Impact Of Green Human Capital On Corporate Sustainable Performance

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Abstract

The gravest challenge faced by humankind pertains to its survival. Despite all the amenities brought by industrialization, corporate businesses around the globe understand the importance of achieving and maintaining sustainable performance as their foremost objective. The framework laid in the form of Sustainable Development Goals (SDGs) by the United Nations guides both developed and developing countries to achieve marked improvement in various indicators for reducing environmental hazards and achieving sustainable corporate performance. The stakeholder approach also advocates the need to focus on enhancing the interest of stakeholders with the minimal utilization of resources; however, the awareness of the same is relatively lesser across the firms from developing countries. The very premise of this study is to learn and develop an understanding of the relationship between green human capital and Corporate Sustainable Performance (CSP) with the mediating role of competitive advantage in Pakistan, a developing country. This study measures the impact of green human capital on each component of CSP (economic, environmental, and social performance). Based on the deductive approach, the present research employs self-administered questionnaires and surveys (both face-to-face and online) to collect data from the manufacturing and firms operating in the Punjab Province of Pakistan. The data was collected from the senior managers responsible for strategic decision-making and implementation from different industrial hubs. The present study's findings affirm that green human capital significantly explains the economic, environmental, and social performance of manufacturing firms operating in Punjab, Pakistan. Furthermore, competitive advantage significantly mediates the association between green human capital and each performance component (economic, environmental, and social).

Keywords: Green human capital, competitive advantage, economic performance, environmental performance, and social performance.

Introduction

Businesses traditionally focus on maximization of return without realizing that their operations could also impact the environment in terms of pollution and resource depletion leading to various forms of environmental degradation (Yusliza, Yong, Tanveer, Ramayah, & Juhari, 2020). Keeping this issue in mind, businesses today have been compelled to focus on multi-dimensional sustainable corporate performance instead of traditional monotonous performance matrices due to fast-paced changing environmental and social caveats (Haseeb,

Hussain, Kot, Androniceanu, & Jermsittiparsert, 2019). Hence, modern organizations want to enhance their financial performance in compliance with eco-friendly initiatives while having a better control mechanism to reduce environmental pollution (Jain, Vyas, & Roy, 2017).

The need for eco-friendly organizational operations is also evident because it is becoming a thoughtful concern for consumers interested in purchasing and consuming the product or services from the organization with concerns for environmental sustainability (Yadiati, Nissa, Paulus, Suharman & Meiryani, 2019). Under present circumstances, businesses are inclined towards eco-friendly ways of meeting organizational goals to ensure sustainable performance across economic, environmental, and social perspectives.

Scholars have paid more attention to sustainability since the Brundtland Report (1987), which was the first to consider it (WCED, 1987). As society has increased concern about environmental problems and the external environment started changing rapidly, it compelled the stakeholder to move their focus to environmental issues (Higgins & Coffey, 2016). The most frequently accepted definition of sustainability is "progress that meets current demands without jeopardizing future generations' ability to meet their own needs." (WCED, 1987).

The concept of being "green" has expanded across numerous businesses, causing traditional organizational processes and resource use to change (Albort-Morant et al., 2016). Many organizations now have the motivation to focus on moving on green performance. To begin with, organizations feel it is their responsibility to increase the focus on environmental problems as it also helps them to decline environmental pressure (Bird et al., 2007). Second, corporations may acquire a green label because of increased environmental realization and consumer demand

for green products, which also help the firm develop a customer-driven favorable image. Third, it also considered that local and global environmental standards are unavoidable for a long-term success plan for the organization (Albort-Morant et al., 2016).

As a result, there are many progressions and consequences for the guidelines and instances by which firms may impact their environmental performance and boost their competitive position in the presence of strict natural restrictions and widespread ecological awareness among consumers (Driessen et al., 2013). Thus, the importance of the Green Intellectual Capital (GIC) environmental perspective is noteworthy to supplement the prospect of sustainable development and improve organizational performance and competitiveness.

In recent years, scholars have been increasingly interested in the study of IC (Samson, Gloet, & Singh, 2017). The capacity to transfer information and ideas into new processes, products, and systems for the benefit of organizations and their stakeholders is called Innovation Capability (IC) (Lawson & Samson, 2001). Product and process innovation are two types of IC, with the first being the most often researched. Several researchers have stressed the importance of studying IC by detecting many indications ranging from research to market penetration (Kafetzopoulos & Psomas, 2015). Nonetheless, there have been inconsistent results in the study of IC due to diverse views and classifications (Samson et al., 2017).

Green practices and sustainability have much focus in research in developed countries. However, underdeveloped countries still need to focus on these areas as the link between a firm's sustainable performance, intellectual capital, and innovation capability is mainly unexplored in literature (Yusliza, Yong, Tanveer, Ramayah, & Juhari, 2020). Most studies focus on the impact of intellectual capital on firm performance (Gul

et al., (2022; Khalique, Ramayah, Shah, & Iqbal, 2019) and intellectual capital disclosures (Mubarik, Naghavi & Mubarik, 2019). Recent literature has observed numerous measures influencing green intellectual capital, either as antecedents, intermediate influences, or representing the consequences of intellectual capital.

It is established in extant literature that green intellectual capital serves to affect sustainable performance both directly and indirectly, whereas another intermediate variable, such as knowledge management capability (Shahzad, Qu, Zafar, Rehman, & Islam, 2020), innovation speed and quality (Wang, Cai, Liang, Wang, & Xiang, 2021) and firm strategy (Peppard & Rylander, 2001). Antecedent variables include knowledge sharing (Ngah & Ibrahim, 2011)), dynamic capability (Singh & Rao, 2016), and corporate governance (Suroso, Widyastuti, Salim, & Setyawati, 2017). In contrast, most researchers have been interested in noting the effect of GIC on different aspects of organizational performance, such as company reputation (Yadiati, Nissa, Paulus, Suharman, & Meiryani, 2019), innovation performance (Jirakraisiri, Badir, & Frank, 2021), corporate and financial performance, competitive advantage (Chaudhry, Bilal, Awan, & Bashir, 2016), sustainable performance. Research has demonstrated that businesses that enjoy a rich GIC exhibit better sustainable performance (Yusliza, Yong, Tanveer, Ramayah, & Juhari, 2020).

This study also covers the area of innovation and its impact on sustainable performance through the mediation of competitive advantage. This research is an attempt to align the resource-based perspective with the stakeholder theory by highlighting the more nuanced perspective at the call of various scholars asking for the consolidation of the two views (Freeman, Dmytriyev, & Phillips, 2021;

Freudenreich, Lüdeke-Freund, & Schaltegger, 2020; Lourenço, Branco, Curto, & Eugénio, 2012). Developed nations have a strict mechanism for utilizing natural resources and their sustainability. Such countries also create environmental sustainability as a criterion for trade with other countries. This criterion becomes a barrier for developing countries (Ederington & Minier, 2003; Ojo & Ayo, 2021).

Organizations emphasize building green intellectual capital that supports their pursuit of falling in line with sustainable performance requirements considered mandatory in the developed world. There is a further need to identify how green intellectual capital develops a relationship with sustainable performance, especially in developing countries like Pakistan. Innovation capability and competitive advantage are important constructs that can help understand the nature of this relationship. This will help organizations utilize the maximum benefits of green intellectual capital by building sustainable performance.

Literature Review
The United Nations developed a sustainable development goals (SDGs) Agenda for 2030. However, it creates a good move toward a human-friendly environment and conflicts between the activities and the targets. Businesses exploit natural resources for wealth maximization and never try to focus on sustainability. Because there is no strict mechanism, and awareness is also limited in developing countries. The need brought the focus of researchers to explore the contributing factors, such as green intellectual capital, innovation capability towards sustainable performance (Khaled, Ali, & Mohamed, 2021; Khalid, Sharma, & Dubey, 2021).

Green Human Capital
Brundtland, 1987 encouraged companies to adopt responsible green business practices to compete in a global economy and protect the environment

(Yong, Yusliza, Ramayah, & Fawehinmi, 2019). Furthermore, (Chang & Chen, 2012)argued that worldwide environmentalism has proliferated in the last decade and that increasing environmental consciousness is critical for developing green intellectual capital. According to López-Gamero, Zaragoza-Sáez, Claver-Cortés, and Molina-Azorn (2011), sustainability focuses on a firm's future performance rather than its current performance there is a need to understand the problems of sustainability through knowledge. Green intellectual capital combines intellectual capital and environmental concerns at the corporate or personal level, encompassing all sorts of intangible assets such as competencies, information, and relationships (Chen, 2008).

According to López-Gamero et al. (2011), green intellectual capital is the sum of all information a firm can use to obtain a competitive advantage while undertaking environmental management. In general, intellectual capital is regarded as a multi-dimensional concept that corroborates it as an intangible resource of businesses based on practical experience, capabilities, and knowledge to increase the organization's value (Allameh, 2018; Sydler, Haefliger & Pruksa, 2014). Knowledge can be found inside the corporation, including corporate databases, individuals, external or internal relationships, business processes, and systems (Yong et al., 2019). Human, relational, and structural capital is essential to measure green intellectual capital.

Green human capital is an environmental type of human capital that can be defined as the sum of a worker's skills, innovativeness, talents, capacities, and responsibilities regarding environmental protection. Green structural capital refers to hierarchical assets such as organizational capabilities, information, information arrangement for rewards, executives, licenses, administrative components, trademarks, enlightening innovation framework, organization image, organizational culture, copyrights, and databases, among other things, all of which are related to environmental protection. Green relational capital is defined as a company's relationships with clients, dealers, platforms to engage on, and information sharing in environmental protection and cost reduction (Chen, 2008).

Competitive Advantage

Intellectual capital covers resources and competencies that are valuable, uncommon, difficult to imitate, and non-substitutable and provide the organization with a long-term competitive advantage and superior performance (Barney, 1991; Prahalad & Hamel, 1990). Spender (1996) stated, similarly to the resource-based theory of the business, that competitive advantage can only be gained through the utilization of scarce, intangible, and firm-specific assets. Wang and Chang (2005) recognized that intellectual capital is a crucial determinant of a firm's current and future competitiveness, as well as its value growth, in a similar scenario. Tovstiga and Tulugurova (2009) said that a firm's internal resource base, particularly its intellectual capital, is a crucial determinant of competitive success in medium and small businesses. According to their results, organizations that successfully mobilize their intellectual assets through knowledge, technological skills, experience, and strategic competencies gain a competitive advantage. Haseeb et al. (2019) modified the competitiveness model to incorporate performance, quality, productivity, innovation, and image, as well as a detailed examination of intangible and tangible outcomes. Firms have learned to use ISO 9000 and ISO 14000 criteria as a means of gaining a competitive edge during this time (Schulz & Flanigan, 2016; Montabon, Melnyk, Sroufe, & Calantone, 2000; Pagell & Wu, 2009)

Sustainable Performance

The demand for corporate sustainability has increased dramatically in this era of globalization (Hansen & Schaltegger, 2016). Organizations now focus on environmental and economic challenges (Svensson, Wood, & Callaghan, 2010), yet maintaining a competitive edge has become a serious challenge (Cancino, La Paz, Ramaprasad, & Syn, 2018). Environmental, economic, and social sustainability are the three dimensions of sustainable performance. First, environmentally sustainable performance is primarily determined by reduced environmental harm and optimized and efficient exploitation of resources. Furthermore, the responsible handling of industrial waste, reducing CO_2 emissions toxic waste and reducing the probability of hazardous accidents in a manufacturing plant, and producing environmentally friendly products, among other things. Second, economic sustainability is primarily concerned with cost-effectiveness, revenue creation, energy efficiency, and waste as a source of money, among other things. Organizations focusing on improving environmental sustainability by reducing unfavorable outcomes from manufacturing processes will improve their economic sustainability. Finally, social sustainability is concerned mainly with facilitating communication between external and internal groups, ensuring and strengthening society's health, safety, and well-being, and offering equal opportunity (Paulraj, 2011; Shahzad et al., 2020; Tseng et al., 2016; Ullah et al., 2019; Zhu & Sarkis, 2004; Zhu et al., 2008).

Research Methodology

This chapter provides the research design for the study. This study is based on deductive and primary reasoning as data will be gathered using a questionnaire, and analysis will be performed quantitatively by structured equation modeling (SEM) using the software Smart PLS 3.2.9. The study is cross-sectional, where the data will be collected simultaneously. This study aims to study the effects of green intellectual capital on sustainable firm performance in Pakistan. The data is collected from manufacturing, and our unit of analysis is manufacturing sector organizations that operate in Punjab's industrial & business hubs. We will target firms with an established environmental management accounting system that caters to environmentally responsible operations because an organization practicing according to some environmental protection certification or guideline would be the best example to study green practices. The total population of such firms cannot be determined as no such data is found with the Chamber of Commerce, SECP, or SMEDA.

The total population is unknown for such manufacturing firms; hence we will revert to the purposive sampling technique that will also consider the snowball effect as the study continues. To determine the study sample in such a case, the researchers advocate using various techniques as recommended in the literature (Sekaran & Bougie, 2016; Zikmund, Carr, & Griffin, 2013). Using the rule of thumb technique that suggests a minimum of ten responses at least for each latent factor of the study, the minimum sample size for this study comes out to be 100 according to the ten (10) variables of the study (Chin & Newsted, 1999). While according to another recommended procedure, the minimum sample is to be determined using Daniel Soper's sample size formula. The recommended sample size comes out to be 200 based on the number of latent constructs being 10 and observed items being 60, with a probability of 0.05, with a medium level of expected effect size, i.e., 0.30 and required statistical power at 0.80 level (Soper, 2022; Westland, 2010).

Employees with at least an executive status are the unit of analysis for this study's significant participants from Punjab's industrial & business hubs. This is the ideal option for the

study because they are in charge of the firm's daily operations and, more importantly, have the most in-depth understanding of their companies. The researcher believes that employing questionnaires to address the underlying nature of the construct is crucial because most key informants of organizations have hectic schedules and need to devote more time to answering questions. The researcher committed to providing a summary of research findings to the respondents at the end of the study to encourage a prompt and comprehensive answer.

Measuring instrument has been adopted from further research as an instrument for green human capital has five questions adopted from Chen (2008) endorsed by Cahyono & Hakim, 2020; Chang & Chen, 2012; Jirakraisiri et al., 2021; Yadiati et al., 2019; Yang et al., 2018 and Yusliza et al., 2020. The measuring instrument for competitive advantage has six questions and was adopted by Barney (1991) and endorsed by Chang 2011; Chen, 2008; Porter & Van der Linde, 1995; Ullah et al., 2021. Sustainable performance has three dimensions. The measuring instrument for environmental performance has six questions, and economic performance has five questions, social

performance has five questions. Measuring instrument for sustainable corporate performance is adopted from Zhu & Sarkis, 2004 endorsed by Abbas et al., 2019; Shahid et al., 2020; Shahzad et al., 2020; Paulraj, 2011 and Zhu, Sarkis & Lai (2008).

Results

Factor analysis has been performed to evaluate the reliability and validity of the scale used to measure the latent constructs (Byrne, 2005). The present study adapted the scale from the existing literature to measure the latent constructs. The findings of factor analysis indicate no issue in reliability and validity as the factor loadings meet the minimum threshold value of 0.50. The results of all factor loadings are reported in Table 1 (Tzeng, Chiang, & Li, 2007). The assessment of convergent validity is performed based on Cronbach alpha, composite reliability, and average variance extracted. The convergent validity results were reported in Table 1, along with factors loading. The present study considered the threshold value for Cronbach alpha 0.70, for composite reliability 0.70, and average variance extracted 0.50 (Ab Hamid, Sami, & Sidek, 2017).

Table 1: Assessment of Reliability and Validity

	Loadings	CA	CR	AVE
CA1	0.804			
CA2	0.808			
CA3	0.791	0.865	0.902	0.649
CA4	0.792			
CA5	0.831			
ENP1	0.692			
ENP2	0.815			
ENP3	0.819	0.841	0.888	0.614
ENP4	0.822			
ENP5	0.763			
EP1	0.860	0.898	0.929	0.765
EP2	0.897			

EP3	0.892			
EP4	0.850			
GHC1	0.786			
GHC2	0.814			
GHC3	0.867	0.893	0.921	0.700
GHC4	0.861			
GHC5	0.853			
SP1	0.809			
SP2	0.846	0.868	0.910	0.716
SP3	0.873			
SP4	0.856			

In the structural equation modeling technique, discriminant validity assessment is essential to validate the assessment of the measurement model. The underlying objective of discriminant validity analysis is to evaluate that the latent constructs must not be highly correlated. Two standard methods exist to evaluate the discriminant validity: Fornell-Larcker and Heterotrait-Monotrait (HTMT) (Al-Maroof & Al-Emran, 2018). The prior literature documented a few shortcomings in the Fornell-Larck for assessing discriminant validity; hence HTMT is the more appropriate technique to assess the discriminant validity (Al-Maroof & Al-Emran, 2018). There are two schools of thought to determine the threshold value for discriminant validity. The first approach is considered a lenient approach which defines the threshold value for the discriminative validity as 0.90 (Gold, Malhotra, & Segars, 2001), while the second approach is considered a strict approach which outlines the threshold value of 0.85 for the assessment of discriminate validity (Kline, 2011). The present study follows the lenient approach for assessing discriminant validity, and the findings are reported in table 2.

Table 2: Assessment of Discriminant Validity

		1	2	3	4	5
1	Competitive Advantage	0.806				
2	Economic Performance	0.722	0.875			
3	Environmental Performance	0.600	0.774	0.884		
4	Green Human Capital	0.778	0.702	0.703	0.837	
5	Social Performance	0.723	0.701	0.727	0.727	0.846
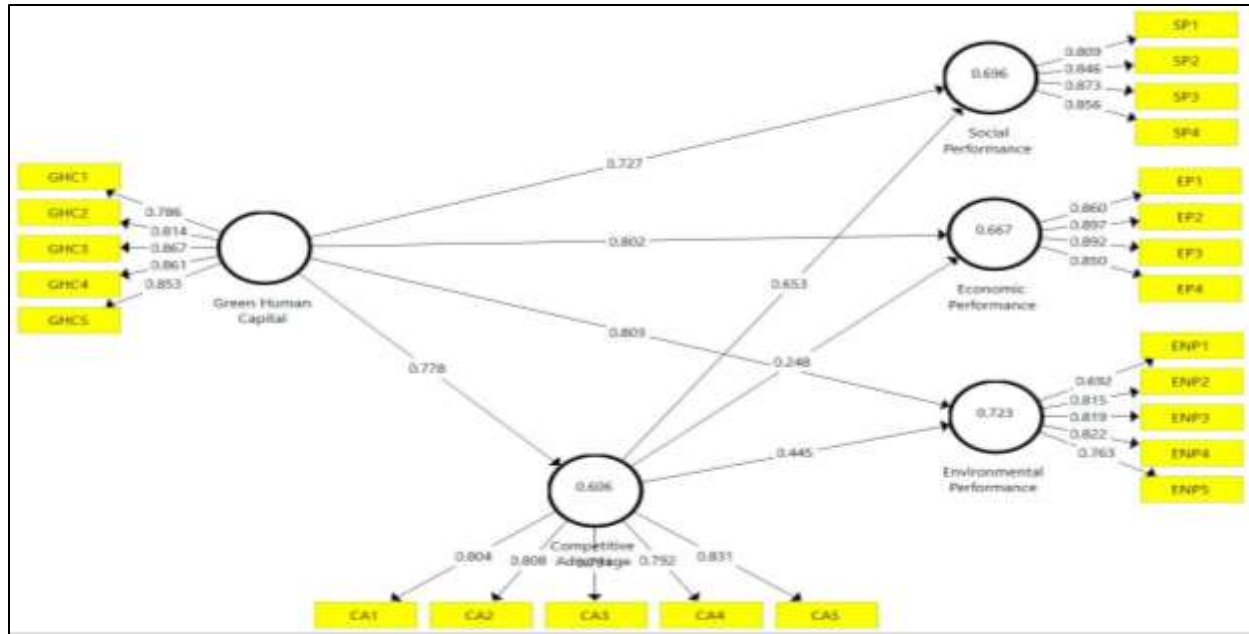
Figure 1: Assessment of measurement model

Results and Discussion

The assessment of direct relationship was reported under the structural equation modeling technique reported in table 3. The results of the current study indicate that green human capital is significantly and positively linked with economic performance (β= 0.608, t= 9.487, p= 0.000), environmental performance (β= 0.457, t= 8.234, p= 0.000), and social performance (β= 0.219, t= 3.833, p= 0.000). Prior literature reported similar findings, which affirm that green human capital positively and significantly influences the economic performance of manufacturing firms (Marrucci, Daddi, & Iraldo, 2021). In addition, the literature reveals that green human capital in logistic practices also significantly improves the economic performance of firms (Agyabeng-Mensah & Tang, 2021). Moreover, green human capital is critical in environmental performance (Al-Swidi, Gelaidan, & Saleh, 2021; Haldorai, Kim, & Garcia, 2022). The green human capital significantly explains the social performance of manufacturing firms under CSR activities (Agyabeng-Mensah & Tang, 2021; Haldorai,

Kim, & Garcia, 2022; Bahuguna, Srivastava, & Tiwari, 2023).

The findings indicate that competitive advantage is positively and significantly linked with economic performance (β= 0.248, t= 3.915, p= 0.000), environmental performance (β= 0.445, t= 7.706, p= 0.000), and social performance (β= 0.653, t= 11.859, p= 0.000) at 5 percent level of significance. The findings of the current study, supported by the prior literature, affirm that competitive advantage is significantly and positively linked to the economy (Maury, 2018; Na, Kang, & Jeong, 2019), environment (Singh, Chen, Del Giudice & El-Kassar, 2019; Waqas, Honggang, Ahmad, Khan, & Iqbal, 2021; Asiaei, Bontis, Alizadeh, & Yaghoubi, 2022), and social performance (Agyabeng-Mensah & Tang, The relationship among green human capital, green logistics practices, green competitiveness, social performance and financial performance, 2021; Hang, Sarfraz, Khalid, Ozturk, & Tariq, 2022). The present study contributes to the triple bottom line theory, which claims that economic, environmental, and social performance is significantly linked with the organizational

resources and capabilities to achieve the comparative advantage which leads towards economic, environmental, and social performance.

Furthermore, the findings affirm that green human capital is significantly and positively linked with competitive advantage (β= 0.778, t= 32.827, p= 0.000). Compared to traditional measures, the triple bottom-line theory focuses

on social and environmental performance and economic performance (Liu, Mei, & Guo, 2021). The existing literature supports the present study's findings, which affirms that green human capital significantly explains the competitive advantage in the case of manufacturing firms as compared to service sector organizations (Amjad et al., 2021; Bahuguna, Srivastava, & Tiwari, 2023).

Table 3: Assessment of the direct relationship

	Coeff.	SD	T-Values	P-Values
Green Human Capital -> Economic Performance	0.608	0.064	9.487	0.000
Green Human Capital -> Environmental Performance	0.457	0.056	8.234	0.000
Green Human Capital -> Social Performance	0.219	0.057	3.833	0.000
Competitive advantage -> Economic Performance	0.248	0.063	3.915	0.000
Competitive advantage -> Environmental Performance	0.445	0.058	7.706	0.000
Competitive Advantage -> Social Performance	0.653	0.055	11.859	0.000
Green Human Capital -> Competitive Advantage	0.778	0.024	32.827	0.000

The present study considered the competitive advantage as mediating latent construct between green human capital and manufacturing firms' economic, environmental, and social performance. The findings of the present study indicate that competitive advantage significantly and positively mediates the association between green human capital and economic (β= 0.193, t= 3.825, p= 0.000, environmental (β= 0.346, t= 7.200, p= 0.000), and social performance (β= 0.508, t= 11.158, p= 0.000). The resource-based view theory claims that organizational capabilities and competencies lead toward competitive advantage, and the present study's findings affirm that green human capital is significantly and positively linked with a competitive advantage. The current study borrowed two latent constructs, green human

capital, and competitive advantage, from the resource-based view theory to evaluate the firm performance using the triple bottom line theory. The present study considered the triple bottom line theory as underpinning, which claims that traditional methods of performance measurements were outdated; hence firm performance must be evaluated based on three dimensions economic, environmental, and social performance. The present study's findings affirm that green human capital significantly and positively contributes to the economic, environmental, and social performance of manufacturing firms in a direct relationship. In addition, competitive advantage significantly and positively mediates the association between green human capital and economic, environmental, and social performance.
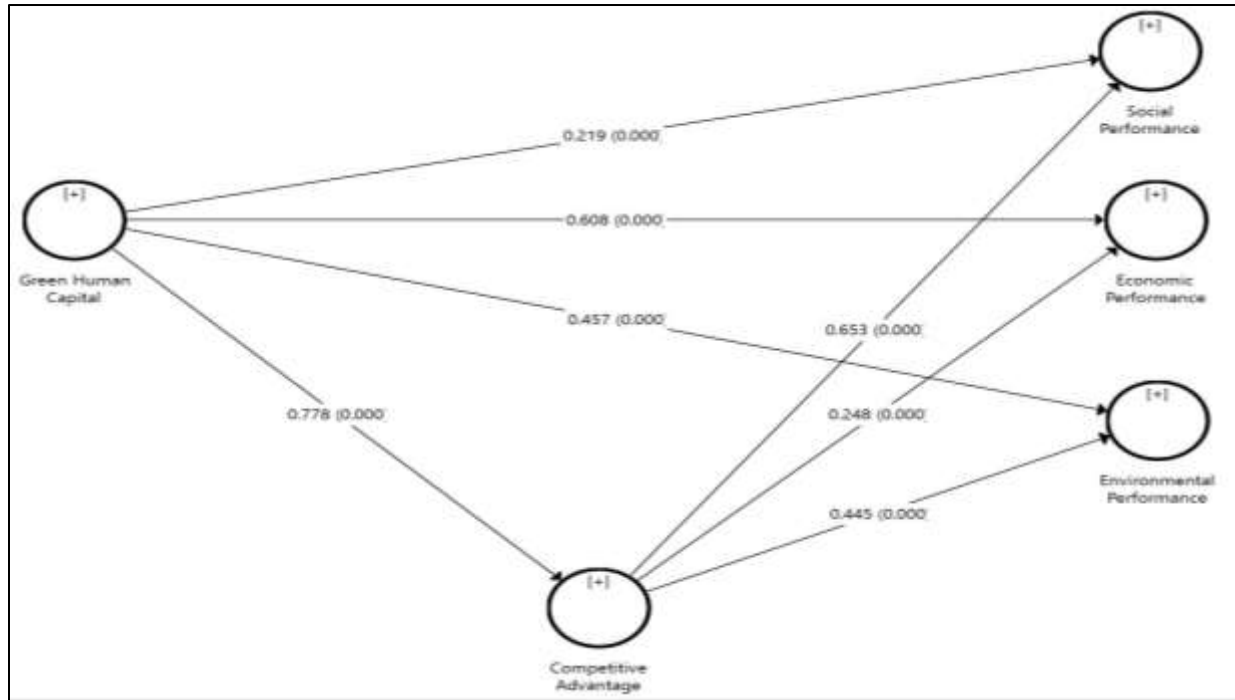
Figure 2: Assessment of structural model

Table 4: The assessment of mediation analysis

	Coeff.	SD	T-Values	P-Values
Green Human Capital -> Competitive advantage -> Economic Performance	0.193	0.051	3.825	0.000
Green Human Capital -> Competitive advantage -> Environmental Performance	0.346	0.048	7.200	0.000
Green Human Capital -> Competitive advantage -> Social Performance	0.508	0.046	11.158	0.000

Conclusions

Traditionally businesses focus on maximization of return without realizing that their operations could also impact the environment in terms of pollution and resource depletion leading to various forms of environmental degradation. Recently the trends significantly change in developed and developing economies. With the emergence of (corporate social responsibility) CSR, manufacturing firms from developed economies realize that it is only possible to enhance their financial performance with compliance with eco-friendly initiatives while having a better control mechanism to reduce environmental pollution. However, manufacturing firms in developing countries need to understand green practices' significance in organizational performance. The current study considered the manufacturing firms as a unit of analysis and used survey questionnaires to collect the data from managers. The present study considered the role of green human capital to evaluate the economic, social, and environmental performance of manufacturing firms in Pakistan using the structural equation modeling technique.

Moreover, competitive advantage is a latent mediating construct between green human capital and economic, environmental, and social performance.

The present study's findings affirm that green human capital is significantly and positively linked with the economic, environmental, and social performance of manufacturing firms. In addition, the results indicate that competitive advantage significantly and positively mediates the association between green human capital and manufacturing firms' economic, environmental, and social performance. The present study concludes that organizational capabilities and competencies lead toward competitive advantage, which is significantly and positively associated with organizational economic, environmental, and social performance. The present study significantly contributes to the triple bottom-line theory by empirically documenting the association between latent constructs and with mediating role of competitive advantage.

Future directions and limitations

The present study considered the manufacturing firms currently operating in Punjab, Pakistan's major cities. Manufacturing firms from other provinces were not considered in the scope of the current study. Respondents of the present study were the general managers, while the font line and operations level managers were not considered. In addition, the present study needs to include ground-level employees and document their opinion. The current study considered only green human capital as a latent construct as an independent variable to predict economic, environmental, and social performance with the mediating role of competitive advantage. Future studies need to consider the manufacturing firms of other provinces and document the point of view of employees, front-line, and operations managers to predict the association among the latent constructs. In addition, future studies need

to consider other latent constructs, such as green intellectual capital and green structural capital, to improve the prediction power of the model.

Practical Implications

The present study's findings outline the practical implications for managers, investors, policymakers, and regulatory authorities. The results indicate that green human capital of manufacturing firms significantly improves the competitive position of firms in a competitive environment. The competitive advantage significantly translated into manufacturing firms' economic, environmental, and social performance. The results of the present study will facilitate the managers, investors, policymakers, and regulatory authorities to understand the significance of green human capital and competitive advantage towards the economic, environmental, and social performance of manufacturing firms.

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