The Role of Green Organizational Practices and Environmental Performance for Sustainble Competitive Advantage in the IT Sector of Pakistan

Haleema Qureshi
National University of Sciences and Technology, NUST Business School, Islamabad. haleema.mhr21nbs@student.nust.edu.pk
Dr. Asad Amjad
National University of Sciences and Technology, NUST Business School, Islamabad. asad.amjad@nbs.nust.edu.pk
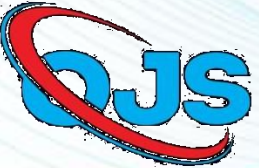**Dr. Syeda Sana Zainab***
Fatima Jinnah Women University, Pakistan. Corresponding Author Email: syeda_sana@fjwu.edu.pk
Dr. Muhammad Irfan Sheeraz
Higher Education Commission, Pakistan. isheeraz@hec.gov.pk
Ambreen Raza
Fatima Jinnah Women University, Pakistan. ambreenraza@fjwu.edu.pk

Abstract

This study examines the effect of green practices on environmental performance helping organizations to gain sustainable competitive advantage. Moreover, this study examines the mediating role of environmental performance between green innovation, green information system, Green HRM and sustainable competitive advantage. Also, this study examines the moderating role of Green shared vision among stated antecedents and environmental performance. This study examines the empirical relationship through survey questionnaires using Quantitative method approach. The research is based upon objective ontology and positivist epistemology as generalization of results is assumed. Approach of the study is deductive and considering the shortage of time, the research design is cross-sectional. Data collection has been done from the IT sector of Pakistan. Major cities that has been approached were Islamabad, Lahore, Faisalabad and Karachi. Our respondents were Managers, Top Management and Employees that have been involved in strategy designing at their organization, working in IT Sector of Pakistan. The power analysis is performed using G-Power 3.1.9.2 software to identify the minimum sample size for the hypothesized framework (Memon et al., 2020). According to the software a minimum sample size of 124 is required for this study to achieve 80% statistical power at a level of 5% for the conceptual; framework. The analysis tells that the minimum sample size required is 124. The scales that helps to test this study enlists 34 items for 6 variables. The results show all the items met the criteria for outer loading. All the constructs achieved AVE above 0.5 i.e. Environmental Performance (0.692), Green Human Resource Management (0.775), Green Innovation (0.622), Green Information system (0.735), Green shared vision (0.803) and Sustainable competitive advantage (0.583). The study advises organizations to adopt and adapt such green practices that can enhance environmental performance of the organizations helping them competitive edge in the market. Also, such green practices helps organizations to positively contribute towards the society and build systems that shouldn't harm the environment.

Keywords: Green Innovation, Green Information System, Green HRM, Environmental Performance and Sustainable Competitive Advantage.

Introduction

In recent years, concern over an organization's long-term viability has increased as a direct result of environmental problems across the world. Businesses now have a higher understanding of environmental issues and are starting to take on more environmental duties as a result of increased environmental concerns (Yusliza, 2020). Due to this, organizations are under intense pressure to create strategies that encourage "pro-environmental behaviors" in their workforce. As a result, these organizations must alter their policies and practices so that they include sustainability into every aspect of their operations (Afsar et. al., 2020; Saeed et. al., 2019). The community as a whole gains from businesses incorporating environmentally friendly practices into daily operations, which also demonstrates a company's dedication to upholding moral principles. To cater the need for sustainability and adoption of such practices that can help in enhancing environmental performance that would lead to sustainable competitive advantages. With the help of SLR, frequently discussed green practices have been extracted to examine their effect on environmental performance. Out of 59 antecedents, I received from SLR, three frequently used antecedents were Green Innovation, Green Information system and Green HRM. Among these GHRM were the most commonly used antecedents. Green innovation deals with organization's production for such products or to provide such services that would provide ecofriendly results. Products and services that could reduce the waste and pollution from the environment are described as green products (Singh et al., 2020). The process to plan and design such products and services needs an innovative behavior. Organizations that take initiative to plan and design such ecofriendly products and services can contribute to enhance environmental performance that will lead to sustainability (Imran et al., 2022).

Green information system refers to design, plan and implement such software and technologies into organization's system that could provide knowledge and data about the adoption and fair implementation of green practices (Z. Liu et al., 2018). Through such systems it is easy for the management to monitor, assess and reward their employees. In particular GIS is a modified information system that is used to track environmentally friendly output and practices (Sarkis et al., 2013).

Green HRM refers to such practices that involves employees green behavior. Practices

and procedures through which organization can attract, select, train, develop, assess and reward such employees that supports the environmental policies and are willing to participate in the environment friendly activities. By adopting such Green HRM practices organization can gain a competitive edge (M. S. Malik et al., 2020).

Green shared vision has been taken as a moderator in this study that will help us to analyze the moderating effect among antecedents and environmental performance. Green shared vision refers to the ideology and perspective that organization distributes in the culture of the organization (T.-W. Chang et al., 2019). Green shared vision indicates that organization should share the vision to promote ecofriendly activities from top to bottom and bottom to top and everyone in the organization should contribute for the shared common goal and vision.

These antecedents helps organizations to contribute to the environmental performance. Environmental performance refers to the adoption of such procedures and practices that would lead to the reduction of harmful substances, waste, pollution etc. (Lee et al., 2017; Sarkis et al., 2013; Zhu et al., 2010). By enhancing environmental performance, organizations can lead to sustainable competitive advantage. Sustainable competitive advantage usually refers to the adoption of such measures that your competitors couldn't replicate or adapt (De Guimarães et al., 2018). Brief summary has shown in following *Table 1*.

Table 1: Operational definitions of variables used for the study

Variables	Operationalization	Source
Green Innovation	Green Innovation is the degree of designing and adopting strategies that promote recyclable, reusable and recoverable materials	Zhang et al., (2015)
Green Information System	Green Information System refers to the degree of use of databases to regularly track, monitor, and share environmental information	Z. Liu et al., (2018)

within organization

Green Human Resource Management	GHRM is the degree of training, evaluating and rewarding employees to promote their green behavior and values	Dumont et al., (2017)
Green Shared Vision	Green Shared Vision is the degree of common environmental mission and strategic goals	H.- T. Chang et al., (2013)
Environmental Performance	Environmental Performance is the degree of reduced air emissions, energy consumption and hazardous material usage in organization	Laosirihongthong et al., (2013)
Sustainable Competitive Advantage	Sustainable Competitive Advantage is the degree of adopting practices, policies and resources that are difficult to imitate by competitors	De Guimarães et al., (2018)

In February 2024, Global Climate Risk Index reports Pakistan as the 5th most vulnerable country which faces the most of environmental issues that is continuously effecting the economy and people (Earth.Org//2024-Environmental-Issues/, 2024). Pakistan has been facing severe climate changes since 2020 which is a major reason for environmental issues but beside this another major reason is the unnecessary use of such materials and

things that results in harming the environment i.e., unwanted use of electricity, use of hazardous materials and use of material like paper and plastic. Such non-decomposable substances cause a severe harm to the environment that results in the pollution and health related issues for Pakistanis. Environmental issues not only disturb the health but also plays a vital role in the non-development of the country.

According to Environmental Performance Index (EPI) 2022, offers a data-driven summary of the sustainability situation globally. The 2022 EPI offers a quantitative basis for comparing, investigating, and comprehending environmental performance for 180 countries. Using the most current year of data available, they graded and rated these nations based on their environmental performance, and then determined how these rankings had changed over the previous decade (2012-2022) (Welcome | Environmental Performance Index, 2022). The EPI offers a scorecard that highlights leaders and laggards in environmental performance among which Pakistan is at rank 176 out of 180 countries (at 5th last) and have only progressed with 1.40 ratio over decade, which shows the lack of concentration towards environmental performance and betterment of society (Environmental Performance Index | Environmental Performance Index, 2022).

Furthermore, a Gallup Pakistan Survey in March 2022 (and similar surveys done by Worldwide Independent Network of Market Research (WIN) across the world), 3 in 4 Pakistanis (73%) believe that natural disasters have increased because of global warming; 81% of people globally believe this (Gallup Pakistan - Pakistan's Foremost Research Lab, 2022). To protect environment and society, it is necessary for individuals as well as organizations to adopt such practices and behaviors that can help them to contribute towards society. Green practices refer to environmentally friendly actions and initiatives adopted by organizations to reduce their environmental impact and promote sustainability. By looking into this serious issue, there is a need to adopt such practices that would help us to contribute towards the betterment of the environmental performance of the country. This study examines the effect of such green practices that would be beneficial for organizations to improve their environmental performance which would ultimately contribute towards the betterment of Pakistan's environmental performance.

SLR based on past 10 years i.e. 2013 to 2023 has been done with the help of Scopus. The keywords used to search documents relevant to my topic were "Antecedents of green

performance" "Antecedents of employee green performance" and "Antecedents of environmental performance". By these searches I got total of 265 articles and made a literature matrix table which includes author, year, country, DOI, article name, abstract, theory, keywords used and the future directions present in the article. After reading all the articles, 50 relevant articles were found for this study. After reading those relevant articles, I have found 59 Antecedents relevant to environmental performance out of these antecedents I have chosen 3 antecedents for my model that had frequency greater than 2 i.e. Green innovation, Green information system and Green HRM (Farooq et al., 2022; Zahrani, 2022; Khaskhely et al., 2022; Singh et al., 2020; Abu Seman et al., 2019; Z. Liu et al., 2018). The above mentioned process has been summarized with the help of a diagram that is shown in *Figure 1*.

After reading the articles, the table was formed which shows all the 59 antecedents and their frequencies i.e., the number of times a variable was discussed as an antecedent of Environmental Performance. This table has been attached in *Appendix-I* for reference. Previous studies have discussed these antecedents in the relation with environmental performance whereas there still exist a gap to study all these antecedents together under one model with environmental performance. This study helps to collectively examine the effect of all these antecedents (having frequency greater than 2 based on Scopus SLR) in relation to environmental performance and sustainable competitive advantage.

Moreover, there is limited research on the relationship of these antecedents with sustainable competitive advantage. Past studies have separately discussed the relationship of green practices with environmental performance and environmental performance with sustainable competitive advantage (Nasrollahi et al., 2020). This study provides a novelty by discussing environmental performance as a mediator among the relationship of antecedents of environmental performance and sustainable competitive advantage. So, this is a novel model that haven't been discussed and environmental performance have not been studied earlier as a mediator among Green innovation, Green information system and Green HRM in relation to sustainable competitive advantage.

Past studies have mostly discussed the direct relation of antecedents with environmental performance and suggested to add moderators that could affect their relationship (Song &

Choi, 2018). (Malik et al., 2021) used Green shared vision as a moderator between Green Innovation and Environmental Performance, which provides an evidence from the literature that Green shared vision can moderate the relation between green practices and environmental performance. Hereby, we assume that Green shared vision also moderate other green practices used as antecedents for this study i.e. Green innovation, Green information system and Green HRM. So, this study helps us to examine the moderating effect of green shared vision among green practices (antecedents of environmental performance) and environmental performance

Furthermore, most of the studies related to environmental performance have been conducted in Malaysia (Abu Seman et al., 2019; N. U. Khan, Wu, et al., 2021; Shafaei et al., 2020; Yusliza, 2020), China (Y.-C.

Huang & Huang, 2022; Z. Liu et al., 2018; Roscoe et al., 2019; Su et al., 2020) and Oman (Aldaas et al., 2022; Imran et al., 2022). Whereas very few studies have been conducted in Pakistan and most of them used manufacturing sector as their respondents (S. A. R. Khan & Qianli, 2017; Khaskhely et al., 2022; Malik et al., 2021; Mansoor et al., 2021; Saeed et al., 2019). Many researchers have suggested to study environmental performance in different regions and cultures (Liboni et al., 2023; Adubor et al., 2022; Y.C. Huang & Huang, 2022; N. U. Khan, Wu, et al., 2021; Mansoor et al., 2021; Su et al., 2020). To cater the gap, this study helps to examine the effect of green practices and environmental performance in IT sector of Pakistan, which will serve as another contribution of this study as very limited studies have been done previously in Pakistan's context
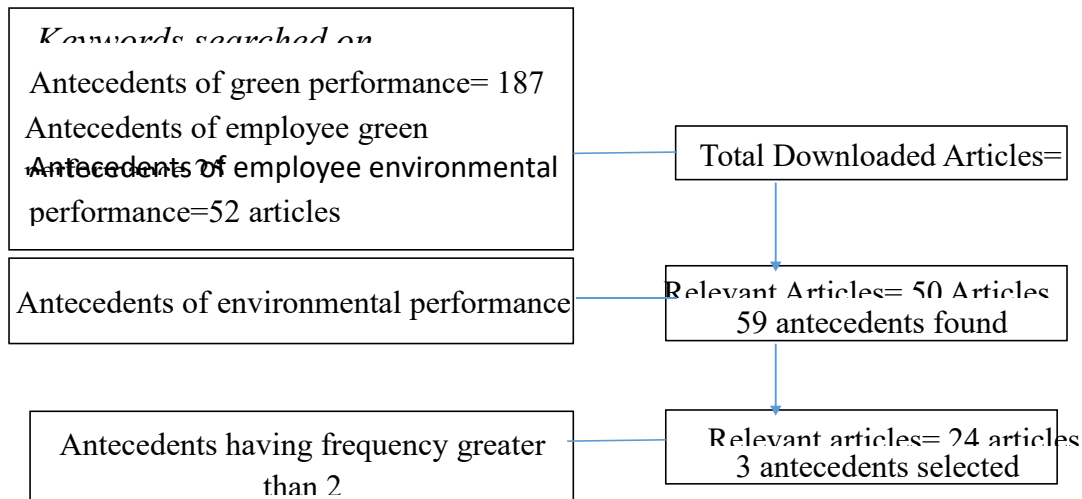
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Figure 1: Flow diagram of selected articles through SLR with Scopus database

Aim of the study is to examine and provide with such green practices that would help the organizations to gain sustainable competitive advantage. This study examines the role of Green innovation, Green Information System and Green HRM in IT sector of Pakistan and its effect on their Environmental performance. Moreover, the study extends the literature by using Green shared vision as a moderator between the antecedents i.e. GI, GIS, GHRM and Environmental Performance. The model has been discussed in the light of RBV Theory which says that achieving sustainable performance and a competitive edge depends on making the best use of limited and unique organizational resources (Gile et al., 2018).

Further the study provide insights for both academics and practitioners working in IT sector of Pakistan. The dynamics of the world are constantly evolving with time, which not only effects the environment but also changes the working styles and behaviors of the people. Traditionally organizations usually focus on the financial performance of their firms but with the change in working style, environment became an important aspect to cater. As it is the duty of every organization as well the individuals to contribute towards the betterment of society along with gaining returns (Omar et al., 2019). As the concept took spotlight globally, every organization started to contribute towards the society and tries to show their presence. With fulfilling such responsibilities, organizations have to change their policies and practices, and have to adopt such practices that could help them to enhance their environmental performance (Liboni et al., 2023). This study focuses on such green practices that organization should adopt to

enhance environmental performance. By playing a role to enhance environmental performance, organizations not only fulfill their duty but also learn to sustain in a competitive world (Nasrollahi et al., 2020). Our model for the study help future researchers to extend the literature and also provides evidence to organizations that in what ways they can play their role in increased environmental performance that would lead to sustainable competitive advantages (Khaskhely et al., 2022). These practices aware them to attract, select, retain, assess and reward such employees that support ecofriendly behavior. Moreover, this study provides them insights about green innovation, GHRM and green information system that organizations should adopt to gain competitive edge (Pan et al., 2021). This study extends the literature and provide guidelines to the widely developing sector of Pakistan i.e. IT sector. This helps the IT sector to identify, adopt and adapt such green practices that will help them in their development. IT sector in Pakistan contributes to the large share of Pakistan's GDP and plays a significant role in its development. It plays an important role in the innovation, employment opportunities and economic growth. So, it is important for them to use such practices that enhances environmental performance of the IT sector as well as the country and also help them to gain sustainable competitive edge over their competitors.

On the basis of above stated Research Gap, this study will help to answer the following

Research Questions

RQ1: What will be the impact of Green innovation on Environmental performance?

RQ2: Does Green Information system have a relationship with Environmental performance?

RQ3: What will be the effect of Green HRM and Environmental performance?

RQ4: Do Environmental performance have an impact on sustainable competitive advantage?

RQ5: What will be the mediating effect of Environmental performance between green practices and sustainable competitive advantage?

RQ6: What will be the moderating effect of Green shared vision on the relationship of Green innovation, Green information system, Green HRM and Environmental performance?

Keeping in view the above discussed Research Gap and Research Questions, this study

will serve to cater the following Research Objectives:

RO1: To explain the positive impact of Green innovation on Environmental performance

RO2: To determine the positive relationship between Green Information system and Environmental performance

RO3: To study the positive relationship between Green HRM and Environmental performance

RO4: To explain the positive impact of Environmental performance on sustainable competitive advantage

RO5: To determine the mediating effect of Environmental performance.

RO6: To study the moderating effect of Green shared vision on the relationship of Green innovation, Green information system, Green HRM and Environmental performance

Hypothesis Development

RBV Theory

RBV believes that internal skill development is necessary to get a competitive advantage over competitors. (Aslam et al., 2021)**.** Particularly, the concept of unique internal resources and skills served as the foundation for RBV. Maintaining the company's competitive advantage requires making use of its distinctive, challenging-to-copied tangible and intangible resources (Arda et al., 2019). Nevertheless, these continual improvements in environmental laws can point companies in the path of sustainable growth (Trumpp & Guenther, 2017). The implementation of innovative environmental strategies in the form of efficient green practices can therefore improve business sustainable strategic growth, which in turn can raise corporate financial benefits by getting access to the necessary resources (Christmann, 2000).

(Imran et al., 2022) developed his research on the assumptions of RBV, It argues that achieving sustainable performance and a competitive edge depends on making the best use of limited and unique organizational resources (Gile et al., 2018). A resource-based perspective examines an organization's internal resources and places special emphasis on those that can aid in developing strategies to create a competitive yet sustainable advantage (Fahmi et al., 2020). If these resources are unique and irreplaceable, the organization will gain long-term success along with a competitive edge over their competitors (Barney et al., 2001).

Green Innovation and Environmental Performance

Environmental performance (EP) refers to company processes that provides above and afar the requirements of elementary laws and rules in order to meet and exceed communal norms with regard to the environment (Y. Chen et al., 2015). It considers how the utilization of resources, product development, and company activities affect the environment in a way that is consistent with accepted environmental norms. According to previous studies, environmental product quality, the green procedure and product revolution, and the incorporation of eco-friendly sustainability considerations into business strategies and product expansion have a significant effect on Environmental Performance (Amir et al., 2020; Y. Chen et al., 2015; Dubey et al., 2015). Green innovation boosts environmental efficiency and contributes to a comprehensive environmental management system (Adegbile et al., 2017; Y.-S. Chen et al., 2006; Singh et al., 2020). Green innovation is a strategic plan that achieves a balance between economic performance and sustainability by developing environmentally friendly products and procedures. Two aspects of green innovation are green product innovation and green process innovation (S. Liu et al., 2021; Ullah et al., 2022). Green product innovation seeks to adapt product designs, eliminate toxic materials, and choose more ecologically friendly raw materials in order to minimize the environmental impact of waste. Green process innovation seeks to lower energy consumption during manufacturing and reutilize waste into products with market value (S. Liu et al., 2021; Marco-Lajara et al., 2022; Ullah et al., 2022).

Green innovation is the best course of action to protect the environment and generate economic success. According to the literature, businesses utilize green innovation to cut manufacturing costs and minimize wastage of raw materials (Awan et al., 2021; Mahto & Khanin, 2015). Green innovation therefore enhances a company's social and financial performance while simultaneously minimizing the harm done to the environment as a result of its operations (Ullah et al., 2022). Green innovation therefore coordinates Entrepreneurial economic interests with company environmental management goals. Weng et al., (2015) has proposed that the development of green products and processes not only decreases a company's negative impact on the surroundings but also improves monetary and communal. Previous research demonstrates

that GI should not be understood as a firm's response to third party concerns by using progressive corporate goals and events to promote environmentally friendly sustainability and to gain a competitive advantage (De Burgos-Jiménez et al., 2013; Kratzer et al., 2017). Based on the prior research, expect that green product creation and innovation are crucial functioning capabilities that a firm can employ to increase its environmental efficiency and win over key stakeholders.

According to the resource-based view (RBV) theory of the company, a firm's performance and competitive advantage depend on how it makes use of its strategic resources, which are valuable, uncommon, and challenging for competitors to replicate. The theory in relation to our variables consider green innovation as a resource that organization could practice to gain a competitive edge over their competitors. Green innovation acting as a useful resource for the organization will enhance environmental performance and gain sustainable competitive advantage for the organization. By using the RBV theory for this, we anticipate that GI has a direct influence on EP. Hereby, we hypothesis our first hypothesis as:

H1: There is a positive relationship between Green innovation and Environmental Performance.

Green Information System and Environmental Performance

Close coordination between various functional units is required in order to successfully implement sustainable strategy and accomplish green operations in terms of eco-product design, manufacture, packaging, transportation, recycling, and disposal. As a result, a significant amount of data about a company's daily activities in terms of environmental factors including raw materials, energy and water consumption, waste, emissions, toxicity, etc. will be generated throughout the process (Debnath, 2018). To carefully monitor and manage these sustainable operation processes, the business must take proactive steps to gather information about all of these environmental-related elements. There will be a need for improved coordination and high-level information sharing among the company's many functional units or groups. Additionally, in order to facilitate effective management and attain the sustainable goal, all information must be appropriately processed, posing a significant challenge to the organization's information-processing capacity (Poulsen & Lema, 2017). By synthesizing various data about green operations and creating a

productive management system, an effective GIS can help a company significantly increase its information processing capacity in order to implement, manage, coordinate, and monitor its green operations (Shad et al., 2017).

Thöni & Tjoa, (2017) have discussed the following two components of a company's green operations will be aided by a good GIS: First, GIS can help a business advance its green initiatives. A business can collect environmental sustainability data during the production, buying, selling, and logistics processes using GIS, and can then analyze that data to produce important information for green initiatives and innovations that can increase environmental sustainability. Data and information can flow easily across diverse functional units or departments with improved information processing capabilities, allowing for high-level coordination and collaboration in the creation and implementation of green initiatives (Sarkis et al., 2013). Second, GIS may assist businesses in actively tracking the environmental impact of their everyday operations to improve operation efficiency by lowering total input, including raw material and energy usage, through effective scheduling, procurement, process optimization, etc. Additionally, GIS can lessen environmental damage and waste generation (Z. Liu et al., 2017). Green Information System can also be utilized to facilitate recycling and recovery with reference to an organization's excess investment in inventory, scrap, and other surplus capital equipment (Yang et al., 2018).

The RBV theory places a strong emphasis on the creation of distinct abilities that are challenging for competitors to adopt. For a GIS, this could entail creating specialized software, educating staff about ecofriendly habits, and incorporating eco-friendly measures into decision-making procedures that could differentiate an organization from their competitors. Organizations can strategically link their environmental sustainability initiatives with their overall competitive strategy by integrating RBV theory with a Green Information System. While the GIS offers the tools and technology to efficiently store and use environmental data for decision-making and performance improvement, the RBV framework assists organizations in identifying and leveraging their distinct green resources and capabilities. Therefore, we hypothesize:

H2: There is a positive relationship between Green information system and Environmental Performance

Green HRM and Environmental Performance

Scholars assert that any environmental management program within a corporation must first receive employee approval. GHRM improves staff awareness related to environmental issues (Renwick et al., 2013), resulting in enhanced environmental performance. Over the past ten years, numerous studies have been conducted to determine the effect of green HR practices that might help firms in enhancing their environmental performance (Aldaas et al., 2022; Kim et al., 2019; Mishra, 2017). Green HR practices have decreased waste and taught staff about energy saving, both of which have a good impact on the environment (Paillé et al., 2020). Furthermore, (Kim et al., 2019) argued that GHRM is said to improve the hospitality industry by boosting effectiveness, cutting costs, and increasing competence. Roscoe et al., (2019) established a substantial link between environmental development and environment friendly HR practices in Chinese businesses. Further, (Gilal et al., 2019) conducted research to keep track of green practices effect on ecological performance.

According to previous study, businesses can encourage eco-friendly behavior by engaging and attracting naturally environmentally conscious workers. Growing environmental awareness enhances employees' understanding of environmental practices. Employees are incentivized to use fewer office supplies, dispose of trash properly, save electricity and water, and switch off lights by receiving green rewards and remuneration. An ecological hiring and selection strategy makes certain that new hires are aware of and supportive of the company's environmental values (Ojo & Raman, 2019; Paillé et al., 2020). Likewise, GHRMPs like as green training and development (Jerónimo et al., 2020; Pham et al., 2019), performance management and assessment (Martins et al., 2021) and green rewards and compensation are essential HRM strategies that improve environmental performance (Jabbour & De Sousa Jabbour, 2016). The GHRM bundle, a unified collection of HR practices that impact environmental performance, will be examined in this study.

By looking GHRM with the lens of RBV theory we can say that organizations can manage their human resources strategically. This calls for locating and obtaining valuable and uncommon human resources, developing their skills to make them challenging to copy, and utilizing their special qualities to achieve a competitive edge. Organizations

can better connect their human resource plans with their entire competitive strategy by integrating RBV theory and GHRM, which will ultimately improve their environmental performance and success. Therefore, we propose that:

H3: There is a positive relationship between Green HRM and Environmental Performance

Environmental Performance and Sustainable Competitive Advantage

One of the key topics of discussion in the field of assembly and actions management today is the impact a production system has on the environmental, economic, and operational performance. Khaksar et al., (2015) indicated that research on the positive association between environmental performance and competitive advantage is lacking. According to some academics, the increased environmental performance has the potential to be a source of competitive advantage because it can result in more productive operations, and cheaper compliance costs (Lu & Taylor, 2018). Chiou et al., (2011) proved that organizations may improve their environmental performance and their green corporate image, both of them serve to expand commercial prospects and boost competitive advantage. Researchers discovered a link between environmental performance and competitive advantage in a study of North American businesses (Vachon & Klassen, 2008). According to Nasrollahi et al., (2020) states that environmental performance plays a vital role in gaining sustainable competitive advantage. Prior studies show that environmental performance have a significant positive impact on sustainable competitive advantage (Singh et al., 2019).

Environmental performance has an impact on an organization's social acceptability as well as its capacity to gain a competitive edge (Kassinis & Vafeas, 2006). That encourages businesses to make environmental management "an organizational philosophy that permeates everything and engages everyone in greening the firm." (Sarkis et al., 2013). Environmental performance will act as a resource from the organization that would help organizations to get competitive edge against their competitors.

H4: There is a positive relationship between Environmental Performance and Sustainable competitive advantage.

Mediating role of Environmental Performance

Prior studies have largely examined the direct impact of green practices on firms' environmental performance and provided mixed results. A major limitation of these studies is that there still exists a gap to discuss the mediating role of environmental performance in this relationship. The RBV perspective indicates that by meeting the demands of influential stakeholders, implementing green practices gives businesses a competitive edge by minimizing their negative environmental effects and boosting their reputation and image (H.-T. Chang et al., 2013). To the best of our knowledge, limited existing studies have quantitatively looked at the mediating role of environmental performance that plays a vital role while implementing organization's green business practices and long-term competitive advantage. This adds to the body of study in this field while also enhancing environmental performance through the use of green practices (Feng et al., 2018). The business practices among Japanese culture keeps on evolving and to adopt new practices timely (Endo, 2020) therefore when they don't get the desired environmental results, Japanese businesses tend to take a reactive strategy and are more likely to reveal specific environmental facts. (Nishitani & Kokubu, 2020).

Moreover, according to Lee et al., (2017), a third party verifies the environmental performance of around 42% of the companies. In light of this, we can say that enhancing environmental performance, which is frequently linked to the adoption of green practices, can lead to the acquisition of a sustainable competitive advantage. It can also be suggested that adopting green business practices improves an organization's ability to sustainably compete. Aslam et al., (2021) discusses the environmental performance as a mediator between environmental practices and financial performance, which helps us to understand that environmental performance creates a strong bridge organizational practices to achieve organizational goals. This study concludes from the discussion above that environmental performance is the crucial link between green business practices and a firm's long-term competitive advantage. Therefore, our hypothesis are:

H5a: Environmental Performance positively mediates the relation between Green innovation and Sustainable competitive advantage.

H5b: Environmental Performance positively mediates the relation between Green information system and Sustainable competitive advantage.

H5c: Environmental Performance positively mediates the relation between Green HRM and Sustainable competitive advantage.

Moderating role of Green Shared Vision

An organization's common standards and goals that direct its members to the organization's future might be expressed in a shared vision (Larwood et al., 2023). A collective vision also offers a collective strategic approach, which might reveal convergent goals. Promoting green initiatives now relies heavily on a common understanding of green management. In this study, the phrase "green shared vision" is proposed and it is described by (Larwood et al., 2023; M. S. Malik et al., 2021) as "the acceptance by members of an Enhancing Environmental Performance through Green HRM and Green Innovation organization for clear and common strategic direction of collective environmental goals and aspirations." In the environmental era, organizational thinking with regard to sustainability management is more important to promote green ideals within an organization (Naz et al., 2023). A common vision leverages the possibility for future business growth as a foundation for impractical policies. A common vision can provide a clear organizational goal and inspire the necessary structural adjustments to support green innovation. According to earlier research, a shared vision is an essential predicate for awareness since it provides guidelines for how to think and act. People can view their work in a wider and more mindful environment with the help of a shared vision (Vogus & Sutcliffe, 2012).

Top managers may articulate a common vision, detail how they achieve their goals, exhibit trust and optimism, and actively support the standards and beliefs of their staff. Another way to make sure the group's members believe they can successfully overcome the current problems and direct their actions in a way that is effective is to create a common vision. The organization's shared vision serves as a guide for action to guarantee alignment with long-term goals. By removing ambiguities and conflicting interests, providing context for new tasks, and focusing the attention of departments and teams, a shared vision capability may aid in goal clarification. Considering the prior research, we are able to suggest that a shared vision is favorably correlated with environmental performance. M. S. Malik et al., (2021) tested Green shared vision as a moderator between Green innovation and Environment. Due to which it can be assumed

that Green shared vision will also act as moderator among other green practices and environmental performance. Following the discussion above, it could be assumed that GSV not only positively impact environmental performance but also moderate the association between GI, GIS, GHRM and EP. Hereby, we propose that:

H6: Green shared vision moderates the relationship between Green innovation and Environmental Performance.

H7: Green shared vision moderates the relationship between Green information system and Environmental Performance.

H8: Green shared vision moderates the relationship between Green HRM and Environmental Performance.
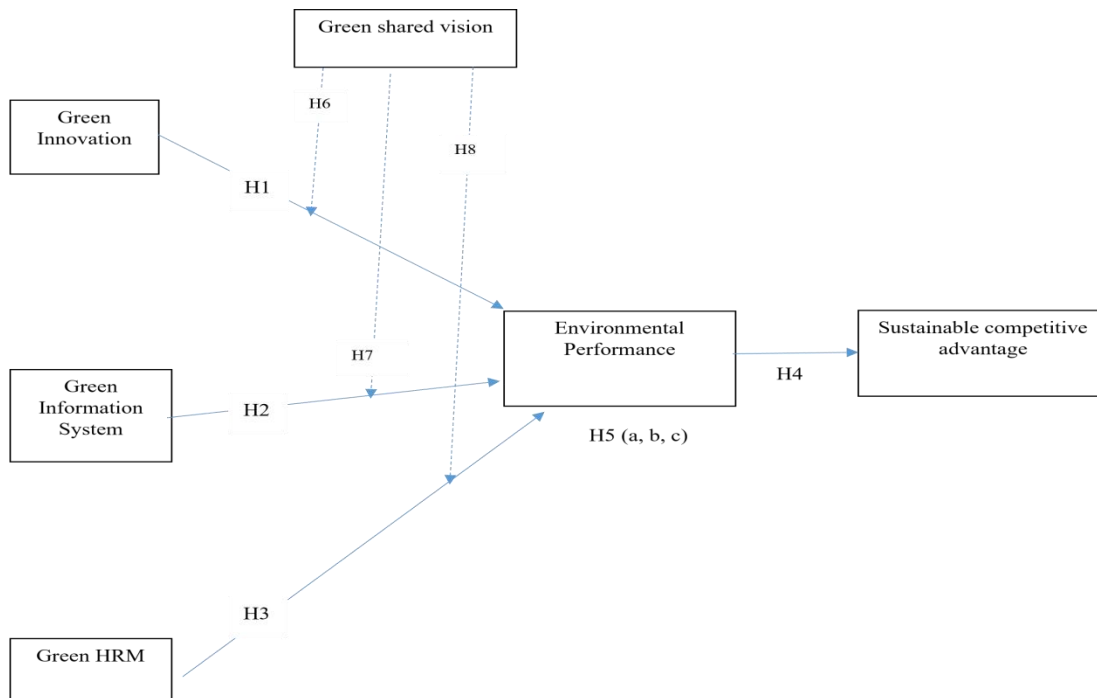
Figure 2: Hypothesized Research Model

Methodology

Context of the study

The study helps to empirically examine the relation between green practices, environmental performance and sustainable competitive advantage. Many researchers have discussed environmental performance with variety of antecedents but most of these studies have been conducted in Malaysia (Abu Seman et al., 2019; N. U. Khan, Wu, et al., 2021; Shafaei et al., 2020; Yusliza, 2020), China (Y.-C. Huang & Huang, 2022; Z. Liu et

al., 2018; Roscoe et al., 2019; Su et al., 2020) and Oman (Aldaas et al., 2022; Imran et al., 2022). Whereas very few studies have been conducted in Pakistan and most of them used manufacturing sector as their respondents (S. A. R. Khan & Qianli, 2017; Khaskhely et al., 2022; Malik et al., 2021; Mansoor et al., 2021; Saeed et al., 2019). Many researchers have suggested to study environmental performance in different regions and cultures (Liboni et al., 2023; Adubor et al., 2022; Y.C. Huang & Huang, 2022; N. U. Khan, Wu, et al., 2021; Mansoor et al., 2021; Su et al., 2020). To cater the gap, this study examines the effect of green practices and environmental performance in IT sector of Pakistan, which serves as another contribution of this study as very limited studies have been done previously in Pakistan's context. Moreover, it is necessary for Pakistan's organizations to contribute towards the environmental performance, which would be beneficial for organizations to effectively and efficiently enhance their productivity, gain a competitive edge. As we observed through different past surveys that IT sector of Pakistan needs to adopt practices that could help them to positively contribute towards the environment. This study will guide IT sector organizations in their development and help Pakistan improve, grow and develop.

Research Instrument

Quantitative research methodology has been used to run the analysis on hypothesized model. This study includes 34-items in total other than the demographic information and will measure all the items using five points Likert scale (1) strongly disagree to (5) strongly agree. Following are briefly discussed the scale of each variable:

The study uses the scale of Green Innovation from prior study i.e. (Su et al., 2020). The scale was adapted by (Zhang et al., 2015). The scale consisted of 6 items. The sample question includes, "Our Organization design products that are materials-saving and energy-saving".

The study uses and adapt the scale of Green Information system from prior study (Z. Liu et al., 2018). The scale consisted of 6 items. The sample question includes, "Our Company has a formal system regarding environment improvement in operation".

The study uses and adapt the scale of Green HRM from prior study (Dumont e.t al., 2017). The scale consisted of 6 items. The sample question includes, "My Company sets green goals for its employees".

The study uses and adapt the scale of Green Shared vision from prior study (H.-T. Chang et al., 2013). The scale consisted of 6 items. The sample question includes, "My Company sets green goals for its employees".

The study uses the scale of Environmental Performance from prior study i.e. (Yusliza, 2020). The scale was adapted by (Laosirihongthong et al., 2013). The scale consisted of 5 items. The sample question includes, "My organization has improved compliance with environmental standards."

The study uses the scale of Sustainable Competitive advantage from prior study i.e. (Nasrollahi et al., 2020). The scale was adapted by (De Guimarães et al., 2018). The scale consisted of 5 items. The sample question includes, "Our revenue with new products/services is much better in relation to our competitors'."

Sampling Technique/Sample Size/Pretesting

This study examines the empirical relationship between Green innovation, Green information system and Green HRM with Environmental performance which leads to sustainable competitive advantage through survey questionnaires using Quantitative method approach. The research is based upon objective ontology and positivist epistemology as generalization of results is assumed. Approach of the study is deductive and considering the shortage of time, the research design is cross-sectional. Data collection has been done from the IT sector of Pakistan. Major cities that has been approached were Islamabad, Lahore, Faisalabad and Karachi. Our respondents were Managers, Top Management and Employees that have been involved in strategy designing at their organization, working in IT Sector of Pakistan.

The power analysis is performed using G-Power 3.1.9.2 software to identify the minimum sample size for the hypothesized framework (Memon et al., 2020). According to the software a minimum sample size of 124 is required for this study to achieve 80% statistical power at a level of 5% for the conceptual; framework. The analysis tells that the minimum sample size required is 124. The scales that helps to test this study enlists 34 items for 6 variables.

All the data has been calculated offline using survey questionnaire. It is important to test questionnaires before moving to the data collection phase to get the valid responses (Hilton, 2017). Before starting the actual data collection process, 5

questionnaires were distributed among family and friends for the purpose of pretesting. In which it was ensured that all questions were easily understandable. It was judged through both communication and facial expressions that it was easy for them to understand and response to all the asked questions. There were two reversal questions in the survey that were a bit confusing for the respondents. So, it was considered, altered and made easy to understand. After the pretesting phase, the actual data collection has been made.

Data Collection/Response Rate

The sector that has been chosen for gathering data was IT sector of Pakistan. Various IT organizations have been visited in four big cities i.e. Islamabad, Lahore, Faisalabad and Karachi. All the data have been gathered in person. This study intended to collect data at the organizational level. So, the Top Management Employee from each company has been chosen to provide valid information regarding green strategies, policies and practices across the organization. Around 400 organizations has been visited out of which 370 provided with the information (through survey questionnaire) regarding green practices. After excluding invalid and incomplete questionnaire, 324 valid questionnaires have been used for data analysis indicating net response rate of (324/400 x 100) = 81%. According to (Holtom et al., 2022) a response rate of over 65% is generally considered as sufficient for valid results of a quantitative study.

Table 2: Response Rate

Questionnaires	Responses
No. of Questionnaires distributed	400
No. of Questionnaires received	370
No. of excluded Questionnaires	46
Response Rate	81%

Common Method Bias

As the data was self-collected and self-reported, there exists a chance of common method bias (Podsakoff et al., 2003). For this, a cover letter at the start of each questionnaire has been attached. So, each respondent should know that for what purpose data has been gathered, their participation is voluntary, they can withdraw whenever they want and their data will be treated with confidentiality and only for the purpose of this study. The

questionnaire was designed in simple English. So, it would be each for everyone to understand and most of the valid responses could be gathered. Statistically, the elimination of common method bias was ensured by Harmon one factor test using SPSS (Harmon et al., 1996). The results of exploratory factor analysis were performed on all items, this indicates the maximum variance of 33.8% which is less than the threshold value which is 50%. This means that there is no problem of common method bias in this data.

Table 3: Harmon's One Factor Test for Common Method Bias

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.220	33.814	33.814	17.220	33.814	33.814
2	2.031	6.346	60.160			
3	1.645	5.142	65.302			
4	1.420	4.439	69.741			
5	1.012	3.162	72.904			
6	.834	2.608	75.511			
7	.730	2.281	77.792			
8	.653	2.040	79.833			
9	.601	1.877	81.709			
10	.521	1.628	83.337			
11	.462	1.444	84.781			
12	.453	1.416	86.197			
13	.425	1.329	87.526			
14	.405	1.265	88.790			
15	.333	1.039	89.830			
16	.308	.963	90.793			
17	.303	.946	91.738			
18	.285	.891	92.629			
19	.252	.789	93.418			
20	.227	.708	94.126			

21	.223	.696	94.822
22	.213	.666	95.488
23	.203	.633	96.121
24	.181	.565	96.686
25	.179	.561	97.247
26	.162	.506	97.753
27	.145	.452	98.205
28	.136	.424	98.629
29	.126	.392	99.022
30	.123	.385	99.407
31	.116	.364	99.771
32	.073	.229	100.000

Data Analysis

To analyze the results SPSS and Smart PLS software were used for our proposed framework. Correlation and Regression analysis were performed on the data gathered from the responses. SPSS helped to resolve missing values data, analyze demographic data and reverse coded items. Smart PLS helped to conduct thorough analysis at two stages i.e. measurement model and structural model (Hair Jr. et al., 2017; Ramayah, T., et. al., 2018). The results have been presented using graphs, tables and findings. Our model's complexity as a "moderated-mediation model" is the primary motivation for employing PLS. The second justification for employing SEM-technique is that our model is a "prediction-based model," and such models are best tested using SEM. While using Smart PLS software various tests have been performed i.e. internal consistency and reliability, convergent validity, discriminant validity, multi-collinearity etc. It also put to use while looking for patterns in data. Discussion part will elaborate our extension in the existing literature and explain the results of this study aligning with the previous studies in the area.

Ethical Considerations

For the sake of scientific integrity, respect for human rights and dignity, and cooperation between science and society, research ethics are important. These rules guarantee that

research respondents are given a choice, receive knowledge about the study, and increase trust about keeping their information safe. Even if the idea being studied is beneficial to society, this does not allow any researcher to violate the dignity or human rights of those who participated in the study. This study also considered to strictly follow research ethics while collecting the data. It was made sure that the respondents were aware of the fact that their participation in this study was voluntary and they were not being pressurized for the participation in any form.

Also, they had the right to withdraw at any time without reason (including withdrawing data they have already provided). They were informed so by adding a brief cover letter in the questionnaire. The confidentiality of the data collected by respondents was ensured and data have been only used by the researcher for the stated study. Furthermore, participants were assured that their identity will be kept confidential and they were informed that along with the researcher, supervisor will also have the access to the gathered data.

Demographic Profile of the Respondents:

The sector that has been chosen for gathering data was IT sector of Pakistan. Various IT organizations have been visited in four big cities i.e. Islamabad, Lahore, Faisalabad and Karachi. All the data have been gathered in person. This study intended to collect data at the organizational level. So, the Top Management Employee from each company has been chosen to provide valid information regarding green strategies, policies and practices across the organization. Around 400 organizations has been visited out of which 370 provided with the information (through survey questionnaire) regarding green practices. After excluding invalid and incomplete questionnaire, 324 valid questionnaires have been used for data analysis.

The demographic variables on the questionnaire are gender, age, qualification, designation, experience and city. The demographic data of the respondents has been gathered with the help of SPSS. This shows that the respondents for this study are 81.2% male and 18.8% Female among which 26.9% lies between the age group of 21-30 and 42% lies in the age bracket of 31-40 and 30% are between 41 to 50 and above. This also shows that most of the respondents were Post Graduated i.e. 52.8% and have an experience of 72%. By this analysis we can have a clear and detailed picture of our

respondents.

The data has been gathered from the 4 major cities of Pakistan, among which most of the data has been gathered from Islamabad and Lahore i.e. 38% whereas 8% and 14% from Karachi and Faisalabad. The data has been collected from the top management of IT organizations among which 32% were Managers whereas 30% were at the different other Executive posts.

72% of the respondents have an experience of 2 to 5 years in the IT sectors and have a good knowledge about the practices and policies that would help organization grow. All these demographic details have been briefly mentioned below in *Table 4*.

Table 4: Demographic Profile of the Respondents

Demographic	Category	Frequency	Percentage variables
Gender	Male	263	81.2%
	Female	61	18.8%
Age	21-30	87	26.9%
	31-40	136	42.0%
	41-50	93	28.7%
	51 or above	8	2.5%
Qualification	Undergraduate	5	1.5%
	Graduate	146	45.1%
	Post Graduate	171	52.8%
	Other	2	0.6%
Designation	Manager	106	32.7%
	Executives	99	30.6%
	Engineers and Developers	37	11.4%
	Coordinators	8	2.5%
	Others	74	22.8%

Experience	Less than 2 years	20	6.2%
	2-5 years	234	72.2%
	6 years or above	70	21.6%
City	Islamabad	126	38.9%
	Lahore	126	38.9%
	Karachi	26	8.0%
	Faisalabad	46	14.2%

Firstly, SPSS software was used for Demographic Analysis and after that Smart PLS software has been used for further analysis. Smart PLS is used for two main reasons, firstly it helps in the prediction of dependent variables. Secondly, it assist the incremental characters present in the study such as green shared vision. Smart PLS 4.0 was used for analysis in two stages i.e. firstly measurement model and secondly structural model (Hair et al., 2017).

Results

Measurement Model Assessment

Internal Consistency Reliability

The measurement approach was put to the test to evaluate the convergent, divergent, and internal consistency reliability of the constructs. Internal consistency reliability was examined to see how well the items represented their latent constructs (Hair et al., 2017). Composite reliability was used to gauge internal consistency (Hair et al., 2017). The measurement model's composite reliability must be more than 0.7 in order for it to be determined satisfactory (Nunnally, 1978; Nunnally and Bernstein, 1994; Richter et al., 2016). The results for this study have shown the composite reliability for all of the constructs above 0.7- Environmental Performance (0.888), Green Human Resource Management (0.945), Green Innovation (0.905) and Green Information System (0.929), Green shared vision (0.923) and Sustainable competitive advantage (0.84) which shows higher internal consistency for all measures.

Convergent Validity

In order to determine the degree to which one measure has positive correlations with other measures of the same construct, I examined convergent validity after confirming the composite reliability of my constructs (Hair et al., 2017, p. 112). The outer loadings of

the items have been examined in order to test the convergent validity. In order to achieve appropriate results, outer loadings should be equal to or more than 0.6 (Chin et al., 1997), while AVE score should be equal to or greater than 0.5 (Avkiran, 2017). The results show all the items met the criteria for outer loading. All the constructs achieved AVE above 0.5 i.e. Environmental Performance (0.692), Green Human Resource Management (0.775), Green Innovation (0.622), Green Information system (0.735), Green shared vision (0.803) and Sustainable competitive advantage (0.583). *Table 5* shows the analyzed results of the internal consistency reliability and convergent validity.

Table 5: Internal Consistency Reliability and Convergent Validity

Construct	Items	Cronbach's Alpha	Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
Employee Performance	EP01	0.887	0.749	0.888	0.692
	EP02		0.874		
	EP03		0.875		
	EP04		0.848		
	EP05		0.806		
Green Human Resource Management	GHRM01	0.942	0.916	0.945	0.775
	GHRM02		0.9		
	GHRM03		0.891		
	GHRM04		0.88		
	GHRM05		0.87		
	GHRM06		0.823		
Green Innovation	GI02	0.857	0.814	0.905	0.622
	GI03		0.868		
	GI04		0.869		
	GI05		0.859		
	GI06		0.867		
	GIR01		0.270		

Green Information System	GIS01	0.928	0.844	0.929	0.735
	GIS02		0.887		
	GIS03		0.834		
	GIS04		0.899		
	GIS05		0.845		
	GIS06		0.835		
Green Shared Vision	GSV01	0.918	0.897	0.923	0.803
	GSV02		0.908		
	GSV03		0.9		
	GSV04		0.879		
Sustainable Competitive Advantage	SCA01	0.793	0.831	0.84	0.583
	SCA02R		0.325		
	SCA03		0.889		
	SCA04		0.837		
	SCA05		0.793		

Discriminant Validity

According to Hair et al. (2017), Discriminant validity measures how different a construct is from other constructs in the model. Heterotrait-Monotrait Ratio (HTMT, Henseler et al., 2015) is the criterion to examine and validate the value of divergent validity. In order to maintain the constructs' divergent validity, a HTMT value should not be higher than 0.85 (Henseler et al., 2015). The analyzed measurement model's results were satisfactory and complied with the requirements stated above. As shown below in *Table 6*, the current study effectively measured the DV and met the HTMT criteria.

Table 6: Discriminant Validity (HTMT) criterion

Latent Constructs	EP	GHRM	GI	GIS	GSV	SCA
EP						
GHRM	0.745					
GI	0.796	0.736				

GIS	0.792	0.786	0.596		
GSV	0.729	0.775	0.717	0.730	
SCA	0.791	0.705	0.654	0.652	0.790

Multicollinearity:

While performing analysis, one must confirm the Multicollinearity of the structural model before proceeding to the second stage of studies, which can be done by evaluating the variance inflation factor (VIF) value, which should be less than 5.0 (Hair et al. 2014). The VIF findings for each construct was less than 5.0, and Multicollinearity was not a problem. Table 7 shows the Multicollinearity values for the study.

Table 7: Multicollinearity test

Construct Items	VIF
EP01	2.062
EP02	2.985
EP03	3.075
EP04	3.092
EP05	2.145
GHRM01	4.347
GHRM02	4.22
GHRM03	3.937
GHRM04	3.38
GHRM05	3.121
GHRM06	2.632
GI02	2.213
GI03	2.806
GI04	2.67
GI05	2.592
GI06	2.571
GIR01	1.05
GIS01	2.803
GIS02	3.594
GIS03	2.621
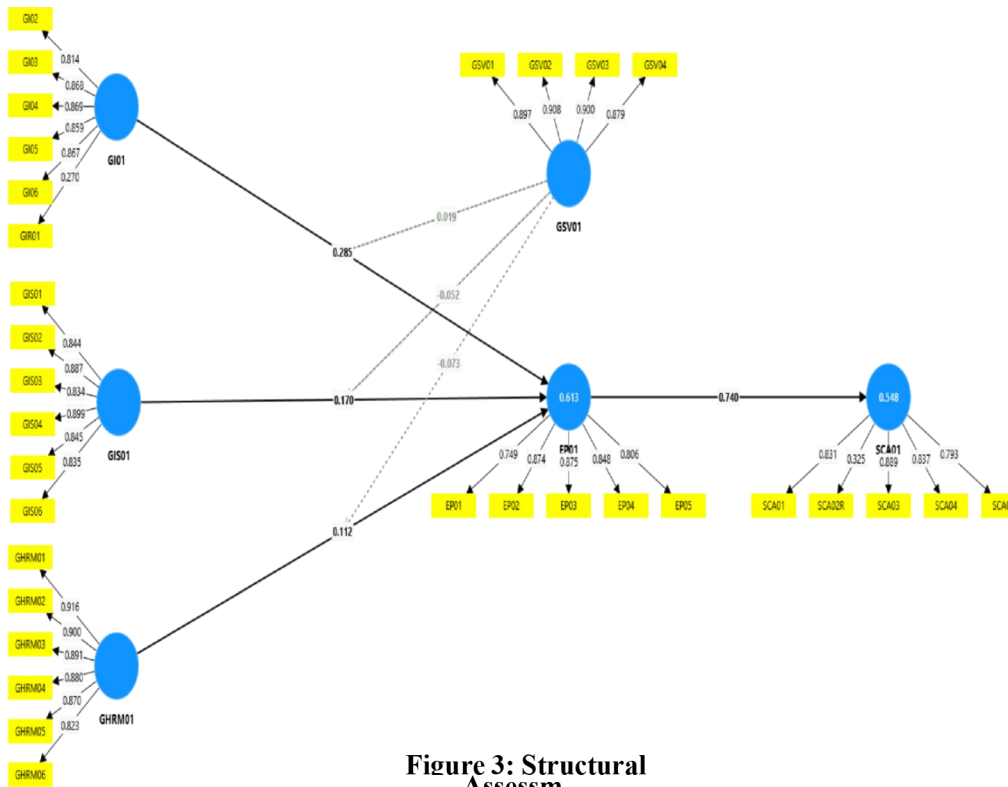
Figure 3: Structural Assessm

GIS04	
GIS05	3.048
GIS06	3.247
GSV01	3.381
GSV02	3.61
GSV03	3.079
GSV04	2.964
SCA01	2.201
SCA02R	1.058
SCA03	3.162
SCA04	2.418
SCA05	1.899

Structural Modeling Assessment Results

The results indicate that Green Innovation (H1: β ¼ 0.285, p value: 0.00) has a significant positive association with Environmental Performance, as hypothesized. Also, Green Information system (H2: β ¼ 0.17, p value: 0.041), Green Human Resource Management

(H3: β ¼ 0.112, p value: 0.012) is significantly and positively related with Environmental Performance as stated in the hypothesis. The relation between Environmental performance and Sustainable Competitive Advantage also shows a significant and positive relationship (H4: β ¼ 0.074, p value: 0.000) as hypothesized in Hypothesis 4. The intervening role of Environmental Performance between Green Innovation, Green information system, Green HRM and

Sustainable Competitive Advantage have been examined and hypothesized in H5a, H5b and H5c. Here Preacher and Hayes (2008) method was used to check the intervention effect of Environmental Performance. The results for indirect effect have shown that Environmental Performance fully mediates the relation between Green Innovation (H5a: β ¼ 0.211, p value=0.000), Green Information System (H5b: β ¼ 0.126, p value=0.042), Green Human Resource Management (H5c: β ¼ 0.083, p value=0.017) and Sustainable Competitive Advantage. It also help us to examine the moderation effect of Green Shared Vision and the results show that Green Shared Vision (H6: β ¼ 0.09, p value=0.018) moderate the relationship between Green Innovation and Sustainable competitive advantage. Also, it moderates the relation between Green information system (H7: β ¼ 0.073, p value=0.007) and sustainable competitive advantage and Green HRM (H8: β ¼ 0.052, p value=0.014) and sustainable competitive advantage. So, the results supports all the generated hypothesis as summarized in *Table 8*:

Table 8: Hypothesis Results

Hypothesis	Paths	Beta	STDEV	T-values	P-values	Results
	Direct Effect					
H4	EP -> SCA	0.074	0.042	17.578	0.000	Supported
H3	GHRM -> EP	0.112	0.092	3.718	0.012	Supported
H1	GI-> EP	0.285	0.074	3.848	0.000	Supported
H2	GIS-> EP **Moderating**	0.17	0.098	2.737	0.041	Supported
	Effect					
H6	GSV01 x GI01 -> EP01	0.09	0.082	2.23	0.018	Supported
H8	GSV01 x GIS01 -> EP01	0.052	0.142	2.366	0.014	Supported

H7	GSV01 x GHRM01 -> EP01	0.073	0.128	2.569	0.007	Supported
	Mediating Effect					
H5a	GI01 -> EP01 -> SCA01	0.211	0.054	3.897	0.000	Supported
H5b	GIS01 -> EP01 ->SCA01	- 0.126	0.073	2.723	0.042	Supported
H5c	GHRM01 -> EP01 -> SCA01	0.083	0.066	2.244	0.017	Supported

Note: p-value should be < 0.05, t-value > 1.645 (one tailed test), t-value > 1.96 (two tailed test)

Co-efficient of Determination

The structural model assessment involves testing the casual relationships between the constructs. Here we also calculate the coefficient of determination (R square) (Awan et al., 2021) (Hair Jr et al., 2017). R square represents the overall predictive accuracy of the model. Cohen (1988) suggests R square values of 0.26, 0.13 and 0.02 be considered as substantial, moderate and weak respectively. Here we also calculate the coefficient of determination that is represented in *Table 9 and Figure 4*, which shows substantial R square value for the study.

Table 9: Co-efficient of Determination, R square value.

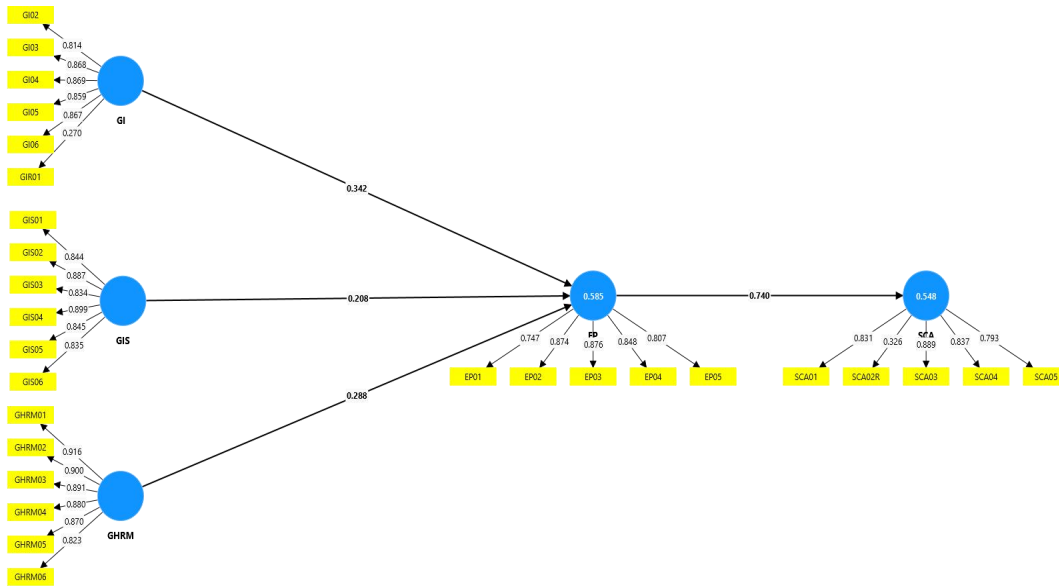| Variables	R-square	R-square adjusted	Results
EP	0.585	0.581	Substantial
SCA	0.548	0.547	Substantial

Figure 4: R-Square value without moderation of GSV

 Results for Moderating Variable

The moderation effect of Green Shared Vision and the results show that Green Shared Vision (H6: β ¼ 0.09, p value=0.018) moderate the relationship between Green Innovation and Sustainable competitive advantage. Also, it moderates the relation between Green information system (H7: β ¼ 0.073, p value=0.007) and sustainable competitive advantage and Green HRM (H8: β ¼ 0.052, p value=0.014) and sustainable competitive advantage. So, the results supports all the generated hypothesis as summarized in *Figure 3 and Table 8.*

In moderation analysis, the R2 change becomes an important matter. As R2 changes its value when a moderation effect is introduced in the model. As we can see in Table 9 R square of EP is 0.585 and SCA is 0.548. When the Green shared vision is examined as a moderator the R square value of EP increases to 0.613 whereas the value of SCA remains the same. *Table 10 and Figure 5* shows the comparison of R squares with and without moderation.

Table 10: Co-efficient of Determination, R square value after moderation of GSV.

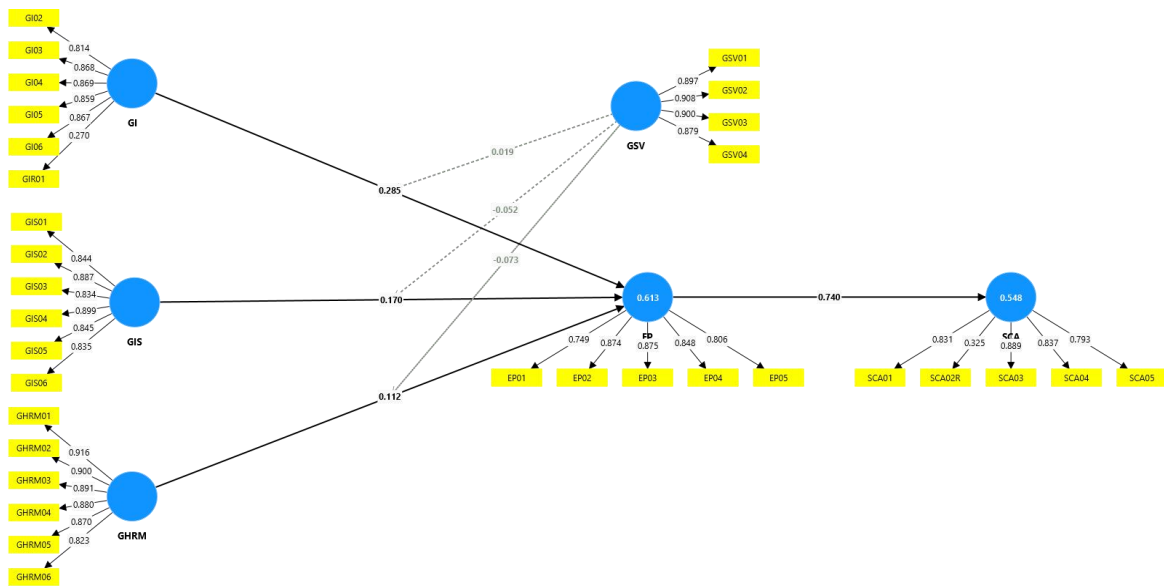| Variables	R square (without moderation of GSV)	R-square (with moderation of GSV)	Results
EP	0.585	0.613	Substantial
SCA	0.548	0.548	Substantial

Figure 5: R square value with moderation of GSV

Discussion and Implications

This study provides an insight about environmental performance and the practices an organization could use to gain environmental performance and competitive edge. There are number of ways through which we can increase environmental performance of an organization i.e. reducing greenhouse gas emissions, supporting renewable energy sources, and improving energy efficiency are examples of environmentally beneficial actions that help to counteract climate change. Reducing the amount of greenhouse gases, such carbon dioxide, released into the atmosphere is one way that these activities help mitigate the effects of global warming, including rising sea levels, harsh weather, and ecological damage. By lowering pollution and the health hazards it poses to ecosystems and people alike, environmentally friendly activities frequently result in better air and

water quality. Reduced air and water pollution improves public health and environmental quality. Examples of such actions include cutting back on emissions from cars and industrial processes, supporting renewable energy sources, and putting pollution control technologies into practice. Making the switch to eco-friendly methods opens up new avenues for innovation, economic expansion, and green jobs. Aside from creating jobs, sectors like eco-tourism, sustainable agriculture, energy efficiency, and renewable energy also promote economic growth and encourage the development of clean technology and sustainable business strategies.

This study also gathered and discusses few variables with the help of Systematic Literature Review which could help organizations in improving their environmental performance. The variables include Green Innovation, Green Information System and Green HRM. To check the reliability and validity of these practices I chose IT sector of Pakistan for testing and analysis. The organizational level data was collected to cover most of the large organizations and to get in touch with managers and executives about strategy making, policy building and practices implementation within the organization. Four big cities i.e. Islamabad, Lahore, Faisalabad and Karachi were kept in view for data gathering.

The practices I discussed through my Questionnaire was Green Innovation, Green Information System and Green HRM. The term "green innovation," which is also used to describe sustainable innovation or eco-innovation, describes the creation and use of novel goods, procedures, technologies, or business plans with the intention of resolving environmental issues and advancing sustainability. By adoption of green innovation, organization can increase their environmental performance which would lead to their sustainable competitive advantage. This is also the Hypothesis H1 for this study, which was supported by data gathered and analysis. The goal of green innovations is to maximize output or utility while minimizing the consumption of resources including energy, water, and raw materials. This could entail creating longer-lasting products, using renewable resources, or creating more effective production techniques (Awan et al., 2021). Moreover, it is centered on reducing or completely doing away with waste production and pollution at every stage of a product's lifecycle, from raw material extraction to disposal. This could include creating items with a low environmental impact, introducing

recycling programs, or creating cleaner production techniques (Rustiarini et al., 2022).

Second Variable used in the study that would help to enhance Environmental Performance is Green Information System. An information system that is created and executed with consideration for environmental sustainability is known as a "green information system" (GIS). Sustainability is ingrained in all aspects of its development, implementation, and operation. The goal of green information systems is to use as little energy as possible. Using energy-efficient hardware components, streamlining software algorithms to lower processing power requirements, and putting power management strategies into place to save energy while systems are not in use are just a few ways to accomplish this (Liu et al., 2018). This was the Hypothesis H2 for this study and it was also supported and proved that Green Information system will lead to better environmental performance.

Third practice we extracted with the help of SLR was Green HRM. The term "green human resource management," or "green HRM," describes how different HRM procedures within a company incorporate environmental sustainability concepts. It entails coordinating HR strategies, procedures, and policies with the environmental aims and objectives of the company. Green HRM is the umbrella term for a number of programs designed to reduce the organization's ecological footprint, promote environmental sustainability, and instill a sense of environmental responsibility in staff members (Dumont et al., 2017). Implementing eco-friendly procedures can improve the employer brand and draw in talent who cares about the environment. Employers who exhibit a commitment to sustainability are more in demand by workers, and implementing Green HRM activities can help set your company apart from the competition (Aldaas et al., 2022). This was Hypothesis H3 for the study and examines that the adoption of green HRM will lead to enhanced Environmental Performance of the organization that would lead to sustainable competitive advantage.

The fourth Hypothesis for the study was relevant to environmental performance that would lead to sustainable competitive advantage. Reducing energy use, trash production, and resource use are common ways to improve environmental performance. Over time, these efficiency increases may result in substantial cost reductions. When compared to less environmentally conscious competitors, companies that make

investments in energy-efficient technologies, waste reduction programs, and sustainable supply chain procedures can reduce operating costs and increase profitability (Chin et al., 2015). Establishing a company's environmental responsibility can improve its brand image and reputation. Companies that put sustainability first are seen as moral, socially conscious, and progressive, which can increase client loyalty and trust. Moreover, a strong brand image can draw in top personnel, financiers, and business associates who share your commitment to environmental responsibility (Borg et al., 2022).

Another variable that have been used in the study was Green shared vision. A shared knowledge and desire among stakeholders to achieve environmental sustainability goals is referred to as a "green shared vision." To solve environmental issues and advance sustainability, it entails coordinating the goals, values, and deeds of people, groups, communities, and governments. Green shared vision have been previously studied as a moderator between Green Innovation and Environmental performance (Chang et al., 2019). By which, we assumed that it will also moderate between other green practices and environmental performance. Hypothesis H6, H7 and H8 are relevant to the moderation of Green Shared Vision, all the hypothesis were supported and green shared vision fully moderates between Green practices and Environmental Performance.

Lastly, Environmental Performance was assumed as a mediator between green practices and sustainable competitive advantage. By generating cost savings, guaranteeing regulatory compliance, distinguishing goods and services, boosting reputation and brand image and successfully managing risks, environmental performance can give firms a sustained competitive edge. Businesses that put an emphasis on environmental stewardship are likely to beat their rivals in the long run as sustainability gains importance in the global economy. Businesses can improve their reputation and cultivate strong bonds with stakeholders, such as consumers, investors, regulators, and local communities, by showcasing their dedication to environmental sustainability through Green HRM programs. Increased market distinction, brand loyalty, and commercial opportunity may result from this. The organization may save money by putting into practice environmentally friendly activities like trash reduction or energy conservation. Green HRM can assist in finding areas where productivity may be increased and motivate staff members to take up eco-friendly habits that save expenses.

Green information systems encourage digitization and lessen the need for paper-based procedures, which both help to reduce waste. GIS contributes to a reduction in waste generation and environmental effect by promoting electronic recording and communication and decreasing the use of paper. Green information systems give the usage of eco-friendly hardware and infrastructure first priority. This entails locating equipment with high energy efficiency ratings, making hardware out of recyclable materials, and using ecofriendly procedures while running data centers. In addition, green innovation entails the advancement of sustainable business practices, including eco-friendly policy implementation, green supply chain management adoption, and the development of an organizational sustainability culture. These practices altogether help organization to enhance its environmental performance that would lead to their sustainable competitive advantage.

Theoretical Implications:

The study helps to extend the existing literature by discussing the relation of Green innovation, Green information system, Green HRM and Environmental performance which will lead to sustainable competitive advantage. In Addition, this study examines the mediating role of environmental performance between antecedents of environmental performance and sustainable competitive advantage, which would extend the literature as such model will be the novelty of this study.

The study helps us to explain this relation in light of the moderating effect of green shared vision and also provide theoretical evidence for the future researchers to further explore the variables that could moderate and mediate this relationship. Further the study contributes in the field of environmental performance in Pakistan's context, as very few studies have been conducted in Pakistan's culture. Moreover, IT sector is still understudied in this context. The desire to positively impact society and the environment drives many researchers. Researchers can connect their job with their values and passions by studying environmentally friendly techniques, which makes them feel personally fulfilled and satisfied that they are making a positive impact on a more just and sustainable world. For Asian Researchers, it is more beneficial as 3rd world countries are facing severe environmental issues that creates a wide range of research opportunities for the researchers.

The dissemination of research findings are facilitated by journals and conferences devoted to environmental science, sustainability, and related subjects. Researchers can advance knowledge in the subject and share their thoughts, findings, and best practices with the larger academic community by publishing their study on environmentally friendly activities. Researching ecofriendly approaches frequently entails creating cutting-edge tools, processes, and fixes to enhance sustainability and environmental performance. New systems, procedures, and products with commercial uses that boost competitiveness and economic growth may result from this innovation.

Practical Implication:

The study advise organizations and management to adopt and adapt such green practices that can enhance environmental performance of the organization that can help them in attaining competitive edge over other organizations in the market. Organizations should focus on HR practices i.e. recruitment and selection, training and development, performance and assessment and rewards and compensation that could help them in identifying sustainable performers and could also help them to attract and train such workforce that supports the concept of environmental performance.

By utilizing energy-saving technology, streamlining data centers, and utilizing power management strategies are just a few examples of how energy-efficient practices may be put into practice to dramatically lower energy usage. Due to this, IT companies running huge data centers can save a significant amount of money on their electricity expenses.

In Addition to this, organization should build such information systems that could enhance their productivity, motivate their employees to perform as socially responsible individuals and help in the development of organization as well as of the country. Moreover, organizations that have a shared vision to perform collectively for the betterment of the society, are more developed and productive. So, organizations should focus on adopting such behavior that gives the message to everyone in the organization that they should feel responsible about the environmental performance.

Energy usage in IT operations, especially in data centers, can have a major impact on the environment. IT organizations can lessen their environmental effect and support international efforts to prevent climate change by upgrading energy efficiency, offsetting

carbon emissions, and using renewable energy sources.

IT organizations may improve their brand image, draw in environmentally sensitive clients, and win over socially concerned investors by showcasing their dedication to eco-friendly operations. Adopting a sustainable approach can stimulate innovation in IT firms, resulting in the creation of new services, products, and technology that are profitable and healthy for the environment. As a result, businesses may gain a competitive advantage in the marketplace and establish themselves as leaders in their sector.

Nowadays, a company's dedication to social responsibility and environmental sustainability can inspire a lot of workers. IT firms may increase employee morale, draw in top talent, and increase retention rates by supporting eco-friendly practices and may create a community where people ecomindsets exist and join together for a good cause.

Conclusion

In such evolving world, it is important for every organization to adopt such measures that could become a reason for their sustainability and competitive advantage. Moreover, due to the extensive use of technological products, increased population and pollution, it is important for every individual as well organizations to contribute towards the betterment of the society and can enhance their environmental performance. For this purpose, this study contributes to study Green innovation, Green information system and Green HRM in relation to environmental performance in one model, which also have been seen as a gap in literature. There is also limited research on the relationship of these antecedents with sustainable competitive advantage Nasrollahi, et al., (2020), which were examined in this study. In Addition, this study examines the moderating effect of green shared vision among antecedents and environmental performance Malik M.S. et al., (2021). Furthermore, very few studies have been conducted on the IT sector of Pakistan related to green practices and environmental performance which will serve as another contribution of the study. Utilizing energy-saving technology, streamlining data centers, and utilizing power management strategies are just a few examples of how energy-efficient practices may be put into practice to dramatically lower energy usage. Due to this, IT companies running huge data centers can save a significant amount of money and can also play an important role in creating healthy and clean environment. There are many other green practices that organizations should adopt as it beneficial for both the companies and

environment as well.

Limitations and Future Directions

The findings of this study are subject to certain limitations. Firstly, due to limited time resources cross sectional and organizational level data have been collected for this study. Therefore, it has been suggested that future researchers could use longitudinal approach and employee level data should gather to get more insights of the implementations of green practices within the organizations.

Secondly, the data was gathered on organizational level and only top management i.e. Managers and Executives were involved, future studies could involve employees from different positions and could expand or diversify this sample set. As employees know that how the practices are being implemented and whether there is a continuous improvement or not.

Thirdly, this study is conducted in Pakistan. So, the results generated are according to the practices and policies implemented in Pakistani culture. Future researches should carry out this study in other countries to help in generating more generalizable findings. As the results might not be the same for different countries and cultures. Fourthly, this study took its antecedents on the basis of SLR based on (2013-2023). So, there could be many other factors that could in achieving Environmental Performance that could be considered in the future researches.

Lastly, we have used one mediator and one moderator for the study i.e. Environmental Performance and Green Shared Vision. Whereas future studies could consider other variables that could mediate and moderate this relationship.

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Appendix-I

Table 1:

Antecedents of Environmental Performance	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	Total
1. Green Innovation		1	2	1	1							5
2. Green HRM	1	2	1	1								5
3. Green TL	1				1							2
4. Pro Environmental behavior	1											1
5. Reverse Logistics	1											1
6. Intellectual Capital		1										1
7. Green Team Creativity		1										1
8. Green Recruitment and Selection		1										1
9. Green Performance Management		1										1
10. Green Compensation		1										1
11. Green SCM		1			1							2

12. Green Innovation Behavior		1										1
13. Green Intellectual capital		1	1									2
14. Employee Ecological Behavior		1										1
15. EGSCM implementation		1										1
16. Green Purchasing		1										1
17. TQM		1										1
18. Innovation capability		1										1
19. SGSCM		1		1								2
20. Employee Environmental Commitment		1										1
21. Green Product Innovation			1									1
22. GHRM practices			1									1
23. OCBE	1		1									2
24. Environmental Management System			1									1

25. Environment and Social sustainability efforts				1							1
26. LED usage				1							1
27. Top Mgt. Support				1							1
28. Environmental Orientation				1							1
29. Environmental Leadership				1							1
30. Green Innovation strategy				1							1
31. Green innovative actions				1							1
32. Eco Innovation				1						1	2
33. Cleaner Production				1							1
34. Operational Agility					1						1
35. Strategic Adaptability					1						1
36. Proactive Pollution					1						1

Reduction Behavior												
37. GSCM practices					1	2						3
38. Competitive Advantage					1							1
39. Internal green practice						1						1
40. Supplier green monitoring						1						1
41. Green Information system						1	1				1	3
42. Supply distribution risk							1					1
43. Environmental practices							1					1
44. Integration with supplier							1					1
45. Eco Design							1					1
46. Green Manufacturing							1					1
47. Cooperation with customers							1					1
48. Internal									1			1

Green Management											
49. Green Product/Process Design								1			1
50. Pro Environmental Behavior	1										1
51. Dynamic Sustainable capabilities		1									1
52. Environmental Knowledge	1										1
53. Decision making effectiveness				1							1
54. Decision making efficiency				1							1
55. Average Individual Goal Accomplishment								1			1
56. Business E commitment								1			1
57. Effectiveness of Environmental mgt. process								1			1

58. Green Practice Adoption	1										1
59. Green Practice Innovation		1									1

Table 2:

Selected Antecedents for the study	Used as Antecedent of Environmental performance	Frequency
Green Innovation	1. Green Innovation (2019, 2020, 2021, 2021 and 2022) 2. Green Innovation strategy (2020) 3. Green innovative actions (2020)	7
Green Information system	1. Green IS (2013, 2017, 2018)	3
Green HRM	Green HRM (2020, 2021, 2022, 2022, 2023) Green Recruitment and Selection (2022) Green Performance Management (2022) Green Compensation (2022) GHRM practices (2021)	9

GREEN PRACTICES ORGANIZATION SHOULD ADOPT TO ACHIEVE ENVIRONMENTAL PERFORMANCE THAT COULD HELP IN ATTAINING SUSTAINBLE COMPETITIVE ADVANTAGE

Dear Participant,

My name is Haleema Qureshi, and I am a MS student at National University of Science and Technology Islamabad. For my MS thesis, I am examining the role of green practices with the environmental performance that will help organizations in attaining sustainable competitive advantage. I request you to participate in this research by completing the attached survey.

The following questionnaire will require approximately 10 minutes to complete. The data collected will provide useful information regarding the above-mentioned factors. Completion and return of questionnaire will indicate your willingness to participate in this study. Data shared by the respondents will remain confidential and will only be used for the purpose of this study. If you require additional information or have questions, please contact us at the details given below.

Thank you for taking the time to assist me in my educational endeavors.

Sincerely,

Haleema Qureshi

Student of MS-HRM

NUST Business School, Islamabad . Email: haleema.mhr21nbs@student.nust.edu.pk

Supervisor

Assoc. Prof. Dr. Asad Amjad NUST Business School, Islamabad

asad.amjad@nbs.nust.edu.pk

Section A:

Demographic Information

1.	Gender	□ Male	□ Female	□Transgender
2.	Age	□ 21-30 □ 31-40 □ 41-50 □ Above 50		
3.	Qualification	□ Undergraduate □ Graduate □ Post Graduate □ Other		
4.	Industry/Sector *(Please Specify)*			
5.	Current Designation*(Please Specify)*			
6.	Experience *(Please Specify)*	□ Less than 1year □ 1-2 years □ 2-3 years □ 3-4 years □ 4-5 years □ More than 5 years		
7.	City *(Please Specify)*			

SECTION B:

FOR EACH STATEMENT BELOW PLEASE CIRCLE/TICK MARK THE APPROPRIATE RESPONSES:

1 = Strongly Disagree (SDA), 2 = Disagree (DA), 3 = Neutral (N), 4 = Agree (A),   5 = Strongly Agree (SA)

GREEN INNOVATION	SDA (1)	DA (2)	N (3)	A (4)	SA (5)
1. My organization has a short-term objective for green innovation in the firm	1	2	3	4	5
2. My organization has a Long-term vision for green innovation in	1	2	3	4	5

the firm					
3. My organization has clear plan for how to conduct green innovation activities at workplace.	1	2	3	4	5
4. My organization takes part in designing recyclable, reusable, recoverable materials or components	1	2	3	4	5
5. My organization takes part in designing products that are materials-saving and energy-saving	1	2	3	4	5
6. My organization improves the production processes to reduce emissions of hazardous materials and waste	1	2	3	4	5

1 = Strongly Disagree (SDA), 2 = Disagree (DA), 3 = Neutral (N), 4 = Agree (A), 5 = Strongly Agree (SA)

GREEN INFORMATION SYSTEM	SDA (1)	DA (2)	N (3)	A (4)	SA (5)
1. My company has a formal system regarding environment improvement in operation	1	2	3	4	5
2. In my organization, we have formal department that is responsible for environmental affairs	1	2	3	4	5

3. In my organization, the practices and steps in the system regarding green practices are widely available	1	2	3	4	5
4. In my organization, we formally track and report the EP within our company	1	2	3	4	5
5. In my organization, we regularly track, monitor, and share environmental information within company	1	2	3	4	5
6. My firm has a well-developed database to track and monitor environmental issues	1	2	3	4	5

1 = Strongly Disagree (SDA), 2 = Disagree (DA), 3 = Neutral (N), 4 = Agree (A),

5 = Strongly Agree (SA)

GREEN HUMAN RESOURCE MANAGEMENT	SDA (1)	DA (2)	N (3)	A (4)	SA (5)
1. My company sets green goals for its employees.	1	2	3	4	5
2. My company provides employees with green training to promote green values.	1	2	3	4	5
3. My company provides employees with green training to develop employees' knowledge and skills required for green management.	1	2	3	4	5

4. My company considers employees' workplace green behavior in performance appraisals.	1	2	3	4	5
5. My company relates employees' workplace green behaviors to rewards and compensation.	1	2	3	4	5
6. My company considers employees' workplace green behaviors in promotion.	1	2	3	4	5

1 = Strongly Disagree (SDA), 2 = Disagree (DA), 3 = Neutral (N), 4 = Agree (A),

5 = Strongly Agree (SA)

GREEN SHARED VISION	**SDA (1)**	**DA (2)**	**N (3)**	**A (4)**	**SA (5)**
1. A commonality of environmental goals exists in the company.	1	2	3	4	5
2. My organization have total agreement on the strategic environmental direction of the organization.	1	2	3	4	5
3. All members in the organization are committed to the environmental strategies.	1	2	3	4	5
4. Employees of the organization are enthusiastic about the collective environmental mission of the organization.	1	2	3	4	5

1 = Strongly Disagree (SDA), 2 = Disagree (DA), 3 = Neutral (N), 4 = Agree (A),

5 = Strongly Agree (SA)

Environmental performance (EP)	SDA (1)	DA (2)	N (3)	A (4)	SA (5)
1. My organization has improved compliance with environmental standards.	1	2	3	4	5
2. My organization has reduced their air emissions.	1	2	3	4	5
3. . My organization has reduced energy consumption	1	2	3	4	5
4. My organization has reduced material usage	1	2	3	4	5
5. My organization has reduced consumption of hazardous materials.	1	2	3	4	5

1 = Strongly Disagree (SDA), 2 = Disagree (DA), 3 = Neutral (N), 4 = Agree (A),

5 = Strongly Agree (SA)

SUSTAINABLE COMPETITVE ADVANTAGE	SDA (1)	DA (2)	N (3)	A (4)	SA (5)
1. Our Organization's revenue with new products/services is much better in relation to our competitors'.	1	2	3	4	5
2. Our operation costs, during production and/or service delivery, is inferior to our competitors'.	1	2	3	4	5

3. The profitability with new products/services is much better in relation to our competitors'.	1	2	3	4	5
4. Our new products/services incorporate knowledge and concepts of environmental sustainability.	1	2	3	4	5
5. Our new products/services are produced and offered respecting the entrepreneurial social responsibility precepts.	1	2	3	4	5