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Impact of Intellectual Capital on Organizational Performance: Mediating Role of Green Supply Chain Management Practices

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ABSTRACT

The major purpose of this study was to look empirically at the missing mediating role of Green Supply Chain Management (GSCM) practices in the relationship between intellectual capital(IC) and organizational performance(OC). Using concept from the resource-based view (RBV) theory, in the complex context of Pakistan's construction sector, the integration of Green Supply Chain Management (GSCM) processes is not just a choice, but a must for attaining sustainable growth. The main objective of GSCM is to mitigate negative environmental impacts and improve operational effectiveness. For this, a sample of 327 employees was gathered from the managerial staff of the construction industries by using a nonprobability purposive sampling technique, as only respondents engaged in SCM and GSCM activities were contacted. The hypotheses were put to the test using Smart PLS-SEM version 4 via reliability, validity statistics, and mediation analysis using the Hayes and Preacher model. Overall, the results imply that intellectual capital is significantly contributing to improving OC. Also, results revealed the partially mediating role of GSCMP in the association between intellectual capital and organizational performance. This study also highlights the GSCMP approach for creating sustainable competitive advantage, which highlights various implications for prospective academicians and practitioners.

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1. Introduction

Increasing awareness of environmental preservation and sustainability has made green supply chain management (GSCM) a common method nowadays. To strengthen the environment and green image, industries are obligated to use green practices (Nawaz, Iqbal, Iqbal, Ali, & Jin, 2024). In this perspective, different service, industrial, agricultural, and mining industries have put into effect GSCM practices in several nations and worldwide (Kannan, Jabbour, & Jabbour, 2014). The organizations are accountable for their practices in preventing environmentally harmful operations such as raw material and trash overflow removal from sites; therefore, organization should impose and implement environmental rules on their activities. GSCM aims to reach sustainable development objectives by avoiding or eradicating environmental damage caused by supply chain operations. Therefore, GSCM actions make it necessary and feasible for businesses to redesign their procurement, production, storage, and logistics processes. According to earlier studies, some companies adopted GSCM based on customer satisfaction and expectations, and others embrace green processes to comply with environmental legislation. Current globalization has compelled policymakers to implement environmentally, socially, and economically sustainable initiatives (Ali et al., 2019). Therefore, industries need to add value-creation techniques to their existing manufacturing process. The significance of the fourth

industrial revolution (Industry 4.0), which is focused on sustainability, has been highlighted in a number of studies (Manavalan & Jayakrishna, 2019; T. Stock & Seliger, 2016). A different study qualitatively analyses Industry 4.0's ability to generate industrial value from both a micro and macro perspective. According to the investigation's findings, sustainable growth is aided by the creation of industrial value (Tim Stock, Obenaus, Kunz, & Kohl, 2018).

Many large organizations have been integrating GSCM methods over the ensuing ten years as a strategy to increase their competitiveness in the marketplace (Dubey, Gunasekaran, & Papadopoulos, 2017). Currently, a large number of companies focus on environmental goals and take part in GSCM practices consist of eco-design, resource recovery, recycling, remanufacturing and reconditioning (Al-Sheyadi, Muyldermans, & Kauppi, 2019). The legal requirements imposed by product maker companies in many developed countries to collect, recover, and/or dispose of used and used products and their packaging have led to the development of concepts (or terms) like "reverse logistics," "complete the loop of supply chains," and "green supply chains" (Mitra & Datta, 2014). The necessity to protect the environment and minimize pollutants is becoming increasingly clear to businesses, governments, and even consumers (Soda, Sachdeva, & Garg, 2015; Zhu, Qu, Geng, & Fujita, 2017) Conversely, there is a higher need for GSCM methods to be adopted in developing countries because their industries are less sympathetic to the cause of environmental protection (Scur & Barbosa, 2017; Soda, Sachdeva, & Garg, 2015).

According to GSCM, intellectual capital is regarded as one of the preconditions for performance enhancement, as indicated in an earlier study (AL-Khatib, 2022). 3 Given the importance of intellectual capital as a prerequisite for performance improvement, several previous studies (N. U. Khan, Anwar, Li, & Khattak, 2021; Shou, Prester, & Li, 2020) looked into the positive effects of intellectual capital on sources for establishing long-term competitive advantages and improving organizational performance and effectiveness. According to the perspective of environmental management, "green intellectual capital" is the sum of the information and abilities that a firm employ in its organizational and environmental processes and activities to build a competitive edge (Malik, Cao, Mughal, Kundi, Mughal, & Ramayah, 2020; Yong, Yusliza, Ramayah, & Fawehinmi, 2019; Yusliza, Yong, Tanveer, Ramayah, Noor Faezah, & Muhammad, 2020). According to the knowledge-based viewpoint theory, green intellectual capital encourages information sharing at the organizational level, as well as the interchange of knowledge and experiences among individuals within an organization. This should also promote the environmental information and skill-sharing activities that are necessary for sustainable performance (Yong et al., 2019). As a result, enterprises' employment of intellectual capital focused on environmental operations enhances the efficacy of the green supply chain (GSC), providing new information and skills (Ullah, Wang, Mohsin, Jiang, & Abbas, 2022). Firms that use their information resources and manage the flow of information across supply networks achieve improved green supply chain performance (Jemai, Chung, & Sarkar, 2020; Ullah et al., 2022).

The growth and blooming rate of Pakistan's construction companies during 2017 and 2018 was 9.13%, according to Shahbaz, Bhatti, Soomroe, and Zafarullah (2019). The labor-intensive building projects also drive and support other production and manufacturing units (Dlamini, Oshodi, Aigbavboa, & Thwala, 2020; Liu & Kim, 2020). Construction sectors are the foremost employer for both skilled and unskilled workers in underdeveloped countries (Goel, Ganesh, & Kaur, 2019; Iqbal, Nawaz, Ali, Osman, & Hamza, 2024). The construction sector employs all scales. Numerous studies have demonstrated a great interest and attention in examining the relationship between environmental and sustainability practices and profitability; yet, the correlation is unclear, claiming no obvious direction, such as positive and substantial, direct or indirect (N. U. Khan et al., 2021). Furthermore, in their research, Shahbaz, Rasi, Zulfakar, Ahmad, Abbas, and Mubarak (2018) found that Pakistan's construction supply chain performance is influenced by connections between suppliers, customers, and parties who share risk and rewards. Shahbaz et al. (2019) in a different study, investigated the effect of supply chain capabilities on logistical effectiveness for construction projects. For the purpose of monitoring and simulating real-time logistics in modular building, created a digital twin architecture (D. Lee & Lee, 2021). By using a GIS-enabled routing program to simulate several logistical circumstances, the digital twin produced an artificial asset based on BIM. According to Gabol and Siddiqui (2019); Iqbal et al. (2024), the success of Pakistan's construction supply chain is largely attributed to top management commitment, collaborative learning, and trust among employees.

Ahmad and Karadas (2021); Nawaz et al. (2024) have identified potential risk factors for the implementation of green supply chain management (GSCM) in developing nations' building industries. Pakistan is an example. Using a green supply chain (GSCM) is a recently acknowledged notion. Businesses employ GSCM because to pollution and environmental restrictions. Only a tiny or very small percentage of the Pakistani sector has implemented GSCM practices due to a shortage of research studies on GSCM and its influence on a firm's development.

Recent studies have looked into the influence of Green Intellectual Capital (GIC) on organizational performance and supply chain management. GIC has been proven to favorably affect Green Supply Chain Integration (GSCI), and Green Supply Chain Performance (GSCP), with supply chain transformational leadership mediating these interactions (Buhaya & Metwally, 2024; Xi, Fang, & Feng, 2023). Green Supply Chain Management (GSCM) partially mediates the GIC-Sustainable Performance link in the wine business (Martínez-Falcó, Sánchez-García, Millan-Tudela, & Marco-Lajara, 2023). External forces attenuate the GIC-GSCP connection, showing the significance of environmental influences (Buhaya & Metwally, 2024). Employee Green Behavior (EGB) mediates the link between the GIC dimensions and organizational success, with green spiritual capital emerging as a new GIC component (Ghosh, 2022). These findings advance our knowledge of GIC's role in improving organizational and supply chain performance, underlining the necessity of incorporating environmental issues into corporate goals and procedures.

1) Does intellectual capital affect organizational performance?
2) Whether GSCM practice mediates the relationship between intellectual capital and organizational performance?

This study is essential to conduct because academics and practitioners have been increasingly concerned about environmental issues over the past two decades; Companies are under a significant amount of pressure from competitors, clients, and suppliers. However, if GSCM practices are fully embraced by all companies in Pakistan, a strong relationship between the actions and increased competitiveness is essential. This study is essential to sustaining a functional "industrial ecosystem" for products based on industrial technology along the supply chain, especially for businesses with operations in nations with various extents of environmental legislation. Industries that adopt intellectual capital in GSCM practices will stop waste and integrate technologies to diminish the effects of unsafe traditional systems on the environment, reduce operational costs, increase the efficiency of firms, and improve their operational activities and reputation.

2. Literature Review

2.1. Theoretical Support

Resource-based view theory recommends that, an organization is best positioned for long-period and lengthy cycle success if it has access to resources that are valued, rare, hard to replicate, and non-substitutable (Barney, 1991). Therefore, on the base of definition, we can deduce that while abilities are required to bundle, manage, and in other respects exploit resources in such a method that adds value to customers and gives an advantage over competitors, strategic resources can serve as the foundation for developing firm capabilities that can result in superior performance over time. For example, a few of Apple's numerous strategic resources include the Apple Store, different aspects of the whole shopping experience, including price, and an inventive culture. Another is their own hardware and software platforms, which have developed over literally decades through a number of advancements and enhancements. Being led for a lot of years by the brilliant and creative Steve Jobs was beneficial to them. Many computer companies have experienced financial difficulties due to their extremely low margins. Apple has achieved success through a unique corporate strategy that concentrates on its key resources, resulting in years of record profitability. According to stock prices, Apple was once the world's most valuable firm. In a workplace where imitation is encouraged as the only weapon used in competition, the RBV predicts that resources that consist of a range of essential and sufficient qualities give the company that controls them consistently better performance than an average industry rival without such resources.

2.2. Empirical Support

2.2.1. Intellectual Capital and Organizational Performance

Several research on the link between intellectual capital and organization performance have been undertaken in a range of industries (banking/finance, pharmaceutical/chemical, IT,

high technology, service, manufacturing, etc.) and nations (Taiwan, Canada, Egypt, Malaysia, USA, Australia, Greece, Japan, France, etc.) (Asiaei & Bontis, 2019; Sardo, 2017). A recent examination of this stream of research reveals that IC influences a number of organizational outcomes and performance in a constructive way (Kianto & Cabrilo, 2022). Existing research also indicates the likelihood of interactions between various IC components, which would strengthen their combined effect on organizational performance. For an organization, IC is viewed as an intangible resource that must be considered when evaluating organizational performance and long-term competitive advantage. Businesses can obtain an advantage over their competitors by introducing steady improvements, such as new processes or products. The ability of the business to increase its competitive edge, in particular, depends on intangible resources (Barney, 1991). according to Asiaei and Bontis (2019) viewpoint, in a separate analysis and independent of performance.

Human capital, structural capital, and relational capital are three general characteristics of intellectual capital (Wang, Wang, Cao, & Ye, 2016). Asiaei, Jusoh, and Bontis (2018) define intellectual capital as social, human, relational, and structural capital. Academics also largely disregard renewal capital in favor of human, structural, and relational capital (Asiaei, Jusoh, & Bontis, 2018). In order to comprehensively assess intellectual capital, this study additionally includes a component of capital to the concept. Therefore, there is still an opportunity to conduct further research into the relationship between IC and organizational effectiveness. Additionally, scholars claim that the company is under the direction of Wagner. They also have a superb operating system and workforce but need protection from bankruptcy (Rehman, Bresciani, Ashfaq, & Alam, 2022). As a result, taking intellectual capital into account is important for evaluating organizational performance.

Human Capital: The term "human capital" describes all of the individual members' abilities, backgrounds, and experiences that add to an organization's success and production. It includes the expenditures on training, education, and development for staff members, all of which improve their capacity to produce financial value for the company (Kenton, 2024, July 3).

Structural capital: The non-human resources that help an organization's human capital function and be productive are referred to as structural capital. Databases, organizational procedures, patents, trademarks, and the culture of the company are some of its constituent parts. Part of intellectual capital, structural capital consists of the networks, processes, and procedures that allow a company to continue operating and retaining knowledge throughout time—even in the event that individual personnel go (Cismas & Dumitru, 2024).

Renewal capital: The assets and resources utilised by a company to support innovation, adaptability, and ongoing process, product, and service improvement are referred to as renewal capital. It consists of spending on R&D, training, and the development of fresh concepts to drive the company's long-term expansion and sustain its competitiveness in an evolving market. (Rehman et al., 2022).

2.2.2. Green Supply Chain Management and Organizational Performance

Abdallah and Al-Ghwayeen (2019) Ghwayeen's meta-analysis of twenty (20) years of research reveals a substantial association between market and operational success and GSCM approaches. Similarly, to this, Cucchiella, Gastaldi, and Miliacca (2017) employed empirical evidence to illustrate how green and environmental policies boost management efficiency, produce knowledge, and set up internal procedures to improve long-term rivalry economical and financial performance. Furthermore, it was revealed that organizations who apply Green supply chain management approaches have improved their financial and environmental performance (S. A. R. Khan, Jian, Yu, Golpîra, & Kumar, 2019; Wong, Wong, & Boon-itt, 2020). Managers should use the GSCM method to improve their performance and competitiveness in comparison with other organizations (Micheli, Cagno, Mustillo, & Trianni, 2020). In conclusion, the adoption of GSCM techniques assists organizations in achieving their primary objectives of improved organizational performance (Sahoo & Vijayvargy, 2021). It is anticipated that Pakistani organizations will use these GSCM strategies to attain excellent levels of performance outcomes based on the findings of the existing studies.

According to Sahoo and Vijayvargy (2021) Every stage of the supply chain, from sourcing to inventory management, transportation, network design, and contract design, can be used to evaluate and mitigate the impact of emission reductions. Green Purchasing is concerned with making sure that materials and products it purchases adhere to environmental standards set by the company making the purchase, such as reducing waste generation and fostering material substitution, recycling, and reuse (Younis & Sundarakani, 2019). Another component of GSCM practices is called environmental design (ED), which refers to the steps taken through product development to significantly reduce an item's environmental influence throughout its entire life cycle, from raw material development to manufacturing, use, and finally disposal. The performance and affordability of the product are not compromised in the process (Yildiz Çankaya & Sezen, 2019). Younis, Sundarakani, and Vel (2016), Implementing GSCM practices requires collaboration and cooperation amongst numerous stakeholders on the internal and external levels. For instance, in the manufacturing industry, cooperation between the various functional departments of the organizations, suppliers, Customers are required to attain environmental goals in order to build an environmentally eco-friendly product that matches customer demand (Younis & Sundarakani, 2019; Younis, Sundarakani, & Vel, 2016). Implementing an environmental management system, collaborating with departments for environmental improvements, and upper- and middle-level managers' support for environmental practices are all actions that fall under the authority of Internal Environmental Management (Yildiz Çankaya & Sezen, 2019). The impact of each GSCM practice, such as Green Purchasing on Eco Procurement Namagembe, Ryan, and Sridharan (2019); Younis, Sundarakani, and Vel (2016), CC on EP (Choudhary & Sangwan, 2019; Ullah et al., 2022; Younis, Sundarakani, & Vel, 2016).

2.3. The Mediating Role of Green Supply Chain Management GSCM Practices

The degree to which Green Supply Chain Management practices mediate the impact of Intellectual Capital on Organizational Performance is our primary research question. The study of regional and broad research that haven't yet addressed the relationship between the factors gave rise to this query. GSCM practices' ability to mediate the effects of IC on organizational performance is the key question here. As a result, the field needs this study. The current study is special in that it uses GSCM as a mediating influence because there haven't been many studies that examine how GSCM as a mediating affects the performance of the organization. The study has practical applications since adopting several GSCM principles can significantly enhance organizational performance in the green manufacturing industry. According to Nguyet, Huyen, Oanh, Phuong, Hang, and Uan (2020), The overall quality management facilitates the adoption of GSCM methods, which in turn enhances operational performance. These findings are congruent with those reported by Vanalle, Ganga, Godinho Filho, and Lucato (2017), who found that in-depth training facilitates GSCM procedures that improve operational performance. The data revealed a significant association between cooperation, operational effectiveness, and GSCM approaches. These finding are reliable with previous research by Kazancoglu, Kazancoglu, and Sagnak (2018). The study also found that GSCM procedures serve as a link between overall quality management and operational success. These findings are consistent with those of Feng, Yu, Wang, Wong, Xu, and Xiao (2018), who found that GSCM approaches mediate the just-in-time operational management element and operational performance.

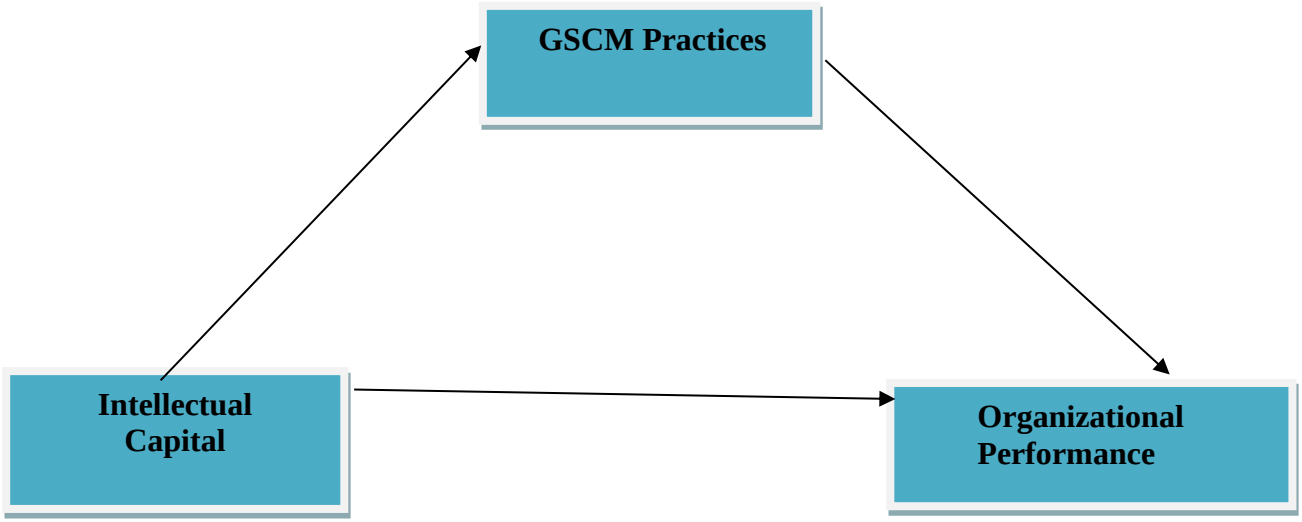
These findings are consistent with earlier research by Schmidt, Foerstl, and Schaltenbrand (2017) that supports the same conclusion. The study by Ahmad and Karadas (2021) claims that the relationship between organizational success and the most successful organization, leading employees, and leading processes is entirely mediated by GSCM techniques. Because the performance of the organization was both directly and indirectly correlated with the leadership self, the data also demonstrated that GSCM practices dramatically reduced this association. By illustrating how effective management in its aspects of leading people, organizations, and oneself may enhance OC, the study contributes greatly to the body of knowledge. While this is taking place, GSCM methods improve social and environmental performance, which has a significant impact on operational performance. Operational performance also improves organizational performance. Emissions from logistics and production processes have significantly decreased as a result of process improvement and more effective operations. In order to tackle global warming and pollution, one strategy is to decrease the amount of carbon dioxide released into the atmosphere (Jamil et al., 2024). Lean manufacturing decreases development cycles and improves resource usage as a result of eliminating waste, which may help reduce pollution. Sarfraz, Khawaja, Han, Ariza-Montes, and Arjona-Fuentes (2023) proposed an evaluation system to rate businesses based on how well their supply chains are implemented. Lean organizations

have adopted these techniques in a variety of industries to boost productivity and competitiveness (Viles, Kalemkerian, Garza-Reyes, Antony, & Santos, 2022). Spreading lean techniques through other lean activities will allow you to reap the rewards of these lean practices. Sustainability, according to Anwar, Jamil, Idrees, Atif, and Ali (2023), is the next productivity stage of lean management to promote and drive the reduction of external waste, the GSCM, and global social conditions. In order to achieve efficient distribution and delivery, management methods can be used throughout the supply chain and in different industries (Kumar, Ganapathy, Gokhale, & Tiwari, 2020). By doing this, waste may be eliminated, and quality and customer satisfaction can be maintained throughout the entire supply chain.

3. Theoretical Framework and Hypotheses Development

This study investigates the relationship between intellectual capital, organizational performance, and green supply chain management (GSCM) in the context of Pakistan's construction industry, which challenges particular difficulties such as resource shortages and environmental sustainability issues. Through the integration of sustainable practices into the construction process, GSCM functions as a strategic bridge that connects intellectual capital to improved organizational performance. Construction companies can increase their competitiveness, reduce their environmental effect, and boost resource utilization by implementing GSCM principles. Continuous improvement can be specifically facilitated by strengthening human capital through training in sustainable practices, utilizing structural capital with cutting-edge IT systems for waste tracking, cultivating relational capital through solid supplier partnerships, and encouraging renewal capital with an innovation-focused focus. By utilizing intellectual capital and incorporating GSCM concepts, this framework ultimately seeks to enhance organizational performance in Pakistan's construction industry, addressing both environmental issues and the requirement for economic sustainability.

Figure 1: Theoretical Model



H_{1a}: Human Capital has a significant influence on organizational performance.
H_{1b}: Structural Capital has a significant impact on OC.
H_{1c}: Renewal Capital has a significant effect on OC.
H_{2a}: Green supply chain management practices have a significantly mediates the relationship between human capital and OP.
H_{2b}: GSCM practices have a significantly mediates the relationship between Structural capital and OP.
H_{2c}: GSCM practices have a significantly mediates the relationship between Renewal capital and OP.

4. Research Methodology

4.1. Research Design

The research approach is the first step in the study design phase. This study employs quantitative research methods. Quantitative research is an empirical method that collects, analysis, and displays data empirically, as opposed to in narrative form. Quantitative research is considered a positivist research strategy since it is based on positivist philosophy. This method

is also known as the scientific method since it meets the characteristics of being factual, objective, quantitative, rational, and systematic. Additionally, the research uses a descriptive correlation examination to test the suggested hypotheses. This research gathered information in a typical environment where events take place as they would naturally, making it non-contrived. The data was collected from the employees of the construction industries located in Peshawar, Khyber Pakhtunkhwa.

4.2. Population and Sampling

This research primarily focuses on SME's (small and medium enterprises) in the district of Peshawar, KP's construction industry. Clients, contractors, consultants, and subcontractors are frequently involved in construction projects, as well are supply chain supervisors, managers, directors, operation managers, project managers or coordinators, supply chain managers, purchasing managers, inventory management personnel, and warehouse managers. This strategy made it straightforward to examine supply chain activity in various construction industries owned by small and medium-sized businesses in Peshawar, KP district. The unit of analysis or sample, was taken from such a huge population using the following inclusion criteria.

1. The employee is familiar with SCM or GSCM tasks, and
2. The employee is in "a position that holds the magnitude of the entire environmental impact of a corporation (Walton, Handfield, & Melnyk, 1998).

Because small and medium-sized suppliers are the "invisible link" in supply chains, their inability to manage the environment can negatively affect their financial performance, which is why we pay attention to them (S. Y. Lee & Klassen, 2008; Sarkis & Dijkshoorn, 2007).In terms of sample size and methodology, since non-probability purposive sampling is an effective method for identifying respondents who are specifically engaged in SCM/GSCM activities, it should be recognised for its inherent limitations. Because selection bias may introduce bias into the sample, it might not accurately represent the larger population, which restricts the findings' generalizability. Additionally, even if norms by Comrey and Lee (1992); Joseph F Hair, Celsi, Ortinau, and Bush (2017); Sekaran (2016) specify that a sample size of 300–500 is appropriate, the non-random character of the sample may compromise the validity of the statistical conclusions. Furthermore, there is a chance of response bias when depending solely on perceptual data, which could affect the validity of the findings. Consequently, despite the sample size selected is appropriate, consideration should be taken when extrapolating the results to groups other than the one under study, and these limitations should to be openly acknowledged in the interpretation of the data.

Table 1: List of Companies

List of companies'	Category	License No	Locations
1. M/S Ihsan Ullah Construction Co.	C1	Pk-C1/Kp/PRC/21	Peshawar
2. M/S Hidayat Construction Co.	C1	Pk-C1/Kp/PRC/1	Peshawar
3. M/S Cemcon (PVT) LTD.	C1	Pk-C1/Kp/PRC/07	Peshawar
4. M/S Zenith Construction & Engineering (PVT) LTD	C1	Pk-C1/Kp/PRC/08	Peshawar
5. M/S I.G.C Construction	C1	Pk-C1/Kp/PRC/13	Peshawar
6. M/S Ahmad Said Construction Co.	C1	Pk-C1/Kp/PRC/23	Peshawar
7. M/S Raja Sabir Khan & Company	C1	Pk-C1/Kp/PRC/44	Peshawar
8. M/S khilji Brothers Engineering Co	C2	Pk-C2/Kp/PRC/14	Peshawar
9. M/S MAK Pumps Company (PVT) LTD.	C2	Pk-C2/Kp/PRC/155	Peshawar
10. M/S Ali & Co	C2	Pk-C2/Kp/PRC/35	Peshawar
11. M/S Tesla Industries (PVT) LTD	C2	Pk-C2/Kp/PRC/57	Peshawar
12. M/S sustainable Engineering associate (PVT) LTD	C2	Pk-C2/Kp/PRC/29	Peshawar
13. M/S Gul Engineering Construction Company (PVT)LTD	C2	Pk-C2/Kp/PRC/40	Peshawar
14. M/S Axcetech Engineering Construction Contractor (PVT) LTD	C2	Pk-C2/Kp/PRC/92	Peshawar
15. M/S Manzar Hussain Construction Company	C2	Pk-C2/Kp/PRC/95	Peshawar
16. M/S Ali & Co	C2	Pk-C2/Kp/PRC/35	Peshawar
17. M/S Younas Builders	C2	Pk-C2/Kp/PRC/25	Peshawar

18.	M/S Zeraki Enterprises	C2	Pk-C2/Kp/PRC/38	Peshawar
19.	M/S Black Rock Builders & Developers (PVT) LTD	C2	Pk-C2/Kp/PRC/159	Peshawar
20.	M/S Pakhtunkhwa Construction Co	C2	Pk-C2/Kp/PRC/63	Peshawar
21.	M/S safi Progressive Engineering (PVT) LTD	C2	Pk-C2/Kp/PRC/97	Peshawar
22.	M/S A.K Engineering & Contractors (Pvt.ltd))	C2	Pk-C2/Kp/PRC/101	Peshawar
23.	M/S Sher wali Khan	C2	Pk-C2/Kp/PRC/121	Peshawar
24.	M/S Green Crown Construction (PVT) LTD	C2	Pk-C2/Kp/PRC/112	Peshawar
25.	M/S SAK Construction Co.	C2	Pk-C2/Kp/PRC/120	Peshawar
26.	M/S Haji Muhammed Ayub	C3	Pk-C3/Kp/PRC/90	Peshawar
27.	M/S Safi Brothers	C3	Pk-C3/Kp/PRC/62	Peshawar
28.	M/S Haseeb enterprises	C3	Pk-C3/Kp/PRC/78	Peshawar
29.	M/S Wadan Construction Company	C3	Pk-C3/Kp/PRC/176	Peshawar
30.	M/S Salar Builders & Contractors	C3	Pk-C3/Kp/PRC/141	Peshawar
31.	M/S Javid & Brothers	C3	Pk-C3/Kp/PRC/61	Peshawar
32.	M/S QRI Construction (PVT) LTD	C3	Pk-C3/Kp/PRC/165	Peshawar
33.	M/S Walayat Khan Construction Company (PVT)	C3	Pk-C3/Kp/PRC/65	Peshawar
34.	M/S shamer Gul & Co	C3	Pk-C3/Kp/PRC/51	Peshawar
35.	M/S Jamal Badshah & Sons	C3	Pk-C3/Kp/PRC/72	Peshawar
36.	M/S K.T Builders Engineer & Surveyor	C3	Pk-C3/Kp/PRC/179	Peshawar
37.	M/S Muhammad Khan & Co	C3	Pk-C3/Kp/PRC/246	Peshawar
38.	M/S shafique & Brothers	C4	Pk-C4/Kp/PRC/108	Peshawar
39.	M/S Abasin Construction Co	C4	Pk-C4/Kp/PRC/301	Peshawar
40.	M/S Umaira Construction Company	C4	Pk-C4/Kp/PRC/414	Peshawar
41.	M/S Dimension Engineering & Contracting Co.	C4	Pk-C4/Kp/PRC/401	Peshawar
42.	M/S Development Construction Associates	C4	Pk-C4/Kp/PRC/67	Peshawar
43.	M/S Tahir Muhammad & Brothers	C4	Pk-C4/Kp/PRC/75	Peshawar
44.	M/S Kamal,s Company Construction	C4	Pk-C4/Kp/PRC/137	Peshawar
45.	M/S Naeem Khan & Brothers	C4	Pk-C4/Kp/PRC/206	Peshawar
46.	M/S Mughal Zai Construction Company	C4	Pk-C4/Kp/PRC/216	Peshawar
47.	M/S Wajid Ali	C4	Pk-C4/Kp/PRC/168	Peshawar
48.	M/S Pak Reliable Engineering (SMC-Private) LTD	C4	Pk-C4/Kp/PRC/64	Peshawar
49.	M/S AAzan IU Engineering services	C4	Pk-C4/Kp/PRC/72	Peshawar
50.	M/S Bawar khan	C4	Pk-C4/Kp/PRC/79	Peshawar
51.	M/S JS Construction Company	C4	Pk-C4/Kp/PRC/226	Peshawar
52.	M/S I Builders	C4	Pk-C4/Kp/PRC/245	Peshawar
53.	M/S fast Construction & Engineering Works	C4	Pk-C4/Kp/PRC/156	Peshawar
54.	M/S Khan Group of Company	C4	Pk-C4/Kp/PRC/187	Peshawar
55.	M/S sha Engineering private limited	C4	Pk-C4/Kp/PRC/73	Peshawar
56.	M/S Friends Engineering Services & Enterprises	C4	Pk-C4/Kp/PRC/190	Peshawar
57.	M/S Khushal khan and Co	C5	Pk-C5/Kp/PRC/79	Peshawar
58.	M/S Muhammad Sajjad Malik Din Khel	C5	Pk-C5/Kp/PRC/214	Peshawar
59.	M/S Khurshid & Co	C5	Pk-C5/Kp/PRC/236	Peshawar
60.	M/S Shisht Engineering Co	C5	Pk-C5/Kp/PRC/270	Peshawar
61.	M/S Halimi & Sons Construction company	C5	Pk-C5/Kp/PRC/166	Peshawar
62.	M/S shah Afridi & Co	C5	Pk-C5/Kp/PRC/97	Peshawar
63.	M/S Aj Engineering Services & Company	C5	Pk-C5/Kp/PRC/75	Peshawar
64.	M/S Northern Construction Services	C5	Pk-C5/Kp/PRC/90	Peshawar
65.	M/S Haider Khel Construction Co	C5	Pk-C5/Kp/PRC/139	Peshawar
66.	M/S M.A.K Builders & Contractors	C5	Pk-C5/Kp/PRC/84	Peshawar
67.	M/S Build SMORE Construction (PVT) LTD	C5	Pk-C5/Kp/PRC/87	Peshawar
68.	M/S MDK Engineering & electrical Works	C5	Pk-C5/Kp/PRC/454	Peshawar

Source: KP Procurement Regularity Authority

4.3. Data Collection Procedure

Two approaches were employed to use survey data: face-to-face surveys and online form surveys. In this study, the online form survey was employed first, and approximately forty (37) professionals participated. Later on, face-to-face interviews were also conducted to boost response rates and gain more comprehensive and insightful information about green supply chain management (GSCM). In this approach, two hundred and eighty-five (285) skilled employees

were involved, of whom twenty-two (22) were discarded. A subcategory of the target population, construction sectors in Peshawar KP, was given the questionnaire. The Khyber Pakhtunkhwa procurement regularity authority (KPPRA), the first credit rating division in KP, provides a list of SMEs in the construction sector. The corresponding SMEs' managers were expected to receive the questionnaire via a link to a Google form. Consequently, after distributing 350 questionnaires, the researcher got response from 327 employees, and on further screening, 27 questionnaires were discarded. Hence, the response rate was around 60%, subject to 500 sample size.

4.4. Measurement and Instrumentation

This study borrowed the scale from the previous studies for which the details are as follows.

Table 2: Variables names, Items and sources

Variable Name	Items	Source
Intellectual Capital	15	Ya-Hui & Wenchang 2008 Kianto et al., 2013
Organizational Performance	05	Soh Hyun Chu et al 2017
Green Supply Chain Management	07	Soh Hyun Chu et al 2017

4.5. Tools of Data Analysis

After collecting the data from the respondents, the scholar first used descriptive statistics aimed at analyze the demographics of the respondents using SPSS version 26. Furthermore, another computer-based software called Smart PLS version 4 was used for obtaining the desired results pertaining to scale reliability, validity, regressions, and mediation analysis by using the preacher and mediation techniques.

5. Data Analysis and Result

5.1. Descriptive Analysis

Descriptive analysis is the practice of using statistical techniques to summarize or characterize a collection of data. It is also known as descriptive analytics or descriptive statistics. Descriptive analysis, one of the most prevalent approaches to data analysis, is well-known for its ability to obtain precise results from raw data. The arranging, sorting and manipulation of data to produce knowledge about the provided data, i.e., the translation of unstructured data into an understandable and analyzable format. The data for the current study was collected from the construction sector in Peshawar, Pakistan. From top management to frontline management, all the information is gathered through face-to-face interview questionnaires and online Google forms. With the help of Smart PLS version 4, all the collected data has been tested. In terms of descriptive analysis, all mean values fall between 5 and 6, which on a liked scale of 1 to 7 indicate agreement. The Overall result and statistical detail are shown in Table 3.

Table 3: Descriptive Analysis

Items	Mean	Standard deviation
GSCMP1	5.685	1.136
GSCMP2	5.788	1.157
GSCMP3	5.680	1.220
GSCMP4	5.768	1.136
GSCMP5	5.665	1.108
GSCMP6	5.729	1.119
GSCMP7	5.877	1.105
HC1	5.842	1.039
HC2	5.655	1.166
HC3	5.803	1.212
HC4	5.887	1.093
OP1	5.872	1.052
OP2	5.744	1.071
OP3	5.798	1.028
OP4	5.921	1.066
OP5	5.700	1.093
RC1	5.695	1.242
RC2	5.424	1.367
RC3	5.596	1.436
RC4	5.704	1.279
SC1	6.025	0.954
SC2	6.000	0.936
SC3	6.020	0.931

SC4	5.833	1.106
SC5	5.768	1.088
SC6	5.857	1.038
SC7	6.143	0.426

5.2. Reliability and validity Analysis

To test reliability, the entire sample was first analyzed using Cronbach's alpha with a range of 0.60-0.90. Composite reliability ρA with the range of 0.60-0.90 and Composite reliability ρC with the range of 0.60-0.90 are acceptable, as cited by Joseph F. Hair, Risher, Sarstedt, and Ringle (2019); Ringle . The range of threshold values in the interpretation represents the overall result. The results are therefore well established based on Cronbach's alpha, Composite reliability ρA, and Composite reliability ρC. To determine the validity, researcher used loading >0.70, indicators reliability >0.50, and AVE >0.50 as cited by Joseph F. Hair et al. (2019); Ringle duly support in our results. With the exception of the third item of organizational performance, which has satisfactory AVE values, we conclude that our convergent validity is well proven based on these three arguments. Discriminant validity was further tested by cross-loading and HTMT. Both tests have shown satisfactory results. The comprehensive result is shown in tables 2, 3, and 4 respectively.

Table 4: Reliability and Validity Analysis

Latent Variable	Indicators	Convergent Validity			Internal Consistency Reliability		
		Loadings	Indicators Reliability	AVE	Cronbach's Alpha	Composite Reliability ρA	Composite Reliability ρC
		>0.70	>0.50	>0.50	0.60-0.90	0.60-0.90	0.60-0.90
Human Capital	HC1	0.848	0.719	0.892	0.838	0.895	0.917
	HC2	0.880	0.774				
	HC3	0.765	0.585				
	HC4	0.787	0.619				
Structural Capital	SC1	0.963	0.927	0.965	0.957	0.968	0.965
	SC2	0.957	0.916				
	SC3	0.952	0.906				
	SC4	0.862	0.743				
	SC5	0.855	0.731				
	SC6	0.898	0.806				
	SC7	0.757	0.573				
Renewal Capital	RC1	0.907	0.823	0.750	0.888	0.890	0.923
	RC2	0.836	0.699				
	RC3	0.843	0.711				
	RC4	0.875	0.766				
Organizational Performance	OP1	0.714	0.510	0.505	0.755	0.757	0.836
	OP2	0.733	0.537				
	OP3	0.655	0.429				
	OP4	0.748	0.560				
	OP5	0.875	0.766				
Green Supply Chain Management Practices	GSCMP1	0.765	0.585	0.611	0.894	0.895	0.917
	GSCMP2	0.797	0.635				
	GSCMP3	0.793	0.629				
	GSCMP4	0.772	0.596				
	GSCMP5	0.777	0.604				
	GSCMP6	0.788	0.621				
	GSCMP7	0.781	0.610				

Table 5: Discriminant validity by Heterotrait Monotrait Method (HTMT)

	GSCMP	HC	OP	RC	SC
GSCMP					
HC	0.900				
OP	0.735	0.708			
RC	0.703	0.808	0.492		
SC	0.594	0.507	0.537	0.358	

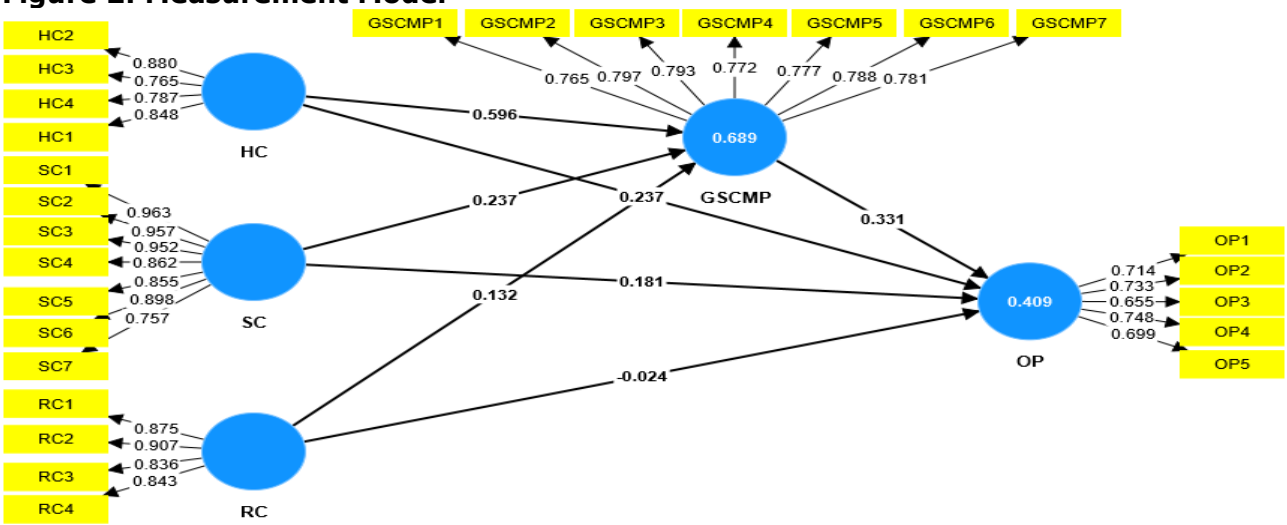
5.3. Structural Equation Modelling

Structural Equation Modeling (SEM) is a statistical approach that uses factor analysis and multiple regression analysis to examine and estimate causal relationships between variables. both observed and unobserved. It enables analyzing the complicated linkages and interactions between variables within a single comprehensive framework (Byrne, 2013; Joseph F Hair et al., 2017; Kline, 2015).

5.3.1. PLS-SEM

Partial Least Squares Structural Equation Modeling, or PLS-SEM, is the current favored approach for evaluating complicated interactions between observable and latent variables. PLS-SEM manages complicated models with several elements and interactions well, which is crucial for the study's structure. It is great for real-world data that may not be regularly distributed since it works with small to medium-sized samples, allowing for reliable findings even with limited information. Additionally, it does not require the assumption of normality in data distribution. Furthermore, PLS-SEM places a strong emphasis on prediction and variance explanation, which is in line with the study objectives to comprehend the influence. Additionally, it makes mediation analysis simpler, enabling researchers to investigate the ways in which it mediates the connection between variables. Moreover, PLS-SEM is accessible to academics and practitioners because to its ease of interpretation and flexibility in model specification, which increases the practical consequences of findings.

Figure 2: Measurement Model



5.3.2. PLS-SEM Bootstrapping

In PLS-SEM, the technique for resampling referred to as "bootstrapping" can be used to determine the standard errors and ranges of confidence for model parameters. Re-estimating the model for each sample entails drawing a significant quantity of samples with substitutions from the dataset. Researchers can acquire a distribution of the model parameters by performing this process continuously, which can then be used for calculating standard errors, t-values, and confidence intervals. In PLS-SEM, bootstrapping is essential because it offers accurate estimates of variable uncertainty, particularly when the sample size is small. It assists researchers in drawing reliable inferences about the connections in their models (Joseph F Hair et al., 2017; Ringle). Bootstrapping is statistical method used to increase model estimates' accuracy, especially when working with small sample sets. Bootstrapping in the context of Partial Least Squares Structural Equation Modelling (PLS-SEM) is the process of repeatedly sampling from the data with replacement, meaning that the same data points may appear more than once in each new sample. By using this procedure, researchers may produce a distribution of the model's parameters and estimate standard errors, t-values, and confidence intervals with greater accuracy. In essence, bootstrapping is a useful technique for deriving strong conclusions from the data since it aids in evaluating the stability and dependability of the findings (Joseph F Hair et al., 2017; Ringle).

Table 6: Intellectual Capital – Organizational Performance

Hypotheses	B	T – Statistics	P Values
H_1: HC -> OP	0.240	3.72	0.000
H_2: RC -> OP	0.328	4.82	0.000
H_3: SC -> OP	0.130	1.85	0.063

The results for the overall sample are presented in table 5 which shows that: H_{1a}: HC→OP (β = 0.240, t = 3.72, p = 0.000) H_{1b}: RC→OP (β = 0.328, t = 4.28, p = 0.000) H_{1c}: SC→OP (β = 0.130, t = 1.85, p = 0.063) All hypotheses were tested and showed a positive and significant

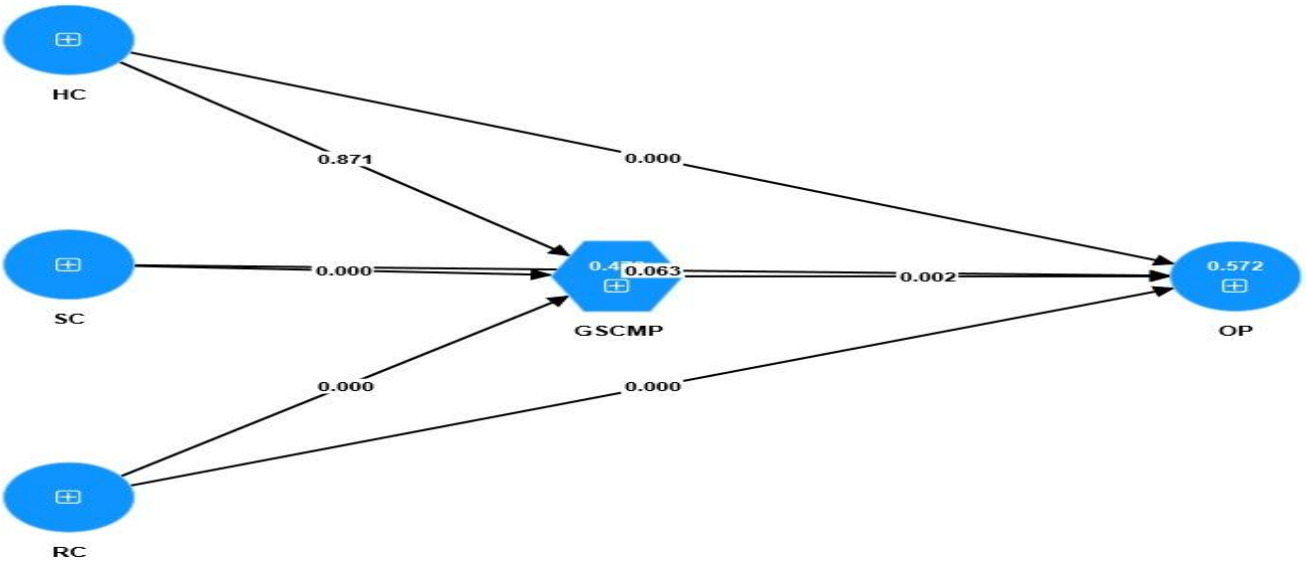
impact, except $H_{1c,}$ which is slightly significant. Overall, the results imply that IC is significantly contributing to improving Organizational Performance.

Table 7: Mediating Effect

Hypotheses	B	T – Statistics	P Values
H_{2a}: HC -> GSCMP -> OP	-0.003	0.153	0.879
H_{2b}: SC -> GSCMP -> OP	0.075	2.304	0.021
H_{2c}: RC -> GSCMP -> OP	0.098	2.652	0.008

Results for the analysis of the mediating effect of GSCMP on the linkage between IC and OC are presented next. Overall results revealed that H_{2a}: HC -> GSCMP -> OP (β = -0.003, t = 0.153, p = 0.879). Hence, it is concluded that GSCMP has no mediating effect between human Capital and OP. H_{2b}: SC -> GSCMP -> OP (β = 0.075, t = 2.304, p = 0.021) and H_{2c}: RC -> GSCMP -> OP (β = 0.098, t = 2.652, p = 0.008). Consequently, GSCMP has partially mediating effect between structural capital and organization performance, while GSCMP has a full mediating effect between renewal capital and organization performance, respectively.

Figure 3: Structural Model



5.4. Hypothesis Testing

Three hypotheses were put to the test in our analysis to investigate the correlations between particular variables. The first hypothesis (H_{1a}) claimed that human capital and organizational performance were positively correlated. This hypothesis was confirmed by the findings, which showed a significant positive connection (β=0.240, SD=0.065, t=3.724, p<0.001). This result implies that higher HC levels are linked to greater OP. Similar to Hypothesis H_{1a}, Hypothesis (H_{1b}) suggests that Renewal Capital and Organization Performance are positively correlated. H_{1b} was supported by the analysis, which revealed a significant positive connection (β = 0.328, SD = 0.068, t = 4.826, p<0.001). This suggests a relationship between higher RC and higher OP. However, the association between structural capital and organizational performance was not statistically significant according to Hypothesis (H_{1c}) β = 0.130, SD = 0.070, t = 1.853, p = 0.064). The link between SC and OP was not statistically significant in our research, although it had a favorable tendency. In conclusion, our findings strongly confirm H_{1a} and H_{1b}, showing that HC and RC both significantly predict OP. Although the association between SC and OP was positive, statistical significance could not be established in this study, and more research or a larger sample size may be necessary before establishing firm conclusions.

In the current study, we investigated the relationships among several key variables. Hypothesis H_{2a} posited a link between human capital, with the mediating effect of GSCMP, and organizational performance. Our analysis revealed that HC is not mediating GSCM practices and OP (β=−0.003, SD=0.017, t=0.153, p=0.879), suggesting that HC does not have a direct influence on OP through the mediator variable GSCMP. Conversely, Hypothesis (H_{2b}) proposed a positive relationship between structural capital, GSCMP and OP. The results supported H_{2b}, indicating a significant positive relationship (β=0.075, SD=0.032, t=2.304, p=0.021). This

finding suggests that SC affects OP positively, partially mediated by GSCMP. Similarly, hypothesis (H_{2c}) predicted a positive relationship between RC, GSCMP, and OP. The analysis confirmed H_{2c}, revealing a significant positive relationship (β = 0.098, SD = 0.037, t = 2.652, p = 0.008). This result implies that RC has a direct and positive influence on OP, fully mediated by GSCMP. These findings shed light on the complex interplay of these variables and highlight the unique pathways through which they imp*act organizational performance*.

6. Discussion and Conclusion

6.1. Discussion

This study is intended to observe the missing mediating link of GSCMP between IC and OP, particularly in the construction sector of Peshawar, KP, Pakistan. For examining such an effect, two research objectives were proposed by the scholar, which are given as follows:

RO1: To examine the effect of intellectual capital on organization performance.

RO2: To investigate the mediating role of GSCM practices between intellectual capital IC and organizational performance (OP). According to the statistics of the Board of Investment (BoI)[1] it is construction that contributes around 7.61% and 2.53% of employment and GDP in Pakistan, respectively It is necessary to make an effort aimed at curtailing such hazards and making the environment clean and green. For the search for such a cause, the data was gathered through face-to-face and online surveys to grab the maximum number of respondents from the sector concerned. After carrying out the analysis with the help of SMART PLS 4, the results revealed that overall structural, renewable, and human capital have a significant effect on OP, hence H_{1a} stands approved. The same results are validated by reviewing the relevant literature across the globe as cited. According to Cleary and Quinn (2016), HC, SC, and RC are all significant in Irish organizations; they examined various studies that support the link between IC and OP. However, not all of them have the same strength; in this case, HC was the most significant, according to the study conducted by Ibarra Cisneros and Hernandez-Perlines (2018). On the other hand, it is confirmed that all of the IC components have an influence on the competitiveness of Mexican organizations.

Whereas, literature also found it inconclusive while explaining the same relationship, for which our results are not supported. According to Bontis (2004), HC alone was unable to support an organization's performance in its core competencies. Other organizational capital, such as structural capital, is needed to support human capital. According to Muhammad and Ismail (2009) study, neither structural nor human capital contribute significantly to an organization's performance. Additionally, businesses that hold all of the IC components have a stronger ability to compete in the market than those that own only one IC resource (Kamaluddin & Rahman, 2013). Keeping in mind the SDG 2030, every corporation is required to follow and implement some sustainable initiatives for the sake of the improvement of society at large, which can be seen in the vision 2030 of Pakistan. Therefore, we proposed and tested the second hypothesis, which is about the mediating effect of GSCMP. Overall, the results indicated that GSCMP has partially mediating effect (RC -> GSCMP -> OP Beta = 0.098, t = 2.652 and p = 0.008), has full mediating effect (SC -> GSCMP -> OP Beta = 0.075, t = 2.304 and p = 0.021), and has no mediating effect (HC -> GSCMP -> OP Beta = -0.003, t = 0.153 and p = 0.879).

In the context of construction, numerous variables may play a role in the insufficient use of human capital to mediate (GSCM). It's essential to remember that some observations are generalizations and may change depending on particular circumstances and organizations. Implementing green technologies and practices often requires specialized knowledge and skills. Human capital might lack the necessary expertise to adopt and integrate these practices effectively, leading to a gap in the mediation of GSCM. The construction industry is often rooted in traditional practices. Introducing new environmentally friendly technologies, materials, and processes can face resistance from workers and managers who are accustomed to conventional methods. Many individuals in the construction industry, including laborers, contractors, and suppliers, might lack awareness and education about green practices. Without a clear understanding of the environmental impact of their activities and the benefits of green supply chain practices, it's challenging for human capital to effectively mediate GSCM.

[1] **BOI. URL:** http://invest.gov.pk/housing-and-construction

Due to the many difficulties associated with environmental complexity, market dynamics, supply chain changes, and the interconnection of many types of intellectual capital, renewal capital has a partial mediating influence on GSCM practices. The integration of renewal capital into GSCM practices may grow more complete as organizations stay creative, change, and expand in sustainable practices, having a greater impact on sustainable supply chain management. Structural capital fully mediates GSCM practices by offering the required information, procedures, training, support for innovation, mechanisms for cooperation, commitment to conformity risk management, and strategic alignment. For an organization to successfully implement and continuously enhance environmentally sustainable supply chain practices, structural capital must exist and be effective. According to RBV theory, enterprises may gain and maintain a competitive edge by acquiring, developing, and deploying valuable, uncommon, and non-substitutable resources and skills. When it comes to Green Supply Chain Management (GSCM) practices, RBV may be used to highlight the strategic value of environmental resources and capabilities. For examples Firms can identify environmentally friendly technologies, patents, or expertise related to sustainable practices. The adopted resources will be valuable in the context of GSCM. Unique environmental certifications, exclusive partnerships with eco-friendly suppliers, or access to rare sustainable materials can be rare resources that contribute to a firm's competitive advantage. Certain environmental resources, like a specific eco-friendly production process, might not have direct substitutes, enhancing their strategic importance. In summary, applying RBV theory to GSCM practices involves identifying, developing, and leveraging environmental resources and capabilities that are valuable, rare, and non-substitutable. By aligning green practices with these RBV principles, firms can achieve a more accurate and precise integration of environmental sustainability within their overall competitive strategy.

6.2. Conclusion

Since intellectual capital (IC) is a subject that hasn't been explored all that much in Peshawar, Pakistan, the research done there has confirmed that there is a connection between IC and organization performance (OP). The influence of IC on construction enterprises may be determined by directly evaluating its components. There are some gaps in the results regarding which components have greater influence. The knowledge gained during the research's creation confirmed that businesses are aware of the potential of IC; however not all of them do so effectively, which lowers their level of competitiveness. In a knowledge-based economy, intellectual capital, as compared to physical assets, now serves as a powerful strategic lever to maintain and enhance performance. Investors are becoming more concerned with non-financial intangible assets than only tangible assets as a result of globalization. This study found a substantial relationship between intellectual capital (IC) and organizational performance (OP) objectives. This study discovered that of the three components of intellectual capital, human capital and renewable capital have greater and more significant influences on organizational performance, whereas structural capital has a less significant impact when compared to other dimensions of intellectual capital. Furthermore, our findings show that GSCM Practices have an essential and significant mediating role in the link between intellectual capital and organizational performance.

6.3. Implication

The findings of this research have far-reaching ramifications for both academia and industry practitioners. Academically This study adds to the existing literature and gives a more nuanced view of how GSCMP can be a strategic tool for improving organizational outcomes. The research emphasizes the crucial relevance of using GSCMP to achieve sustainable development and competitive advantage for practitioners, particularly those in Pakistan's construction industry. Managers are encouraged to invest in intellectual capital and GSCMP as a means of driving increased performance and sustainability. This research outcome supports the intentional alignment of intellectual resources with green. The practical implications highlight the significance of intellectual capital (IC) in influencing organizational performance (OP) in Peshawar, Pakistan's construction industry. According to the research, companies should strategically concentrate on improving their human and renewal capital since they have the most significant effects on performance. To effectively exploit IC, organizations must prioritize investing in employee development, stimulating innovation, and promoting sustainability. The study further suggests that implementing Green Supply Chain Management (GSCM) practices can improve overall competitiveness in a global market that is becoming more and more focused

on sustainability, in addition to highlighting the significance of integrating these practices. It has been found that GSCM practices significantly mediate the relationship between OP and IC.

6.4. Limitation and Future Direction

The study does have limitations. The analysis is first restricted to the construction sector of just one city. Second, the study's capacity to be generalized is constrained because respondents were from top or middle management and not at all from front-line employees. Third, because SMEs provided the majority of the data and only three components of IC were examined in this analysis, Finally, the sample size also remained a matter of concern. For future study many improvements should be taken into consideration on the relationship between OP and IC, with GSCM practices serving as a mediating factor. To improve the generalizability of the results and make them more typical of other situations, the study should be expanded to include more cities in Pakistan. A more thorough understanding of the ways in which IC and GSCM practices affect OP may be obtained by utilizing a mixed-methods approach that combines quantitative surveys. Furthermore, by using a longitudinal study design, researchers could evaluate the long-term effects and trends over a period of time. Including major enterprises could increase the results' robustness because of their more organized IC and GSCM procedures. Lastly, an in-depth understanding of the mediating roles of different IC dimensions, like relational or inventive capital, on the relationship between IC and OP may be possible through the application of sophisticated statistical approaches like structural equation modelling (SEM).

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