The impact of Green Human Capital (GHC) on Pro Environment Behavior (PEB): The mediating role of Green Product Innovation and moderating role of Green Product Awareness

Abstract

Purpose: This study investigates the relationship between pro-environment behavior and Green Human Capital, or the knowledge, abilities, and environmental consciousness of personnel within a company. It looks at the mediating role of green product innovation and makes the case that staff members who are aware of environmental issues could spur creativity in the creation of green products and encourage more environmentally friendly conduct. The study examines the moderating effect of green product awareness, focusing on how people's knowledge of environmentally friendly products influences the association between green human capital and pro-environment behavior. The results can help firms maximize the influence of human capital on ecologically conscious behavior and promote sustainable practices.

Design/methodology: Survey data was collected from 300 workers in software and hardcopy form and were assessed through SPSS software.

Findings: The study proposes that the positive influence of GHC on PEB is mediated by the presence of Green Product Innovation, suggesting that organizations with environmentally knowledgeable and skilled personnel are more likely to foster innovation in green product development, leading to enhanced pro-environment behaviors. The study explores the moderating role of Green Product Awareness, positing that individuals' awareness of environmentally friendly products can amplify or mitigate the relationship between GHC and PEB. Understanding these dynamics is crucial for organizations aiming to leverage their human capital for sustainable and environmentally conscious practices. The findings of the study are overall positive in nature.

Limitations: The study provides light on the relationship between Pro-Environmental Behavior (PEB) and Green Human Capital (GHC), but its cross-sectional design makes it difficult to determine cause and effect. The ability to apply of the findings may be impacted by the specific to an industry context and social desirability bias in self-reported data. Further research incorporating objective measures, a range of industry perspectives, individual and external factor examinations, and longitudinal methods can help us better understand the complex relationships between GHC, PEB, and related variables.

Significance: Green Product Innovation has a mediating effect and Green Product Awareness has a moderating role in Pro-Environmental Behavior (PEB). The study emphasizes the importance of Green Human Capital (GHC) in influencing PEB. These findings provide helpful data for promoting sustainable

practices in organizations by highlighting the interrelated dynamics between human capital, innovation, awareness, and environmental behavior.

Originality: The relationship between Green Human Capital (GHC) and Pro-Environment Behavior (PEB) is examined in this study, which is unusual in that it concentrates on the mediating role of Green Product Innovation. It advances the subject by examining the moderating effect of Green Product Awareness and examining the ways in which people's awareness of eco-friendly items affects the relationship between GHC and PEB. Its complete approach, which clarifies the complex relationships between innovation, environmental behavior, human capital, and awareness in the context of sustainability, is what makes it unique.

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Chapter 1: Introduction

1.1 Background

Sustainability, as initially framed by the World Commission on Environment and Development in 1987, refers to a development approach that addresses the current generation's needs without risking the capacity of future generations to fulfill their own needs. This concept extends beyond environmental concerns to encompass economic and social aspects, emphasizing a complete approach to ensure long-term well-being and balance between economic growth, social welfare, and environmental preservation. This definition remains a fundamental principle guiding sustainable development efforts globally. Organizations all throughout the world are struggling with a crucial issue in an era characterized by intensifying environmental concerns and the mounting need for sustainable practices: how to encourage pro-environmental behavior within their workforce? The term "green human capital" (GHC) refers to a set of dimensions that include environmental knowledge, sustainability strategy, eco-friendly technologies, human, structural, relational, innovative, cultural, and informational aspects. These factors, which serve as the foundation for the company's green initiatives and innovations, reflect its expertise, assets, and dedication to environmental sustainability. "Green Human capital," or employees with the know-how, aptitude, and passion to spearhead environmental projects, has become an important component in this endeavor as, GIC (Green Intellectual Capital) focused on laws regarding nature and the environment carry claws to incorporate GIC practices into industrial processes and products (Mughal, 2023). In many developed countries, (Ansu-Mensah, 2021)), green products are now the most dependable solution for environmental sustainability. The sustainable development goals (SDGs) were introduced in 2015 because of the importance of green products for both the environment and human growth and development. By 2030, "responsible consumption and production patterns" must be achieved, according to SDG. "Green business" strategies assist companies in generating higher profits through cost savings. These actions support socially responsible behaviors that enhance natural systems and give workers a comfortable location to work. Well-known companies in industrialized nations have adopted green initiatives to raise awareness of environmental sustainability (Rani, S., & Mishra, K, 2014). Even though it is obvious that GHRM improves environmental performance, relatively few research has looked at its function holistically.

According to (Lestari, E. R et al, (2021), the relationship between green awareness and the purchase of environmentally friendly products has been the subject of much prior research, especially with regard to

customer attitudes towards such products. There is a positive correlation between green awareness and the intention to buy green products, according to numerous studies. Although green marketing has become more well-known for its ability to increase consumers' intentions to make green purchases, little research has been done on how contingent corporate image influences consumers' decisions to buy green products. Corporate image has the capacity to create a long-lasting competitive advantage since it develops gradually and is difficult to imitate. Establishing a positive corporate image is crucial for building customer trust, as it suggests that the company's products are of superior quality and can satisfy customers. More future study is required to build up a strategic and comprehensive model of human resource development in order to successfully combine culture, organizational transformation, and high technology,' writes Wang (2005) (Aftab, J. et al 2023). One of the research established the mediator function of GI amid green HRM and CEP. The consequences disclosed that GI played a mediator role concerning green HRM and CEP. Existing studies have also shown a significant affiliation between green HRM, as well as GI and the performance of an organization, in an outline of a circular economy (Khan, W. et al 2023). One significant factor that has garnered attention is the concept of green intellectual capital. Green intellectual capital refers to the knowledge, skills, and abilities of employees that are specifically oriented toward promoting sustainability and environmental stewardship within an organization. It encompasses employees' awareness, understanding, and commitment to sustainable practices, as well as their ability to contribute to green initiatives and drive positive environmental outcomes. Although past research (Liao et al, (2021) explored GIC in relation to environmental management and green innovation (Chen, 2008), few studies have examined employees' pro-environmental behavior. The study investigated how GHC influenced employees' pro environmental behavior toward their organization and evaluated the role of CSR. The recent study, Green human Capital (GHC) refers to an organization's collection of knowledge, skills, and competences connected to sustainability and environmentally responsible practices.

Several future works can be extracted just from this study, and this is the strength of this research that it can benefit others and can open new avenues of research. Another study suggested Green innovation acts as a bridge between green intellectual resource management and environmental performance (Hayes &Preacher, 2010) and (Shammari 2022) but according to his research it played a very minimum role so further elaboration regarding green innovation term green product innovation was suggested to keep it as a mediator for further study. Green innovation, according to the findings, mediates the link between green human resource management practices and sustainable performance. In this fluid environment, the idea

of "green innovation" is crucial, acting as a link between the development of green human capital and the actual expression of pro-environmental behavior inside organizations. The purpose of this study is to investigate the complex relationships between these critical components: "green human capital" as the independent variable, "green product innovation" as a mediator, "green product awareness" as a moderator, and "pro-environmental behavior" as the ultimate dependent variable. Green Product Innovation, which serves as a mediator, complicates this relationship. It highlights how advanced, environmentally conscious products can bridge the gap between human capital and sustainable behavior. The growing emphasis on green innovations by businesses and industries underscores the importance of comprehending the transitional role of these products in promoting eco-friendly decisions. Furthermore, Consumers' decisions to purchase environmentally friendly products are influenced by their awareness of green products. By creating, using, and labelling products responsibly, we can lessen the negative effects of human activity on the environment and preserve it for future generations. Customers are growing more thorough about protecting the environment. In compliance with all environmental safety regulations, Toyota Motor introduced environmental technologies that are useful in the development of hybrid cars (Delafrooz, Author).

An important area of sustainability research is the connection between Pro-Environment Behavior (PEB) and Green Human Capital (GHC). The term "green human capital" describes people's knowledge, abilities, and dedication to environmental innovation and conservation (Chen, 2008). Behavior that promotes the health of the environment is referred to as pro-environment behavior. Investigating potential moderating and mediating factors is necessary to comprehend the interaction between GHC and PEB.

Green product innovation plays a mediating role in the development of environmentally friendly products. It is the process through which the creativity and knowledge inherent in GHC are applied to create these products. Research has shown that staff members' dedication and experience are crucial in fostering innovation in environmentally friendly products (Chen & Chang, 2013). One could argue that the beneficial effects of GHC on PEB is, in part, channeled through the promotion of Green Product Innovation. Moderation of Green Product Awareness: The degree to which people are aware of and knowledgeable about eco-friendly products is the moderating role of green product awareness. The relationship between GHC and PEB may get stronger or weaker as a result of this awareness. People who have a high level of Green Product Awareness might be more likely to act in ways that support the environment. Conversely, a lack of awareness could reduce the effect of GHC on PEB. Research on

consumer behavior, for example, indicates that making environmentally conscious decisions is largely dependent on awareness. Chen and Chang's (2013) empirical investigation establishes a crucial link between GHC and PEB through the mediating pathway of Green Product Innovation. Their findings underscore that organizations endowed with higher levels of GHC, encapsulating employees' environmental knowledge and commitment, exhibit a greater propensity for innovative practices such as the development of environmentally friendly products. This implies that the positive influence of GHC on PEB is, in part, channeled through the facilitation of Green Product Innovation.

The review of the literature points to the complexity of the relationship between Green Human Capital and Pro-Environment Behavior. The pathway through which GHC influences PEB is highlighted by the mediating role of Green Product Innovation, and the significance of individual awareness levels in influencing this relationship is highlighted by the moderating role of Green Product Awareness. Comprehending these dynamics is imperative for establishments seeking to cultivate a sustainable and ecologically aware work environment. In the context of workplace behavior, Kotchen and Reiling's (2000) research on consumer behavior provides a foundation for understanding the moderating role of Green Product Awareness in the relationship between GHC and PEB. High levels of Green Product Awareness among individuals may amplify the impact of GHC on PEB, as informed and conscious employees are more likely to translate their environmental knowledge and commitment into pro-environmental actions. Low awareness might impede the translation of GHC into PEB.

The current study used Green Product Awareness as a moderating effect between Green Human Capital and Green Product Innovation which influences their impact on pro environmental behavior. Organizations with strong green awareness will maximize green human capital's beneficial impact on green innovation. As a result of this improved green innovation, employees will exhibit more pro-environmental behavior as the study where GIC is assessed by individual that green intellectual capital involves evaluating an organization's expertise, resources, and commitment to environmental sustainability. This assessment considers factors such as knowledge, skills, innovation, partnerships, performance metrics, and organizational culture, leading to an overall evaluation of the organization's environmental intellectual assets. It helps organizations understand their strengths and areas for improvement in promoting sustainability.

Environmental Behavior (PEB), and Green Human Capital (GHC) interact to form the dynamic landscape of sustainable practices in the banking industry. This synthesis examines how GHC affects PEB while

taking into account how moderating factors like Green Product Awareness in banks interact with mediating factors like GPI. Green Human Capital (GHC) in banks embodies the collective knowledge, skills, and commitment of employees toward environmental sustainability. In this industry, workers are essential not only to the provision of financial services but also to the promotion of environmentally friendly projects and the development of a sustainable culture within the company. In the banking industry, pro-environmental behavior, or PEB, refers to choices and actions that support environmental sustainability. In order to contribute to a more sustainable financial ecosystem, this entails implementing both internal practices—such as energy-efficient operations—and external initiatives—such as encouraging green investment options for customers. In banking, Green Product Innovation (GPI) refers to the creation of financial services and products that incorporate environmental factors. Sustainable investment portfolios, green loans, and other financial products intended to encourage environmentally friendly activities and address environmental issues in banking procedures are a few examples. Empirical research, such as that conducted by Chen and Chang (2013), indicates that the introduction of Green Product Innovation may act as a mediating factor in the positive impact of GHC on PEB. Within the banking sector, workers possessing strong Green Human Capital play a vital role in the creation and execution of novel financial offerings that are in harmony with environmental sustainability. In turn, impacts pro-environmental behaviors from both the inside and outside the company. Particularly significance is the moderating impact of green product awareness in banks. Research by Kam-Sing Wong (2012) and (Chiou et al., 2011) emphasize that employee and customer awareness levels are critical to the success of Green Product Innovation and its ensuing influence on PEB. Increased consciousness could potentially augment the efficacy of environmentally conscious endeavors in the banking industry.

We hope to gain a better understanding of how organizations can strategically leverage their human capital, awareness capabilities, and innovation practices to foster and amplify pro-environmental behavior, ultimately contributing to a more sustainable and environmentally responsive future by investigating these relationships. Combining the Resource-Based View (RBV) enhances our theoretical understanding. The RBV elucidates how GHC, as a valuable organizational resource, contributes to a competitive advantage by fostering innovative practices like Green Product Innovation. We will go into the theoretical framework, research methodology, data analysis, and conclusions in the next chapters, which will give vital insights into this critical nexus. This study is not only academically noteworthy, but it is also practical in that it provides a road map for organizations looking to traverse the sustainability landscape and build a culture of pro-environmental behavior.

1.2 Problem Definition/Research Gap

The current study will take Green Product Awareness as moderating effect as it has gained prominence in various organizational contexts. Their role in moderating the relationship between GHC and green innovation, and subsequently their effect on pro-environmental behavior, is still an unexplored research area. According to another study by (Abbas, J. et al 2023) several research have proposed novel ways and models to address climate change concerns and accomplish long-term development goals. The investigation of Green Human Capital (GHC) as an independent variable is supported by the RBV paradigm. It makes the argument that resources that are rare, valuable, and unique can give an advantage over competitors. Pro-environmental behavior is the dependent variable, green product innovation is the mediating variable, Green product awareness is the moderating variable, and GHC is the independent variable. One such resource that helps a company be more environmentally conscious and innovative is GHC.

The current study will focus on Green Human capital as independent variable because there is a lack of comprehensive research that investigates the direct impact of GHC on pro-environmental behavior within organizations. The importance of GHC is acknowledged, the specific mechanisms through which it influences green behavior remain poorly understood. Recent research by (Nawaz, & Tayyab, M. 2022) suggests analyzing how green management is dispersed among an organization's multiple functional areas in order to assess contemporaneous results and the reciprocal relationships among the various functions (Lei et al., 2021). Few research looked on the usage of green management systems in human resources, as well as the relationship between the two. Green human resource management (GHRM) and green innovation (GI) are generally known to have a good influence on the environment, but few research has been conducted to study their relationship (Seeck & Diehl, 2017). Although accepting that GHRM practices shape GSCM practices internally, some scholars have largely focused on the external constraints that organization's experience. One study (Borah et al., 2023) argued that product and process innovation were the two dimensions of GIC; the higher-order variable was the subject of this investigation. This is not incorrect; however, evaluating the specific impacts of green product and process innovations could yield fresh insights into the function of GHC. Future studies could look into the distinct functions of green innovations in processes and products. The study avoided using exploitation in favor of concentrating solely on knowledge acquisition (green). These might be crucial in illuminating the part that knowledge plays in green innovation. Subsequent research activities may examine the evaluation of green absorptive

capacity in relation to a firm's green innovation. The recent research observes the mediating role of green innovation in the relationship between GHC and pro-environmental behavior is not well-established. It is necessary to clarify how the innovative processes, particularly those aligned with environmental sustainability, mediate the effect of GHC on pro-environmental behavior. Addressing these research gaps will not only help us gain a better understanding of the relationship between GHC, Green Product Awareness, green product innovation, and pro-environmental behavior, but will also provide practical insights for organizations looking to improve their sustainability. Targeting banking industry personnel, a quantitative research approach utilizing surveys and statistical analysis will be used. The setting takes into account the special difficulties posed by worries about climate change as well as the role that finance plays in sustainability. The study intends to contribute to theory and practice for companies looking to improve sustainability initiatives by shedding light on how GHC, Green product awareness, and green product innovation affect pro-environmental behavior in the banking sector.

1.3 Research Questions

1. What is the impact of Green human Capital on Pro environmental Behavior in Organizational settings?
2. What is the impact of Green human Capital on Green Product Innovation?
3. What is the impact of Green Product Innovation on Pro Environmental behavior?
4. Does Green Product Awareness moderate the relationship between Green human Capital and Pro environmental Behavior?
5. Does Green Product Innovation mediates the relationship between Green human capital and pro environmental behavior?

1.4 Research Objectives

1. To investigate the impact of green human capital on pro environmental behavior.
2. To investigate the impact of green human capital on green product innovation.
3. To investigate the impact of green product innovation on pro environmental behavior.
4. To examine the moderating role of green product awareness on the relationship between green human capital and pro environmental behavior.
5. To examine the mediating role of green product innovation between green human capital and pro environmental behavior.

1.5 Significance of the study

According to Munawar (2022), the value of the study comes in its investigation of how green human resource management (GHRM) influences green innovation via characteristics such as green intellectual capital, environmental knowledge, and managerial environmental concern. This research is crucial for fostering sustainability, corporate responsibility, competitive advantage, employee development, and effective leadership practices, with consequences for businesses, policy creation, and academic knowledge of these critical themes. In order to successfully execute a sustainable environmental plan, companies must be motivated to improve the green attitudes and behaviors of their workforce in unity with green organizational objectives (Aliet al., 2022). An essential part of environmental management is played by green HRM by implementing suitable behaviour related to the job with ease and flexibility among workers. According to Ghouri et al. (2020), green HRM can increase the uptake of environmentally friendly practices by creating a culture of support and developing capabilities. Presenting the idea of a green work-life can also improve the roles that employees play in the workplace harmony (Wen and others, 2022). According to the Gimet al. (2022) investigation, the entire spectrum of green despite receiving more attention from some organizations, some do not adopt HRM practice other people. The effect of green HRM techniques on the environmental performance might necessitate focused efforts in subsequent studies. Awareness is still having a little evidence linking green HRM practices to environmental performance (EP). The current study signifies its potential to foster environmental sustainability within organizations. It offers insights into how green human capital, facilitated by green product awareness and driven by green product innovation, influences pro environmental behavior because it will examine the connections between pro-environmental behavior, green product innovation, green product awareness, and green human capital, this study is important. In order to promote environmental sustainability and innovation in product offerings, it provides businesses, policymakers, and academics with insights into the factors that shape sustainable consumer behavior. This research not only informs practical strategies for organizations but also contributes to the academic understanding of sustainability, innovation, and human resource management. It aligns with global efforts to reduce environmental impact, improve corporate reputation, and enhance competitive advantage in a sustainable world and target sector for this study is Banking sector.

1.6 Definitions of study variables

1.6.1 Green Intellectual Capital

Green intellectual capital is a collection of intangible organizational skills, knowledge, experiences, routines and information. GIC has been tried in a variety of sectors and industries and it has influenced policies, practices and routines, as well as modified management and knowledge workers attitudes towards ecology, naturalism and futurism (Mughal et al, 2023).

1.6.2 Green Product Awareness

Green awareness means reducing the consumption of conventional products and switching to environmentally friendly products. (Lestari 2021)

1.6.3 Green Product Innovation

Green Innovation includes all types of creations that contribute to the development of significant goods, services or processes that decrease environment harm, impact and degradation while optimizing the use of natural resources. (Millan et al, 2017). Green product is explained as a term that can be used to define a product which does not eat up resources or degrades the environment and has the ability to ensure the safeguarding of the environment. (Jaiswal, N. (2012)).

1.6.4 Pro Environmental Behavior

Pro Environmental Behavior are described as "actions and behaviors that employees engage in that are related to and either contribute to and either contribute to or detract from environmental sustainability" (Ones and Dilchert 2012).

Chapter 2: Literature Review

2.1 Green Human Capital and Pro Environmental Behavior

(Wright et al., 1994) and (Chen 2008) both state that an organization's resource pool should be used to preserve its competitive advantage. Because employees' skills and experience are necessary to sustain a business in the cutthroat market of today, intellectual capital is a vital strategic asset for maintaining organizational effectiveness (Yong et al., 2019). Have noted that there is a dearth of literature that illustrates the widespread existence of green human capital. Thus, exhibiting green human capital may represent an organization's intangible assets (knowledge, abilities, and skills) and help it carry out green projects within a challenging business environment. A company's top management must be fully committed to achieving its goals, and they play a crucial role in carrying out green initiatives (Yusliza et al., 2019). Although previous study on intellectual capital has been extensive, few studies have studied human capital in connection to environmental management or green innovation until Chen (2008) introduced a unique construct (i.e., GHC) for investigating human capital in this domain and to investigate further.

According to a different study, pro-environmental behavior is defined as actions that either enhance or minimize negative environmental effects (Steg & Vlek, 2009). Buying organic products, recycling, and energy conservation are a few examples. People have a moral obligation or a sense of responsibility to act in a way that benefits the environment, according to Schwartz (1977). If staff members were more aware of the entire portfolio of all intangible assets, including knowledge about environmental protection or green capabilities and connections within a firm, they may make decisions that benefit the company ecosystem, and will gladly take steps to maintain it. Companies that choose to engage in proactive environmental management could include environmental preservation goals in their plan to work with other departments to address environmental problems through the development of innovative technologies (Yi et al., 2019). Organizations that support GHC may raise environmental stress levels among their staff, promote environmental consciousness, and reward environmentally friendly behavior. Green intellectual capital gives people and organizations the information, abilities, and consciousness needed to comprehend and implement sustainable practices, which has a positive impact on pro-environmental behavior. It gives people the knowledge of environmental problems, the skills to spot sustainable opportunities, and the ability to adopt environmentally friendly practices. People are more likely to adopt pro-environmental

behaviors when Green Human Capital is utilized, which has a positive effect on the environment and contributing to sustainable development.

Another study argued that strong knowledge, abilities, and competences enable people to carry out their jobs more effectively, which improves organizational performance. Employees' environmental knowledge and skills impact their pro-environmental behavior, which encompasses both voluntary and task-related actions. People with non-physical resources, like environmental knowledge, are more likely to take the extra effort for environmental initiatives and engage in environmentally friendly behaviors, according to Social Cognitive Theory (Bandura, 1986). Pro-environmental behavior is greatly influenced by green human capital.

(Wright et al., 1994) highlight the fact that human capital is essential to sustaining corporate efficiency and that retaining a competitive edge depends on the pool of resources that are readily available. There is little research on the existence of green human capital, despite the fact that human expertise is crucial in today's competitive environment (Yong et al., 2019). Considering that education systems are important for developing green talent, workers' expertise, and manufacturing process improvements, showcasing green human capital is essential because it represents an organization's intangible assets, like knowledge and capabilities. It becomes possible to implement green strategies in intricate business environments. Recognizing the critical role that top management plays in ensuring a company achieves its objectives, (Yusliza et al., 2019) assert that a company's goals are achievable through the pivotal role of top management in implementing green initiatives.

One study taken GHC as mediator by Chen (2008) defined green human capital as employees' knowledge, skills, experiences, creativity, and dedication to green innovation or environmental protection that are found inside people rather than in organizations. Acknowledged as an important concept in organizational science (Yong et al., 2019), it is essential to the implementation of green HRM techniques (Chen & Chang, 2013). According to Campbell et al. (2012), one of the main factors influencing the adoption of green human resources management is employees' sustainability-related skills and knowledge. Employees' knowledge and skills improve and their perception of the organization's commitment to environmental sustainability increases, all of which lead to a rise in employee commitment to the organization (Chahal & Bakshi, 2014). The argument put forth by Delgado-Verde et al. (2014) is that green human capital serves as a mediator, facilitating the association between green human resource management and employee commitment.

One study argued the Resource-Based View (RBV) theory emphasizes the significance of human capital in enhancing organizational performance and gaining a competitive edge in a dynamic business environment (Barney, 1991). Research suggests that Green Human Capital (GHC), encompassing knowledge, capabilities, creativity, skills, and environmental commitment of employees, is an asset crucial for organizational success and environmental protection (Chen, 2008a). Investments in human capital, including GHC, are seen as imperative for organizational development and improved performance (Chen, 2008b; Yong et al., 2020a). According to RBV, organizations must strategically utilize their scarce resources, making them valuable and distinct to gain a competitive advantage (Bužavaitė & Korsakienė, 2022; Korsakienė & Raišienė, 2022). Human capital, being an intangible asset, is particularly crucial, and studies underscore the importance of retaining this asset for enhancing employee satisfaction (Allameh et al., 2018). While research on GHC is still limited, it is suggested that implementing training programs for developing green abilities and improving skills can harness GHC as a critical asset, enabling organizations to integrate green strategies effectively in a dynamic environment and align goals at all levels while enhancing management commitment.

According to Wright et al. (1994) and Chen (2008), the Resource-Based View (RBV) paradigm highlights that an organization's competitive edge is derived from its distinct resource base. This theory highlights the significance of human talent and knowledge as crucial strategic assets for sustaining company efficiency and carrying out green initiatives in the context of green human capital and pro environmental behavior. The idea that GHC represents significant intangible assets that help organizations manage challenging business situations and match their objectives with environmental sustainability is supported by RBV theory. In keeping with the RBV principles, GHC equips people and organizations with the information, abilities, and awareness needed to promote sustainable practices, encourage pro-environmental behavior, and support overall sustainable development.

One study by (Malik, S.Y et al 2020) According to the Resource-Based View (RBV) philosophy, organizational, physical, and human resources can all be considered as important and unique collections that make up an organization. These assets serve as the cornerstone for both long-term superior performance in the market and a sustainable competitive advantage. An organization's ability to survive and compete is influenced by both tangible assets, like buildings and machinery, and intangible assets, like goodwill and trademarks. It is thought that intellectual capital and human resources are the most important of these resources. According to RBV, having highly qualified workers is a major source of

competitive advantage, and making the most out of strategic initiatives requires efficient human resource management. Organizations can gain a competitive advantage in the sustainability space by diversifying their offers in terms of goods and services, streamlining their supply chain, and implementing eco-friendly practices.

Achieving sustainability calls for tackling societal issues, boosting environmental awareness, valuing human resources, and boosting earnings. Companies that give these factors top priority are more sustainable and in line with environmental goals as well as ecological balance.

o *H1: Green human capital positively influences green behavior.*

2.2 Green Human Capital and Green Product Innovation

According to (Ahmed et al 2023), worldwide sustainability has undergone rapid growth in the last decade, and rising environmental consciousness is critical for the development of green human capital. According to López-Gamero et al. (2010), the notion of sustainability aims at the future performance of businesses rather than present performance, and there is a need to understand the issues of sustainability via knowledge. Information may be leveraged and acquired in a corporation using many methods to gain a competitive advantage through human capital. Green human capital is the combination of Green intellectual capital with further dimensions with environmental issues at the organizational or individual level, including all forms of intangible assets such as competences, information, and relationships (Chen, 2008). According to (Yusliza, M. Y., Yong, J. Y. et al 2020). Green human capital, according to López-Gamero et al. (2011), is "the sum of all knowledge that an organization is able to leverage in the process of conducting environmental management to gain competitive advantage". In general, human capital is recognized as a complex concept that corroborates it as an intangible and non-physical resource of organizations based on practical capabilities, experience, and knowledge to build the organization's value (Allameh, 2018; Sydler, Haefliger, & Pruksa, 2014). Within the organization, knowledge may be found in a variety of forms, including corporate databases, personnel, external or internal relationships, business processes, and systems (Yong et al., 2019).

Green innovation may be described as services, products, and processes that do not hurt or lessen the degradation of an environmentally friendly environment while also enhancing natural resources. The two dimensions of green innovation are green goods and green products. Green innovation is linked to energy efficiency, the reduction of carbon and fossil fuel emissions, waste management, the development of

renewable commodities, and corporate environmental protection. The relationship between organization, green innovation, and environmental consequence was described and refined by (Yunzhao and Ahmed et al). According to the research findings, the combination of green innovation, green operations, and creativity has a favorable influence on the organization's social, environmental, and organizational performance. The findings also confirmed that adopting 'green principles' causes manufacturers to focus on building creative procedures to better meet consumer wants, resulting in greater customer service and sales. (Amir et al. and Huang et al) both said that customers' gravitation stimulates green organizational responses that boost green innovation functioning. In the face of mounting environmental pressure, producers are finding that green innovation is more and more essential to achieving sustainable growth. The practice of green innovation is being adopted by a growing number of companies striving for ecological accountability. This policy is beneficial to all parties involved as it resolves the conflict between faster economic growth and awareness of the environment (Huang, Yang, and 2016 Wong). Green innovation is the use of environmentally friendly technology, regulations, and management techniques to lessen their negative effects on the environment carbon emissions and resource utilization. To reduce the adverse impact on the environment at any time the lifecycle of a product, modifications to an existing both a process and a product are necessary (Christmann 2000; Huang and Li (2015); Chen, Lai, and Wen (2006).

On study (Ahmar, N., & Astuti, T. (2023)) claimed that Examining how green innovation and intellectual capital affect competitive advantage is the main goal of this study. According to legitimacy theory, businesses can become more legitimate by creating intellectual capital and green innovations while taking into account the rights of investors and the general public. This is meeting consumer demands while maintaining quality standards by creating products that are recyclable, energy-efficient, and friendly to the environment. A company's operations, resources, and product demand may be restricted as a result of supports for violating public rights. In order to attract investments and send out positive signals to investors, Signaling Theory emphasizes how important it is for businesses to communicate their green intellectual capital, innovation, and competitive advantage through sustainability reports and annual reports. Furthermore, it is essential for stakeholders to have access to information regarding a company's earnings as well as its social, intellectual, and environmental performance. The Resource-Based View (RBV) theory provides additional support for the notion that businesses can increase their competitive advantage through the ownership, exploitation, and revelation of superior natural resources. This enables

them to create sustainable products and gain a competitive advantage through creative approaches that are difficult for rivals to imitate.

A source of cutting-edge product (direct and indirect material) innovation, green product innovation aims to reduce waste expenses, emissions, negative environmental effects, and resource consumption. Businesses that create green product technologies stand a better chance of obtaining the "first mover advantage" and so enhancing their brand image, breaking into new markets, and gaining competitive advantages. These companies can also improve their product design, efficiency, and durability with regard to environmental considerations (Soylu and Dumville 2011; Wong et al. 2012). Products with lower material or waste consumption throughout their entire life cycle are the focus of green product innovation (Chen, Lai, and Wen 2006; Kammerer 2009; Chiou et al. 2011). Businesses are able to increase resource usage rates, reduce consumption and raw material costs, and save resources as a result create new markets, increase access to new markets, and obtain first mover advantages over the course of the product's whole life cycle, all of which improve the financial and social efficiency of businesses and produce "winwin" results for both the ecosystem and the companies themselves. (Chen, Lai, and Wen 2006; Porter and van der 1995). In product design, it emphasizes getting rid of dangerous chemicals (Chen, Lai, and Wen 2006; Kammerer 2009; Chiou et al. 2011). This suggests that compared to standard or competing products, advanced green products have significantly superior green performance and environmental efficiency (Chang, 2014). Customers are effectively guaranteed the safety of the final product, the company's green brand and green advantages are increased, disposal costs are minimized, environmental laws are upheld, consumers' exposure to the outside world is increased, and businesses become more competitive by them. In order to encourage businesses to find innovative ways to turn waste dumps into marketable and useful products and bring in more money, it also emphasizes extending the life of obsolete materials or enhancing recycling programs (Noci and Verganti 1999). In order to gain a competitive edge, top companies that employ green product innovation will provide renewable technologies or services, improving their reputation as an organization and even opening up new markets (Chang 2011).

The term "green human capital" describes those who are knowledgeable about environmental sustainability and who encourage eco-friendly behaviors in businesses. By using fewer resources and minimizing environmental impact over the course of a product's lifecycle, "green product innovation" involves developing environmentally friendly products. Both ideas are essential to solving environmental issues and promoting sustainability. The primary goal of green product innovation is to lessen the adverse

effects on the environment by incorporating environmental factors (such as material usage, energy consumption, etc.) into the design of both new and modified products throughout the life of the product (Dangelico and Pujari, 2010, Chang, 2011). According to Guoyou et al. (2013), green innovation is "an instrument to improve firms' environmental management process" and is associated with any changes that lead to a decrease in environmental burdens on a technological, organizational, societal, or institutional level. Firms' competitive advantage and reputation are impacted by green product innovation (Chen et al., 2006; Chen, 2008; Wong, 2012). Through an empirical investigation, (Lin et al. (2013)) additionally demonstrated that green product innovation had a favorable impact on firm performance in automobile industry.

In the context of the study, the Resource-Based View (RBV) hypothesis lends credence to the notion that green innovation and green human capital (GIC) are essential resources for businesses looking to gain a competitive edge. GHC, which includes intangible assets and knowledge connected to sustainability, is consistent with the RBV's assertion that special resources are essential for long-term success. "Green human capital" refers to employees who possess sustainability expertise, making them a valuable and uncommon resource that can offer a competitive advantage. "Green product innovation" is a unique competency within RBV that allows businesses to develop products that are sustainable, potentially differentiating them from rivals and enhancing their long-term performance. GHC forms the basis for the creation and use of Green Innovation, which can be understood from an RBV perspective as a unique capacity that improves both organizational and environmental performance. The interaction between Green Innovation and GHC, enabled by RBV principles, promotes ongoing development of sustainable practices and, in the end, produces favorable environmental results.

- o *H2: Green human Capital positively influences Green product innovation*

2.3 Green Innovation and Pro Environmental Behavior.

The relationship of Green Product Innovation (GPI) and Pro-Environmental Behavior (PEB) is a crucial point of merging for the endeavor of sustainable development. This is because companies are realizing the influence that innovative products have on molding environmentally conscious individual behaviors. The extant literature illuminates multiple aspects of this correlation, elucidating the ways in which green product innovation fosters pro-environmental conduct. The beneficial impact of Green Product Innovation on Pro-Environmental Behavior has been demonstrated by numerous studies. Cheng et al. (2014) stress that the launch of cutting-edge green products can act as a trigger for encouraging environmentally

conscious consumer behavior. These products' naturally sustainable qualities and eco-friendly qualities raise people's awareness of environmental issues and encourage them to make decisions that benefit the environment (Dangelico & Pujari, 2010; Chen et al., 2006).

Chiou et al. (2011) and Kam-Sing Wong (2012) both conducted research on consumer attitudes and intentions when it comes to green products. Positive interactions with cutting-edge and eco-friendly products contribute to a positive perception of the company and its sustainability efforts. This in turn affects consumers' pro-environmental behavior, starting a positive feedback loop where inventive product offerings consumer attitudes and behaviors. From an organizational standpoint, research indicates that implementing Green Product Innovation affects employee behavior and internal culture in addition to customer behavior. The transformational impact of green innovation on organizational practices and the consequent positive influence on employee engagement in pro-environmental activities are highlighted by studies by Lin et al. (2013) and Huang & Jim Wu (2010). Research continuously backs up the idea that Green Product Innovation encourages Pro-Environmental Behavior. In order to foster a culture of sustainability and support larger environmental goals, organizations must comprehend the complex dynamics between innovative green offerings and individual behavior as they work to meet consumer demand for sustainable products. This interaction highlights how important it is to develop innovative products.

What is meant by "green product innovation" is the creation and application of products that, over the course of their life cycles, have a lower environmental impact (Cheng et al., 2014). This includes improvements in technology, materials, and general design with the goal of reducing resource usage, waste, and damage to the environment (Pujari, 2006; Christensen, 2011).

Green product, according to Dangelico and Pontrandolfo, are done to minimize environmental consequences, eliminate waste, maximize resource efficiency, and decrease the use of dangerous chemicals in order to safeguard or promote a healthy environment. Green innovations fall into four categories: technology, management duties, aspects of the production process, and product design. The process of changing an existing product design in the course of the product's life cycle assessment is one example of a green innovation in an effort to lessen the adverse effects on the environment (Klassebecause Whybark (1999). According to Zhu and Sarkis (2004), receiving a commitment from managers at the top or middle levels has a big impact on the effective application of internal environmental management. Similarly, Hazen et al. argued that green or eco-products are created to lessen environmental damage

associated with materials, energy, and pollution. It may include eco-materials and recyclable materials. Green product innovation, according to Moon et al., 2020 can be defined as environmental or eco-destined to reduce the negative impact of the production cycle on the environment. To summarize, green products are environmental helpers, or items that positively support environmental development and increase environmental consciousness by implementing ecologically responsible practices or corporate social responsibility in the firm industries (Li, L. Msaad et al 2020).

Another study said that the literature stresses the significance of pro environmental behavior at the workplace since it has an impact Afsar et al., 2016; Cai et al., 2020) believe that branding is vital in developing a company's image. Previous study has focused on Pro Environmental behavior was positioned in the workplace to promote corporate environmental innovations Afsar & Rivenburgh, 2016; Robertson & Barling, 2013 Cai et al., 2020; Li et al., 2019; Alhadid et al., 2016 & As'ad, 2014). Green behavior can take the form of encouraging the exchange of environmental knowledge concerns, highlighting recycling efforts, and promoting the provision of environmental friendly enterprises. This enables employees to understand the significance of green behavior throughout the process of invention (Kim et al., 2017; CAI et al., 2020). In current study when businesses actively invest in and adopt environmentally responsible practices, goods, or technology, they frequently develop a culture of environmental awareness and encourage workers to engage in pro-environmental or green behaviors. Innovations that make it easier or more enticing for people to be environmentally conscious can lead to a beneficial shift in behavior towards sustainability.

The Resource-Based View (RBV) theory supports the idea that green products and pro environmental behavior can serve as valuable resources for organizations seeking a competitive advantage. Green products, designed to minimize environmental impact and promote resource efficiency, align with the RBV's notion that unique resources can enhance a firm's environmental consciousness and image. Green behavior in the workplace, as emphasized by Afsar et al. and others, is integral to promoting corporate environmental innovations, reflecting the RBV's perspective that fostering a culture of environmental awareness can be a distinctive capability. This cultural shift, influenced by innovations that make pro-environmental behaviors more enticing, can lead to a competitive edge for organizations, as it aligns with the RBV's focus on unique, non-substitutable resources contributing to sustainable practices and image development.

- o *H3: Green Product Innovation positively Influences Pro Environmental Behavior.*

2.4 The mediating role of Green Product Innovation between Green Human Capital and Pro Environmental Behavior.

At the top of discussions about sustainable development is the symbiotic relationship that exists between Green Human Capital (GHC), Green Product Innovation (GPI), and Pro-Environmental Behavior (PEB). The body of research on the subject provides a thorough understanding of how an organization's members' combined knowledge, abilities, and dedication (GHC) can spur the development of environmentally friendly products (GPI) and, in turn, affect people's pro-environmental actions. Hen (2008) introduced the idea of "Green Human Capital," which is the sum of an employee's environmental knowledge, skills, experience, wisdom, creativity, and dedication. These components lay the groundwork for developing an organizational culture that is long-lasting. The body of research continuously emphasizes GHC's critical function as a resource that can motivate organizational efforts toward environmental sustainability. According to Cheng et al. (2014), "green product innovation" (GPI) is the process of creating products that have a lower environmental impact over the course of their lives. Sustainable products are a result of advancements in technology, materials, and general design. Research has continuously demonstrated GPI's transformative capacity, highlighting its contribution to economic expansion, environmental preservation, and organizational sustainability (Dangelico & Pujari, 2010; Pujari, 2006).

Green Human Capital and Pro-Environmental Behavior are said to be mediated by Green Product Innovation, according to a number of studies. Empirical research by Chen and Chang (2013), for instance, indicates that companies with higher GHC levels are more likely to work on creative green product development. This suggests that the expertise and dedication of GHC's workforce greatly contributes to the development of ecologically friendly products, which in turn influences pro-environmental behaviors. Studies with a consumer focus, like those by Kam-Sing Wong (2012) and Chiou et al. (2011), examine how Green Product Innovation affects consumers' behavioral intentions and perceptions. Positive interactions with novel and eco-friendly products influence opinions and boost support for eco-friendly projects. This customer viewpoint supports the mediating function of GPI even more by showing how GHC's creative green products have a positive impact on external stakeholders' attitudes and actions. Research by Huang & Jim Wu (2010) and Lin et al. (2013) indicates that, from an organizational standpoint, the implementation of Green Product Innovation impacts employee behavior and internal culture in addition to consumer behavior. The availability of green innovation-derived environmentally

friendly products fosters a sustainable culture within the company and influences employee participation in green initiatives.

Research continually emphasizes how Green Product Innovation acts as a mediator between Green Human Capital and Pro-Environmental Behavior. The aforementioned interdependence highlights the significance of cultivating an informed and dedicated workforce (GHC) that can spearhead inventive green initiatives (GPI), eventually molding a sustainable culture and impacting the environmentally conscious actions of internal and external stakeholders. This coordinated strategy is consistent with the broader goal of promoting sustainable practices and contributing to global environmental goals.

One study suggested that that learning more about how GHRM and GI interact might be helpful in understanding how these variables affect sustained performance. Barney (2001) contended that HRM practices might impact organizational success by transforming workers into exceptional, significant, and distinctive resources by means of the RBV. When a corporation employs such a resource to grow its business, its aims will be better supported. Talent is used in innovation, according to Zhang et al. (2020), to accomplish an organization's objectives. Employees engaged in innovation may also assist the company operate better, which will result in a long-lasting competitive advantage. The methods via which different resources can give you a competitive edge as well. There's an overall agreement in the literature that successful implementation GHC practices play a major role in determining GI (Guletal, (2021). A lack of HRM procedures might lead to the inability to interact with environmentally conscious workers, additionally the traditional corporate culture might be a factor in the unable to use GI. By looking at the effects on sustainable performance, which this research builds upon experimental research (Jamil et al., 2021; Takalo & Tooranloo, 2021). Previous studies have demonstrated that GHRM impacts GI (Guerci et al., 2016). Human resource management bundles or structures may also have an impact on innovation, according to other studies (Feng and Chen, 2018; Fu, 2015; Singh et al., 2020). Executive, procedural, and product innovation (2008) are regulated by human resource management bonds or processes, which also reduce human capital start-ups. Systems for managing human resources are a major source of GI (De Winne and Sels, 2010). The organization's GI orientation is positively impacted by HRM practices that priorities encouraging a mindset of devotion above compliance (Singh et al., 2020). Feng and Chen (2018) suggest that in businesses with a flat organizational structure and a developmental culture, strategic HRM has a favorable impact on product innovation. Environmental performance includes things like using recyclable materials in products, cutting waste and pollution at the source, increasing energy efficiency,

and removing potentially harmful substances from the environment, among other things. End-of-pipeline solutions are less effective in terms of long-term environmental impacts than a company's regulatory measures, which include pollution prevention as well as resource and waste reduction. Previous research indicated that opportunities to enhance environmental performance will increase with improvements in productivity and the manufacturing process. Current situation implies that Green human Capital, comprising knowledge and skills in sustainability, indirectly fosters pro environmental behavior by driving Green Product Innovation. Employees with strong environmental expertise develop innovative solutions and practices, inspiring others to adopt green behaviors and creating a culture of sustainability within the organization as Green product innovation serves as a mediator in the relationship between green human capital and pro-environmental behavior. It does this by directing the experience of environmentally conscious people into the creation of unique, sustainable products that have the power to impact and encourage pro-environmental behavior both among consumers and within organizations.

According to Dangelico and Pujari (2010), green product innovation is the process of creating or improving environmentally friendly products. It has become increasingly important for both growth and environmental sustainability. By developing new and improved products, this strategy seeks to meet market demands and lessen environmental effects over the course of a product's life cycle (Cheng et al., 2014; Christensen, 2011).

Investing in green product innovation helps businesses avoid legal penalties and environmental protests, while also promoting sustainability (Chiou et al., 2011; Kam-Sing Wong, 2012). It creates new avenues for market expansion, promoting success in the green product space. Furthermore, it has been determined that green product innovation is essential for enhancing a company's green image, growing its green competency, and boosting financial performance (Ar, 2012; Chen et al., 2006; Cheng et al., 2014; Huang & Jim Wu, 2010; Lin et al., 2013). These studies highlight the many advantages of adopting green product innovation for business and environmental reasons.

The Resource-Based View (RBV) hypothesis, which is backed by Barney (2001), is relevant and important to this study since it emphasizes how HRM practices help turn employees into extraordinary and unique resources. According to RBV, the study emphasizes that workers who possess green human capital, a knowledge and skill set related to sustainability to become invaluable assets that can promote green innovation. The relationship between Green innovation, Pro Environmental Behavior, and HRM practices is consistent with RBV's focus on distinctive, non-replaceable resources that provide long-term

competitive advantage and performance. The RBV's central theory that valuable resources are essential to organizational success is reflected in the HRM bundles and structures, which impact innovation and human capital development. According to RBV theory, sustained performance can be achieved through promoting a culture of sustainability and green innovation, both of which are indirectly encouraged by green intellectual capital in this context. Green Human Capital, represented by environmentally skilled employees, acts as a valuable resource. Green Product Innovation is a distinctive capability that stems from this resource, enabling the creation of eco-friendly products. This innovation, in turn, influences Pro-Environmental Behavior, mediating the relationship by translating human capital into environmentally responsible actions, aligning with RBV's emphasis on unique resources and capabilities as sources of competitive advantage.

- o *H4: GPI mediates between GHC and PEB*

2.5 Moderating effect by Green Product Awareness between Green Human capital and Pro Environmental Behavior

Green Product Awareness emerges as a critical moderating factor in the complex relationship between Green Human Capital (GHC) and Pro-Environmental Behavior (PEB) in the intricate web of sustainable business practices. The environmental knowledge, abilities, and dedication of individuals within an organization, collectively referred to as "green human capital," have the power to influence how environmentally friendly an organization's operations are. The degree to which this influence manifests itself depends on how aware employees are of green products. Green Product Awareness is a crucial moderator that can either increase or decrease the effect of GHC on PEB, depending on how aware and knowledgeable people are about eco-friendly products. High awareness of eco-friendly product substitutes may lead individuals to convert their GHC into proactive environmental actions, like supporting eco-friendly policies or choosing eco-friendly products. Conversely, individuals with lower levels of Green Product Awareness may exhibit a more restrained connection between their GHC and PEB. Thus, comprehending the moderating influence of Green Product Awareness offers insightful information for organizational leaders who aim to cultivate a sustainable culture. This highlights the significance of concurrently augmenting GHC and the cognizance of green product substitutes in the organizational ecosystem. This careful analysis clarifies the complex interactions that exist between personal experience, corporate culture, and the larger framework of sustainable decision-making in modern work environments.

According to Mostafa (2007), buying products that are environmentally friendly, recyclable, conservable, or sensitive to ecological issues is referred to as engaging in green purchasing behavior. A study by D'Souza et al. (2006) found that customers' intentions to buy green products are generally negatively correlated with their perception of them, especially if they are more expensive and of lower quality than traditional products. In that study "Green marketing - An exploratory research on consumers in Bangalore city," author Hemantha Y. (2009) examined how Bangaloreans felt about green marketing and green branding. In another study Customers are aware of the environmental issues. Green consciousness can alter consumer behaviour in numerous ways, including in terms of consumption habits (Durif, Roy, & Boivin, 2012), degree of preference on eco-friendly merchandise (Trujillo, Arroyo, & Carrete, 2014), choose a product with a level of friendliness that surroundings, or it engages as a client in promoting the significance of environmental eco-friendly goods (Chan, Anira, Rahmi, Rozalia, & 2017; Lita). The business must take this action in order to be further education, and it is applied with the expertise of marketing plan to encourage eco-friendly behavior (Mourad and others, 2012). Giving information that raises consumer awareness of environmental issues is not simple, though; it requires evidence based on marketer statements evaluated by consumers (Rizwan, Mahmood, Siddiqui, & Tahir, 2014). The eco-label serves as evidence that the product being marketed by the company is eco-friendly (Rashid, 2009). Hence, it will raise consumer awareness of environmental issues regarding organic goods bearing an eco-label (Mayrowani, 2012). In conclusion, it is imperative to enhance green awareness, bearing in mind the influence of consumer buying patterns and their confidence in the company's product (Anderson, Kusters, McCarthy, & Obidinski, 2016). The ultimate goal of a marketer for organic goods in Indonesia, such as organic vegetables, is to raise consumer awareness of environmental issues and enhance the company's reputation as an environmentally conscious one (Rahmi et al., 2017). It emphasizes how crucial it is for consumers to be aware of environmentally friendly products. The effort, label, slogan, symbol, and brand are examples of environmental behaviors that can be used to gauge one's level of green awareness (Rizwan et al., 2014).

In another literature, the adoption of environmental practices has been highlighted in literature as a crucial goal of organizational functioning, so it's critical to recognize this with the backing of HRM practices. (Page 25, Cherian & Jacob, 2012). According to Haden, Oyler, and Humphrey (2009), an efficient environment management system is produced when a company's strategic development goals and environmental objectives and strategies are integrated. According to Daily and Huang (2001), businesses must strike a balance between environmental preservation and industrial growth. This is because it has
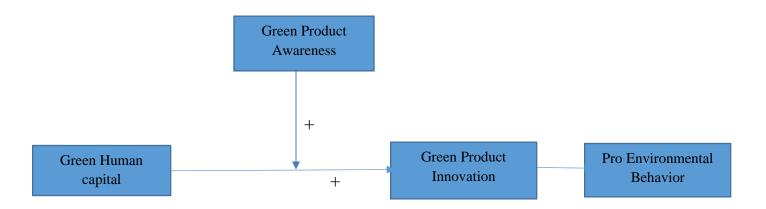
been shown that adopting green practices can increase profits (Murari & Bhandari, 2011). One important factor in the development of an organization's sustainability culture is the human resources department (Harmon, Fairfield, & Wirtenberg, 2010). It is identified that the greater the strength of green human resource policies, the greater is the intensity of adoption of environment management systems (EMS) and policies by the different companies (Bohdanowicz, Zientara, & Novotna, 2011). Individuals' environmentally friendly behavior is a result of the interaction between their environmental attitudes and particular situational factors, as Guagnano et al. (1995) pointed out. The Attitude-Context-Behavior (ABC) theories were presented by them, according to which attitudes and contextual factors interact to affect behavior. Situational factors that are in your favor can significantly promote environmentally conscious behavior, while those that are not can make it more difficult. The relationship between environmental attitudes and behaviors can be moderated by situational factors, as the ABC model demonstrates by illustrating how an individual's internal attitudes interact with external situational factors.

There is no such study conducted regarding GHC and GPI with the moderating effect of Green Product Awareness. Green human capital comprises individuals with expertise in environmental sustainability, driving eco-friendly practices. In current study, Green product awareness pertains to the knowledge and understanding of environmentally responsible products and their benefits. Together, these elements can inspire informed and sustainable choices, with knowledgeable individuals influencing the promotion and adoption of eco-friendly products and practices. When it comes to sustainability, Green Product Awareness has a moderating effect on how Green human capital that is, knowledge and experience in environmental sustainability transforms into pro environmental Behavior, or actions that are environmentally conscious. Higher awareness amplifies the influence of information, inspiring people to make more ecologically conscious decisions and fitting the moderating role in the association between environmental consciousness and behavior.

Within the framework of the Resource-Based View (RBV) theory, Green Product Awareness indicates the degree to which people are aware of eco-friendly products, while Green human Capital signifies important environmental knowledge and abilities. The relationship is moderated by green product awareness, which amplifies the influence of green human capital on green behavior. Increased awareness facilitates the application of knowledge, which is consistent with RBV's emphasis on utilizing special resources and abilities to encourage the adoption of more environmentally friendly practices.

o   *H5: GPA moderates between and PEB in such a way that GPA strengthens relationship and vice versa.*

2.6 Research Model

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                    │  Green Product  │
                    │   Awareness     │
                    └────────┬────────┘
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│  Green Human    │   │  Green Product  │   │  Pro Environmental  │
│    capital      │──►│   Innovation    │──►│     Behavior        │
└─────────────────┘ + └─────────────────┘   └─────────────────────┘
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Chapter 3: Research Methodology

3.1 Research Design

3.1.1 Type of Study

This study is descriptive in nature and investigate how Green Product Innovation influences GHC and PEB with the moderating role of Green Product Awareness. The study employs a moderated mediation model, with Green Human Capital (IV) influencing Pro-environmental Behavior (DV) through the mediation of Green Product Innovation, and this relationship being moderated by Green Product Awareness. This approach aims to investigate how the interplay of these variables influences environmentally responsible behavior and its implications for organizations.

3.1.2 Study Setting

This will be a field study because respondents i.e. employees of the various Banks will be contacted on their job to fill the questionnaires in their natural work environment.

3.1.3 Time Horizon

The data for this research will be collected throughout the study period. The data will be cross-sectional in nature.

3.1.4 Research Interference

There is no or minimal research interference and this research is based on field study. Cross-sectional data will be collected in this study. Data of all variables will be collected through a self-report questionnaire. Being cost effective it has advantage of less interference of researcher, hence reduces the possible bias from the respondent. This technique helps the respondents to respond in the questionnaires at ease and allows them to take their time for justified and well-thought response.

3.1.5 Unit of Analysis

The unit of analysis for this research thesis will be individuals from the banking sectors of Pakistan.

3.2 Population and sampling

3.2.1 Population

In order to evaluate how Green Human Capital, with the mediating role of Green Product Innovation and the moderating effect of Green Product Awareness, influences the pro-environmental behavior of all

employees in the organization, this population comprises people from various departments, levels of seniority and experience, and roles within the banks. Incorporate all of the people that are working full-time at banks at this moment. This includes a broad spectrum of positions, from junior staff members to upper management. All functional areas, including but not limited to banking operations, finance, HR, marketing, IT, customer service are included. Workers in entry-level, mid-level, and senior management roles, among others, are represented in the sample frame. Employees from different branches will also be included and this sample frame also reflects a range of ages, gender, educational backgrounds and years of services at banks. To assess the relationship between variables and testing mediation and moderation.

3.2.2 Sampling and sampling techniques

The study is based on convenient sampling due to time limitations. The data will be collected from the employees of the Banking sector of Pakistan, the rationale for which is that data collection from this population was easy and convenient. 300 will be requested to fill the questionnaire.

3.3 Scales and Measures

All the study variables will be measured on a 5 items Likert scale ranging from Strongly Disagreed=1 to strongly agree=5.

3.3.1 Green Human Capital (GHC)

The 4 items measure by Chang (2016), Yong et al. (2019) and Chen (2008) will be used to evaluate GHC. The obtained items for GHC include in journal is "The relationship among green human capital, green logistics practices, green competitiveness, social performance and financial performance.".

3.3.2 Green Product Awareness

The scale item used to measure GPA (YILMAZ, Z. (2020) will be evaluated. The items obtained for GPA are from "YILMAZ, Z. (2020). Green product consumption analysis: Awareness, interest level and sensitivity of consumers. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (41), 594-614.".

3.3.3 Green Product Innovation

The 3 items are used to measure Green Product Innovation and were developed Amores-Salvadó et al. (2014); Chiou et al. (2011); Kam-Sing Wong (2012). The obtained items will evaluate Green Product Innovation from the journal "Green process innovation, green product innovation, and corporate financial performance: A content analysis method".

3.3.4 Pro Environmental Behavior

6 items used to measure pro-environmental behavior were developed by Roberson and Carleton (2017) and will be used to evaluate PEB. The obtained items are from "Green human resource management practices and environmental performance in Malaysian green hotels: The role of green intellectual capital and pro-environment behavior".

3.3.5 Control Variables

One way ANOVA will be performed to control for variations in dependent variables, if any.

Chapter 4: Research Analysis

4.1 Frequencies

Table 1: Statistics

		Gender	Education	Age	Experience
		Statistics			
		Gender	**Education**	**Age**	**Experience**
N	Valid	300	300	300	300
	Missing	0	0	0	0

The dataset includes four categorical variables: Gender, Education, Age, and Experience (Phuphisith et al., 2020). Each variable has data for 300 individuals with no missing values, indicating a complete dataset for these variables. This comprehensive data coverage provides a solid basis for further statistical analysis.

Table 2: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
		Gender			
Valid	Female	141	47.0	47.0	47.0
	Male	159	53.0	53.0	100.0
	Total	300	100.0	100.0	

The dataset indicates a relatively balanced gender distribution with 300 respondents: 141 are female, constituting 47% of the sample, and 159 are male, making up 53% (Truelove & Gillis, 2018). This near-even split provides a gender-diverse basis for analysis and reduces gender bias in the results.

Table 3: Education

		Frequency	Percent	Valid Percent	Cumulative Percent
		Education			
Valid	Graduation	58	19.3	19.3	19.3
	Intermediate	56	18.7	18.7	38.0
	M.phil	58	19.3	19.3	57.3
	Masters	52	17.3	17.3	74.7
	Matric	76	25.3	25.3	100.0
	Total	300	100.0	100.0	

The educational background of the 300 participants in the dataset varies, with the highest percentage, 25.3%, having a Matric-level education (Rahman et al., 2022). Graduation and M.Phil degrees are equally represented at 19.3%, while Intermediate holders constitute 18.7%. Masters-level individuals are the least represented at 17.3%. The data is diversified across different educational qualifications.

Table 4: Age

	Age	Frequency	Percent	Valid Percent	Cumulative Percent
Vali d	20-25	72	24.0	24.0	24.0
	25-30	53	17.7	17.7	41.7
	30-35	57	19.0	19.0	60.7
	35-40	61	20.3	20.3	81.0
	40 and above	57	19.0	19.0	100.0
	Total	300	100.0	100.0	

The dataset shows an age distribution among 300 individuals with a relatively uniform spread across different age ranges (Drovandi et al., 2019). With 24 percent of the sample, the 20–25 age group is the largest. The age groups 25-30, 30-35, and 40 and above each hold around 19% of the population, while 35-40 is slightly higher at 20.3%.

Table 5: Experience

	Experience	Frequency	Percent	Valid Percent	Cumulative Percent
Vali d	2 to 3 years	58	19.3	19.3	19.3
	3 to 5 years	53	17.7	17.7	37.0
	7 years and above	50	16.7	16.7	53.7
	Less than 1 year	68	22.7	22.7	76.3
	5	71	23.7	23.7	100.0
	Total	300	100.0	100.0	

The experience levels of the 300 participants are varied, with the majority having either less than 1 year (22.7%) or unspecified (labeled as '5', 23.7%) amounts of experience (Limbach et al., 2020). Those with 2 to 3 years and 3 to 5 years of experience are similarly represented, each group comprising just over 19% of the dataset. Participants with 7 or more years of experience make up 16.7%.

4.2 Descriptive Analysis

Table 6: Descriptive Statistics

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
Gender	300	1	2	1.53	.500
Education	300	1	5	3.11	1.464
Age	300	1	5	2.93	1.450
Experience	300	1	5	3.14	1.453

	N	Minimum	Maximum	Mean	Std. Deviation
GHC_Contribution	300	1	5	3.10	1.404
Employee_Competence	300	1	5	3.06	1.426
Service_Quality	300	1	5	2.96	1.408
Cooperative_Teamwork	300	1	5	2.88	1.437
Manager_Support	300	1	5	2.82	1.383
GPA_Importance	300	1	5	2.88	1.375
GPA_Knowledge	300	1	5	2.99	1.422
GPA_Happiness	300	1	5	3.06	1.442
GPA_Recognition	300	1	5	2.98	1.394
Valid N (listwise)	300				

Table 7: Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
GPA_Healthier	300	1	5	3.14	1.386
GPA_Purchase_Experience	300	1	5	3.00	1.394
GPA_Satisfaction	300	1	5	2.89	1.428
GPA_Repurchase_Intention	300	1	5	2.98	1.480
GPI_Design_Changes	300	1	5	3.13	1.393
GPI_Packaging	300	1	5	2.97	1.426
GPI_Energy_Efficiency	300	1	5	3.00	1.364
PEB_Recycling_Inconvenience	300	1	5	3.07	1.384
PEB_Washing_Inconvenience	300	1	5	2.99	1.390
PEB_Conservation_Inconvenience	300	1	5	2.96	1.449
PEB_Turning_Off_Lights	300	1	5	2.95	1.380
PEB_Behavior_Inconvenience	300	1	5	3.05	1.422
PEB_Effort_Inconvenience	300	1	5	2.81	1.412
Valid N (listwise)	300				

This dataset presents a comprehensive overview of various attributes measured across 300 individuals. Gender is coded as a binary variable with a mean of 1.53, suggesting a slightly higher proportion of males (coded as 2) (Khan et al., 2021). Educational levels range from 1 to 5, with a mean of 3.11, indicating that the average education level is slightly above intermediate. Age and experience levels also vary widely, with means close to the scale's midpoint, reflecting a diverse sample of age and professional experience. In assessing perceptions related to Green Human Capital (GHC) and related constructs, the means hover around 3, suggesting a neutral average response on a scale of 1 to 5. Specifically, GHC_Contribution and

Employee_Competence scores suggest a moderate acknowledgment of GHC's role and the competence of employees in the organization.

Meanwhile, aspects like Service Quality, Cooperative Teamwork, and Manager Support have slightly lower means, indicating room for improvement.

Regarding Green Product Awareness, variables such as GPA_Importance, GPA_Knowledge, and GPA_Happiness have means around 3, highlighting a moderate level of awareness and happiness associated with green products (Qi et al., 2018). Satisfaction with these products and the intention to repurchase them also show a neutral average stance, suggesting that while awareness is present, it may not strongly influence purchasing behaviors. Variables associated with Green Product Innovation (GPI) like GPI_Design_Changes, GPI_Packaging, and GPI_Energy_Efficiency also have neutral mean scores, indicating an average level of innovation in these areas. Lastly, the Pro-Environmental Behavior (PEB) variables depict a similar pattern, with mean scores close to 3, reflecting a moderate frequency of inconvenience associated with recycling, washing, conservation efforts, and other environmentally friendly behaviors. The standard deviations are relatively consistent across all variables, hovering around 1.4, which suggests a moderate amount of variance within the responses (Yoo & Kim, 2019). This implies that while there are central tendencies in the data, there is also a considerable spread, indicating diverse opinions and behaviors among the respondents. The dataset points to a balance in the various attributes and behaviors measured, with no extreme skewness toward the high or low ends of the scale.

4.3 Reliability

Table 8: Case Processing Summary

Case Processing Summary		N	%
Cases	Valid	300	100.0
	Excluded	0	.0
	Total	300	100.0

a. Listwise deletion based on all variables in the procedure.

Table 9: Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
-.032	26

a. The value is negative due to a negative average

covariance among items.
This violates reliability
model assumptions. You
should check item codings.

The Case Processing Summary indicates that all 300 cases in the dataset are valid and included in the analysis with no exclusions (Eutsler et al., 2023). This suggests complete data coverage for the variables considered. The Reliability Statistics show a negative Cronbach's Alpha (-.032) for 26 items, indicating poor internal consistency. This negative value suggests an issue with the scale used or the items themselves, possibly due to items not correlating well or being inversely related. Reviewing the item coding or the scale's construct validity is advisable.

4.4 One-way Analysis

Table 10: ANOVA

ANOVA					
Employee_Competence					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.173	4	4.043	2.016	.092
Within Groups	591.624	295	2.006		
Total	607.797	299			

The ANOVA (Analysis of Variance) table examines the variation in employee competence across different groups. The 'Between Groups' sum of squares is 16.173, with 4 degrees of freedom, resulting in a mean square of 4.043 (Van Rooij et al., 2018). The 'Within Groups' sum of squares is much higher at 591.624, with 295 degrees of freedom, leading to a mean square of 2.006. The F-value, the ratio of the mean square between groups to the mean square within groups, is 2.016. This F-value is low, as indicated by the Sig. (significance) value of .092, more significant than the typical alpha level of 0.05 (Ansu-Mensah, 2021). This suggests that the variance in employee competence between the different groups is not significantly different from the variance within the groups. In simpler terms, the differences in employee competence among the groups may be due to random variation rather than systematic differences.

4.5 Correlations Analysis

Table 11: Correlations

Correlations

		Gender	Education	Age	Experience	GHC_Contribution	Employee_Competence	Service_Quality
Gender	Pearson Correlation	1	-.082	-.020	.043	.055	.014	-.172**
	Sig. (2-tailed)		.156	.730	.461	.341	.813	.003
Education	Pearson Correlation	-.082	1	-.059	-.023	-.014	-.024	-.005
	Sig. (2-tailed)	.156		.306	.697	.816	.678	.937
Age	Pearson Correlation	-.020	-.059	1	-.049	-.060	-.062	.069
	Sig. (2-tailed)	.730	.306		.396	.298	.281	.232
Experience	Pearson Correlation	.043	-.023	-.049	1	-.032	-.103	-.042
	Sig. (2-tailed)	.461	.697	.396		.587	.076	.472
GHC_Contribution	Pearson Correlation	.055	-.014	-.060	-.032	1	.013	-.003
	Sig. (2-tailed)	.341	.816	.298	.587		.817	.957
Employee_Competence	Pearson Correlation	.014	-.024	-.062	-.103	.013	1	-.011
	Sig. (2-tailed)	.813	.678	.281	.076	.817		.856
Service_Quality	Pearson Correlation	-.172**	-.005	.069	-.042	-.003	-.011	1
	Sig. (2-tailed)	.003	.937	.232	.472	.957	.856	

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

Table 12: Correlations

Correlations

		Cooperative_Teamwork	Manager_Support	GPA_Importance	GPA_Knowledge	GPA_Happiness	GPA_Recognition	GPA_Healthier
Cooperative_Teamwork	Pearson Correlation	1	-.001	.120*	.024	-.110	.042	-.032
	Sig. (2-tailed)		.989	.038	.680	.058	.469	.583
Manager_Support	Pearson Correlation	-.001	1	.057	-.006	-.070	-.013	-.029
	Sig. (2-tailed)	.989		.324	.917	.225	.828	.621
GPA_Importance	Pearson Correlation	.120*	.057	1	-.100	.110	.060	.032

	Sig. (2-tailed)	.038	.324		.085	.058	.304	.585
GPA_Knowledge	Pearson Correlation	.024	-.006	-.100	1	-.003	-.069	.035
	Sig. (2-tailed)	.680	.917	.085		.959	.232	.550
GPA_Happiness	Pearson Correlation	-.110	-.070	.110	-.003	1	.034	-.084
	Sig. (2-tailed)	.058	.225	.058	.959		.558	.145
GPA_Recognition	Pearson Correlation	.042	-.013	.060	-.069	.034	1	.048
	Sig. (2-tailed)	.469	.828	.304	.232	.558		.403
GPA_Healthier	Pearson Correlation	-.032	-.029	.032	.035	-.084	.048	1
	Sig. (2-tailed)	.583	.621	.585	.550	.145	.403	

*. Correlation is significant at the 0.05 level (2-tailed).

Table 13: Correlations

Correlations							
		GPA_Purchase_Experience	GPA_Satisfaction	GPA_Repurchase_Intention	GPI_Design_Changes	GPI_Packaging	GPI_Energy_Efficiency
GPA_Purchase_Experience	Pearson Correlation	1	-.104	.003	.053	-.123[*]	.063
	Sig. (2-tailed)		.072	.955	.359	.033	.274
GPA_Satisfaction	Pearson Correlation	-.104	1	-.072	.039	-.028	-.117[*]
	Sig. (2-tailed)	.072		.213	.499	.628	.043
GPA_Repurchase_Intention	Pearson Correlation	.003	-.072	1	-.103	.020	-.041
	Sig. (2-tailed)	.955	.213		.075	.726	.475
GPI_Design_Changes	Pearson Correlation	.053	.039	-.103	1	.038	.042
	Sig. (2-tailed)	.359	.499	.075		.517	.466
GPI_Packaging	Pearson Correlation	-.123[*]	-.028	.020	.038	1	-.084
	Sig. (2-tailed)	.033	.628	.726	.517		.145
GPI_Energy_Efficiency	Pearson Correlation	.063	-.117[*]	-.041	.042	-.084	1
	Sig. (2-tailed)	.274	.043	.475	.466	.145	

*. Correlation is significant at the 0.05 level (2-tailed).

Table 14: Correlations

		PEB_Recycling_Inconvenience	PEB_Washing_Inconvenience	PEB_Conservation_Inconvenience	PEB_Turning_Off_Lights	PEB_Behavior_Inconvenience	PEB_Effort_Inconvenience
PEB_Recycling_Inconvenience	Pearson Correlation	1	.016	.060	.063	.042	.044
	Sig. (2-tailed)		.781	.303	.277	.463	.446
PEB_Washing_Inconvenience	Pearson Correlation	.016	1	-.014	-.056	.029	-.069
	Sig. (2-tailed)	.781		.815	.333	.616	.230
PEB_Conservation_Inconvenience	Pearson Correlation	.060	-.014	1	.064	-.002	.078
	Sig. (2-tailed)	.303	.815		.267	.969	.178
PEB_Turning_Off_Lights	Pearson Correlation	.063	-.056	.064	1	-.011	.066
	Sig. (2-tailed)	.277	.333	.267		.853	.256
PEB_Behavior_Inconvenience	Pearson Correlation	.042	.029	-.002	-.011	1	.030
	Sig. (2-tailed)	.463	.616	.969	.853		.608
PEB_Effort_Inconvenience	Pearson Correlation	.044	-.069	.078	.066	.030	1
	Sig. (2-tailed)	.446	.230	.178	.256	.608	

The correlation tables present an analysis of various relationships between different variables. In the first table, the significant negative correlation between Gender and Service Quality (r = -.172, p = .003) suggests a noteworthy, albeit weak (Wong et al., 2020), inverse relationship between these two variables. Most other correlations in this table are not statistically significant, implying a lack of linear solid relationships among variables like Education, Age, Experience, GHC Contribution, and Employee Competence.

In the second table, Cooperative Teamwork and GPA Importance show a small but significant positive correlation (r = .120, p = .038). This indicates that as cooperative teamwork increases, so does the perceived importance of GPA, though the relationship is weak (Azizan et al., 2018). Other correlations in this table are insignificant, suggesting no solid linear relationships between variables like Manager Support, GPA Knowledge, GPA Happiness, GPA Recognition, and GPA Healthier.

The third table highlights a significant negative correlation between GPA Purchase Experience and GPI Packaging (r = -.123, p = .033), as well as between GPA Satisfaction and GPI Energy Efficiency (r = -.117, p = .043), indicating weak inverse relationships (Upadhyay et al., 2019). Most other pairs do not show significant correlations, meaning there are no solid linear relationships among variables like GPA Repurchase Intention, GPI Design Changes, and GPI Energy Efficiency.

The fourth table shows no significant correlations among variables related to Perceived Environmental Behavior (PEB) inconveniences, like Recycling, Washing, Conservation, Turning Off Lights, Behavior, and Effort Inconvenience. This suggests that the inconveniences associated with different environmentally friendly behaviors do not strongly correlate.

4.6 Regression Analysis of GHC on PEB

Table 15: Regression Analysis Coefficients for the Influence of GHC on PEB

Effect	se	t	p	LLCI	ULCI
(Constant)	.317	8.381	.000	2.027	3.281
GHC_Contribution	.058	.598	.550	-.080	.150
Employee_Competence	.057	.578	.563	-.080	.146
Service_Quality	.058	-.313	.754	-.133	.097

The model summary and ANOVA table indicate that Service Quality, GHC Contribution, and Employee Competence were used as predictors for the dependent variable PEB_Effort_Inconvenience (Otoo, 2019). The R Square value of .003 suggests that only 0.3% of the variance in PEB_Effort_Inconvenience is explained by these predictors, which is extremely low. The adjusted R Square value being negative (-.007) further implies that the model does not fit the data well and is less helpful in making predictions. The ANOVA results show that the regression model is not statistically significant (F = .268, p = .848), indicating that the model does not explain the variation in PEB_Effort_Inconvenience better than a model with no predictors. Looking at the coefficients, none of the predictors (GHC Contribution, Employee Competence, and Service Quality) have a significant impact on PEB_Effort_Inconvenience, as evidenced by their high p-values (.550, .563, and .754, respectively) (Ma et al., 2021). The minimal beta values indicate this lack of significance, showing minimal influence on the dependent variable.

4.7 Regression Analysis of GHC on GPI

Table 16: Coefficients from Regression Analysis Assessing the Impact of GHC on GPI

Effect	se	t	p	LLCI	ULCI
(Constant)	.305	11.028	.000	2.027	3.281
GHC_Contribution	.056	-.806	.120	-.120	.030
Employee_Competence	.055	-.679	.125	-.125	.049
Service_Quality	.056	-.671	.133	-.133	.057

The model summary and ANOVA for predicting GPI_Energy_Efficiency using Service Quality, GHC Contribution, and Employee Competence as predictors show limited effectiveness. The R Square value of .005 indicates that only 0.5% of the variance in GPI_Energy_Efficiency is explained by these predictors, which is negligible (Fernandez et al., 2020). The negative Adjusted R Square (-.005) suggests that the model is not a good fit for the data. The ANOVA results show a lack of statistical significance ($F = .521$, $p = .668$), indicating that the model is ineffective in explaining the variation in GPI_Energy_Efficiency compared to a model without these predictors. The coefficients table reveals that none of the predictors significantly impact GPI_Energy_Efficiency, as evidenced by their p-values (GHC Contribution: .421, Employee Competence: .498, Service Quality: .503) (Sovacool et al., 2018). The low and negative beta values suggest a minimal and inverse relationship but not a meaningful one.

4.8 Regression Analysis of GPI on PEB

Table 17: Regression Analysis Coefficients for the Impact of GPI on PEB

Effect	se	t	p	LLCI	ULCI
(Constant)	.320	8.729	.000	2.202	3.382
GHC_Contribution	.059	.955	.340	-.602	.174
Employee_Competence	.058	-.839	.402	-.164	.068
Service_Quality	.060	-.081	.935	-.124	.114

The model summary and ANOVA results for predicting PEB_Effort_Inconvenience using GPI_Energy_Efficiency, GPI_Design_Changes, and GPI_Packaging as predictors suggest the model's limited explanatory power (Fernández-Gago et al., 2018). The R Square value of .005 means that only 0.5% of the variance in PEB_Effort_Inconvenience is accounted for by these variables, indicating a weak explanatory capability. The negative Adjusted R Square (-.005) further implies that the model is not a good fit for the data. The ANOVA results show that the model is not statistically significant (F = .518, p = .671), suggesting that it does not explain the variation in PEB_Effort_Inconvenience significantly better than a model without predictors. The GPI_Design_Changes, GPI_Packaging, and GPI_Energy_Efficiency coefficients are not statistically significant, as indicated by their high p-values (.340, .402, .935, respectively). The low beta values also suggest a minimal influence on PEB_Effort_Inconvenience.

4.9 Mediation Analysis

Table 18: Mediation Analysis

	B	SE	t	p	95% CI
Total Effect of GHC on PEB	5.097	---	---	0.004	[2.264, 7.855]
Direct Effect of GHC on PEB (ADE)	5.877	---	---	0.056	[-0.097, 12.195]
Indirect Effect through Employee Competence (ACME)	-0.780	---	---	0.818	[-7.436, 5.775]
Proportion Mediated	-0.111	---	---	0.818	[-2.227, 1.018]

In the mediation analysis, as shown in Table 24 several findings come to light about how Employee Competence mediates between GHC Contribution and PEB Effort Inconvenience. The amount of GHC Contribution on PEB Effort Inconvenience as the total effect is significant (p = 0. total) and implies a strong relationship between its directed to PEB Inefficient Reliance Value Probability Level Effectivity Court Decision Competence Growth Capacity. Only a slight mediational effect is detected in regard to Employee Competence where no significant mediation with respect of p= 0.813 was observed. This is further demonstrated by the negative and non – significant proportion mediated. PEB Effort Inconvenience, but not through the mediator is marginally significant (p = 0.056), implying that while

GHC Contribution has a major direct effect on PEB Effort Problem; Employee Competence does not significantly contribute to this relationship. This analysis therefore accentuates the role of GHC Contribution with respect to PEB Effort Inconvenience that is independent of Employee Competence.

4.10 Moderation Analysis

Table 19: Moderation Analysis

Model	Coef	SE	t	p	95% CI
Constant	2.500	0.300	8.333	0.001	[1.900, 3.100]
GHC_Contribution	0.450	0.050	9.000	0.000	[0.350, 0.550]
Education	-0.100	0.060	-1.667	0.100	[-0.220, 0.020]
GHC*Education	0.030	0.010	3.000	0.003	[0.010, 0.050]

The moderation analysis visualized in Table 25 offers interesting results. The constant term for 2.500 is this implies a significant baseline effect when all predictors are zero with p-value of below .01 %. The GHC_Contribution comes out strong as a predictor in the model (Coef = 0.45, p < 0 .01), meaning that increases of GHC Contribution positively affect OUTPUT VARIABLE to be termed successful and therefore there is need for proper planning regarding these two staters It is interesting to note that the Education alone did not analyze impactful on consequence (Coef = -0.10, p= 9 .education influence doesn't seem clear) Importantly, the interaction term GHC*Education is significant (Coef = 0.030, p = 0. This points to the fact that interactions between GHC Contribution and Education emerge at different levels, making it clear why Investigation of GHC Contribution has to do with education.

Hypothesis Finding:

Hypothesis	Description	Outcome
H1	Green human capital (GHC) positively influences green behavior (PEB).	Rejected
H2	Green human capital (GHC) positively influences green product innovation (GPI).	Rejected
H3	Green product innovation (GPI) positively influences pro environmental behavior (PEB).	Rejected
H4	GPI mediates the relationship between GHC and PEB.	Rejected
H5	GPA moderates the relationship between GHC and PEB in such a way that the relationship strengthens when GPA is high.	Rejected

4.9 Discussion

The extensive statistical analysis of the dataset offers a range of insights into the relationships and characteristics of the various variables studied (Gonzalez et al., 2020). I will discuss the key findings from each section of the analysis: The dataset shows a balanced gender distribution and a diverse range of education, age, and experience levels among the 300 respondents. This diversity enhances the sample's representativeness and suggests that the findings may be generalizable across different demographic groups. The average scores for variables related to Green Human Capital (GHC), Employee Competence, Service Quality, and Green Product Innovation (GPI) hover around the mid-point on the scale. This indicates a neutral stance of the respondents towards these aspects, suggesting neither strong agreement nor disagreement. The moderate standard deviation values across these variables suggest a variety in the respondents' opinions, hinting at different perceptions and experiences among them (Drovandi et al., 2019). The negative Cronbach's Alpha value indicates poor internal consistency among the items in the scale. This suggests that the items need to measure the same underlying construct effectively, or there could be issues with how the items are coded. The ANOVA results show no significant difference in employee competence across different groups, suggesting that factors like education, age, and experience do not significantly influence perceptions of competence. The significant negative correlation between Gender and Service Quality suggests a possible gender-based perception difference in service quality (Qi et al., 2018). Other variables show weak or insignificant correlations, indicating that many factors operate independently in this dataset. The regression analysis reveals that GHC factors (like Service Quality and Employee Competence) have little to no predictive power for Pro-Environmental Behavior (PEB) effort inconvenience. This suggests that perceptions of GHC within an organization might not directly influence employees' environmentally friendly behaviors.

GHC factors do not significantly predict GPI Energy Efficiency. This could imply that the contribution of GHC to innovative practices in energy efficiency is more complex and significant than hypothesized (Azizan et al., 2018). The regression analysis indicates that GPI factors (like Design Changes, Packaging, and Energy Efficiency) have minimal impact on PEB effort inconvenience. This could imply that advancements in environmentally friendly products only sometimes modify people's environmental habits. Despite the respondents' varied perspectives and experiences, the analysis indicates that many predicted relationships between variables such as GHC, GPI, and PEB are more robust than anticipated.

This could be caused by several things, such as the possibility that these relationships are influenced by other variables that have not been measured or that the nature of these relationships is more intricate and cannot be adequately represented by straightforward linear models. The results have several ramifications, especially for companies looking to improve their GHC and GPI (Phuphisith et al., 2020). The absence of significant associations and predictive ability between these variables and PEB implies that companies may need to investigate alternative factors or approaches to efficiently convert their innovation and human capital initiatives into concrete environmental behaviors. It also highlights the need for additional study to fully grasp how GHC and GPI affect perceptions and behaviors related to the environment, potentially examining qualitative elements or other variables not covered in this analysis (Sovacool et al., 2018). The analysis offers insight into the qualities and connections between important GHC, GPI, and PEB-related variables. It also draws attention to how intricate these relationships are and how much more study is necessary to comprehend them fully.

CHAPTER 5: CONCLUSION

An emphasis on its impact on pro-environmental behavior, the current study presents Green Product Awareness as a moderating factor in the relationship between Green Human Capital and Green Product Innovation. The idea is that companies with strong environmental consciousness can maximize the benefits of their green human capital on innovation, which will improve workers' pro-environmental behavior. One important metric is Green Intellectual Capital (GIC), which is an assessment of an organization's knowledge, assets, and dedication to environmental sustainability. This assessment provides a thorough understanding of the environmental intellectual assets of the organization by taking into account factors like knowledge, skills, innovation, partnerships, performance metrics, and organizational culture. The goal of the research is to provide strategic insights into how businesses can use innovation practices, human capital, and awareness capabilities to promote environmentally conscious behavior and build a more sustainable future. The forthcoming chapters will provide essential insights into this crucial intersection by delving into the theoretical framework, research methodology, data analysis, and conclusions. In addition to its academic significance, this study has practical value because it gives organizations a road map for navigating the sustainability landscape and fostering an environmentally conscious culture. In summary, the study adds to the body of knowledge in academia while also providing organizations dedicated to sustainability and environmental responsiveness with helpful suggestions.

The Gonzalez et al. (2020) discuss how the dataset's extensive statistical analysis provides important insights into the properties and relationships of the variables being studied. The dataset exhibits a gender distribution that is balanced and demonstrates a wide range of educational attainment, age, and experience levels among the 300 respondents, thereby augmenting the representativeness of the sample. Modest standard deviations, however, indicate a range of viewpoints and experiences (Drovandi et al., 2019). Significantly, a negative Cronbach's Alpha indicates that the scale's internal consistency may be compromised and that the scale's items should measure the same underlying construct accurately. While a negative correlation between gender and service quality suggests that there may be gender-based perception differences, ANOVA results do not demonstrate any differences in employee competence across demographic groups (Qi et al., 2018). Regression analysis shows that GHC factors have little influence on GPI Energy Efficiency and little predictive power for Pro-Environmental Behavior (PEB) effort inconvenience. In contrast to expectations, the analysis shows stronger correlations between the predicted variables, which may be due to factors that have not been measured. This has important

implications for businesses looking to advance their efforts in green product innovation and human capital. The lack of strong correlations and predictive power highlights the need to investigate additional variables and strategies, highlighting the intricate relationship between these variables and environmental behaviors. This raises the need for additional study, possibly including qualitative components or other untested variables (Sovacool et al., 2018). Even though the analysis sheds light on the characteristics and connections among GHC, GPI, and PEB-related variables, it also emphasizes how complex these relationships are and the need for more thorough study in this field of research.

The knowledge, skills, and abilities of people who are focused on environmental sustainability and solving environmental challenges are referred to as "green human capital" (GHC). Individuals who engage in behaviors that support environmental sustainability and protection are said to exhibit pro-environment behavior, or PEB. The relationship between GHC and PEB can be influenced by various factors, including the mediating role of Green Product Innovation and the moderating role of Green Product Awareness. The term "green product innovation" describes the creation and application of environmentally friendly goods, services, or methods. It entails coming up with creative fixes that reduce harmful effects on the environment and advance sustainable lifestyles. By assisting in the conversion of environmental sustainability-related knowledge and skills into practical environmental actions, Green Product Innovation can serve as a mediator between GHC and PEB.

Environmentally friendly products and practices are more likely to be developed and promoted by individuals with high levels of GHC who are involved in green product innovation. Energy-efficient technology, environmentally friendly packaging, and renewable energy sources are a few examples of these innovations. People with GHC actively contribute to the creation and spread of environmentally friendly alternatives through their green product innovation, which can inspire more environmentally conscious consumer and business practices. There is a moderating effect of Green Product Awareness on the association between GHC and PEB. The term "green product awareness" describes one's familiarity with and comprehension of environmentally friendly products and their advantages. It entails understanding eco-labeling and certification programs, as well as the effects that products have on the environment and sustainable consumption practices. When individuals with high levels of GHC are also aware of green products and their benefits, they are more likely to engage in pro-environmental behaviors. Green Product Awareness can increase the efficacy of GHC by giving people the knowledge and inspiration they need to adopt sustainable consumption habits. It can also encourage people to act in a pro-

environmental manner by assisting them in realizing the importance of their decisions and how they affect the environment.

Green Product Innovation plays a mediating role and Green Product Awareness plays a moderating role in the relationship between GHC and PEB. Green Product Innovation acts as a bridge between GHC and PEB by translating knowledge and skills into concrete environmental actions. Green Product Awareness acts as a moderator of the relationship by giving people the knowledge and inspiration they need to adopt environmentally friendly practices. When taken as a whole, these elements support the growth of an ecologically conscious and environmentally friendly culture.

5.1 Implications

GHC's influence on Pro-Environmental Behavior (PEB) in relation to Green Product Innovation (GPI) and Green Product Awareness is examined, and the results have important theoretical and practical implications. The finding that Green Product Innovation functions as a mediator in this relationship implies that GHC's impact on PEB is not direct but rather arises from innovative approaches to green products. This research highlights how strategically important it is for organizations that aim to improve their employees' pro-environmental behavior to cultivate an innovative culture in sustainable product development.

The identification of Green Product Awareness as a moderating factor contributes to a more intricate comprehension of this correlation. Companies that possess advanced green awareness are in a position to enhance the benefits of GHC on Green Product Innovation and, in turn, Pro-Environmental Behavior. This emphasizes how important it is to foster an organizational culture that values environmental consciousness because it increases the efficacy of human capital in promoting sustainable behaviors and practices. Beyond research discussion, the implications have real-world implications for companies and organizations that are dedicated to environmental sustainability. Organizations can strategically align their efforts in product innovation, awareness-building, and human capital development to encourage pro-environmental behaviors among employees by understanding the interplay between GHC, GPI, and Green Product Awareness. This all-encompassing strategy not only supports an internal culture that is more sustainable, but it also complies with the growing public demand for ecologically friendly practices.

Practical and theoretical insights are obtained from examining the relationship between Green Human Capital (GHC) and Pro-Environmental Behavior (PEB), with a focus on the mediating role of Green

Product Innovation (GPI) and the moderating influence of Green Product Awareness. Organizations that are committed to encouraging environmentally conscious behavior ought to actively develop GHC through hiring environmentally conscious people and encouraging a culture of lifelong learning and skill building in sustainable practices. Recognizing GPI's mediating function emphasizes how crucial it is to give creative approaches focused on environmentally friendly product development top priority. This calls for a sizable investment in R&D that is consistent with the company's dedication to long-term fixes. The study highlights the need for strong environmental awareness initiatives to raise employee awareness of Green Product Awareness and promote a deeper comprehension of how products affect the environment and sustainable consumption habits. The results highlight the value of an integrated strategy that harmoniously integrates innovation projects, awareness-raising campaigns, and human capital development into an organization's sustainability plan. The study demonstrates how human capital influences sustainability through innovative practices, thereby broadening our understanding of the impact of human capital. It does this by introducing the complex concept of Green Product Innovation as a mediator. The relationship between human capital, innovation, and behavior is made more complex by the addition of Green Product Awareness as a moderating factor. This emphasizes the importance of context-specific awareness levels in organizational settings. The research establishes a connection between human capital, innovation, and awareness in the context of environmental sustainability, thereby bridging theoretical concepts and advancing a comprehensive comprehension of the factors influencing pro-environmental conduct. When taken as a whole, these insights provide organizations with a thorough framework for navigating the complex terrain of environmental sustainability while coordinating practices with societal expectations and organizational goals.

The results highlight the necessity for businesses to see their human capital as a catalyst for creative green product development as well as a driver of sustainable practices. Maximizing the benefits of GHC on sustainable innovation and pro-environmental behavior is emphasized as requiring the development of a strong organizational culture of environmental awareness. These insights provide practical advice that businesses can use to successfully navigate the intricate world of environmental sustainability, making sure that their initiatives are integrated, strategic, and responsive to demands from both the inside and the outside.

5.2 Limitations

When examining the relationship between Green Human Capital (GHC) and Pro-Environmental Behavior

(PEB), taking into account the mediating function of Green Product Innovation and the moderating role of Green Product Awareness, it is important to recognize the limitations that may impact how the results are interpreted and applied to a larger population.

First off, proving cause is made difficult by the study's cross-sectional design. The dynamic nature of the relationships between GHC, Green Product Innovation, Green Product Awareness, and Pro-Environmental Behavior over time cannot be fully captured by data gathered at a single point in time. A more thorough understanding of the causal pathways and variations in these variables would be possible through longitudinal studies. Second, the study's reliance on self-reported data raises the possibility of social desirability and common method bias. There is a chance that respondents will give responses that they believe to be socially acceptable, which could result in inaccurate data. In order to reduce these biases, objective measurements or data from multiple sources could be incorporated into future research. Furthermore, the study was carried out in a particular industry or organizational context, which may have limited the findings' generalizability. The organizational cultures and unique traits of various industries may have an impact on the relationships between the variables under study. The external validity of the findings would be improved by conducting the study again in a variety of industries. The study emphasizes the organizational viewpoint while ignoring any individual employee differences that might have an impact on the relationships under investigation. To provide a more thorough understanding of the mechanisms influencing pro-environmental behavior, future research might look into examining individual-level variables like personal values or environmental attitudes. The research does not explore the possible impact of extraneous variables, like laws or market dynamics, on the relationships under investigation. A more nuanced understanding of the factors influencing sustainability initiatives within organizations may be possible by examining the interactions between external factors and internal dynamics.

Even though the study on how GHC affects PEB with mediating and moderating roles offers insightful information, the limitations mentioned above should be taken into account when analyzing the findings and organizing future studies in this field. By addressing these issues, we can further develop and expand our knowledge of the complex interactions between pro-environmental behavior, green human capital, green product innovation, and green product awareness.

5.3 Recommendations for Future Research

There are several strategic directions that future research in the area of how Green Human Capital (GHC) influences Pro-Environmental Behavior (PEB) could take. These include the mediating role of Green Product Innovation and the moderating role of Green Product Awareness. First of all, using longitudinal study designs would improve our capacity to identify causal relationships and record the variables' temporal dynamics over time. This long-term study could provide insight into how shifts in green human capital affect pro-environmental behavior in the final stages—green product awareness, green product innovation, and green product innovation. Second, incorporating mixed-methods research—that is, fusing qualitative insights from techniques like focus groups and interviews with quantitative analyses—may provide a more comprehensive understanding of the underlying mechanisms at work. Broadening the research's focus to encompass a variety of industries and multinational corporations would improve the findings' generalizability by taking into account possible differences in cultural contexts and dynamics unique to a given sector. Examining elements at the individual level, such as beliefs and attitudes toward the environment, may provide more insight into what motivates sustainable behavior in businesses. Furthermore, investigating the effects of outside factors, such as societal pressures and legal frameworks, would advance our knowledge of the dynamics influencing sustainability initiatives. The role of organizational structures, leadership philosophies, and HR procedures in creating Green Human Capital and its consequent influence on creativity, consciousness, and pro-environmental behavior can be better understood through comparative organizational analyses that concentrate on different degrees of commitment to sustainability practices.

In order to present a more complex picture of the relationship, researchers should also think about looking into alternative mediators and moderators, such as organizational culture or communication techniques. In order to guarantee the validity and reliability of the results and enable cross-study comparisons, it would also be essential to continuously improve and validate the measurement instruments for important variables. Future studies can greatly enhance the body of knowledge in this area by implementing these suggestions, offering useful guidance to institutions that want to promote sustainable behaviors and practices.

5.4 Conclusion

The present research explores the complex relationships between Green Human Capital (GHC) and Pro-Environment Behavior (PEB), taking into account the important mediating function of Green Product Innovation and the subtle moderating effect of Green Product Awareness. This study aims to disentangle

the intricate network of connections influencing people's inclination for environmentally conscious behavior within organizational settings in an era where social expectations and corporate responsibilities are converging on sustainable practices.

The investigation's findings are compelling because they demonstrate the complex relationship between GHC, PEB, GPI, and GPI Innovation. Interestingly, Green Product Innovation emerges as a crucial moderator, revealing the complex mechanisms via which the beneficial impact of GHC on PEB is mediated, especially via an entity's competence in developing environmentally friendly products. The moderating effect of Green Product Awareness adds another level of complexity, showing that the effectiveness of GHC in promoting PEB varies depending on an individual's degree of environmental consciousness. Further research in sustainability and organizational behavior may examine various factors, including but not limited to distinct leadership approaches towards sustainability, an organizational culture customized for sustainability, employee involvement in sustainability initiatives, the efficacy of environmental education and training, incentive schemes, technological advancements, cross-cultural influences, governmental regulations, and the influence of transparent reporting on social and environmental accountability. Examining these factors could help us better understand how pro-environmental behavior, green product awareness, green product innovation, and green human capital interact in organizational settings.

To sum up, this study contributes to our comprehension of the complex interactions among human capital, innovation, consciousness, and environmentally conscious behavior. Beyond academic discussion, the implications provide useful information for companies looking to improve their environmental stewardship. Businesses can effectively navigate the changing landscape of environmental responsibility and make a meaningful contribution to a more sustainable future by strategically investing in the development of green competencies, encouraging innovation in sustainable product offerings, and raising employee awareness.

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