Mårtensson and Westerberg, 2016).

Various resource types have varying implications on businesses' adoption of green innovation initiatives. Financial resources are critical throughout the research and development phase of green innovation. Financial resources are mostly used to acquire innovative manufacturing and pollution control equipment, as well as to conduct green innovation trials. Human resources are critical in the innovation commercialisation and the R&D investment phases, facilitating firms' acquisition of competencies and knowledge of green innovations and the creation of more environmentally friendly manufacturing processes. Enterprises can leverage information resources to swiftly seize market

opportunities that are related to GI, create new goods to satisfy customers' demands and execute green marketing campaigns to acquire a competitive edge (Chang and Chen, 2013).

Numerous researches have established a link between resources of innovation and GIS. Horbach et al. (2011) asserted that innovation resources benefit the development of unique organisational competencies, which in turn promotes the adoption of a green innovation approach. Chan (2005) distinguished innovation contributors and demonstrated that enterprise-owned resources such as knowledge structure, technology, and information contribute positively to GI. Additionally, scarce resources can only accommodate organisations that adopt the lowest-level environmental strategy necessary to comply with environmental regulations and that environmental leadership strategies and higher-level pollution prevention require more abundant resources. (Buysse and Verbeke, 2003).

3.3 Green Organisational Identity

Organisational identity relates to the extent to which employees belong to the organisation as a whole rather than to the units in which they work or their field of professional specialisation. The concept of organisational identity refers to everything that members of the organisation feel, what they think and what they hold of standard attitudes and visions towards their organisation, values, philosophy, organisational structures and work style, which are formed through many factors and influences. The green organisational identity expresses the beliefs adopted by the organisation's workers who care about the environment and how to protect it. The green organisational identity serves as an incentive for workers to strengthen relations with consumers and to suggest creative and innovative methods to solve the problems they face (Chen et al., 2014). The green organisational identity focuses on how to take care of the environment and the social responsibility of organisations through their success in producing green

products or providing green services (Tepe & Pinar, 2018). The green organisational identity is also concerned with the environmental management of organisations through the development of green behaviours for their employees (Rasool et al., 2021). Social media can be used to build a green organisational identity by transforming social media into employee organisational storytelling as they are discussed in informal personal conversations between co-workers (Madsen, 2016).

3.3.1 The concept of green organisational identity

The concept of organisational identity is relatively recent, as the research presented by Albert & Whetten (1985) was considered the real beginning of this concept. Organisational identity is defined as the distinctive personality of the organisation that is perceived through the pervasive values that appear in the organisation's contacts abroad (Aust, 2004). Organisational identity lies in the shared explanatory schemes that members build collectively to provide meaning for their experience. Although organisational identity can influence the thinking and behaviour of members of the organisation, they, especially leaders, can adjust their interpretations or reinforce new concepts that can reshape organisational identity when they are dealing with environmental changes (Chen, 2011). It can be said that an organisation's identity is a list of the most essential, unique, and long-lasting beliefs that the organisation holds (Song and Yu, 2018; Whetten, 2006). According to Albert et al. (2000), the members of an organisation can better understand it, be more aware of its goals, and keep up with the organisation because they have an "organisational identity."

Chen (2011) used the term "green organisational identity" to refer to an interpretative scheme concerning environmental management and preservation that members establish together to provide a kind of meaning to their actions (Chen & Chang, 2013). Thus, a green organisational identity is a snapshot of how a business views its management and how it wishes to be regarded by

stakeholders, whether internal or external, customers and investors (Soewarno et al., 2019). The more employees feel their organisational identity, the more their faith in the organisation increases, and the positives with it increase, as it directly affects their behaviour, so the organisation's goals become their goals, and its success or failure, success or failure for them. Studies have shown a mutual influence relationship between corporate social responsibility and green organisational identity. There is also a statistically significant relationship between the green organisational identity and both green vision, green products, and green behaviours of employees (Chang et al. 2019), in addition to a statistically significant relationship between the green organisational identity and the environmental performance of organisations (Xing et al. 2019).

Organisations are paying more attention to environmental management issues now that there is more international regulation and customers are more aware of the environment. They also emphasise reducing environmental pollution through changing organisational behaviour (Chang and Chen, 2013). Chen (2011) came up with the idea of GOI, which was based on the idea that environmental protection should be a part of the organisation's identity. This way, we could ensure that both organisational development and protecting the environment didn't conflict with each other (Chen, 2011). Chang and Chen (2013) looked into the relationship between GOI and green innovation performance. They stated that GOI directly affects green innovation performance, but they didn't say how.

Another thing that Song and Yu (2018) developed, was a framework for a green innovation strategy that included GOI. They also found that GOI played a role in the relationship between GIS and green creativity. Bahraini businesses have made some changes in how they think about the environment. Still, there aren't many studies in Bahrain that are both theoretical and empirical relevant to these changes. Therefore, the internal mechanism between GOI and GI needs to be further examined.

3.3.2 The positive effect of green organisational identity

In a company, what members think about its identity affects how they feel about strategic issues. This is because the interpretations of strategic matters could change the behaviour of members of a business (Xing et al., 2019; Gioia and Thomas, 1996; Dutton and Dukerich, 1991). If environmental issues positively affect the organisation's identity, this would make the managers more likely to look for opportunities and less likely to avoid threats (Fernández et al., 2003). As a result, people who make environmental interpretations or put forward a strategic environmental vision and then follow through on it can have a green advantage (Fernández et al., 2003). An important identity can make people look for solutions and make them feel like they belong together, which can help a company do better (Dutton and Dukerich, 1991). Organisational identity, which is a core skill, can help a company be more competitive by putting new adaptive behaviours in context and giving them meaning. Organisational identity is a resource that can't be duplicated and can lead to long-term advantages. Organizational identity contributes to long-term competitive advantage by embedding activities with meanings that are distinctive to the company's context in which they are performed. Because identities are part of cultural systems of meaning, valued organisational identities can last for a long time and give them a long-term advantage over their competitors (Fiol, 2001).

Organisational identity may not only impact member behaviour, but it can also serve as a point of reference for management interpretations of strategic concerns (Dutton and Dukerich, 1991). Thus, an organization's thinking is moulded by its organisational identity (Chen, 2011). If ecological concerns become a central part of an organization's identity, they might be perceived positively, encouraging members to dedicate more time and effort to environmental initiatives (Sharma, 2000).

3.4 Environmental Organisational Legitimacy

Acquiring and sustaining environmental legitimacy have evolved into a top priority for businesses. As a result, management research has increasingly focused on how organisations acquire and maintain environmental legitimacy (Gomulya & Mishina, 2017). A sizable portion of this research is devoted to diverse individual aspects that affect stakeholder perceptions of business legitimacy. This may include, but is not limited to, environmental performance, green patenting, third-party certifications, voluntary disclosure and public communication, charitable contributions, and the worldwide reach of environmental activities. We now have a comprehensive knowledge of the individual components that contribute to legitimacy as a result of our effort (Berrone et al., 2017).

Environmental organisational legitimacy is described as the degree to which an organization's environmental aims and operations conform to a widely held system of environmental standards, beliefs, and values among its stakeholders. (Chen, 2011). Bettinazzi et al. (2018) describe environmental legitimacy as the widespread belief or assumption among stakeholders that a firm's environmental activity is desirable, legitimate, or suitable. This concept takes into consideration the notion that environmental legitimacy is a designation bestowed on a business by both its external and internal constituencies, i.e., its stakeholders.

Interdependence between organisations and their stakeholders is critical not just for their existence but also for their legitimacy (Massey, 2001). According to institutional theory, substantial external constraints would compel enterprises to comply with environmental norms, expectations, and laws (Scott, 1995). Organizational legitimacy may assist businesses in achieving congruence between their performance and the expectations of the environment (Kostova and Zaheer, 1999). Legitimacy is critical for a company's long-term success,

according to institutional theory, and hence organisational legitimacy is positively related to organisational performance (Thomas, 2007). Firms' primary objective is not necessarily to maximise profits but to adhere to external constraints for legitimacy (Sharma et al., 1999). If enterprises have a greater level of environmental and organisational legitimacy, they may garner additional resources and support for their green corporate identity from stakeholders, resulting in improved green innovation performance.

In relevant literature four factors can be found which decide organisational legitimacy; the following is a description of those factors:

- Environmental Performance

It is widely described as "measurable outcomes associated with the management of activities, goods, or services that have the potential to interact with the environment" (ISO 14001, 2015). One may argue that the relationship between performance and legitimacy is self-evident: the greater the environmental performance, the more legitimate it is.

However, stakeholders are not always in a position to witness and evaluate enterprises' environmental performance as a whole. To begin, stakeholders typically lack comprehensive information on a firm's objective environmental performance. Even if managers act honestly, the lack of standards in reporting may create difficulties when evaluating environmental performance among organisations. Second, performance measurements, regardless of whether they indicate economic or environmental performance, are often backwards-looking and have little utility for judging a firm's current or future success, as they may not accurately reflect future actions (Berrone et al., 2017).

- Initiatives towards internal adaptation

Stakeholders form opinions about a firm's behaviour based on not just the current environmental effect, but also on the anticipated future impact (Bansal &

Clelland, 2004). They may be ready to dismiss the business's existing negative environmental effect if they perceive the firm is making significant investments to mitigate it (Bansal, 2005). Two characteristics are particularly noticeable to stakeholders: the firm's efforts to change its operating processes and products, as this may indicate a strong commitment to environmental performance improvement, and the firm's efforts to monitor the environmental impact of operating activities, as this enables effectively maintaining successful adaptation initiatives and discontinuing unsuccessful ones (Zollo et al., 2016).

- Initiatives on a global scale

The third component refers to the scope of a business's environmental operations and their worldwide coordination. Indeed, as their operations become more global, most businesses must decide whether to prioritise (1) the application of standard processes on a worldwide scale coordinated by their headquarters or (2) their response to local special demands (Husted & Allen, 2007). This decision may have ramifications for a firm's entire validity.

Multinational corporations face growing pressure to be more environmentally conscious on a worldwide scale (Christmann, 2004). One may anticipate that large-scale efforts initiated and promoted internationally by the parent company would have a greater impact on stakeholders' perceptions of the company's environmental attitude. Global stakeholders gain prominence, and environmental challenges such as climate change which is a global concern requiring global-level firm answers (Zollo et al., 2016). Multinational corporations, on the other hand, are responding to local isomorphic forces (Durand & Jacqueminet, 2015; Rathert, 2016). Additionally, by adhering to local environmental standards, businesses may establish social contracts with their local stakeholders, demonstrating their dedication to and integration into their communities (Donaldson & Dunfee, 1999).

- Impression Management Approaches

Firms' impression management strategies are designed to influence stakeholders' perceptions of the organisation. They rely on enterprises' use of language and messaging in their interactions and communication with their audiences (Suddaby et al., 2017). Three distinct elements of impression management strategies are identified in the literature: (1) corporate donations (Ashforth & Gibbs, 1990); (2) environmental certifications (Christmann & Taylor, 2006), (3) and the extent to which a firm communicates its environmental commitment both internally and externally (Suddaby & Greenwood, 2005).

In summary, past research identifies four distinct sets of factors as critical to the complicated processes of stakeholder assessment. They combine in a complex fashion to account for stakeholders' perceptions of a firm's environmental conduct.

3.5 Green Creativity

Previous research has demonstrated that businesses may achieve a win-win scenario for themselves and society by incorporating green innovation into their growth processes while pursuing other objectives (Chen, 2010).

In contrast to conventional creativity, green creativity emphasises environmental stewardship and sustainability in goods, services, and behaviours (Chen and Chang, 2013). Through tenacious green creativity, businesses and society may attain environmental sustainability (Chen, 2010). Additionally, green innovation is critical for adapting to global ecological sustainable changes and gaining competitive advantages.

The present literature focuses mainly on the organisational elements that influence green innovation. To have a deeper understanding of how green creativity develops, we may need to go beyond the organisational level and into the individual, since an individual's green creativity serves as the foundation for

the organisation. Previous research has focused on the intrinsic process of green creativity (Mittal and Dhar, 2015). Indeed, external environmental pressures on businesses may motivate executives and staff to explore green ingenuity (Lin, et al., 2014). To pursue green growth, it is critical for businesses to embrace a strategy of integrating internal resources and significant external collaboration with stakeholders, which is sometimes referred to as "open innovation" (Chesbrough, 2003). Open innovation may assist businesses in acquiring external knowledge and resources, compensating for internal inadequacies, reducing the uncertainty associated with research and development, and enhancing their capacity for learning (Setini, et al. 2020).

On the other hand, it would aid businesses in developing or embedding external inventive networks, expanding living space, and integrating internal and external technology in order to enhance their innovation capability (Yun et al., 2019). As a result, businesses may develop a matching green innovation strategy that is able to reflect the impact of external influences on the company and the requirements of internal action for green innovation. Numerous studies have established a clear correlation between a green innovation strategy and green creativity (Song and Yu, 2018). However, group work is becoming more widespread, and a green innovation strategy is frequently created by senior executives, with team leaders being unable to influence this process directly in modern organisations. In light of a green innovation strategy that shows a company's commitment to environmental stewardship and establishes an atmosphere conducive to a team's green invention (Song and Yu, 2018), the researcher views the green innovation strategy as similar to a boundary spanner affecting green creativity.

The importance of green creativity is highlighted by reducing adverse effects on the environment for organisations to reach their primary purpose in achieving their social responsibility through their management of the green

creativity cycle represented by exploration and the efficiency of its operations. Their adoption of green creativity as an organisational culture and its inclusion in their business strategies led to achieving a desirable performance environment (Reuvers, 2015). Green creativity benefits society and the organisation and improves environmental performance (Diegel et al., 2010). In the same manner, Pan (2014) showed that green creativity plays a crucial role in the environmental, social and economic performance of the organisation. Therefore, it is one of the primary measures in determining its overall performance.

3.5.1 Dimensions of green creativity

Each of Chang (2011); Chiou, et al., (2011); Li (2014); and Wang, (2013) agreed that the dimensions of green creativity are represented in two main dimensions: green product innovation and green process innovation. The two dimensions will be clarified as they represent the outcome of the agreement of most researchers.

3.5.1.1 Green Product Creativity

The environmental deterioration experienced by most organisations has motivated them to rely on environmentally friendly practices. Green product creativity is the basis for achieving environmental sustainability due to its reliance on environmentally friendly materials recycled in all product life cycle stages (Rex & Banumam, 2007). The green product is defined as an environmentally friendly product with all its components and aims to reduce risks to the natural environment by using recycling strategies or reprocessing the content (Chen & Chai, 2010; Chao, 2015). The green product represents an improvement of traditional products to safe products that improve environmental performance (Peattie,1995). Organisations must change their production and provide goods and services to exceed the risks of growth and survival in the market. Product innovation also includes a wide range of technological and organisational

processes and financial and marketing activities to achieve the organisation's capabilities (Ferraresi et al., 2012).

3.5.1.2 Green Process Creativity

Green Process Innovation is linked to technological development as it is the influencing factor in product development. The process is the best field in which research, development and creativity are applied. The process creativity can be studied and analysed in four directions: design, which aims to design a new product and process to meet customer needs; strategic, which is determined by the organisation's capabilities and external opportunities and threats; technical, which is the cornerstone of process creativity in producing an innovative green product, and the information direction which indicates that process creativity is the product of information technology (Chao, 2015). The existence of a simple green process that encompasses all environmentally friendly activities, including all procedures and stages that encourage the acceptance of a new product with market value, is a necessary condition for the organisation's sustainability and preservation of green innovation (Denzler & Taskos, 2015).

Chapter Four

Methods and Procedures

Chapter Four:

Methods and Procedures

This chapter demonstrates the researcher's methods and procedures regarding the study methodology, research philosophies, the study population and sample, the study tool used to collect data, the statistical methods used to analyse and extract the data, ethical considerations, and hypothesis development.

4.1 Research Methodology

According to Saunders et al. (2012), there are seven distinct research methodologies. According to them, an experiment research methodology is one that is concerned with the relationship between two or more variables. While the current study examines the relationship between three major factors, it is not experimental in nature due to the absence of experimental and control groups. Additionally, unlike most experiment research methodologies, it does not isolate the issue of Green Innovation, its strategy, and financial performance from its social context (Biggam, 2008). As a result, the current study does not employ the experiment research approach. Saunders et al. (2012) describe a case study as a research approach that employs diverse kinds of information to conduct an empirical analysis of a contemporary topic in its real-world setting. They assert that its capacity to analyse the issues at hand is typically limited by the amount of those variables for which the data will be obtained. The scope of the current study is not limited to a single institution, so the case study methodology can't be used.

An action research methodology has a unique appeal because it entails an in-depth analysis of a subject under inquiry in conjunction with a close cooperation between those concerned with the problem area, which in this case is GI, and the researcher. It is, however, iterative in nature, as the procedure of gathering and analysing data on the issue under inquiry is repeated to assess

whether or not the issue has been resolved. Following that, the method is repeated until the issue is fixed (Saunders et al., 2012). The research is viewed as a cycle of collaborative planning, followed by action, then observation, and finally reflection, with the last phase establishing the framework for succeeding cycles of planning, acting, observing, and reflecting in a continuous cycle of learning (Rose et al., 2015). Though this method of research is advantageous because it entails in-depth examination, the current research does not address any pressing issues. Rather than that, it seeks to examine the link between GIS and GI, and mediating impacts of green identity and environmental legitimacy and green creativity on this relationship and the moderating impacts of managerial concerns, absorptive capacity, organisational culture and competitive intensity on the relationship between GI and financial performance among companies in Bahrain, without necessarily resolving the underlying issue associated with those variables. As a result, the current study does not employ an action research technique.

By contrast, grounded theory research focuses on developing theories and is mainly inductive in nature. The present study is essentially deductive in nature, as it seeks to test rather than establish a theory. As a result, the grounded theory research approach is not used.

Apart from the preceding, the ethnographic research technique is similarly based on an inductive approach and aims to depict the social reality. Additionally, it requires considerable time since researchers must immerse themselves in the social reality under examination to comprehend it (Saunders et al., 2012). The researcher makes no attempt to construct a theory to describe a social environment; accordingly, the current study does not employ an ethnography research methodology. An archival research methodology draws its data from organisational papers and records. The present study analyses data without utilising an archival research methodology.

The current study employs a predominantly deductive survey research methodology. The methodology is frequently employed in business and management research to address how, how much, how many, what, where, and who type of questions (Saunders et al., 2012). Unlike the other methodologies, it enables researchers to acquire enormous volumes of data from relatively small sample sizes. It fits within the scope of the current project, which aims to collect vast volumes of data from a small number of research participants. Also, questionnaires are frequently viewed as authoritative by most people, which encourage the researcher to use them to gather data in this study. Another critical aspect of this method of research that qualifies it for the current research is its capacity to collect and analyse quantitative data utilising inferential and descriptive statistics.

Additionally, a significant component of this technique is that the data collected might provide plausible explanations for the link between distinct factors. In this regard, the study might shed light on the link that exists between GIS, GI, and financial performance within the environment of companies in Bahrain. Also, the study will try to explain the impacts of the Mediators and Moderators on this relationship. The current study used a survey research method since it allowed the researcher greater control over the research procedures. Consequently, the researcher provided findings that accurately represent Bahraini enterprises at a far lower cost compared to alternative methodologies.

4.2 Research Philosophy

Biggam (2008) believes that the philosophical worldview that one holds towards reality significantly influences research epistemology. Biggam (2008) lists interpretative, critical, and positivist world perspectives as the most influential. A person with a vital worldview views reality as historical and is impacted by political, cultural, and social events both subconsciously and consciously. Accordingly, he acknowledges that the world has a lot of conflicts

and constraining forces that are historically rooted and that such aspects overlap with the issues that are under investigation (Antecedents of GI and its impact on financial performance in businesses in the Kingdom of Bahrain in our case). Nonetheless, the research objective would be to free businesses from such influences. While the current research acknowledges that historical considerations may impede Bahraini firms from correctly applying GIS methods, it makes no attempt to free such organisations from historical pressures. Accordingly, the current study does not embrace this perspective since its objective is to understand the influence of GIS on the GI and the impact of GI on financial performance among enterprises in the Kingdom of Bahrain rather than freeing them from such constraining constraints.

In contrast to the preceding, an interpretative worldview adherent thinks that realities should only be comprehended through social contact, which may be understood in terms of the location and time of the encounter. According to this worldview, a researcher that adapts the ontological assumption inherent in constructivism would believe that several equally valid explanations of reality exist in life, and thus would conduct a qualitative study to get an understanding of constructs that is held by individuals in that context (Biggam, 2008). While the current research accepts that there may be multiple realities about GIS and GI in Bahrain, the researcher believes that these realities are unlikely to be significantly impacted by the setting in which they occur. As a result, the current study does not take an interpretative perspective on the world that is fundamentally constructivist in character.

On the other hand, a positivist thinks that realities can be objective and independent of the one observing and can be anticipated and quantified. A researcher with this mindset usually is interested in extrapolating from samples and testing hypotheses (Biggam, 2008). This worldview is relevant to the current research since it tries to test theories about the impact of GIS on GI and GI on

financial performance. Additionally, the researcher wishes to conclude findings and give recommendations.

4.3 Study Population

The primary population studied in order to validate the conceptual model was managers, supervisors or environmental specialists working in (41) listed companies in the Bahrain bourse and five non-listed companies which were added as they are considered the big polluters because of the type of activities they are doing. Table 1 shows those companies and the size of each one of them expressed by the number of employees. The population includes a variety of industries: manufacturing companies, hotels and tourism, commercial banks, investments companies, insurance, telecommunication, and services. Managers, supervisors, and environmental specialists were chosen as they are closer to some of the constructs in the conceptual model like GIS.

It was assumed that managers, supervisors, and environmental specialists had some awareness and experience with GIS and GI within their companies. While the actual number of employees ran into several tens of thousands, it was impossible to estimate the number of managers, supervisors, and environmental specialists within Bahraini companies as it is information that is not published. To estimate the total population the researcher assumed that 10% of the employees usually will be managers, supervisors and environmental specialists which will lead to a total estimated number of (3600) managers, supervisors, and environmental specialists which means that it was critical to obtain replies using a sampling approach. Managers, supervisors, and environmental specialists of either gender, of numerous nationalities, with diverse educational backgrounds, involved in a variety of occupations, and with variable years of experience.

4.4 Study Sample

4.4.1 Sample Size

According to academics (Sekaran, and Bougie 2013), sample size and sampling design are critical for determining the sample's representativeness and generalizability of results. Two methods may be used to determine the sample size. One method is to use the thumb rule, which offers a general recommendation for sample size based on prior experience. For example, Memon et al. (2020) say that sample sizes of more than 30 and less than 500 are usually considered adequate for most of the research. Similarly, the sample size when doing multivariate research, the sample size should be multiple times the number of variables being studied. The other method is to calculate the size of the sample using the following formula; (Nulty, 2008)

$$SS = \frac{z^2 \times p \times (1 - P)}{c^2}$$

Z = Z value (i.e., 1.96 for 95% confidence level)

p = percentage of population selecting a given choice, expressed as decimal (0.5 worst-case percentage)

c = margin of error, expressed as decimal (e.g., .05 = ± 5)

Thus, if the preceding method is used with a margin of error (confidence interval) of 5, Z value=1.96 and p=0.5, the sample size (SS) is determined to be 384. Additionally, researchers utilised the following method to adjust the calculation for the real population in order to get the new sample size. Accordingly, the formula for calculating the new size for the sample is calculated as follows:

$$New\ SS = \frac{ss}{1 + \frac{ss - 1}{pop}}$$

Where (pop) refers to the population

Therefore, for a sample size of 384 computed without regard for the actual population size, the corrected updated sample size will be nearly equivalent to 350 for a population of 3,600. It is feasible to define the real sample size necessary for this research using both the thumb rule and actual calculation.

A total population of 3,600 was evaluated for this study, with a goal of obtaining 350 replies. Thus, the sample size fits both the rule of thumb of 30-500 and the actual sample size formula. The researcher made sure to receive 350 replies.

4.4.2 Sample distribution

Table (1) shows how the questions were distributed to the sample companies. The only Non-Bahraini company Bank Muscat was removed from the sample, Bahrain Middle East Bank B.S.C was suspended during the research period, so it was removed from the sample. One company was connected but no replies received from it. There are many factors that determine the response rate to the sent questionnaires, including the administration's approval to respond and the administration's approval to circulate the questionnaire. Nevertheless, the researcher made every effort to ensure that the sample was representative of the study population and unbiased.

Table (1) The sample list and its distribution

Company Name	Total Number of employees	Sample size
Al Baraka Banking Group B.S.C ¹	10892	13
Nass Corporation B.S.C	6179	12
Aluminium Bahrain B.S.C	3130	24
The Bahrain Petroleum Company ²	2725	17
Bahrain Telecommunication Company B.S.C	1436	16
Bank of Bahrain and Kuwait B.S.C	1077	4
Saudi Telecom Company ²	952	11
Gulf Hotels Group B.S.C	770	5
Ahli United Bank B.S.C	615	8

Company Name	Total Number of employees	Sample size
BMMI B.S.C	601	3
National Bank of Bahrain B.S.C	570	6
APM Terminals Bahrain B.S.C	490	10
Bahrain National Gas Company ²	459	19
Gulf Petrochemical Industries Co ²	420	18
Bahrain Islamic Bank B.S.C	394	2
Ithmaar Holding B.S.C	380	4
Bahrain Commercial Facilities Company B.S.C	351	15
Bahrain Cinema Company B.S.C	336	5
Arab Banking Corporation B.S.C	329	5
National Hotels Company B.S.C	325	4
Arab Shipbuilding & Repair Yard Company ²	320	5
Trafco Group B.S.C	277	11
Zain Bahrain B.S.C	274	11
Khaleeji Commercial Bank B.S.C	219	5
Bahrain Ship Repairing & Engineering Company B.S.C	211	12
Arab Insurance Group B.S.C	208	5
Al Salam Bank - Bahrain B.S.C	194	3
Delmon Poultry Company B.S.C	181	16
United Paper Industries B.S.C (c)	179	8
Bahrain Kuwait Insurance Company B.S.C	164	5
Bahrain National Holding Company B.S.C	159	3
Takaful International Company B.S.C	127	3
Solidarity Bahrain B.S.C	124	5
United Gulf Holding Company B.S.C	103	2
Seef Properties B.S.C	98	7
Bahrain Flour Mills Company B.S.C	96	15
Esterad Investment Company B.S.C	91	2
SI CO B.S.C (c)	84	12
Bahrain Family Leisure Company B.S.C	83	2
United Gulf Investment Corporation B.S.C	77	4
Banader Hotels Company B.S.C	61	2
GFH Financial Group B.S.C	57	0
Eskan Bank Realty Income Trust	56	2
Bahrain Car Parks Company B.S.C	45	5
Bahrain Duty Free Shop Complex B.S.C	43	2
INOVEST B.S.C	38	2
Total	36000	350

Companies are listed according to number of employees.

- 1- Al Barake number of employees include employees of the company outside Bahrain.
- 2- Non-listed Companies.

4.5 Data Collection

Because data were to be collected from any manager, supervisor, or environmental specialists of the selected companies in the Kingdom of Bahrain, a non-probability sampling approach was adopted. There was no defined target group. Convenient sampling was chosen as the suitable approach since population representativeness was not a requirement. Despite the fact that convenient sampling has some drawbacks, like bias for example, the outcomes were not expected to be significantly harmed because even with convenient sampling, a certain amount of randomness was used in the selection of participants when the defined characteristics of a participant were quite simple and straightforward, (Bryman, 2006) thus it was easily achieved using either probabilistic or non-probabilistic sampling. Questionnaires were distributed to companies in proportion to the size of the company. Despite the researcher's efforts to assign a larger number of questionnaires to companies with a large number of employees, some large companies did not return all of the questionnaires that were given to them.

Prior to interviewing the employees, they were informed about the study's advantages and potential hazards. They were then asked to engage in the study freely. Those who freely consented to participate were given a questionnaire to complete on their own and a consent letter to sign. Their completed surveys were then gathered and compiled to achieve the purposes of the data analysis.

4.6 Data Analysis

The collected data was edited and coded using an Excel sheet. Prior to entering data on Smart PLS 4, it was coded using the alphabet and numeric symbols and revised. Each item in the questionnaire has been associated with a distinct variable name. Statistical data analysis comprised descriptive analysis for the study variables, testing the reliability and validity of the questionnaire, and

structural equation model (SEM) which is also called path analysis to test the study hypothesis.

First, the reliability and validity of the questionnaire were conducted using the Cronbach alpha test and correlation between items (Item-to-item) and correlation between items and the total of a construct (item-to-total) using SPSS. Also, Outliers, multicollinearity, normality, and homoscedasticity were all tested using SPSS.

Second, path modelling, with the use of (PLS) partial least squares was performed using the Smart PLS 4 programme to evaluate the study's hypothesis. This technique is required if the data has a multilevel, or hierarchical structure. PLS modelling assists researchers with a number of tasks like prediction, and causal inference (Raudenbush and Bryk, 2002). Acedo and Jones (2007: P242) state that "the PLS approach is justified when theory is poorly grounded, and variables or measurements do not adhere to a strictly stated measurement model or match a particular distribution." Additionally, Ainuddin et al., (2007: P56) said that "PLS is particularly well-suited to exploratory research like this one, where the measures [...] are novel and the associations [...] have not been explored previously." Alpert, et al., (2001) also mentioned that formative indicators might be examined exclusively using partial least squares (PLS), not the more often used structural equation approach of LISREL. Birkinshaw, et al. (1995) said that PLS is most suited when interval scaled data and multivariate normality cannot be assumed, and the researcher's main concern is in the dependent variable's prediction. Calantone, et al (1998) stated that PLS parameter estimates is better in revealing the strength and direction of relationships (i.e., positive vs. negative) between variables when compared to correlation coefficients, and that PLS analysis avoids common regression analysis parameter estimation biases. The use of PLS, according to Pavlou and Chai (2002), "allows for the simultaneous examination of both whether the hypothesised associations at the theoretical level

are empirically acceptable and how well the measurements relate to each concept".

4.7 The study tool

The questionnaire was developed in stages until it took on the final form (Appendix 1). Table (2) below shows all the development stages for the questionnaire. The questionnaire was designed using previously used tools that were evaluated and verified in the literature. (Zhang et al. 2019; Zhang et al. 2020; Bulińska-Stangrecka and Bagińska, 2021; Ge et al., 2018; Soewarno et al., 2019; Xue et al. 2019) A few questions were added by the researcher to adjust to the Bahraini culture.

Table (2) The developments stages of the Questionnaire

No.	The developments stages of the Questionnaire	Questions Numbers
1	Pre-Test stage	56
2	Pilot Survey stage	56
3	Main Survey stage	51

The survey questionnaire is directed at managers, supervisors, and environmental specialists in Bahraini businesses. Enterprises in Bahrain employ a diverse range of nationalities (Arab, Non-Arab and Bahrainis). Additionally, because Arabic is the county's native language, the final questionnaire was completed in English and then translated into Arabic. The Pilot Survey's questionnaire had fifty-six questions and eight items with a single response. The eight multiple-choice questions are connected to demographic characteristics that reflect the sample's composition and distribution; these variables include gender, level of education, age, time period of service and time period in present employment, nationality, as well as job and financial vs nonfinancial sector status. The five-point Likert ordinal scale was used by respondents to indicate their level of agreement or disagreement with each item in the construct in the conceptual model. The 5-point Likert scale is considered one of the most often

used scales, as it allows responders to easily read the description of the whole list of scales while answering questions. Additionally, computer simulations and empirical research have consistently demonstrated that 5-point scales enhance reliability and validity when compared to measures with fewer points. (Malhotra & Peterson, 2006; Dawes, 2008).

4.8 Questionnaire Structure

To measure the study's constructs, a structured questionnaire was developed. The structured questionnaire is divided into three main parts: the first part is a welcome page that summarises the questionnaire's purpose and the research's objective. The second part consisted of eight multiple choice questions with a single answer pertaining to demographic variables like gender, educational level, age, length of service with the company and length of time in the current position, financial and non-financial nature of the company, nationality, and job title. The final segment featured fifty-one questions with interval level responses on a 5-point Likert scale, addressing all nine components in the proposed conceptual model.

4.9 Pre-Test Result

Prior to the actual survey, a pre-test was undertaken for the questionnaire to confirm its content validity, eliminate repeating topics, and make sure that all items in the questionnaire are clear, consistent and can easily be understood. The pre-test questionnaire contains 56 questions drawn from previously published research. Two Associate professors in accounting, and two Assistant professors in Finance conducted the pre-test (Appendix 2). The pre-test of the questionnaire resulted in minor revisions to a few additional questions, including modifying and enhancing the wording and syntax used to build the items. The final version of the questionnaire was approved by the deanship of graduate studies.

4.10 Pilot Study Result

Prior to the main survey, the researcher conducted a pilot survey in April 2022. Managers, supervisors, and environmental specialists in all the targeted firms were approached either directly or through Google forms and Microsoft form which were the platform on which the survey questionnaire was posted online. The survey's URL was circulated through emails to many of the targeted organisations.

The researcher utilised the SPSS to conduct the statistical study necessary to validate the conceptual model. To determine the reliability and validity of the pilot analysis, testing was done in which the range of the lowest and highest values was determined using previously published research methodological literature (Cohen, 1988; Pallant, 2016). Cronbach's alpha test was used to determine the internal consistency of the grouping of objects relevant to each construct. While Cronbach's alpha can range between 0 and 1, the least value deemed acceptable during the pilot stage of the study was 70% (Sekaran and Bougie, 2013). Additionally, the questionnaire's validity was determined using the Pearson correlation factor, which involved comparing each item of the construct in the questionnaire with the overall scores for each construct. Additionally, the connection between things implies that the items are legitimate. Correlation coefficients are in the range -1 to 1, with negative values being not recognised. Correlation values between items were selected to be acceptable at a minimum of 0.3 based on earlier research. Similarly, according to the Cohen, (1988) and Sekaran and Bougie (2013) correlation of item-to-total is considered acceptable at a value of at least 0.5. In doing the pilot analysis, if an item was discovered to be the cause for worry, i.e., lower than the acceptable value, the criterion for retaining or deleting the item to assess each construct was determined by the extent to which the correlation value deviated from the acceptable value (i.e. 0.3 and 0.5) and how many items remained.

The two tables below show the summary of the analysis of reliability and validity before and after deleting some items that were below the criteria followed by the study. Items Q6, Q17, Q37, Q38 and Q52 from constructs 1, 3, 6, 7 and 9 (GIS, Environmental organizational legitimacy, managerial concerns, absorptive capacity and Green Organisational culture) were deleted as they have major issues regarding validity. By removing those items, we will be able to enhance both reliability and validity without having to worry about the number of items required to assess the constructs being insufficient. as shown in Table (4). In construct 4 (Green Creativity) Q24 and Q22 have an item-to-item correlation that is less than 0.3 but as the difference from 0.3 is not so much both will be retained with the main survey but with observation. Same applies on construct 8 (Competitive intensity) Q47, Q48 and Q49. In construct 9 (Green organizational culture) Item Q51 will be retained, However, it was determined that this item would be preserved under observation for the purpose of ensuring the validity of the main survey, as the correlation of item to item and item to total were predicted to improve with the higher sample size.

Table (3) Summary of reliability and validity analyses (for the original questionnaire before removing questions)

No.	Construct	Constructs Codes	Items	Cronbach's Alpha	Correlation between Item-item (>0.3)		correlation between Item-total (>0.5)		Remarks
					Min	Max	Min	Max	
1	Green Innovation Strategy	GIS	Q1-Q6	0.844	0.163	0.750	0.600	0.879	The reliability indicators, of the correlation of item-to-total, and item to-item correlation scores are all within the allowed bounds with the exception of Q6, where the correlation between Q6 and Q1, Q5, is less than 0.3, indicating that this Question should be deleted. <i>For the main survey, all items will be preserved except for q6.</i>
2	Green Organisational Identity	GOI	Q7-Q12	0.896	0.492	0.764	0.771	0.884	The results for reliability indicators, item-to-total correlation, and item-to-item correlation are all within the allowed range. <i>For the main survey, all items will be preserved.</i>
3	Environmental organisational legitimacy	EOL	Q13-Q18	0.777	0.059	0.684	0.477	0.852	The results for reliability, of correlation of item-to-total, and item-to-item correlation are all within the allowed range. except for Q17, which has a correlation of less than 0.3 with Q14, Q15, and Q16 and an item-to-total ratio

									of less than 0.5, indicating that this Question should be deleted. <i>All items except q17 will be preserved for the main survey.</i>
4	Green Creativity	GC	Q19-Q24	0.842	0.287	0.723	0.621	0.825	The results for reliability, of correlation of item-to-total, and item-to-item correlation are all within the range. However, Q24 and Q22 raised some concerns, since the correlation between these two items ranges from bad to good, with a minimum of 0.287, somewhat less than 0.3. Q24 and Q22 may benefit from a higher sample size. As a result, the two items will be monitored for validity when analysing the main survey. <i>For the main survey, all items will be preserved.</i>
5	Green innovation	GI	Q25-Q32	0.910	0.378	0.761	0.701	0.846	The results for reliability, of correlation of item-to-total, and item-to-item correlation are all within an acceptable range. <i>For the main survey, all items will be preserved.</i>
6	Managerial Concerns	MC	Q33-Q37	0.711	-0.029	0.694	0.443	0.820	The values for reliability indicators, item-to-total correlation, and item-to-item correlation are all within the allowed bounds. However, Q37 creates significant issues with reliability, the

									correlation between Q37 and Q33, Q34, Q35, and Q36 is less than 0.3, while the correlation to total is less than 0.5. <i>All items will be maintained for the primary survey, with the exception of Q37, which will be deleted.</i>
7	Absorptive capacity	AC	Q38-Q43	0.813	0.06	0.717	0.453	0.822	Items Q38 is producing significant difficulties with reliability, item-to-item correlations with Q41, Q42, and Q43, and item-to-total correlations. A correlation exists when the value is smaller than 0.5. The reliability indicators, item-to-total correlation, and item-to-item correlation scores for the other questions are all within acceptable levels. <i>Q38 will be omitted from the final questionnaire as a result of this finding.</i>
8	Competitive intensity	CI	Q44-Q49	0.789	0.249	0.519	0.630	0.734	The results for reliability, correlation of item-to-total, and item-to-item correlation are all within an acceptable range. However, Q47, Q48, and Q49 raised some concerns, since the correlation between these items was determined to be between bad and good, with a minimum of 0.249, somewhat less than 0.3.

									Q47, Q48, and Q49 may improve from a higher sample size. As a result, the three items will be monitored for validity when analysing the whole main survey. <i>For the main survey, all items will be preserved.</i>
9	Green Organisational Culture	GOC	Q50-Q56	0.849	0.134	0.796	0.596	0.897	Items Q52 is producing significant reliability issues when used in conjunction with Q54, Q55, and Q56. Q51 raises some concerns since its correlation with Q56 is less than 0.3 yet its correlation with the total is more than 0.5. The reliability indicators, correlation of item-to-total, and item-to-item correlation scores for the other questions are all within acceptable levels. <i>As a consequence of this finding, Q52 will be eliminated from the final questionnaire, while Q51 will be evaluated for validity in the main survey. The remainder of the items in the construct will be included in the final main survey.</i>

Table (4) Summary of reliability and validity testing (after removing Q6, Q17, Q37, Q38 and Q52)

No.	Construct	Constructs Codes	Items	Cronbach's Alpha (>0.7)	correlation& between Item-item (>0.3)		correlation between Item-total (>0.5)		Remarks
					Min	Max	Min	Max	
1	Green Innovation Strategy	GIS	Q1-Q5	0.848	0.320	0.637	0.661	0.884	The results for reliability, of the correlation between item to total and between item to item, are all determined to be in the acceptable range of values. <i>All of the items will be kept for use in the main survey.</i>
3	Environmental organisational legitimacy	EOL	Q12-Q16	0.866	0.301	0.684	0.609	0.841	The results for reliability, of the correlation between item to total and between item to item, are all determined to be in the acceptable range of values. <i>All of the items in the construct will be kept for use in the main survey.</i>
6	Managerial Concerns	MC	Q31-Q34	0.807	0.366	0.694	0.705	0.853	The results for reliability, of the correlation between item to total and between item to item, are all determined to be in the acceptable range of values <i>All of the items will be kept for use in the main survey.</i>
7	Absorptive capacity	AC	Q35 –Q39	0.827	0.360	0.688	0.751	0.843	The results for reliability, of the correlation between items to total and between item to item, are all determined to be in the acceptable range of values. <i>All of the items of this construct will be kept for use in the main survey.</i>

9	Green Organisational Culture	GOC	Q46-Q51	0.832	0.282	0.796	0.649	0.864	The results for reliability, item to total and item to item correlation, are all within an acceptable range of values. However, Q47, and Q50 have a correlation between them of 0.282 which is slightly lower than 0.3. Because the difference is very small for items Q47, Q50 it is expected that the correlation for item to item will improve when analysing the whole sample. Hence, the two items' validity will be put under screening when analysing the main survey. <i>All of the items of the construct will be kept for use in the main survey.</i>
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Table (5) Summary of reliability and validity testing for the variable that was underscreening using the whole sample

No.	Construct	Constructs Codes	Items	Cronbach's Alpha (>0.7)	correlation& between Item-item (>0.3)		correlation between Item-total (>0.5)		Remarks
					Min	Max	Min	Max	
4	Green Creativity	GC	Q17-Q22	0.877	0.378	0.693	0.737	0.838	As seen by the values with large sample size, all items of this construct are within the accepted range.
8	Competitive intensity	CI	Q40-Q45	0.827	0.335	0.598	0.640	0.790	As seen by the values with large sample size, all items of this construct are within the accepted range.
9	Green Organisational Culture	GOC	Q46-Q51	0.825	0.327	0.602	0.693	0.763	As seen by the values with large sample size, all items of this construct are within the accepted range.

Table (6) Cronbach Alpha for all the constructs using the whole sample.

The Construct	Cronbach Alpha for the whole sample	Cronbach Alpha for the pilot sample
Green Innovation Strategy	0.814	0.848
Green Organisational Identity	0.857	0.896
Environmental organisational legitimacy	0.757	0.866
Green Creativity	0.877	0.842
Green innovation	0.860	0.910
Managerial Concerns	0.796	0.807
Absorptive capacity	0.772	0.827
Competitive intensity	0.827	0.789
Green Organisational Culture	0.825	0.832

Cronbach's alpha for all items within each construct for the whole sample are above 0.70, indicating that the reliability of the instrument is satisfactory, as evidenced also by the pilot study findings.

4.11 The Conceptual framework

In developing the conceptual model, the environmental factors affecting financial performance, as evidenced in the previous chapter, have been drawn on. Research that studied the link between GI and financial performance and research that was involved in studying antecedents of GI was also considered. If we can show evidence about this relationship, it is like creating the internal motive of protecting the environment by businesses as GI will be considered a source of profit .

Developing a GIS is the first step a business that wants to achieve green innovation performance should take. A strategy is an organization's long-term scope and direction to meet market demands and the expectations of stakeholders (Ge et al., 2018). A strategy is built on distinctive activities, and hence enterprises must deliberate on activities that deliver a unique mix of value. (Porter,1996) When businesses plan to preserve the environment, they create green innovation strategies that strengthen their environmental sensitivity by reducing pollution, controlling products, and using non-polluting technologies (Hart, 1997).

This thesis aims to investigate the relationship between green innovation and financial performance in the context of Bahraini companies. The conceptual framework proposes that a green innovation strategy is the primary antecedent of green innovation. Green innovation strategy is "the intentional pursuit of green innovation through the development and implementation of environmentally-friendly technologies, products, and processes" (Munshi et al., 2018, p. 76). We hypothesize that a strong green innovation strategy will have a direct positive effect on green innovation.

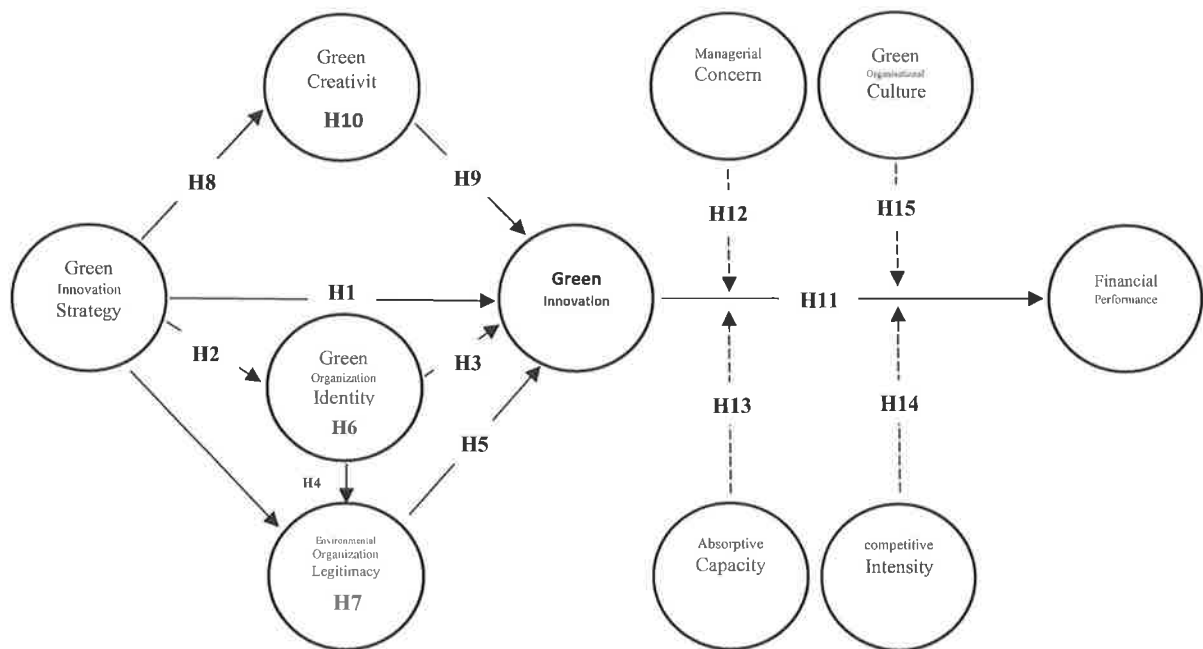
In addition to green innovation strategy, the conceptual framework proposes that green organizational identity, green creativity, and green legitimacy are mediators between green innovation strategy and green innovation. Green organizational identity refers to "the extent to which an organization's culture, values, and norms are aligned with environmental objectives" (Gao et al., 2019, p. 117). Green creativity refers to "the generation of novel and useful ideas, processes, and solutions that reduce environmental impact" (Chen et al., 2014, p. 70). Green legitimacy refers to "the extent to which an organization's environmental actions are perceived as acceptable, appropriate, and necessary by its stakeholders" (Liu et al., 2018, p. 55).

The second part of the conceptual framework focuses on the impact of green innovation on financial performance. We propose that managerial concerns, absorptive capacity, green organizational culture, and competitive intensity are moderators between green innovation and financial performance. Managerial concerns and absorptive capacity refer to the ability of managers to recognize and respond to environmental challenges and to absorb new knowledge and ideas related to green innovation (Krammer, 2011; Yoo et al., 2019). Green organizational culture refers to "the shared values, beliefs, and assumptions that shape employees' attitudes and behaviors toward the environment" (Jabbour et al., 2014, p. 190). Competitive intensity refers to "the degree of rivalry among firms in an industry" (Porter, 1995, p. 4).

By examining the role of antecedents, mediators, and moderators, this conceptual framework aims to provide a comprehensive understanding of the factors that influence green innovation and its impact on financial performance in the context of Bahraini companies. This framework also aims to contribute to the existing literature on green innovation and financial performance and to provide insights for policymakers and managers seeking to improve their companies' environmental and financial performance.

The uniqueness of the study model is in combining the antecedents of GI with the impact of GI on financial performance. This combination might allow for new types of research that relate the antecedents discussed directly with financial performance. Also, this framework is distinguished by introducing a green organisation culture as a moderator of the relationship between GI and financial performance.

Fig (1) The Study conceptual framework



4.12 Hypothesis development

Firms must establish methods for implementing innovations in order to mitigate the negative environmental impacts of their operations. Green innovations encompass a range of technologies that enable the elimination of negative environmental consequences, hence providing a significant potential for businesses to meet environmental objectives and benefits (Lin et al., 2014; Wong et al., 2013). A strategy is the long-term direction and scope of an organisation in order to meet market requirements and the expectations of the stakeholder (Johnson et al., 2005). According to Eiadat et al., (2008) GI is a term that relates to an invention that places a premium on waste reduction, pollution avoidance, and the development of environmental management systems. Thus, a GIS is a form of strategy that a business uses to execute green innovation in order to gain a competitive edge, meet market demands, and meet the expectations of stakeholders. According to Song and

Yu (2018), businesses should adopt a green innovation strategy in order to encourage green innovation. The following initial hypothesis is offered based on the preceding justification:

H1. Green innovation strategy in Bahraini firms has a positive impact on green innovation.

GIS implants in a business knowledge concepts of environmental control, product control, and clean technology, which become part of this knowledge. A GIS will motivate lower, middle, and top management of businesses., as well as internal stakeholders, to use organisational resources and to direct employee behaviour towards mitigating the risks of negative environmental impacts associated with manufacturing processes and outputs. As a result, this type of action will help to reinforce the identity of the organization (Song and Yu, 2018). According to Sharma et al. (1999), when businesses have a robust commitment to the environment, their management will not disregard the detrimental impact of their operations on the environment. According to Chen (2011) this form of environmental concern is incorporated into the organisational identity, which has been called the green organisational identity in recent years. Thus, the following hypothesis can be concluded:

H2. Green innovation strategy in Bahraini firms positively impacts green organisational identity.

Organisational identity is a snapshot of how a business views its style of management and how it wishes to be seen by internal and external stakeholders, such as consumers and investors. Chen, (2011) used the term "green organisational identity" to refer to a jointly constructed interpretative system of managing and preserving environment that members in the organisation use to give meaning to their activities. When environmental stewardship becomes an inherent part of an

organization's identity, environmental management and challenges become more difficult to ignore, and workers make voluntary contributions to the environment (Smith & O'Sullivan, 2012).

Globally, businesses have been driven to innovate and produce green goods in response to growing environmental concerns and challenges raised by stakeholders (Tseng et al., 2013; Green et al., 2012; Sharma, 2000). Businesses with a green organisational identity are more likely to incorporate environmentally friendly technologies into their operations, such as systems of environmental management and energy-efficient types of equipment that may assist minimise pollution and waste caused by their operations .

Additionally, organisations that care about the environment recognise the critical nature of environmental protection; hence, they demonstrate their commitment via their activities. When environmental problems become the primary focus of an organisation's identity, it motivates its members to contribute more to the environment (Lin et al., 2014). As a result, the third hypothesis is as follows:

H3. Green organisational identity in Bahraini firms positively impacts green innovation.

Businesses that have a green corporate identity will quickly gain legitimacy. Legitimacy is defined as the condition in which the company's value is consistent with the greater social value system. (Dowling and Pfeffer, 1975) Thus, if a corporation's value is consistent with societal expectations about environmental challenges, the firm has gained environmental organisational legitimacy.

According to Massey (2001), an organisation's interconnectedness with its stakeholders is critical for the company's survival and legitimacy. Thus, businesses with a green organisational identity and incorporating environmental management

and preservation into their operations may readily achieve environmental organisational legitimacy. Thomas (2007), mentioned that organisational legitimacy is indirectly connected to organisations' reputations. Thus, businesses that achieve environmental organisational legitimacy have a favourable reputation as socially responsible businesses.

The green organizational identity of a business can play a significant role in achieving environmental organizational legitimacy. A firm with a clear and consistent green organizational identity can demonstrate to stakeholders that it is committed to environmental management and preservation (Gao et al., 2019). This commitment can increase trust and stakeholder support, enhancing the firm's legitimacy (Deephouse & Carter, 2005). In addition, adopting a green organizational identity can signal to stakeholders that a firm is engaging in socially responsible behavior (Liu et al., 2018), which can further enhance its legitimacy.

Furthermore, in the context of Bahraini companies, adopting a green organizational identity may be particularly important due to the country's focus on sustainable development and environmental preservation. By aligning with Bahrain's environmental values and goals, companies can enhance their environmental organizational legitimacy and gain a competitive advantage in the market (Al-Sartawi et al., 2020). Therefore, we propose that the green organizational identity of Bahraini firms will positively affect their environmental organizational legitimacy, as stated in Hypothesis 4.

H4. Green organisational identity of Bahraini firms positively affects environmental organisational legitimacy.

In general, a business's financial aim is to maximise investors' equity. However, profit maximisation is not always the primary purpose, as a business must also contend with a variety of external influences in order to obtain legitimacy

(Sharma et al., 1999). The legitimacy theory provided a framework for understanding the interaction between companies and society. Dowling and Pfeffer (1975) defined organisational legitimacy as the degree to which an organisation's operations conform to connected beliefs, norms, values, definitions, and the expectations of the stakeholders. Environmental legitimacy is defined as the widespread belief or assumption that a company's environmental performance is desirable, legitimate, or suitable (Bansal and Clelland 2004). People nowadays are extremely concerned and conscious of the environment, and as a result, customers have developed a strong preference for eco-friendly items. As a result, corporations are required to embrace green innovation in order to meet stakeholder expectations. Green innovation encompasses all areas of product and process development that are environmentally friendly, including pollution control, energy conservation, product design, waste recycling, and environmental management (Figuerola et al., 2018). Organisational legitimacy can assist businesses in aligning their actions with societal expectations (Bettinazzi et al., 2019). Chen et al., (2006) discovered that corporate social responsibility and social legitimacy are positively connected with business performance in three Mexican and five Spanish enterprises. The more a firm's legitimacy among stakeholders, the more resources and support it may obtain from both external and internal stakeholders in order to produce superior green innovations (Song and Yu, 2018). As a result, the fifth hypothesis is as follows:

H5. Environmental organisational legitimacy in Bahraini firms positively impacts green innovation.

When a business develops a GIS, its managers and employees are willing to integrate organisational resources to mitigate environmental risks associated with manufacturing processes, methods, and output's; this type of behaviour can help strengthen the organization's identity (Chang and Chen, 2013). Because organisational

identity is developed collaboratively by individuals who give meaning to the activities they are doing, when environmental protection and management become a major problem in the corporate identity, they cannot be disregarded (Chen, 2011). Green organisational identity participates in this procedure by bringing together a company's diverse skill sets and expertise in order to enable more innovation that places a premium on pollution prevention, waste reduction, and implementing environmental management (Benet-Martnez et al., 2002; Chang and Chen, 2013; Eiadat et al., 2008). Green organisational identity integrates many abilities and areas of knowledge to further allow innovation that prioritises waste reduction, pollution avoidance, and the deployment of green management systems (Benet-Martnez et al., 2002; Chang and Chen, 2013; Eiadat et al., 2008). Green organisational identity motivates business leaders to deploy market-driven technology. The following sixth hypothesis is presented based on the above reasoning:

H6. Green organisational identity in Bahraini firms mediates the relationship between GIS and GI.

As previously said, a GIS places a premium on waste reduction, pollution avoidance, and environmental management. Firms must adopt a green innovation strategy to encourage GI (Song and Yu, 2018). To successfully adopt a green innovation strategy, managers must integrate the organisation's complete resource base and coordinate employee behaviour to prioritise environmental concerns. This type of activity will bolster the organisation's green identity (Chang and Chen, 2013). A business with a strong green corporate identity quickly earns the public's confidence and legitimacy (Song and Yu, 2018). As a result, businesses may garner additional resources and support from external and internal stakeholders. With these resources and robust backup by society, a business will find it easier to create and implement green ideas.

Environmental organizational legitimacy can play a critical mediating role in the relationship between GIS and GI. When a firm successfully adopts a GIS, it can improve its environmental performance and enhance its green identity. This enhancement can increase environmental organizational legitimacy, facilitating the creation and implementation of green ideas (Song & Yu, 2018). By gaining the trust and support of external and internal stakeholders, firms can obtain additional resources and support for their green initiatives, further enhancing their environmental organizational legitimacy.

In the context of Bahraini firms, the mediating role of environmental organizational legitimacy may be significant due to the country's focus on sustainable development and environmental preservation. By prioritizing environmental concerns and adopting a GIS, Bahraini firms can enhance their environmental performance and improve their green identity. This improvement can lead to increased environmental organizational legitimacy, facilitating the creation and implementation of green ideas and further supporting the country's environmental goals. Therefore, we propose that environmental organizational legitimacy in Bahraini firms mediates the relationship between GIS and GI, as stated in hypothesis 7.

H7. Environmental Organisational legitimacy in Bahraini Firms mediates the relationship between GIS and GI.

The researcher argues in this study that a GIS has a favourable effect on green creativity. This impact happens as a result of a green innovation strategy's emphasis on resource efficiency, which will result in cheaper costs and less waste generated by businesses (Eiadat et al., 2008). By cutting expenses, businesses may maximise

their resource use, which increases their knowledge of the possibilities available for green product innovation, contributes to organisational green creativity.

Second, organisational creativity theory states that creativity is defined by means of the generation of innovative and beneficial ideas (Harrison and Wagner, 2016). The organisational strategy may have a good effect on a business's creativity (Freeman and Soete, 1997). As a result, we claim that a firm's GIS may influence its green creativity. Because previous studies have shown that technological improvement, which in turn is powered by the market's push and pull dynamics, is a major driver of innovation (Johnston and Bate, 2013). Businesses that are having difficulty complying with government environmental rules are being encouraged to pursue a green innovation strategy. As a result, this technique may help businesses embrace new ideas, inspire creative thinking, and improve the efficiency of resources, all of which contribute to green creativity.

Finally, fierce market competition combined with pressures from environmental concerns forces companies to create a flexible strategy for their products and operations (Chang and Chen, 2013). In order to meet customer demands for companies to be environmentally responsible, companies need to concentrate on green products in response to these demands (Lin et al., 2014). The GIS is an important way for companies to survive and achieve competitive advantages. The GIS can enhance the company's level of awareness of the environment and stimulate its ability to generate useful and innovative environmentally friendly ideas at the level of products and processes, and such activities also can increase the organisation's potential for green creativity. Accordingly, the researcher proposes the following hypothesis:

H8. Green innovation strategy in Bahraini firms positively affects Green Creativity.

Creativity is the key necessity for developing novel solutions (Halbesleben et al., 2003). In an organisational setting, creativity can be defined as innovative and helpful ideas; where innovation refers to the use of creative ideas to improve organisational processes, practices, or products (Anderson et al., 2014). While creativity is concerned with generating ideas, innovation is concerned with implementing those ideas; hence, creativity is frequently viewed as the precursor to organisational innovation (Anderson et al., 2014).

Green creativity entails the generation of unique, creative, and beneficial concepts for environmentally friendly goods, services, processes, and activities (Chen and Chang, 2013). So, when a business adopts such unique and beneficial green concepts, it initiates a process that fosters green innovation. Green clients' demands for environmental products and their behaviours may compel a business to develop concepts for green processes or products that fulfil these requirements. By meeting these needs, a business overcomes practical obstacles and strengthens its ability to create green inventions (Lin et al., 2014). Secondly, environmental rules represent the interests of many stakeholders. Today, businesses face a rising number of strict environmental government regulations (Eiadat et al., 2008). Because of stakeholders' demand to deal with environmental challenges, managers have started using green innovation strategies that can provide unique and beneficial ideas for green goods, services, processes, and behaviours. When a business adopts innovative green concepts to improve its operations, practices, or products, this contributes to green innovation. As a result, we suggest Hypothesis No. 9:

H9: Green Creativity in Bahraini businesses positively affects Green Innovation

According to Song and Yu (2018), green innovation strategy positively influences green creativity, and green creativity positively affects green innovation. This kind of creativity may help to accelerate the development of green

manufacturing technologies and procedures. When GIS is part of the firm's overall strategy, this will stimulate innovative green ideas. If the level of green creativity is high, the impact of GIS will be mediated to GI. Accordingly, hypothesis number 10 is as follows:

H10: Green Creativity in Bahraini firms mediates the relationship between GIS and GI

Green innovation may help a firm outperform its competitors. Firms participate in green innovation efforts primarily by increasing the number of transactions that meet the requirements and desires of potential consumers. This can result in increased sales volumes (Chen, 2008), hence improving the firm's financial situation, but other empirical studies show that the relationship between innovation and profitability is more difficult to establish (Koellinger, 2008). According to some experts (Driessen et al., 2013; Zhang, 2011; Aguilera and Ortiz, 2013), green innovation has a detrimental impact on a firm's financial success. Indeed, they believe that businesses that establish a practice of pursuing environmental objectives will almost certainly experience negative profitability (González et al., 2018). We propose that a firm's attempts to improve its green innovation can increase the expenses of its operations, eroding profitability grounds (Eiadat et al., 2008). Aguilera and Ortiz (2013) analysed the financial performance of green and non-green innovation enterprises and found that green innovation firms do not outperform non-green innovation firms. According to Liu et al. (2011), the use of green innovation might result in accumulated costs. Additionally, Driessen et al. (2013) noted that innovation of green products is linked with poor financial success.

Despite this, the majority of experts (Chiou et al., 2011; Cheng et al., 2014; Singh, 2016) believe that GI has a beneficial effect on financial performance. According to Bonini and Oppenheim (2008), green innovation methods contribute

to a company's financial success. They think that in order for businesses to reduce waste, they must implement green innovation processes that result in green-labelled branding that builds a green prestige, which will attract potential consumers and generates revenue. Additionally, Fujii et al. (2013) examined Japanese manufacturing enterprises and discovered a favourable correlation between CO2 emission reduction and financial success. Scholars' inconclusive thoughts require additional examination. As a result, the researcher anticipates the following:

H11: Green innovation in Bahraini firms affects financial performance

Concerns about the environment by managers have a beneficial effect on the adoption of environmental innovation techniques (Qi et al., 2013; Bansal, 2005; Eiadat et al., 2008). This, in turn, may improve the firm's performance (Ar, 2012) .

Thus, it is argued that management environmental concerns may influence not only whether a business pursues green innovation but also the degree to which green innovation and firm success are coupled. Managerial environmental concerns may spur green innovation, which in turn can enhance the performance of the organisation. This is why organisations need robust environmental policies, which must be grounded in a shared set of norms, attitudes, and values (Jansson et al. 2010), in order to drive green innovation adoption toward performance and competitiveness. The researcher evaluates the possible moderating influence of management concern for the environment in the following hypotheses.

H12: Managerial concerns in Bahraini firms moderate the relationship between green innovation and financial performance.

Absorptive capacity refers to a company's ability to harness the value of new information and apply it to business activities. The absorptive capacity thus helps transform knowledge into new products, services, or processes to support

innovation. It can be said that maintaining and improving the absorptive capacity is critical to the sustainability of the company. Therefore, absorptive capacity is often associated with innovation (Zou et al., 2018). With application to the environment, companies in their green innovation need to learn from partners, obtain external information, and incorporate it into their existing knowledge base (Xie et al. 2016). Likewise, carrying capacity is related to green innovation. From a resource-based view, if a company has valuable but scarce resources and uses its full capacity, this usually affects its competitive advantage and performance in a positive way. Accordingly, the absorptive capacity can help increase the speed, frequency and scale of innovation and new knowledge to meet their requirements for additional knowledge in the green innovation process, ultimately providing a unique competitive advantage and better financial performance (Ze et al., 2018). The researcher believes that it is necessary to determine the role of absorptive capacity in the relationship between green innovation and the financial performance of companies; Thus, the researcher presents the role of absorptive capacity as a modifier variable for this relationship. The researcher also assumes that the absorptive capacity will positively modify this relationship. Based on the foregoing, the following hypotheses were proposed:

H13: Absorptive capacity in Bahraini firms moderates the relationship between green innovation and financial performance

Under times of intense market competition, customers have the option of selecting items from a diverse range of providers, and those differentiated by ecological marketing attributes give this choice (Leonidou et al., 2013). Additionally, purchasers may more quickly swap suppliers in such highly competitive market settings. Businesses that adopt an eco-friendlier marketing strategy are perceived as more likeable and their services as more appealing,

particularly among environmentally conscious clients (Tsai et al. 2008). Thus, fierce market competition increases the possibility that environmental marketing tactics would provide superior financial returns. By contrast, low competitiveness fosters apathy and inertia regarding ecological issues in markets (Menon et al. 1999). Additionally, when a business pursues a differentiation strategy, it enables the business to capitalise on the advantages of releasing new green goods by differentiating itself from rivals, fostering customer loyalty, and growing general market areas (Desyllas et al. 2018). Thus, differentiation strategy becomes an increasingly crucial and effective approach for enterprises to benefit from green product innovation in the face of strong competition. As a result, the following hypothesis will be put to the test:

H14: Competitive intensity within Bahraini firms moderates the relationship between green innovation and financial performance

O'Regan and Ghobadian (2005) stated that a company's culture, leadership, and strategic planning all contribute to creativity. Additionally, they discovered that organisations with a high degree of innovation had a more defined culture than firms with a low level of innovation. As such, a well-defined environmental culture and policy may help a firm foster green innovation (Ling, 2019). A green culture inside an organisation may help foster environmental technology innovation (Greeno and Robinson, 1992).

Green innovation strategy is formed from a green organization's culture, which encompasses the firm's conduct and environmental stewardship standards. The green culture of an organisation has an effect on managers' attitudes toward green innovation (Özsomer et al., 1997). Managers in firms with an environmentally conscious culture are more likely to adopt environmental protection measures, hence promoting organisational green innovation. Thus, organisations may distinguish themselves from rivals in terms of green innovation capability by aligning their

organisational culture with environmental quality requirements. As a result, implementing a green innovation strategy strengthens a firm's competitive edge and, ultimately, financial success. It is speculated that:

H15: Green organisational culture within Bahraini firms moderates the relationships between green innovation and financial performance

Chapter Five:
Preliminary Test and Results

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Preliminary Test and Results

5.1 Introduction

This chapter consists of two crucial sections: pre-test data and data analysis. The initial part centred on ensuring that the collected data was suitable for analysis. It also involves the editing of the data, mainly via data screening, which includes the evaluation of missing data and the detection of outliers. In addition, the chapter's initial section clarified the data's normality, linearity, multicollinearity and homoscedasticity. Moreover, for the sequential equation model that will be used to test the study hypothesis, we will test the convergent validity of the model using three factors which are factor loading, composite reliability, and average variance factor; the discriminant validity will be tested using cross loading and Variable Correlation- Root square.

The second part of the chapter was concerned with data analysis to convert data into information that needs to be interpreted. It is centred on describing the variables revealing the strengths and weaknesses of the variable within the Bahraini companies in the Kingdom of Bahrain and testing the direct connection between the dependent and independent variables. Also, the moderating and mediating effects are discussed as an interaction between factors or variables, where the results of one variable depend on the levels of the other variable in the analysis. Path modelling techniques will be used to test the suggested model in this study. According to Calantone et al. (1998), "The Partial Least Squares (PLS) Structural equation modelling parameter estimates better reveal the direction and strength (i.e., positive versus negative) of the relationships between the variables than correlation

coefficients" (p.28), and "PLS avoids the common estimation biases associated with regression analysis."

5.2 Missing Data

Due to incomplete questionnaires, 2% of the total questionnaires in this study had missing data (7 people out of 350 participants). However, most missing data were in the demographic factors, which have little impact on the study's primary variables. The number (99) was assigned to missing data, defined as a missing value. Hence SPSS and Smart PLS 4 would not use them in any computations. According to Acock (2005), eliminating missing sample values and minor amounts of missing data did not influence the outcomes.

5.3 Treatment of outliers

The current study's data values were transformed into a z-score to detect the outliers. According to Hair et al. (2010), outlier values on variables occur when the standard score is between (± 2.5). This value range (± 2.5) of the standard score was suggested for a small sample size that ranged between less than and equal to 80. According to Frost (2019), the more significant the deviation of an observation's Z-score from zero, the more exceptional it is. Standard Z-score thresholds for identifying outliers are (± 3). Or more than zero. However, the sample size in our study is more than 80, and the z-score is between (± 3).

Osborne and Overbay (2004) eliminated multivariate outliers from their statistical study. However, Kline (2011) and Tabachnick & Fidell (2019) propose maintaining outliers when there are a small number of outliers in a large sample since the outcome is not significantly impacted. As indicated in *Table (7)*, the current study utilised the z-score in SPSS, with the outliers kept due to the small number of outliers in the sample and the study sample size being relatively high.

Table (7) Data Outliers

Variable	Case Number	Z-Scores > ± 3.0
Green innovation strategy: Q1: The procurement approach emphasises the elimination of non-recyclable products.	34	-3.25
	37	-3.25
	138	-3.25
	309	-3.25
Green innovation strategy: Q5: There is constant adjusting in business processes to lower its energy consumption.	30	-3.65
	131	-3.64
Green organisational Identity: Q1: Managers and employees are proud of their environmental management and preservation history.	30	-3.31
	318	-3.32
Green organisational Identity: Q2: Our firm takes pride in its environmental objectives.	30	-3.55
	318	-3.55
Green organisational Identity Q5: We have a high adherence to sound environmental management and preservation practices.	30	-4.09
	207	-4.09
Green Creativity: Q2: To improve environmental performance, our employees are constantly coming up with new green solutions.	324	-3.33
Green innovation: Q1: We develop and design products using the least polluting materials possible.	3	-3.32
	30	-3.32
	122	-3.32
Green innovation: Q2: We develop and design products using the least energy and resources consuming materials.	3	-3.66
	30	-3.67
	122	-3.66
Green innovation: Q3: We develop and design products with the least materials.	30	-3.24
Green innovation: Q4: The company carefully assesses whether its products are recyclable, reusable, and biodegradable before completing product development and design.	3	-3.2
	30	-3.32
	74	-3.2
Absorptive capacity: Q1: Management encourages a multidisciplinary approach to learning by collaborating with employees from other departments.	198	-3.66
Absorptive capacity: Q2: External information and resources are easily assimilated and integrated for internal usage purposes.	198	-3.59

Absorptive capacity: Q3: In response to newly acquired information, our company has the flexibility to alter or amend its quality control procedures routinely.	198	-4.13
Green Organisational Culture: Q1: We have a strategy that promotes natural resource conservation.	203	-3.73
Green Organisational Culture: Q2: As a community, we have a sense of obligation to maintain natural resources.	203	-3.80

5.4 Normality Test

As it is common knowledge that Likert data are of the discrete type data and the normal distribution is continuous, normality testing will be performed on the grouped variables (the average of all the statements for each variable) that will be used in the analysis. The results of the test are presented in *Table (8) below*.

Table (8) Test of Normality: Kurtoses, Skewness, and Shapiro-Wilk.

Study Variables	Skewness		Kurtoses		Shapiro-Wilk	
	Statistic	Std. Error	Statistic	Std. Error	Statistic	Sig
Green Innovation Strategy	-0.914	0.130	1.683	0.260	0.948	0.000
Green organisational Identity	-0.816	0.130	2.227	0.260	0.962	0.000
Environmental organisational legitimacy	-0.486	0.130	-0.031	0.260	0.942	0.000
Green Creativity	-0.810	0.130	0.388	0.260	0.969	0.000
Green innovation	-0.656	0.130	1.138	0.260	0.969	0.000
Managerial Concerns	-0.128	0.130	-0.513	0.260	0.945	0.000
Absorptive capacity	-0.906	0.130	2.869	0.260	0.962	0.000
Competitive intensity	-0.647	0.130	0.403	0.260	0.964	0.000
Green Organisational Culture	-0.521	0.130	0.031	0.260	0.823	0.000
ROA	1.202	0.130	3.553	0.260	0.763	0.000
ROE	0.330	0.130	8.534	0.260	0.948	0.000

The table shows the skewness and kurtosis of the main variables in the study model, where the skewness and kurtosis test show that the data follow a normal distribution. According to Doane & Seward (2011), the data follow a normal distribution if the absolute values of skewness range between -2 and 2 and the

kurtosis range between 7 and -7 when the sample size exceeds 300, while the Shapiro-Wilk test shows a p-value that is less than 0.05 which means that the null hypothesis is rejected, meaning that the data do not follow a normal distribution. According to Razali and Wah (2011), the Shapiro-Wilk test is unreliable in large samples exceeding 300, which is the case of the sample in this study due to the test's sensitivity to the sample size.

Minor problem with the variable "ROE"; as the kurtosis statistic is more than 7, the study still will consider it normally distributed because the difference is minimal. Also, the data usually is not required to be perfectly following normal distribution, and the skewness shows the normal distribution.

As stated by Pallant (2016), the violation of the normality assumption should not pose significant issues with sufficient sample sizes (> 30 or 40); this means that parametric approaches can be used even when the data are not normally distributed (Elliott and Woodward, 2007). We may disregard the data distribution if we have samples including hundreds of observations. The central limit theorem states that (a) if the sample data are approximately normal, the sampling distribution will be normal as well; (b) in large samples (> 30 or 40), the sampling distribution tends to be normal regardless of the shape of the data (Elliott and Woodward, 2007), and (c) the means of random samples from any distribution will have a normal distribution.

5.5 Multicollinearity

We will examine multicollinearity by performing linear regression despite the fact that this study will use path analysis (SEM), and the goal is to test the linear association between the explanatory variables. The study will also assume that all the mediators and moderators are independent (explanatory) variables, so they can be examined through SPSS. The examination of multicollinearity through the SPSS will be conducted for each ROA and ROE.

There are two methods to test multicollinearity, the first is by the correlation matrix, and the other uses what is known as the Variance Inflation Factor. The study will use both.

Hair et al. (2010) say there are signs of problems when the Pearson correlation coefficient is greater than or equal to 0.8., as shown in *Table (9)*. In addition, they recommended that the Variance Inflation Factor (VIF) value not exceed ten and the tolerance value not go below 0.1 to prevent multicollinearity in linear regression. As shown in *Table (10)*, there was no multicollinearity between independent variables.

Table (9) Pearson correlation coefficients between all the model's variables.

	GIS	GII	EOL	GC	GI	MC	AC	CI	GOC
GIS	1								
GII	0.408*	1							
EOL	0.347*	0.393*	1						
GC	0.306*	0.252*	0.402*	1					
GI	0.432*	0.356*	0.493*	0.364*	1				
MC	0.431*	0.367*	0.379*	0.377*	0.466*	1			
AC	0.390*	0.324*	0.334*	0.394*	0.388*	0.384*	1		
CI	0.292*	0.271*	0.261*	0.324*	0.337*	0.259*	0.357*	1	
GOC	0.324*	0.421*	0.364*	0.249*	0.412*	0.361*	0.381*	0.355*	1

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

Table (10) Collinearity Statistics with Tolerance and Variance Inflation Factor

Predictor	Collinearity Statistics	
	Tolerance	VIF
Green Innovation Strategy	0.671	1.490
Green organisational Identity	0.691	1.448
Environmental organisational legitimacy	0.646	1.549
Green Creativity	0.710	1.408
Green innovation	0.592	1.690
Managerial Concerns	0.651	1.537
Absorptive capacity	0.677	1.478
Competitive intensity	0.768	1.302
Green Organisational Culture	0.677	1.477

5.6 Homoscedasticity

A homoscedasticity test was done between GI and the interaction effect of GI with all the moderators' variables with both the ROA and ROE. The ($P=0.946$; 0.980) in Levene's test for the two models is > 0.05 . This means that the null hypothesis is accepted when the significant value of the Levene test statistic is more than 0.05 and when the assumption of the homogeneity of variances are met (Martin & Birdgmon, 2012). As seen in the two tables below.

Table (11) Levene's Test of Equality of Error Variances (ROA)

Dependent Variable: ROA			
F	df1	df2	Sig.
0.536	333	16	0.946
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
Design: Intercept + GI + GI * MC + GI * GOC + GI * CI + GI * AC			

Table (12) Levene's Test of Equality of Error Variances (ROE)

Dependent Variable: ROE			
F	df1	df2	Sig.
0.540	333	16	0.980
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
Design: Intercept + GI + GI * MC + GI * GOC + GI * CI + GI * AC			

5.7 Descriptive analysis

Descriptive statistics can be used to do two things:

- 1- give basic information about the variables in a set of data.
- 2- show possible connections between the variables.

We may better understand a group's background by learning more about their age, gender, experience, income, employment position, nationality, education, etc.

5.7.1 Demographic analysis

Table (13) Respondent Gender

	Frequency	Valid Percent
Female	143	40.9
Male	207	59.1
Total	350	100

Table (13) reveals that males comprise 59.1% of the study sample and females comprise 40.9% of the sample, indicating that most supervisory positions are males. The researcher attributes this to the prevalent culture that encourages the appointment of women and the propensity of many women to accept these positions and the significant responsibilities they entail. The Kingdom of Bahrain ranked third in the World Competitiveness Yearbook 2022 issued by the Global Competitiveness Center of the Institute for Management Development (IMD) in the index of women in managerial positions by 46% and in the index of women with academic degrees in the age group 25-64 years by 62%, which indicates the relevance of Bahrain's programs and initiatives in empowering and advancing Bahraini women.

Table (14) Level of Education

	Frequency	Valid Percent
Lower than a bachelor's degree	31	8.9
Bachelor's Degree	248	70.9
Master's Degree	70	20.0
Doctoral Degree	1	0.3
Total	350	100

Table (14) above shows the sample distribution according to academic qualification and shows that 70.9% of the sample members are holders of bachelor's degrees. There are also 20% holders of a master's degree and 0.3% are holding a doctorate. This indicates that you need a high degree to get a high position in Bahrain. This distribution shows that the employees working in the business sector in the Kingdom of Bahrain have high academic qualifications, which gives the researcher initial reassurance of their ability to understand the study questions and answer them objectively.

Table (15) Sample Age Distribution

	Frequency	Valid Percent
20-30 years	71	20.3
31-40 years	160	45.7
41-50 years	84	24.0
51-60	22	6.3
60 years and above	13	3.7
Total	350	100

Table (15) shows 45.7% of respondents are between the ages of 31 and 40, while 24.1% are between the ages of 41 and 50, as seen in *Table (15)*. 20.3% are between the ages of 20 and 30. This suggests that most business sector supervisors and managers in the Kingdom of Bahrain come from the middle age group.

Table (16) Length of Service with the Organisation

	Frequency	Valid Percent
0-4 years	70	20.0
4-8 years	95	27.1
8-12 years	52	14.9
12-16 years	75	21.4
Over 16 years	58	16.6
Total	350	100.0

Table (16) illustrates the distribution of the study sample according to years of experience, as 27.1% of the sample individuals have experience between 4-8 years, whereas 21.4% of the sample have experience between 12-16 years, which increases the initial satisfaction with their questionnaire responses.

Table (17) Length of Time in Current Position

	Frequency	Valid Percent
0-4 years	156	44.6
4-8 years	104	29.7
8-12 years	42	12.0
12-16 years	21	6.0
Over 16 years	25	7.1
Total	348	99.4
Missing	2	0.6
Total	350	100

Table (17) shows how the people in the study sample are spread out by how long they have been in their current job. About 44.6% of the people in the sample have been in their current position for less than 4 years, and 29.7% have been in their current job for between 4 and 8 years, which makes them more satisfied with their initial answers to the questionnaire.

Table (18) Distribution of Company type

	Frequency	Valid Percent
Financial Company	214	61.1
Non-Financial Company	135	38.6
Total	349	99.7
Missing	1	0.3
Total	350	100

Table (18) shows that 61.1% of the sample is from the financial sector; this is normal in Bahrain, knowing that the financial sector's contribution to real GDP is 17.8%, with more than 363 financial institutions. The non-financial sector in the Bahraini economy is more pollutant than the financial sector, but it still can contribute to a better environment through green innovation. The research population also includes all the companies listed on the Bahrain Stock Exchange, where the financial sector represents 24 companies out of a total of 41 companies.

Table (19) Distribution of nationality of respondent

	Frequency	Valid Percent
Bahraini	311	88.9
Non-Bahraini	38	10.8
Total	349	99.7
Missing	1	0.3
Total	350	100

Table (19) Most of the respondents are Bahrainis, with percentage of 88.9% and 10.9% of non-Bahraini. This indicates the success of the Kingdom of Bahrain's approach to the Bahrainization of jobs, especially in the private sector and administrative and leadership positions.

Table (20) Distribution of Sample Positions

	Frequency	Valid Percent
Manager	166	47.4
Supervisor	140	40.0
Environmental Specialist	43	12.3
Total	349	99.7
Missing	1	0.3
Total	350	100

Table (20) above shows that the sample mainly consists of managers and supervisors. A manager usually has a higher rank than a supervisor. Employees specialised in the environment within their companies are relatively low, with a percentage of 12.3%. That is, approximately 43 environmental specialists. If this number of environmental specialists were distributed among all the study companies, we would find that each company has a specialist. This indicates that most companies are interested in the environmental aspect and allocate those who have enough suitable experience in the green innovation process.

5.7.2 Constructs' Descriptive analysis

The following tables show the Mean and the standard deviation and the level of importance of all the model constructs. The level of importance is decided low if the mean is between 1-2.33, Medium if the mean is between 2.33-3.66, and high if it is between 3.66 and 5.

Table (21) Descriptive Analysis for Green Innovation Strategy

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	The procurement approach emphasises the elimination of non-recyclable products.	3.78	0.856	High
2	Management pursues a green innovation strategy that includes modifying corporate processes to minimise their impact on humans, animal species, and the environment.	3.90	0.793	High
3	Our firm engages in various voluntary initiatives aimed at rehabilitating the environment.	3.79	0.947	High
4	Business procedures are modified to mitigate the product's environmental impact.	3.61	0.873	Medium
5	There is constant adjusting in business processes to lower its energy consumption.	3.87	0.788	High
	Variable Average	3.79	0.851	High

The mean value of the variables is between 3.61 and 3.9, indicating their significance ranges from moderate to high. As the average is less than 3.66, Statement 4 gets a middling rank. The comparatively low standard deviation implies that the values of the variables vary within an acceptable range. The data shows a weakness in modifying the business processes to reduce the impact of Bahraini companies' products on the environment. The data also shows that GIS is a concept that the management of Bahraini companies is aware of, as statement number (2) above got the highest mean. The variable average of 3.79 is high in terms of importance and indicates that GIS in Bahraini companies is at an acceptable level, but still, there is a place for enhancement as there are some respondents that feel it is not at an acceptable level.

Table (22) Descriptive Analysis for Green Organisational Identity

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	Managers and employees are proud of their environmental management and preservation history.	3.78	0.837	High
2	Our firm takes pride in its environmental objectives.	3.92	0.824	High
3	Our company has established a clear environmental mission.	3.83	0.847	High
4	The company possesses a sufficient understanding of its environmental history and culture.	3.83	0.814	High
5	We have a high adherence to sound environmental management and preservation practices.	3.95	0.720	High
6	We are committed to environmental management and conservation.	4.09	0.826	High
	Variable Average	3.9	0.811	High

Based on the high average of 3.9 in the table, managers, supervisors, and environmental experts in Bahraini enterprises believe their organizations have a green corporate identity and are committed to environmental management and conservation. The first statement has the lowest arithmetic mean, indicating that the issue of pride in environmental management and environmental preservation among workers in Bahraini companies is relatively low and can be improved by encouraging more community partnerships between the company and the community.

Table (23) Descriptive Analysis for Environmental Organisational Legitimacy

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	In terms of environmental management and protection, the company operates safely.	4.12	0.749	High

2	In terms of environmental management and protection, the company operates legally	4.26	0.612	High
3	The company demonstrates credibility in terms of environmental management and protection.	4.22	0.725	High
4	Our company is a role model of environmental management and conservation.	3.85	0.842	High
5	From an environmental management and protection standpoint, our company should be permitted to continue operating.	4.17	0.714	High
	Variable Average	4.12	0.728	High

The above table shows that the arithmetic mean of environmental legitimacy is high, which means that managers, supervisors, and environmental experts believe that companies have a high degree of environmental legitimacy. The arithmetic mean for ELO was 4.12, which is a high level. Still, this opinion represents the companies' side and usually the stakeholders who decide the legitimacy of companies. The table also shows the statement regarding the company being a role model with the lowest mean (3.85); this could lead to the conclusion that environmental management and preservation are still not role models for other businesses.

Table (24) Descriptive Analysis for Green Creativity

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	The employees constantly come up with innovative strategies to achieve environmental protection objectives.	3.95	0.822	High
2	To improve environmental performance, our employees are constantly coming up with new green solutions.	3.92	0.878	High

3	Several employees in our company have taken the initiative to spread the word about new green initiatives.	3.95	0.809	High
4	Our employees design detailed plans for implementing cutting-edge green initiatives.	3.75	0.888	High
5	Our employees would thoroughly test new green initiatives.	3.87	0.917	High
6	Our employees would come up with innovative solutions to environmental issues.	3.89	0.894	High
	Variable Average	3.89	0.868	High

The table shows a high average for measuring the green creativity variable (3.89), which means that the management pays attention to it. The statement with the lowest arithmetic mean is that employees design creative environment solutions, which indicates a relative weakness in this area.

Table (25) Descriptive Analysis for Green Innovation

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	We develop and design products using the least polluting materials possible.	3.86	0.862	High
2	We develop and design products using the least energy and resources consuming materials.	3.75	0.749	High
3	We develop and design products with the least materials.	3.80	0.863	High
4	The company carefully assesses whether its products are recyclable, reusable, and biodegradable before completing product development and design.	3.98	0.932	High
5	Our manufacturing processes efficiently reduce hazardous material or waste emissions.	3.96	0.776	High

6	Our manufacturing processes efficiently recycle wastes and emissions that may be processed and used.	3.92	0.913	High
7	Our manufacturing processes effectively conserve water and-energy.	3.91	0.920	High
8	Our manufacturing processes significantly minimise their reliance on raw materials.	3.93	0.932	High
	Variable Average	3.89	0.868	High

The table shows a high level of green innovations where the mean of the variable was (3.89), which is a high mean. The highest mean was for the statement, “The company carefully assesses whether its products are recyclable, reusable, and biodegradable before product development and design”. The statement “We develop and design products using the least energy and resources consuming materials” with the lowest average indicates a need to pay attention to designing products with the least energy consumption and the least use of resources.

Table (26) Descriptive Analysis for Managerial Concerns

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	Environmental innovation is a critical component of our company’s strategy for environmental management.	3.86	0.792	High
2	In our company, the majority of environmental advancements are beneficial.	3.93	0.709	High
3	Environmental innovation is an effective approach for environmental management.	3.99	0.720	High
4	We rely on environmental innovation to achieve high levels of environmental performance	3.82	0.855	High
	Variable Average	3.9	0.769	High

The table shows the high arithmetic mean of the Managerial Concerns in green innovation, which reached (3.9). This result means that managers in Bahraini companies are highly interested in environmental management. This result can be useful when trying to investigate the modified effect of this variable.

Table (27) Descriptive Analysis for Absorptive Capacity

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	Management encourages a multidisciplinary approach to learning by collaborating with employees from other departments.	3.89	0.789	High
2	External information and resources are easily assimilated and integrated for internal usage purposes.	3.88	0.803	High
3	In response to newly acquired information, our company has the flexibility to alter or amend its quality control procedures routinely.	4.00	0.726	High
4	A lot of time and money is spent on research and development.	3.82	0.913	High
5	Our employees are constantly encouraged to take advantage of educational opportunities (conferences, seminars, etc.) to learn about the latest trends in the market and product development.	4.07	0.808	High
	Variable Average	3.93	0.807	High

The table shows that the absorptive capacity is at a high level in Bahraini companies, with an average of (3.93), which means that these companies have the ability to process the interconnected organizational capabilities that enable a company to acquire, assimilate, and produce new information. Utilizing both

internal and external knowledge, businesses develop and apply Green innovative methods.

Table (28) Descriptive Analysis for Competitive Intensity

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	Price competition is the hallmark of our industry.	3.80	0.802	High
2	In our industry, any action is taken by one competitor; others can match readily.	3.88	0.791	High
3	In our industry, almost every day, one hears of a new competitive move.	3.89	0.815	High
4	There are a lot of “promotion wars” in our industry.	3.97	0.764	High
5	Competition in our industry is cut-throat.	3.98	0.820	High
6	Competition is a critical aspect of our industry's success in the local market.	4.09	0.842	High
	Variable Average	3.94	0.805	High

The statistics in the table above show that competitive intensity is very high in Bahrain, according to an average of (3.94). This is true, especially for financial institutions in Bahrain.

Table (29) Descriptive Analysis for Green Organisational Culture

#	Statements/Variables	Mean	Standard deviation	Level of importance
1	We have a strategy that promotes natural resource conservation.	3.97	0.795	High
2	As a community, we have a sense of obligation to maintain natural resources.	4.07	0.807	High
3	Teamwork practices in our company promote the saving of resources (e.g., reducing paperwork and commuting).	4.15	0.797	High
4	My team and I disseminate information about conservation activities using natural resources.	3.93	0.807	High
5	The team structure contains a resource conservation component (e.g., through the ability to meet and work remotely).	4.00	0.798	High

6	Through informal interactions, our employees encourage one another to conserve natural resources	4.01	0.781	High
	Variable Average	4.02	0.797	High

The above table shows a high average for GOC, which means that the green culture is well-rooted in the business sector in Bahrain.

Table (30) Descriptive Analysis for Financial performance (ROA), (ROE).

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	45	-21.19	35.13	3.3184	7.81387
ROE	45	-49.96	102.23	8.6102	19.98822

The table shows that the average return on assets for the sample companies, which consisted of 45 companies, amounted to 3.32%, while the average return on equity amounted to 8.6%. The low ROA shows a weakness in the management's ability to generate profits from available resources, which may be due to Covid 19, which affected the performance of many companies in 2021. The return on equity appears relatively high, which may indicate an increase in the use of debt. The standard deviation for each of the two indicators also shows a significant increase, which means a noticeable discrepancy in the performance of companies in 2021 in the Kingdom of Bahrain.

5.7.3 Assessment of measurement model

Assessing the measurement model is divided into two parts; the first part is called Convergent Validity, and the second one is called Discriminant Validity. The first one aims to check the degree to which multiple measurements of the same concepts are in agreement. In others words, it will measure the extent to which a measure correlates positively with alternative measures of the same construct. While discriminant validity measures the degree to which items differentiate among

constructs or measure distinct by examining the correlations between the measures of potentially overlapping constructs.

5.7.3.1 Convergent Validity

As indicated in *Table (31)*, three elements are extracted to verify convergent validity: factor loading (Individual Item reliability), composite reliability, and average variance. According to the commonality test, because all the loading values in the table are more than the threshold value (0.7), there is no problem with this data. For each construct, the composite reliability indicators were more than 0.70. Additionally, we examined the average variance extracted (AVE) for every construct. The results were much greater than the 0.5 criteria proposed by Chin (2010).

Table (31) Results of Measurements Model-Convergent Validity

Construct	Items	Loading	CR	AVE
Green innovation strategy	GIS1	0.742	0.870	0.574
	GIS2	0.771		
	GIS3	0.783		
	GIS4	0.817		
	GIS5	0.763		
Green organization Identity	GOI1	0.735	0.894	0.585
	GOI2	0.794		
	GOI3	0.815		
	GOI4	0.777		
	GOI5	0.760		
	GOI6	0.702		
Environmental organizational legitimacy	EOL1	0.776	0.840	0.513
	EOL2	0.760		
	EOL3	0.796		
	EOL4	0.677		
	EOL5	0.762		

Green Creativity	GC1	0.739	0.907	0.619
	GC2	0.826		
	GC3	0.740		
	GC4	0.784		
	GC5	0.840		
	GC6	0.786		
Green Innovation	GI1	0.764	0.892	0.509
	GI2	0.746		
	GI3	0.745		
	GI4	0.717		
	GI5	0.771		
	GI6	0.754		
	GI7	0.703		
	GI8	0.697		
Managerial Concern	MC1	0.804	0.850	0.591
	MC2	0.896		
	MC3	0.710		
	MC4	0.741		
Absorptive capacity	AC1	0.707	0.835	0.508
	AC2	0.747		
	AC3	0.750		
	AC4	0.817		
	AC5	0.769		
Competitive intensity	CI1	0.725	0.790	0.505
	CI2	0.750		
	CI3	0.731		
	CI4	0.821		
	CI5	0.774		
	CI6	0.763		
Green organizational culture	GOC1	0.896	0.821	0.550
	GOC2	0.780		
	GOC3	0.728		
	GOC4	0.770		
	GOC5	0.780		
	GOC6	0.831		

The graph below shows all the external loading for all the constructs.

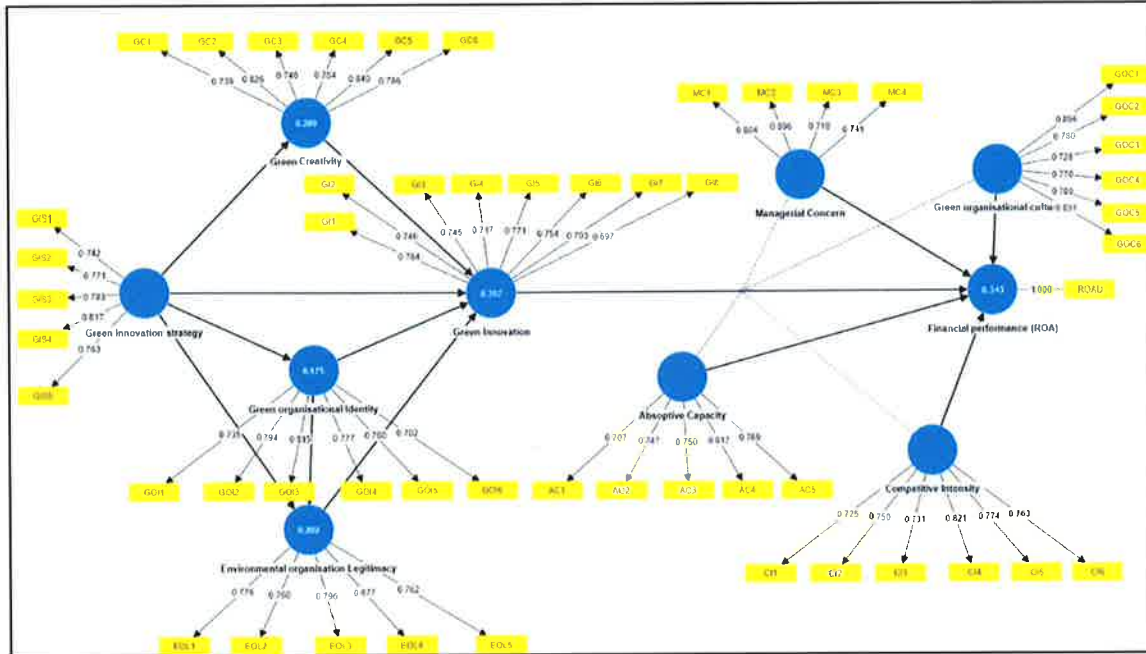


Fig (2) External loading for all the model's constructs

5.7.3.2 Discriminant Validity

Discriminant validity refers to the extent to which items distinguish between constructs or measure different concepts. This is done by looking at the correlations between measures of constructs that might overlap. To test this type of validity, Cross-loading Variable and Correlation-Root square using Fornell-Larcker criterion comparisons were conducted in *Table (32)* and *Table (33)*. *Table (32)* shows that the square root of AVE for each construct was higher than the inter-scale correlation. *Table (33)* shows that all items loaded in a higher value with the same construct than other variables. This comparison satisfies the discriminant validity suggested by Chin's (2010) criteria. In summary, these results indicate satisfactory reliability and convergent validity.

Table (32) Square root of AVE (Latent variable Correlation) according to Fornell-Larcker criterion

	AC	CI	EOL	(ROA)	GC	GI	GIS	GOI	GOC	MC
Absorptive Capacity	0.713									
Competitive Intensity	0.298	0.711								
Environmental organisation Legitimacy	0.313	0.249	0.716							
Financial performance (ROA)	0.125	0.049	0.031	1						
Green Creativity	0.371	0.317	0.407	0.094	0.787					
Green Innovation	0.374	0.318	0.500	0.026	0.367	0.713				
Green innovation strategy	0.380	0.314	0.352	0.061	0.314	0.451	0.758			
Green organisational Identity	0.335	0.233	0.401	0.098	0.254	0.358	0.418	0.765		
Green organisational culture	0.375	0.275	0.332	0.076	0.249	0.400	0.327	0.432	0.742	
Managerial Concern	0.383	0.256	0.372	0.108	0.369	0.461	0.422	0.363	0.330	0.769

Note: Bold values indicate higher factorial loads

Table (33) Discriminant Validity- Cross Loading

	Absorptive Capacity	Competitive Intensity	Environmental organisation Legitimacy	Financial performance (ROA)	Green Creativity	Green Innovation	Green innovation strategy	Green organisational Identity	Green organisational culture	Managerial Concern
AC1	0.547	0.207	0.283	0.025	0.283	0.280	0.305	0.204	0.260	0.202
AC2	0.647	0.244	0.283	0.063	0.344	0.309	0.291	0.186	0.260	0.286
AC3	0.750	0.200	0.266	0.070	0.304	0.282	0.280	0.270	0.302	0.311
AC4	0.817	0.186	0.236	0.113	0.311	0.258	0.242	0.214	0.241	0.271
AC5	0.769	0.262	0.174	0.117	0.187	0.281	0.317	0.315	0.317	0.302
CI1	0.207	0.725	0.212	0.034	0.218	0.278	0.242	0.174	0.213	0.202
CI2	0.302	0.550	0.164	-0.012	0.210	0.268	0.242	0.210	0.218	0.156
CI3	0.209	0.731	0.119	0.028	0.261	0.205	0.162	0.133	0.217	0.126
CI4	0.267	0.821	0.190	0.039	0.251	0.228	0.229	0.192	0.186	0.194
CI5	0.077	0.274	0.085	0.015	0.055	0.130	0.310	0.104	0.119	0.136
CI6	0.300	0.563	0.266	0.010	0.255	0.263	0.180	0.250	0.232	0.237
EOL1	0.122	0.195	0.676	0.008	0.256	0.343	0.230	0.323	0.282	0.211
EOL2	0.141	0.202	0.660	0.071	0.181	0.198	0.191	0.182	0.055	0.212
EOL3	0.289	0.203	0.796	0.027	0.289	0.404	0.242	0.315	0.319	0.275
EOL4	0.286	0.179	0.677	0.029	0.380	0.407	0.340	0.299	0.260	0.295
EOL5	0.240	0.123	0.762	-0.006	0.302	0.371	0.227	0.276	0.195	0.318
GC1	0.291	0.233	0.326	0.136	0.739	0.231	0.238	0.184	0.159	0.243
GC2	0.297	0.267	0.317	0.136	0.826	0.280	0.254	0.189	0.177	0.290
GC3	0.305	0.289	0.315	0.033	0.740	0.275	0.232	0.189	0.181	0.274
GC4	0.291	0.195	0.294	0.010	0.784	0.331	0.246	0.222	0.201	0.315
GC5	0.313	0.285	0.337	0.068	0.840	0.314	0.244	0.200	0.219	0.298
GC6	0.256	0.231	0.335	0.070	0.786	0.289	0.268	0.212	0.229	0.313
GI1	0.336	0.236	0.370	-0.021	0.274	0.764	0.345	0.196	0.331	0.353
GI2	0.320	0.290	0.317	0.034	0.316	0.746	0.385	0.276	0.332	0.415
GI3	0.292	0.277	0.312	0.023	0.287	0.645	0.310	0.205	0.248	0.292
GI4	0.261	0.205	0.373	-0.025	0.293	0.717	0.367	0.281	0.333	0.363
GI5	0.170	0.168	0.376	0.005	0.196	0.671	0.268	0.228	0.186	0.221
GI6	0.247	0.229	0.381	0.023	0.250	0.754	0.349	0.280	0.249	0.336

GI7	0.240	0.224	0.340	0.079	0.199	0.703	0.311	0.300	0.315	0.339
GI8	0.263	0.181	0.385	0.036	0.270	0.697	0.218	0.271	0.275	0.293
GIS1	0.253	0.209	0.201	0.024	0.138	0.190	0.642	0.257	0.184	0.192
GIS2	0.221	0.236	0.259	0.082	0.252	0.288	0.771	0.275	0.194	0.306
GIS3	0.283	0.231	0.285	0.052	0.249	0.345	0.783	0.343	0.254	0.333
GIS4	0.316	0.269	0.309	0.041	0.262	0.423	0.817	0.346	0.260	0.361
GIS5	0.353	0.243	0.264	0.034	0.261	0.404	0.763	0.346	0.324	0.365
GOC1	0.362	0.190	0.249	0.083	0.208	0.357	0.285	0.397	0.896	0.323
GOC2	0.267	0.271	0.298	0.048	0.205	0.287	0.273	0.314	0.780	0.223
GOC3	0.213	0.216	0.264	0.026	0.160	0.231	0.210	0.312	0.728	0.189
GOC4	0.243	0.216	0.279	-0.002	0.193	0.305	0.249	0.296	0.470	0.271
GOC5	0.292	0.261	0.239	-0.012	0.118	0.249	0.180	0.224	0.380	0.288
GOC6	0.309	0.281	0.302	0.034	0.207	0.375	0.247	0.310	0.631	0.292
GOI1	0.241	0.238	0.276	0.120	0.201	0.351	0.280	0.735	0.295	0.253
GOI2	0.257	0.221	0.306	0.100	0.177	0.242	0.283	0.794	0.302	0.342
GOI3	0.24	0.200	0.314	0.097	0.243	0.264	0.329	0.815	0.35	0.273
GOI4	0.267	0.140	0.284	0.022	0.181	0.248	0.313	0.777	0.341	0.277
GOI5	0.284	0.104	0.337	0.073	0.194	0.288	0.400	0.760	0.345	0.310
GOI6	0.240	0.177	0.312	0.032	0.164	0.238	0.294	0.702	0.345	0.204
MC1	0.254	0.155	0.299	0.086	0.300	0.357	0.366	0.361	0.30	0.804
MC2	0.356	0.231	0.311	0.112	0.297	0.418	0.344	0.287	0.281	0.896
MC3	0.327	0.259	0.304	0.052	0.322	0.330	0.316	0.219	0.205	0.710
MC4	0.292	0.210	0.298	0.006	0.278	0.374	0.362	0.287	0.238	0.641
ROA	0.125	0.049	0.031	1	0.094	0.02-6	0.061	0.098	0.076	0.108

Note: Bold values indicate higher factorial loads.

5.7.4 Assessment of Structural Model (Inner model)

5.7.4.1 R-squared

An important criterion for assessing the structural model in PLS-SEM is the R-squared value, also known as the coefficient of determination (Henseler and Sarstedt, 2013; Hair et al., 2011; Hair et al., 2012). The R-squared value represents the variation in the dependent variable(s) that can be explained by one or more predictor variables (Elliott & Woodward, 2007; Hair et al., 2010).

Although the acceptable level of R^2 value depends on the research context (Hair et al., 2010), Falk and Miller (1992) propose an R-squared value of 0.10 as a minimum acceptable level.

Meanwhile, Chin (1998) suggests that the R-squared values of 0.67, 0.33, and 0.19 in PLS-SEM can be considered substantial, moderate, and weak, respectively.

Table (34) shows that the predictors are substantial for GI and ROE outcomes which are considered the most important outcomes in this study, moderate for EOL and GC outcomes, and weak for GOI.

5.7.4.2 Effect Size (F^2)

Effect size indicates the relative effect of a particular exogenous latent variable on endogenous latent variable(s) by means of changes in the R-squared (Chin, 1998).

It is calculated as the increase in the R-squared of the latent variable to which the path is connected relative to the latent variable's proportion of unexplained variance (Chin, 1998). According to Cohen (1988), F^2 above 0.35 are considered a large effect size, F^2 ranging from 0.15 to 0.35 are medium effect size, F^2 between 0.02 to 0.15 considered a small effect size, and values less than 0.02 are considered with no effect size. Table (34) shows that all the predictors are with an effect size that ranges from small to medium and large, except the GOI on GI and the moderating impact of Competitive Intensity on ROA, which has no effect because the impact of those two predictors is insignificant.

5.7.4.3 Q- squared

In addition to evaluating the magnitude of the R^2 values as a criterion of predictive accuracy, researchers should also examine Stone-Geisser's Q^2 value (Geisser, 1974; Stone, 1974). This measure is an indicator of the model's out-of-sample predictive power or predictive relevance. In the structural model, Q^2 values larger than zero for a specific reflective endogenous latent variable indicate the path model's predictive relevance for a particular dependent construct. The Q^2 value in the table (34) shows that all the Q^2 values are above 0, which means that the model has predictive relevance for the endogenous construct.

Table (34) R-square, F-square and Q-square for the Model Predictors

Predictor(s)	Outcome(s)	R Square	F square	Q square
GIS	EOL	0.202	0.052	0.111
GOI			0.097	
GIS	GC	0.299	0.110	0.185
GIS	GOI	0.175	0.212	0.160
GIS	GI	0.357	0.181	0.191
GC			0.122	
GOI			0.009	
EOL			0.114	
GI	ROA	0.343	0.377	0.233
GI x MC			0.251	
GI x AC			0.167	
GI x CI			0.003	
GI x GOC			0.171	

5.7.4.4 The Goodness of Fit of the Model (GoF)

Tenenhous et al. (2005) defined GoF as the global fit measure, the geometric mean of both average variances extracted (AVE) and the average R^2 of the endogenous variables. The purpose of GoF is to account for the study model at both levels, namely the measurement and structural model, with a focus on the overall performance of the model (Henseler & Sarstedt, 2013; Chin, 2010). The calculation formula of GoF is as follows:

$$\text{GoF} = \sqrt{(R^2) \times (AVE)}$$

The criteria of GoF to determine whether GoF values are no fit, small, medium, or large, to be considered a global valid PLS model have been given by Wetzels et al. (2009). *Table (35)* below presents these criteria:

Table (35) GoF criteria

GoF less than 0.1	No fit
GoF between 0.1 to 0.25	Small
GoF between 0.25 to 0.36	Medium
GoF greater than 0.36	Large

According to *Table (35)* above and the value of the GoF (0.421), it can be concluded that the GoF model of this study is large enough to consider sufficient global PLS model validity.

5.7.5 Hypothesis Testing

Table (36) below includes all the results related to the direct relationships and moderating impacts of the Moderator variables on the relationship between GI and financial performance built within the study model. Table (36) includes H20*, which reveals the direct impact of GIS on EOL. This relationship was not hypothesised when the study model was built. Because of that, it is distinguished by a star. While table (37) includes all the mediating relationships in the Model of the study. But also includes H16*, H17*, H18*, and H19*, which are also the same as the above hypothesis, revealing mediating relationships of variables which were not hypothesised when building the study hypothesis.

Table (36) Path Coefficient of Research Hypotheses

Hypo	Relationship	Std. Beta	Std. Error	T- Value	P- value	Decision
H5	Environmental organisation Legitimacy -> Green Innovation	0.319	0.047	6.816	0.000	Supported**
H9	Green Creativity -> Green Innovation	0.133	0.059	2.27	0.023	Supported*

H11	Green Innovation -> Financial performance (ROA)	0.18	0.067	2.183	0.037	Supported*
H20*	Green innovation strategy -> Environmental organisation Legitimacy	0.224	0.055	4.101	0.000	Supported**
H8	Green innovation strategy -> Green Creativity	0.314	0.061	5.131	0.000	Supported**
H1	Green innovation strategy -> Green Innovation	0.26	0.055	4.767	0.000	Supported**
H2	Green innovation strategy -> Green organisational Identity	0.418	0.069	6.101	0.000	Supported**
H4	Green organisational Identity -> Environmental organisation Legitimacy	0.307	0.057	5.341	0.000	Supported**
H3	Green organisational Identity -> Green Innovation	0.087	0.053	1.636	0.102	Not Supported
H12	Managerial Concern x Green Innovation -> Financial performance (ROA)	0.055	0.058	2.944	0.045	Supported*
H14	Competitive Intensity x Green Innovation -> Financial performance (ROA)	-0.074	0.068	1.081	0.280	Not Supported
H15	Green organisational culture x Green Innovation -> Financial performance (ROA)	0.03	0.065	2.461	0.005	Supported**
H13	Absorptive Capacity x Green Innovation -> Financial performance (ROA)	0.035	0.054	2.645	0.019	Supported*

* Supported with 5% significant level.

** Supported with 1% significant level.

H1: *Green innovation strategy in Bahraini firms has a positive impact on green innovation.* According to the table above, GIS in Bahraini firms positively affects GI ($\beta=0.26$, $p<0.01$) is supported. This result suggests that the green innovation strategy, which is a type of strategy that a firm has carried out to implement GI over the long term to meet the needs of the market and the environmental concerns of their stakeholders and to decrease the environmental effect of their operation and

service events should be adopted as the initial step to improve green innovation performance, which is also crucial for competitive advantage. The researcher anticipated this outcome. A strategy that incorporates green innovations into its long-term plans, values, and objectives so that green innovation becomes an integral part of the company's operational processes would surely enhance the performance of environmental innovations inside the business.

H2: *Green innovation strategy in Bahraini firms positively impacts green organisational identity.* According to the table above, GIS in Bahraini firms positively affects GOI ($\beta=0.418$, $p<0.01$) is supported. So, it can be concluded that adopting a GIS in the Bahraini firms will create a green organizational identity. This result means that when the company develops a green innovation strategy to protect the environment, it must implement it, which constitutes its environmental awareness. This strategy will push the management at all levels, upper, middle, and lower, to direct the behaviour of its employees towards working continuously to mitigate the negative effects of manufacturing operations on the environment. This behaviour will undoubtedly enhance its green organizational identity.

H3: *Green organisational identity in Bahraini firms positively impacts green innovation.* **H6:** *Green organisational identity in Bahraini firms mediates the relationship between GIS and GI.* According to the table above, no statistical evidence exists that GOI in Bahraini firms positively affects GI ($\beta=0.087$, $p>0.05$), so H3 is not supported. Also, according to the results of H6, the mediation impact of GOI between GIS and GI couldn't be proved ($\beta=0.036$, $p>0.05$). However, when studying the specific indirect effects, we found that GOI and EOL work as mediators in the relationship between GIS and GI. Both variables to have an impact on the indirect relationship should always be together.

H4: *Green organisational identity of Bahraini firms positively affects environmental organisational legitimacy.* The results in the above table show a significant relationship between GOI and EOL in Bahraini firms ($\beta=0.307$, $p<0.01$). It can be concluded that because interdependence between the organization and its stakeholders is crucial not only for the organization's existence but also for its legitimacy, enterprises that represent a green organizational identity and implement environmental management and protection in all facets of their operations may readily gain environmental organizational legitimacy. Firms' reputations are indirectly tied to their validity. Thus, businesses that acquire environmental organisational legitimacy will get a favourable reputation for social responsibility.

H5: *Environmental organisational legitimacy in Bahraini firms positively impacts green innovation.* The results in the above table show a significant relationship between EOL and GI in Bahraini firms ($\beta=0.319$, $p<0.01$). The findings suggest that managers must assess the roles of green organisational identity and environmental organizational legitimacy within their organisations. In an era of environmental consciousness, managers must first design a strategy for green innovation. However, managers must also recognise that the existence of a strategy alone is inadequate to directly improve green innovation performance. Managers must investigate methods for creating a robust green company identity and use this identity to acquire environmental legitimacy from stakeholders. Organizational legitimacy can help firms to achieve congruence between firm activities and society's expectations. Social legitimacy is positively associated with business results. The higher the legitimacy a firm has from stakeholders, the greater the firm can enjoy access to resources and support from those internal and external stakeholders so that the firm can make better green innovations. The result is consistent with Bansal and Clelland (2004), who demonstrated that environmental legitimacy might have a favourable

impact on a company's stock price and appraisal of unsystematic risk. Better access to resources enables legitimate businesses to compete more successfully and enjoy advantageous circumstances with exchange partners (Oliver, 1991). If a company's stakeholders are not adequately legitimized, customers may alter their consumption, shareholders may sell their shares, and workers and suppliers may withhold their allegiance.

H8: Green innovation strategy in Bahraini firms positively affects Green Creativity.

The results in the above table show a significant relationship between GIS and GC in Bahraini firms ($\beta=0.314$, $p<0.01$). GIS activities can maximise employees' potential for green processes and product creation through organisations that respect and leverage the potential of their human talent. A GIS enables a business to address environmental pressure in order to foster an appropriate environment for environmental innovation. Thus, companies should develop proactive green innovation rather in order to enhance their green creativity and increase product development performance. A GIS enables a business to address environmental pressure in order to foster an atmosphere conducive to environmental innovation.

H9: Green Creativity in Bahraini businesses positively affects Green Innovation.

The results in the above table show a significant relationship between GC and GI in Bahraini firms ($\beta=0.133$, $p<0.05$). This implies that when companies develop creative and valued green ideas, a mechanism to accelerate green innovation is promoted. A novel green idea or concept may effectively affect the performance of the creation of new green products. Therefore, fostering green creativity in businesses is important.

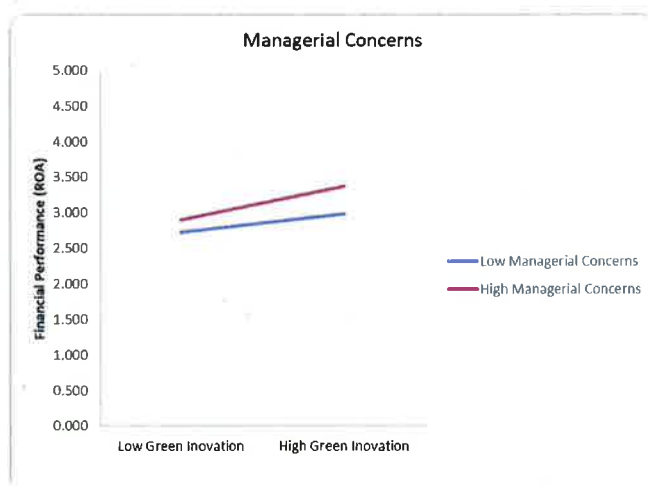
H10: Green Creativity in Bahraini firms mediates the relationship between GIS and GI.

The results in the below table (37) show a significant mediation of GC between GIS and GI in Bahraini firms ($\beta=0.042$, $p<0.05$). Which indicates the critical role of

green creativity when companies pursue green innovation development performance.

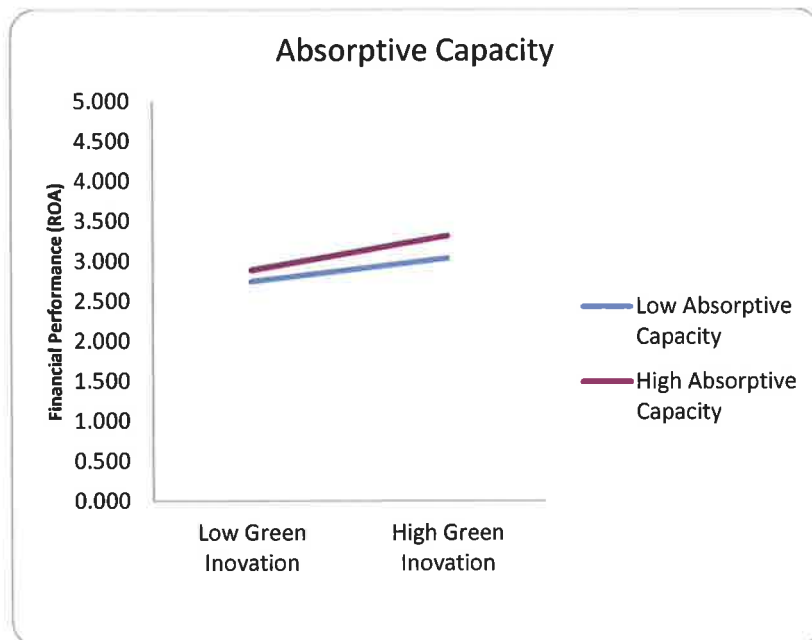
H11: *Green innovation in Bahraini firms affects financial performance.* The results in the above table show a significant relationship between GI and Financial Performance in Bahraini firms ($\beta=0.18$, $p<0.05$). This conclusion is similar to the findings of Lakovou et al. (2016), who found that 75% of American businesses believed that recognizing green process innovations boosted their economic performance. Green process innovations allow companies to employ green raw resources, eliminate waste, minimize carbon emissions, and enhance sustainable practices. The adoption of green process innovation reduces manufacturing costs by using fewer company resources, such as energy usage, which improves the business's financial performance.

H12: *Managerial concerns in Bahraini firms moderate the relationship between green innovation and financial performance.* The results in the above table show a significant moderating effect for managerial concerns on the relationship between GI and financial performance ($\beta=0.055$, $p<0.05$). After proving the moderating impact of Managerial concerns, we must determine if this moderating impact is positive or negative, i.e., whether it strengthens or weakens the link.



The graph shows that managerial concerns strengthen the positive relationship between Green Innovation and financial performance, as with high managerial concerns, the relationship is stronger.

H13: *Absorptive capacity in Bahraini firms moderates the relationship between green innovation and financial performance.* The result in the table above shows that the moderating impact of absorptive capacity is significant ($\beta=0.035$, $p<0.05$). Acquiring, integrating, transforming, and using environmental knowledge, which includes both focusing on creating and assimilating external environmental knowledge and the company's ability to digest environmental knowledge internally. These two dynamics contribute to the company's capacity to discover and utilize new environmental knowledge, which in turn increases the performance of GI. The findings demonstrate that absorptive capacity positively influences the relationship between green innovation and business success. Indeed, the capacity of a corporation to acquire and utilize external knowledge (absorptive capacity) is crucial to its development and sustainability. As external sources produce new information and ideas via research and development (R&D) operations, enterprises may increase their internal knowledge and technology stock to reduce the costs involved with implementing and maintaining green innovation. Consequently, businesses with robust absorptive capacity have the potential to gain greatly from green innovation initiatives. These results are consistent with those of past research (Zahra and George, 2003; Leal-Rodriguez et al., 2014).

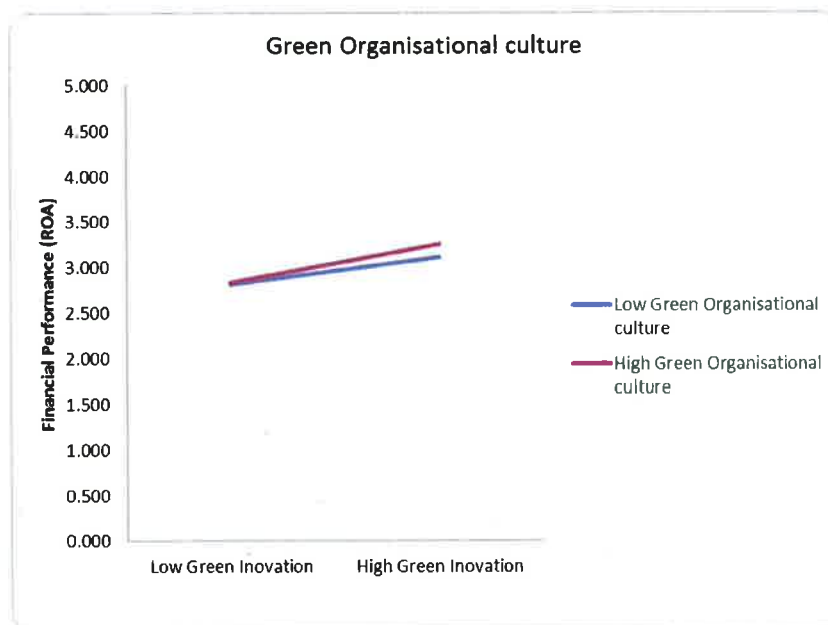


The graph shows that absorptive capacity strengthens the positive relationship between green innovation and financial performance, as with high absorptive capacity, the relationship is stronger.

H14: *Competitive intensity within Bahraini firms moderates the relationship between green innovation and financial performance.* According to the results above, there is no significant moderation impact on the relationship between GI and financial performance ($\beta = -0.074$, $p > 0.05$), so there is no evidence that CI enhance or weakens the relationship between GI and financial performance.

H15: *Green organisational culture within Bahraini firms moderates the relationships between green innovation and financial performance.* According to the results above, there is a significant moderation impact of GOC on the relationship between GI and financial performance ($\beta = 0.03$, $p < 0.01$). It can be concluded that when Bahraini firms face environmental pressure, the managers will choose to achieve the optimal level of green performance, even if it reduces profits. When firms without a green culture have limited resources to spend on their green strategy,

senior management may allocate those funds to more basic organizational concerns instead of environmental rules. Nonetheless, these resources are required for environmental action. Consequently, a Bahraini company favours the second purpose. In contrast, when enterprises with GOC encounter environmental pressure to produce and publish green performance, GOC is a primary driver of green performance.



The graph shows that a green organisational culture strengthens the positive relationship between green innovation and financial performance, as with high green organisational culture, the relationship is stronger.

H*20: the table shows a significant direct impact of GIS on EOL with a ($\beta=0.224$, $P<0.01$) the better the GIS the more EOL the company will get.

Table (37) Hypothesis Testing For the mediator's effect:

Hypo	Relationship	Std. Beta	Std. Error	T-Value	P-value	Decision
H16*	Green innovation strategy -> Green organisational Identity -> Environmental organisation Legitimacy	0.128	0.035	3.632	0.000	Supported**
H17*	Green innovation strategy -> Green Innovation -> Financial performance (ROA)	0.021	0.018	3.129	0.019	Supported*
H18*	Green organisational Identity -> Environmental organisation Legitimacy -> Green Innovation	0.098	0.024	4.157	0.000	Supported**
H19*	Green innovation strategy -> Green organisational Identity -> Environmental organisation Legitimacy -> Green Innovation	0.041	0.013	3.084	0.002	Supported**
H7	Green innovation strategy -> Environmental organisation Legitimacy -> Green Innovation	0.072	0.02	3.648	0.000	Supported**
H6	Green innovation strategy -> Green organisational Identity -> Green Innovation	0.036	0.024	1.495	0.135	Not Supported
H10	Green innovation strategy -> Green Creativity -> Green Innovation	0.042	0.021	1.968	0.049	Supported*

H16*, H17*, H18*, and H19* are hypothesized relationships found when testing the study hypothesis; it was not part of the original hypothesis that the study tried to test. The Smart PLS 4 showed all the mediators' impacts, even those that were not under test by the study.

H7: Environmental Organisational legitimacy in Bahraini Firms mediates the relationship between GIS and GI. EOL in this study is the degree of congruence between the organization's activities, standards, beliefs, values and stakeholders' expectations regarding the environmental issues associated with them. The study found that the environmental organisational legitimacy transfers the impact of the GIS to the performance of green innovations. Therefore, it has a mediating effect, as the ($\beta = 0.072$ and $p < 0.01$). Thus, corporate managers in Bahrain must understand

that green innovation will perform better with stronger legitimacy as these innovations will gain support from the community.

H16*: The table shows a ($\beta = 0.128$ and $p < 0.01$), which indicates a mediating impact of Green organisational Identity on the relationship between GIS and ELO. This indicates that a Green organizational identity integrates diverse talents and areas of knowledge to promote innovation that prioritizes waste reduction, pollution avoidance, and the adoption of a green management system which will extract environmental legitimacy from stakeholders. Green organizational identity promotes enterprises' management to adopt new green technologies required by the market and green consumers.

H17*: The table shows a ($\beta = 0.021$ and $p < 0.05$), which means that GI mediates the relationship between GIS and financial performance. There is an indirect relationship between GIS and financial performance. It can be concluded that paying attention to an environmental innovation strategy can contribute to stimulating financial performance through the green innovations that this strategy produces.

H18*: The table also shows a significant mediation impact of EOL between GOI and GI, as ($\beta = 0.098$ and $p < 0.01$), which means that through EOL, the identity will have an impact on green innovations.

H19*: This relationship shows that both GOI and EOL together mediate the relationship between GIS and GI. As ($\beta = 0.041$ and $p < 0.01$).

Fig (3) and Fig (4) are showing all the p values for all the relationships between all the constructs in the Model for both ROE and ROA.

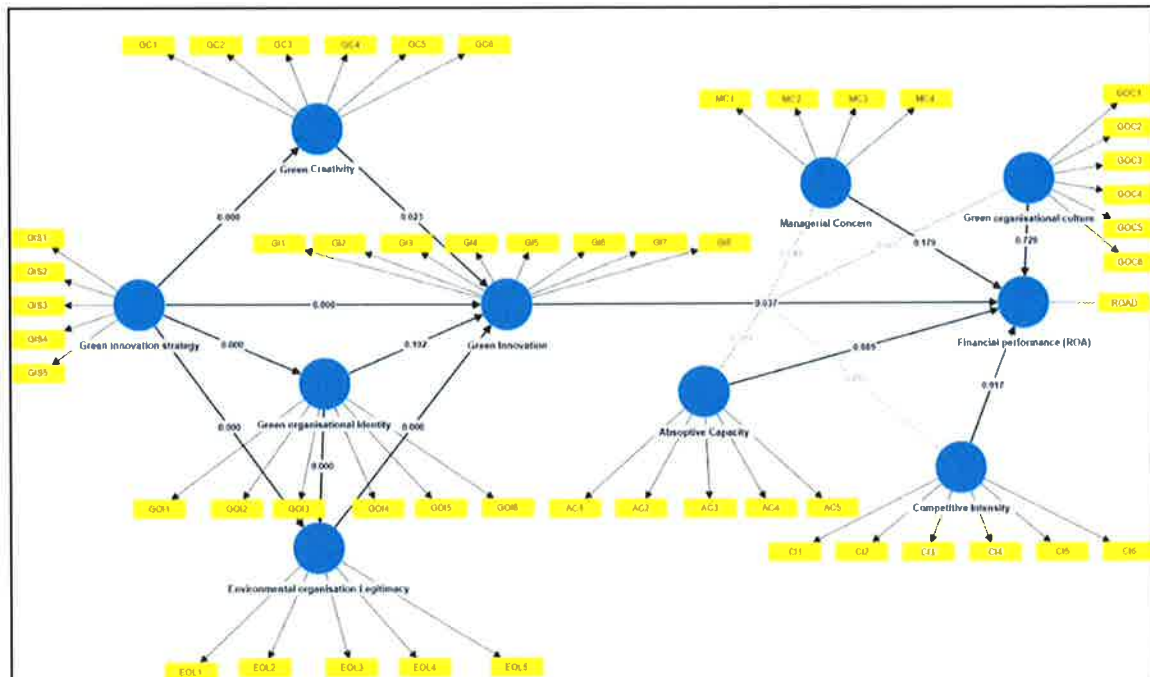


Fig (3) The model using ROA as the dependent variable.

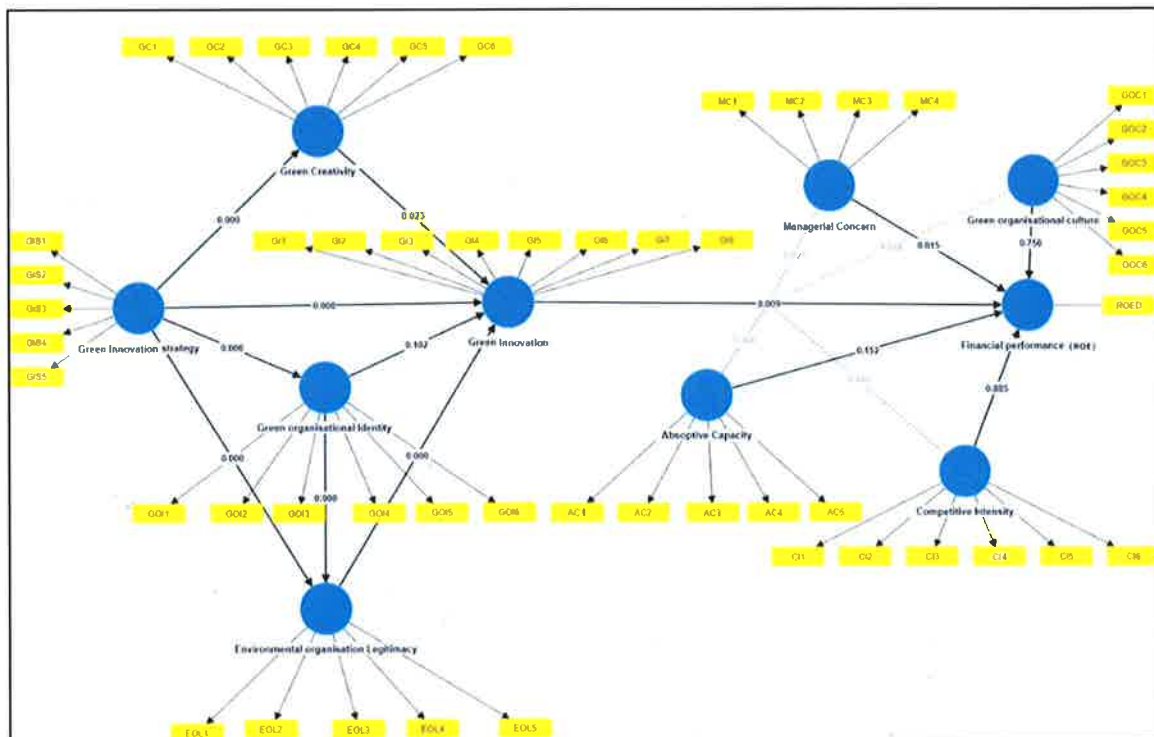


Fig (4) The model using ROE as the dependent variable.

As the figures show, changing the dependent variable from ROA to ROE has no effect on the results of the first part and no effect on the hypothesis testing regarding the second part. Fig (3) only shows a more robust impact of the direct relationship between GI and ROE and more robust moderator impacts of Managerial concern, absorptive capacity, and green organizational culture.

Chapter six

Conclusions and Recommendations

Chapter six:

Conclusions and Recommendations

In this chapter, the key findings are summarised and presented, in addition to key recommendations to practitioners or managers. Recommendations were titled contributions to practice. This chapter also includes study limitations and recommendations for future studies.

6.1 Conclusions

The concerns about green issues are growing worldwide, which led organisations to adopt green technologies and tools, which we call in this study green innovations to keep improving their green abilities toward protecting the surrounding environment, waste minimisation and energy consumption reduction. In this research, we have tried to define the determinants of green innovation within the Bahraini context. We tested the green innovation strategy as a significant determinant and examined the role of green identity, green legitimacy, and green creativity in determining the performance of green innovation. To explain this relationship, we tested the mediating effects of green identity, environmental legitimacy, and green creativity. It is time for businesses in the Kingdom of Bahrain to pay attention to variables such as green identity and green legitimacy because, sooner or later, they will impact their profitability.

No one can deny the relentless efforts made by the Government of Bahrain to protect the environment through the National Environment Strategy of 2006, which was founded on the following principles: improving the current state of the environment, taking precautionary measures to prevent environmental deterioration, fining polluters or those who cause environmental damage, and participating with the private sector. The strategy called for the implementation of the environmental

policy by introducing sound environmental management and its principles in integrated management, the adoption of mechanisms for the valuation of environmental resources in various activities, and an indication of the cost of degradation and the cost of environment rehabilitation as a result. And if environmental degradation has a cost, then there is no doubt that environmental innovations have a revenue, which means that the green innovation adopted by the company has positive repercussions on revenues.

The direct positive relationship between green innovation and corporate profitability, which has been proven in some Bahrain-related literature (Al-Sartawi et al., 2020; Al-Mesaiadeen et al., 2021) and in this study also, is a relationship that would have a significant impact on protecting the environment and preserving resources. Establishing this relationship creates self-motivation for the company's management to adopt green innovation initiatives, which may range from saving in the use of paper to designing filters that reduce greenhouse gas emissions. Self-motivated management motivated the researcher to search for variables supporting this relationship and improve it. Accordingly, the influence of managerial concerns, absorptive capacity, competitive intensity, and green culture were tested as modified variables on this relationship.

The study concluded within the Bahraini context that the strategy of green innovation, green creativity, and green legitimacy are among the determinants of green innovation performance. The relationship between them is positive, while the study could not prove the effect of green identity on green innovation. The study also found that the impact of the green innovation strategy is transmitted to the performance of green innovation through environmental legitimacy and green creativity. That is, a long-term green strategy creates environmental legitimacy for stakeholders and stimulates green creativity among employees. The study could not

show statistical evidence that the impact of green strategy is transmitted through the green identity of the firms in the Kingdom of Bahrain. However, the study found an effect of green identity through its impact on environmental legitimacy. It seems that green identity and environmental legitimacy work together in influencing green innovation, as shown by hypothesis number (19), which assumes that green identity and environmental legitimacy simultaneously mediate between green strategy and green innovation.

The researcher tried to explain the lack of influence of the environmental identity on green innovation and the absence of a mediating effect between green innovation strategy and green innovation, which contradicts the theoretical interpretation of the impact of this variable. Can we explain the nonexistence of impact from a lack of managers' and supervisors' conviction in the concept of the green identity of their organisation? The present study indicates a high level of green organisational identity in the Bahraini business sector under investigation. This result is clear from the increased total average of the green identity construct. This result is consistent with previous research (Chang & Chen, 2013; Chen, 2011), which indicated that organisational members under study have high levels of green organisational identity. It is evident from the study results of the descriptive statistics that managers and supervisors have detailed knowledge about their company's history concerning environmental traditions, cultures, management, and protection, which gives them a sense of pride. Moreover, managers and supervisors perceived their company to pay great attention to environmental management and protection initiatives, and well-developed environmental goals and missions articulated this. So why do these attributes of Bahraini organisational identity have no impact on green innovation?

It seems that managers in Bahrain do not attach much importance to the social and cultural identity of the organisation's members for green development and that they do not work to establish shared epistemological beliefs about protecting the environment to deal with complex environmental challenges. It also seems that the Bahraini society and its institutions have not yet succeeded in creating a green atmosphere. There are shortcomings by the institutions' managers in collecting the latest green knowledge. They are unsuccessful in forming a green interpretation method in which the link between organisational identity and green innovation is documented through the establishment and improvement of green knowledge and the provision of a mechanism for the institution's employees to provide expertise and technical guarantees for innovation and development of green products. The researcher acknowledges that this interpretation needs further testing and investigation.

In the second main part of the study, we found that management concern, absorptive capacity, and green culture improve the relationship between green innovation and financial performance represented by return on assets and equity. The results indicate that MC positively affected the link between GI and financial performance, suggesting that the top manager's management was essential in promoting GI and enhancing performance. The finding indicates that GI can enhance the firm's financial performance, particularly when the firm's top managers tend to be concerned about environmental issues. This result reveals that top managers' attitudes and behaviours toward environmental management are critical to the firm's effectiveness in adopting green practices, which promote their human capital to resolve environmental issues and contribute to green innovation. Thus, to improve green innovation, top managers should support green practices and determine which practices are the worthiest investments. In addition, top managers should effectively

communicate their environmental policies and goals to their employees to help them better comprehend their firm's efforts for green innovation.

The results also indicate the positive impact of absorptive capacity on the link between GI and financial performance. This indicates that the acquisition, processing, and assimilation of information into organisational knowledge, this learning capability which is described as absorptive capacity is an important prerequisite for adopting GI practices and for the GI to have a better impact on financial performance. The result supports the idea that education and training are necessary to realise the environmental initiatives within the firm, particularly on the administrative side. In other words, firms will likely implement green administration if environmental awareness exists among the employees that could be cultivated through education and training.

The study found that GOC increases the impact of GI on financial performance. We believe that GOC is stemmed from the General Culture of society. Also, we believe environmental culture is not yet well established in Bahrain. A green Bahraini consumer who puts the environment as part of his priority is not found yet in Bahrain. A consumer ready to sacrifice his interest for the environment's sake can't be found yet in Bahrain.

Although GOC can be built by the organisation, we feel that the general culture within the society impacts it. The study found a direct impact between GI and financial performance within this context. It also found a positive moderating impact of GOC on the relationship between GI and Financial performance. The employees within the company go beyond profit incentives to increase GI performance, influencing the organisation's financial performance. When employees share environmental ideals, attitudes, and behaviours, a green culture emerges, promoting environmental awareness.

Green recruiting, incentives, performance development, and training achieve this. If a company has a green culture, management may encourage workers to learn about environmental issues. They work together to solve environmental challenges and develop green culture. An employee-centred green culture encourages green behaviours that boost GI performance and employee satisfaction. Green culture links green innovation and performance. If pro-environmental incentive and promotion mechanisms were in place, workers would adopt green beliefs, attitudes, and behaviours to progress their careers. Effective pro-environmental leadership, credibility, peer engagement, and employee empowerment promote green culture, which drives GI performance and affects financial performance.

For CI, the study didn't find a significant impact of CI on the link between GI and financial performance. It looks like the intensity of competition in Bahrain is very low; most of the firms in Bahrain lack tough competitors except only for banks. It looks like management is not assessing the level of competitive intensity to decide how much they need to invest in GI, as no pressure from competition exists. Despite combativeness in the banking sector, it looks like GI is not a determinant factor for Bahrainis when they want to choose their bank.

6.2 Contribution to Practice

Our findings suggest that managers can verify whether their firm's green innovation strategy contributes to green innovation by observing their firm's EOL and GC. Our results indicate that even if the green organisational identity does not directly affect green innovation or the link between GIS and GI, GOI can still significantly affect green innovation indirectly through the EOL. Thus, managers should pay more attention to their green innovation strategy and take the most appropriate approaches to cultivate environmental legitimacy and green creativity.

This factor can enhance the organisation's performance in terms of green innovation and thereby meet the requirements and regulations for environmental protection.

The outcomes of this research provide further evidence for the hypothesis that green creativity mediates the connection between green innovation strategy and green innovation. Therefore, company executives should evaluate their selection and promotion criteria for environmental managers. If businesses wish to increase their environmental performance and level of innovation, they must choose managers who are passionate about environmental concerns (Eiadat et al., 2008). These managers can successfully implement their company's environmental policy and green innovation plan; however, if these managers get no support or encouragement from the organisation and have no role in putting their worries into action. In such a scenario, companies are unlikely to aggressively enhance their green innovation approach. When an organisation adopts a green innovation strategy, this approach may increase the green consciousness inside the organisation. Staff members can collaborate more effectively to provide unique ideas for eco-friendly procedures or goods. When such concepts are applied, a company may increase its capacity for green innovation, enhancing its green performance (Pipatprapa et al., 2017).

As the research findings show that green creativity may boost green innovation, managers should pay more attention to fresh ideas for greener processes or products. In this manner, businesses can generate and apply new ideas to improve green innovation. Thus, fostering innovative and beneficial concepts for green goods assists businesses in gaining a competitive advantage.

This finding indicates that the attitudes and actions of senior managers toward environmental management are crucial to a company's success in implementing green HR practices, which boosts their human resources to address environmental concerns and contribute to green innovation. To enhance green innovation, senior

managers must promote green HR practices and identify which activities most deserve investment. In addition, upper-level managers should adequately explain their environmental policies and objectives to their staff so that they may better appreciate the company's efforts for green innovation.

This study identified the significance of absorptive capacity on GI, indicating that organisations, represented by their managers and knowledge workers, must pay close attention to the firm's absorptive capacity and different knowledge sources, as well as how knowledge capabilities should be enhanced and managed to provide a competitive advantage. Managers should recognise the obstacles preventing personnel from assimilation, transforming, and exploiting their knowledge and work to remove them.

Supporting green practices in the workplace is an essential part of organisation management, considering the rising significance of environmentally conscious employee conduct. The organisational culture may be necessary for enhancing workers' eco-friendly work practices. By demonstrating that matching the different components of organisational culture leads to the effective implementation of the GI, this research has substantial practical consequences. In addition, it emphasises the importance of workers' intrinsic motivation in green workplace initiatives. The conservation of energy and natural resources is a significant problem for contemporary organisations. This study gives essential recommendations for adopting environmental measures in businesses by emphasising real examples. This may be achieved through developing a green workplace and increasing staff understanding of the significance of environmental concerns. Companies should also have a solid commitment to the preservation of natural resources. In addition, by conducting internal campaigns to create a green mentality, organisations may

nurture the inner motivation of their workers to engage in green activities and maintain GI.

6.3 Limitations

This study has several limitations. First, it relies on a cross-sectional survey, which makes it hard to establish a causal relationship between the factors under consideration. We recommend that future studies use a longitudinal research design to determine how green innovation strategy, green organisational identity, environmental organisational legitimacy, green creativity, and green innovation affect each other at different stages of their development in various industries.

Second, all the studied variables emerge from the same survey instrument, so common method variance is a potential problem. The researcher separated the independent and dependent variables psychologically so that respondents may not perceive the measurement of the independent variable to be related to the dependent variable, which will reduce this issue and is unlikely to be serious. For future studies, the researcher recommends collecting data from different information sources for the independent and dependent measures, especially if the dependent variable will be measured by statements rather than secondary data. This approach can reduce the possibility of common method variance.

Third, the study cannot be generalised to cover entire emerging economies. Our findings stem from a Bahraini context only. Therefore, the positive impacts of green innovation on firm performance dimensions, as well as the positive moderating effect of MC, AC, CI, and GOC on green innovation and firm performance dimensions, may be more specific to this region. The researcher encourages future empirical research to examine the above variables in emerging and developed economies.

Fourth, a limitation of GOC research is the distinction between the origins of organisational culture and employee attitude culture. In other words, the issue is whether the group or the person is the unit of analysis. Our survey was sent to people. Since GOC was established at the organisational level, individual employee behaviour may diverge from the broader organisational culture, thereby restricting the interpretability of this research. However, management literature demonstrates that organisational culture is a sum of individual employee behaviours. Hence the researcher argues that individual behaviours might serve as proxies for organisational culture. Previous research has repeatedly shown that employee conduct is the optimal method for assessing corporate culture (Wilson and Howarth, 2002; Hu et al., 2012).

6.4 Future Research

One of the main factors that motivated the researcher to start this attempt is to create a base for future research in Green Innovation in Bahrain. This topic is less prevalent in the literature in Bahrain. The study model can be used in parts so that each variable or group of variables is dealt with independently in separate research, provided that the analysis is more detailed. For example, absorptive capacity can be studied by dividing it into three dimensions existing knowledge utilisation, knowledge building and external knowledge acquisition.

This study explored how green innovation strategy affects green innovation through GOI, EOL, and GC mechanisms. This study didn't consider other factors, such as leadership and human resource management. Therefore, future studies could use a longitudinal research design to investigate how the interactions between leadership, human resource management and green innovation strategy affect green innovation at the different stages, which may find different results.

Overall, our study indicates that green innovation strategy is positively related to EOL and GC, which enhances green innovation but failed to prove the impact for GOI. These findings improve our understanding of how firms can enhance green organisational innovation. The researcher hopes this study encourages other researchers to conduct similar studies in other countries to determine if our findings apply outside Bahrain.

In terms of moderators affecting the relationship between GI and financial performance, new moderator variables can be tested, like green social capital, customers' tacit green needs, and HR practices or other economic factors which could also affect firms' green innovation.

In this study, empirical data are taken from several industries in Bahrain. Even if the study findings are generalisable regarding green innovation, each industry survey has specific characteristics. Thus, further research can helpfully focus on particular industries, such as manufacturing. In addition, the cultural aspects of the sample may limit the generalizability of our findings. The researcher suggests that researchers conduct a similar investigation in a western cultural context to determine the applicability of our results.

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Appendices
Appendix (1)
Questionnaire form

Dear Sir/Madam,

The goal of this letter is to ask for your assistance in collecting the data for my doctoral research, which is now underway. I am presently pursuing a PhD in Sustainable Development at the University of Bahrain.

My dissertation topic is ***Green Innovation's Antecedents and its impact on firm's financial performance: the case of Bahrain.*** The target is to recognise the antecedents of Green Innovation and to show evidence on the relationship between Green Innovation and financial performance.

The enclosed survey is divided into five parts:

1. General Questions (Demographical Data).
2. Green Innovation Strategy.
3. Green Innovation Mediators (Organisational legitimacy, green organisational identity, and Green Creativity).
4. Green Innovation.
5. Green Innovation Moderators (Managerial Concerns, Absorptive Capacity, Competitive Intensity and Green Culture).

Because we cannot utilise incomplete surveys in our data analysis, I would appreciate it if you could fill out the entire form. Please answer each question according to what you practice in your workplace, not how you think it should be. I'm more interested in the aggregated data from groups rather than in the specific responses from individuals. Studying the link between Green Innovation and financial performance can help increase our knowledge.

The University of Bahrain's Deanship of Graduate Studies and Scientific Research has approved this survey. Participation in this study is entirely risk-free. To protect your privacy, the poll does not ask for your name or any other personal information. You are welcome to participate in the survey, but it is entirely voluntary. Please call me at 39466649 if you have any questions about this study.

Thank you for participating.

Sincerely yours,

Jaafar M Hewaishel Almesaiadeen

Candidate for Doctorate in Environment and Sustainable Development

College of Science – University of Bahrain

Part 1: Demographic Data

Please fill out the following information about your characteristics. Confidentiality is guaranteed for all responses to this survey.

1 What is your gender?

Male ☐

Female ☐

2 What is the level of your educational achievement?

Lower than Bachelor Degree ☐

Bachelor Degree ☐

Master's Degree ☐

Doctoral Degree ☐

3 What is your age?

20-30 years ☐

31-40 years ☐

41-50 years ☐

51-60 years ☐

More than 60 years ☐

4 Length of service with the Company?

0-4 years ☐

4-8 years ☐

8-12 years ☐

12-16 years ☐

Over 16 years ☐

5 Length of time in your current position?

0-4 years ☐

4-8 years ☐

8-12 years ☐

12-16 years ☐

Over 16 years ☐

6 Your current company is a:

Financial Company ☐

Non-Financial
Company ☐

7 Nationality? Bahraini ☐

Non-Bahraini ☐

8 Please include your job title?

Manager ☐

Supervisor ☐

Environmental
Specialist ☐

Part 2: Green Innovation Strategy

The following is a list of Green Innovation Strategy-related statements about your company. A number from 1 to 5 indicates how strongly you agree or disagree with the following assertions. Please indicate your level of agreement or disagreement by circling the appropriate number. If you are unable to answer a particular question, mark it with "I don't know" or skip it. (Green Innovation Strategy is the strategy established by Bahraini businesses to promote the use of green innovation activities in products and processes and reflected in their core values)

#	Green Innovation Strategy	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	The procurement approach emphasises the elimination of non-recyclable products.	1	2	3	4	5
2	Management pursues a green innovation strategy that includes modifying corporate processes to minimise their impact on humans, animal species, and the environment.	1	2	3	4	5
3	Our firm engages in various voluntary initiatives aimed at rehabilitating the environment.	1	2	3	4	5
4	Business procedures are modified to mitigate the product's environmental impact.	1	2	3	4	5
5	There is constant adjusting in business processes to lower its energy consumption.	1	2	3	4	5

Part 3 Green Innovation mediators

#	Green Innovation Identity	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	Managers and employees are proud of their environmental management and preservation history.	1	2	3	4	5
2	Our firm takes pride in its environmental objectives.	1	2	3	4	5
3	Our company has established a clear environmental mission.	1	2	3	4	5
4	The company possesses a sufficient understanding of its environmental history and culture.	1	2	3	4	5
5	We have a high adherence to sound environmental management and preservation practices.	1	2	3	4	5
6	We are committed to environmental management and conservation.	1	2	3	4	5

#	Environmental, organisational legitimacy	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	In terms of environmental management and protection the company operates safely.	1	2	3	4	5
2	In terms of environmental management and protection the company operates legally	1	2	3	4	5
3	The company demonstrates credibility in terms of environmental management and protection.	1	2	3	4	5

4	Our company is a role model of environmental management and conservation.	1	2	3	4	5
5	From an environmental management and protection standpoint, our company should be permitted to continue operating.	1	2	3	4	5

#	Green Creativity	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	The employees constantly come up with innovative strategies to achieve environmental protection objectives.	1	2	3	4	5
2	To improve environmental performance, our employees are constantly coming up with new green solutions.	1	2	3	4	5
3	Several employees in our company have taken the initiative to spread the word about new green initiatives.	1	2	3	4	5
4	Our employees design detailed plans for implementing cutting-edge green initiatives.	1	2	3	4	5
5	Our employees would thoroughly test new green initiatives.	1	2	3	4	5
6	Our employees would come up with innovative solutions to environmental issues.	1	2	3	4	5

Part 4: Green innovation

The following is a list of Green Innovation-related statements about your company. A number from 1 to 5 indicates how strongly you agree or disagree with the following assertions. Please indicate your level of agreement or disagreement by circling the appropriate number. If you are unable to answer a particular question, mark it with "I don't know" or skip it. (Green Innovation is Methods, techniques and procedures used by Bahraini firms that contribute to reducing the harmful effects of production processes and products on the environment to ensure the sustainability of the environment and its resources in the interest of current and future generations).

#	Green innovation	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	We develop and design products using the least polluting materials possible.	1	2	3	4	5
2	We develop and design products using the least energy and resources consuming materials.	1	2	3	4	5
3	We develop and design products with the least materials.	1	2	3	4	5
4	The company carefully assesses whether its products are recyclable, reusable, and biodegradable before completing product development and design.	1	2	3	4	5
5	Our manufacturing processes efficiently reduce hazardous material or waste emissions.	1	2	3	4	5
6	Our manufacturing processes efficiently recycle wastes and emissions that may be processed and used.	1	2	3	4	5
7	Our manufacturing processes effectively conserve water, and energy	1	2	3	4	5
8	Our manufacturing processes significantly minimise-their reliance on raw materials.	1	2	3	4	5

Part 5 Green Innovation-Financial performance Moderators

Following is a list of remarks about the role of moderators in the Green Innovation-Finance interaction. A number from 1 to 5 indicates how strongly you agree or disagree with the following assertions. Please indicate your level of agreement or disagreement by circling the suitable number. To suggest that you don't know the answer to a question, you can either mark it as "I don't know" or skip it.

#	Managerial Concerns	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	Environmental innovation is a critical component of our company's strategy for environmental management.	1	2	3	4	5
2	In our company, the majority of environmental advancements are beneficial.	1	2	3	4	5
3	Environmental innovation is an effective approach for environmental management.	1	2	3	4	5
4	We rely on environmental innovation to achieve high levels of environmental performance	1	2	3	4	5

#	Absorptive capacity	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	Management encourages a multidisciplinary approach to learning by collaborating with employees from other departments.	1	2	3	4	5
2	External information and resources are easily assimilated and integrated for internal usage purposes.	1	2	3	4	5
3	In response to newly acquired information, our company has the flexibility to alter or amend its quality control procedures routinely.	1	2	3	4	5
4	A lot of time and money is spent on research and development.	1	2	3	4	5
5	Our employees are constantly encouraged to take advantage of educational opportunities (conferences, seminars, etc.) to learn about the latest trends in the market and product development.	1	2	3	4	5

#	Competitive intensity	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	Price competition is the hallmark of our industry.	1	2	3	4	5
2	In our industry, any action was taken by one competitor; others can match readily.	1	2	3	4	5
3	In our industry, almost every day, one hears of a new competitive move.	1	2	3	4	5
4	There are a lot of “promotion wars” in our industry.	1	2	3	4	5
5	Competition in our industry is cut-throat	1	2	3	4	5
6	Competition is a critical aspect of our industry's success in the local market.	1	2	3	4	5

#	Green Organisational Culture	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	We have a strategy that promotes natural resource conservation.	1	2	3	4	5
2	As a community, we have a sense of obligation to maintain natural resources.	1	2	3	4	5
3	Teamwork practices in our company promote the saving of resources (e.g., reducing paperwork and commuting).	1	2	3	4	5
4	My team and I disseminate information about conservation activities using natural resources.	1	2	3	4	5
5	The team structure contains a resource conservation component (e.g., through the ability to meet and work remotely).	1	2	3	4	5
6	Through informal interactions, our employees encourage one another to conserve natural resources	1	2	3	4	5

Appendix (2)

Questionnaire Validators List

#	Validator Name	Academic Rank	University
1	Allam Hamdan	Full Professor	Ahlia University
2	Ghassan Abu alsoud	Assistant professor	Bahrain Polytechnic
3	Iyad Al-Sartawi	Associate Professor	Applied Science University
4	Mehdi Mili	Associate professor	University of Bahrain

Appendix (3)

Proofreading Confirmation

Kingdom of Bahrain

University of Bahrain

College of Science

This is to confirm that we have done proofreading for the PhD thesis that is under the title of:

“Green Innovation’s Antecedents and its impact on firm’s financial performance: the case of Bahrain”

and that has been introduced to the College of Science, Environment and Sustainable Development Department, by the PhD student: **Jaafar M. Howeishel Almesaiadeen**. We also confirm that the required linguistics modifications have been done, and that it is free from linguistics mistakes.

Signature: 

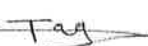
Name: Martin Smithies

Qualification: Master Degree in Applied Linguistics, University of York, UK.

Work place: American University, Bahrain

Email: martinsmithies@gmail.com

Date: 18-6-2023

Signature: 

Name: Taghreed Mohammed AlThiyabat

Qualification: Master Degree in Linguistics, Bangor University, UK.

Work place: Ministry of Education, Bahrain.

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Date: 18-6-2023

ملخص

سعت الدراسة إلى إثبات العلاقة ما بين الابتكار الأخضر والأداء المالي للشركات في مملكة البحرين، وكذلك التعرف على ما يعزز هذه العلاقة، حيث اختبرت الدراسة التأثيرات المعدلة لكل من الاهتمام الإداري، الطاقة الاستيعابية، التركيز التنافسي والثقافة التنظيمية الخضراء. كذلك سعت الدراسة إلى بيان العوامل التي من شأنها أن تعزز من أداء الابتكار الأخضر في الشركات البحرينية من خلال مفاهيم ذات أساس إداري من مثل استراتيجية الابتكار الأخضر، الهوية التنظيمية الخضراء، الشرعية التنظيمية البيئية والابداع الأخضر. وبذلك يمكن لهذه الدراسة أن تكون أساساً لدراسات مستقبلية في نفس المجال ضمن محتوى قطاع الأعمال في مملكة البحرين، وإيجاد آلية نظامية ذاتية من شأنها أن تعزز من محاولات الحكومة البحرينية للدفاع عن البيئة وحمايتها.

من خلال عينة من المدراء ورؤساء الأقسام والمختصين البيئيين التي بلغت 350 فرداً من 46 شركة في مملكة البحرين، وباستخدام نمذجة المعادلة الهيكلية للمربعات الجزئية الأقل Partial Least Squares- Structural Equation Modelling PLS-SEM تمكنت الدراسة من إثبات العلاقة المباشرة ما بين الابتكار الأخضر والأداء المالي ممثلاً بالعائد على الأصول والعائد على حقوق الملكية، وكذلك اثبات التأثيرات المحسنة للمتغيرات المعدلة باستثناء التركيز التنافسي، ويعود ذلك لضعف التنافسية لدى بعض الشركات، وعدم اعتبار الزبائن الاهتمام البيئي أحد معايير الاختيار للشركة التي يتعامل معها مع البعض الآخر. كذلك توصلت الدراسة إلى أن استراتيجية الابتكار الأخضر والشرعية التنظيمية البيئية، والابداع الأخضر محددات للابتكار الأخضر داخل الشركات البحرينية، إلا أن الهوية التنظيمية الخضراء لم تكن محدداً ذو أهمية إحصائية، وربما يعود عدم التأثير هذا إلى أن الإدارة لم تكن ناجحة في تشكيل أسلوب تفسير أخضر لتوثيق الصلة بين الهوية التنظيمية الخضراء والابتكار الأخضر من خلال إنشاء وتحسين المعرفة الخضراء وتوفير آلية لموظفي المؤسسة لتقديم الخبرة الفنية للابتكار وتطوير المنتجات الخضراء. كما تم إثبات أن كل من الشرعية التنظيمية البيئية والابداع الأخضر ينقلون تأثير استراتيجية الابتكار الأخضر إلى الابتكار الأخضر باستثناء الهوية التنظيمية الخضراء التي لا تنقل هذا التأثير إلا إذا كان متحداً مع الشرعية التنظيمية البيئية.

الكلمات المفتاحية: الابتكار الأخضر، استراتيجية الابتكار الأخضر، الهوية التنظيمية الخضراء، الشرعية التنظيمية البيئية، الابداع الأخضر، الاهتمام الإداري، التركيز التنافسي، الثقافة التنظيمية الخضراء، الطاقة الاستيعابية، مملكة البحرين.

جامعة البحرين

كلية العلوم



برنامج

البيئة والتنمية المستدامة

محددات الابتكار الأخضر وأثره على الأداء المالي للشركات: حالة البحرين

الأطروحة المقدمة لاستيفاء متطلبات الحصول على درجة الدكتوراه في الفلسفة
في البيئة والتنمية المستدامة

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يونيو 2023