The Effect of Green Intellectual Capital on Green Innovation: A Proposed Framework

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.90400368

Received: 06 February 2025; Accepted: 14 February 2025; Published: 16 May 2025

ABSTRACT

No research explored green intellectual capital (GIC) and green innovation (GI). This study wanted to fill this research gap, and proposed a novel construct GIC to explore the positive relationship between GIC and green innovation. The empirical results of this study showed that the three types of GIC – green human capital (GHC), green structural capital (GSC), and green relational capital (GRC) – had positive effects on green innovation. Moreover, this study found that green a significant association between GIC with green innovation; a strong association was also found between environmental knowledge and learning orientation and green innovation relational capital was the most common among these three types of GIC. In sum, organizations s investing many resources and efforts in GIC could not only meet the trends of strict international environmental regulations and popular environmental consciousness of consumers, but also eventually obtain corporate competitive advantages., organizations can achieve maximum strong excellence and remain in a competitive market.

Keywords: Green intellectual capital, Green innovation, Environmental knowledge, learning orientation.

INTRODUCTION

Human capital is the backbone of any organization, and its development is critical to achieving the organization's vision and strategy (Ferreira and Franco, 2020). In order to remain competitive in today's business environment, organizations continually strive to build a highly skilled and competitive workforce that can maximize productivity levels (Christensen et al., 2020). Countries that prioritize global competitiveness as a means to achieve national development objectives have a high demand for well-trained workers. GIC serves as a valuable resource for organizations aiming to enhance their environmental consciousness and sustainability practices. GIC comprises a wide range of intangible assets, such as environmental knowledge, expertise, patents, trademarks, environmental certifications, environmental management systems, and relationships with stakeholders committed to environmental protection (Haldorai, Kim and Garcia, 2022). One crucial aspect of GIC is environmental knowledge. Organizations that prioritize environmental consciousness invest in research and development activities to acquire knowledge about sustainable practices, eco-friendly technologies, and environmental regulations. This knowledge empowers organizations to make informed decisions and implement effective strategies to minimize their environmental impact (Pham et al., 2020).

The underlying logic is that embracing eco-innovation can lead to several benefits, including cost savings, improved environmental performance, enhanced reputation, and compliance with evolving regulatory frameworks. Firstly, eco-innovation enables the industry to reduce its environmental impact and carbon footprint. By implementing clean technologies, renewable energy sources, and energy-efficient practices, companies can minimize greenhouse gas emissions and conserve resources (Schmidt-Keilich, Buhl and Süßbauer, 2023).Secondly, eco-innovation offers opportunities for cost savings and operational efficiency (Janahi, Durugbo and Al-Jayyousi, 2021). Through the implementation of energy-efficient measures and optimization of production processes, companies can reduce energy consumption, waste generation, and operating costs. These cost savings can have a significant positive impact on a company's bottom line. Thirdly,

eco-innovation plays a vital role in enhancing the industry's reputation and attracting environmentally conscious stakeholders (Aboelmaged, 2018).

As sustainability becomes an increasingly important criterion for stakeholders, including customers, investors, and regulatory bodies, companies that demonstrate a commitment to eco-innovation and sustainable practices gain a competitive advantage. This can lead to increased market share, customer loyalty, and investor confidence. Furthermore, eco-innovation enables companies to comply with evolving environmental regulations and avoid potential penalties or reputational risks associated with non-compliance. By proactively integrating sustainable practices into their operations, companies can ensure adherence to local and international regulations, contributing to the preservation of the environment and sustainable development.

The remainder of this paper is organized as follows. Section “Theoretical framework and hypotheses” reviews the theoretical framework that forms the basis of this empirical analysis. Section “The proposed framework for the research” describes the study’s research proposed framework. Section “Discussion” discusses the research findings. Finally, Section “Conclusion” elaborates on the implications of the research findings.

LITERATURE REVIEW

The resource-based theory argues that valuable, inimitable firm resources and capabilities contribute to sustainable competitive advantage. The theoretical framework of the study explores the relationship between green intellectual property (GIP) and eco-innovation with a specific focus on the mediating role of environmental knowledge. This perspective emphasizes the strategic significance of GIP as valuable and rare resources that can provide an eco-innovation.

Green intellectual capital

Green intellectual capital (GIC) refers to the intangible assets resulting from mental processes that can be utilized in economic activities, generating value for the organization while preserving environmental quality (Dat et al., 2023). GIC comprises three key components: green human capital, green structural capital, and green relational capital. Green human capital involves employees who possess environmental knowledge, good health, and the skills necessary to manage business operations and utilize resources in an environmentally responsible manner. GSC encompasses the infrastructure, procedures, processes, and databases that support the efforts of human capital in minimizing pollution emissions. Green relational capital involves the knowledge, processes, capabilities, and systems specific to establishing eco-friendly relationships with external stakeholders. GIC plays a crucial role in fostering green innovation and driving sustainable development industry is classified into three distinct components, providing a comprehensive framework for understanding the different aspects of environmental intellectual capital, which are green human capital, green rational capital and green structure capital.

Green human capital

Green human capital (GHC) is regarded as fundamental component of the GIC process that drives green structural capital and green relational capital (Yong et al., 2019). Agyabeng-Mensah and Tang, (2021), claim that green human capital is essential for building sustainable competitive advantage in our current competitive market environment. Firms that invest in building the expertise, knowledge, skills, experience, and wisdom experience better performance improvement (Agyabeng-Mensah and Tang, 2021).

Green relational capital

Secondly, green relational capital plays a pivotal role in shaping the interactive connections between organizations and their customers, suppliers, network members, and partners concerning environmental management and green innovation (Huang and Kung, 2011). As a result, investing in resources to foster relationships centered around shared environmental interests becomes a critical aspect of building favorable associations with these stakeholders. Organizations that actively engage in environmental protection initiatives and align their values with those of their stakeholders are more likely to gain trust and support, leading to

increased credibility and reputation in the industry (Dat et al., 2023). Additionally, in turn, green relational capital serves as a key determinant of a company's success in navigating the environmental era. In today's business landscape, fostering green relational capital is not only essential for organizational success but also for promoting sustainable business practices that benefit the environment and society as a whole.

Green structural capital

Lastly, GSC encompasses a wide array of organizational elements, including capabilities, commitment, knowledge management systems, managerial philosophy, organizational culture, image, and intellectual property assets such as patents, copyrights, and trademarks, all of which are related to environmental protection or green innovation (Huang and Kung, 2011). It plays a pivotal role in providing the necessary specifications, empowerment, and supporting infrastructure required for the successful implementation of environmental protection or sustainability strategies (Huang and Kung, 2011). GSC plays a crucial role in enabling organizations to achieve environmental sustainability and green innovation. It encompasses a wide range of organizational assets and capabilities that support environmental protection efforts and foster a culture of sustainability within the company. By implementing effective environmental management systems and leveraging their GSC, businesses can enhance their reputation, attract environmentally conscious customers, and gain a competitive advantage in the market. As environmental concerns continue to grow in importance, having a robust GSC becomes increasingly vital for organizations seeking long-term success and resilience in today's business landscape.

Eco-innovation

Eco-innovation refers to the development and implementation of new ideas, products, processes, or business models that aim to address environmental challenges, reduce resource consumption, and promote sustainability in various industries and sectors (Rennings, 2000). In today's context, driven by a heightened sense of environmental protection, Eco-innovation has gained significant momentum. As society becomes more environmentally conscious, industries are compelled to adopt more sustainable practices and explore innovative ways to protect the environment and promote a greener future.

Green learning

Green learning involves acquiring knowledge, skills, and attitudes that promote environmental awareness and sustainability (Wang et al., 2020). It enables individuals to make informed decisions and take responsible actions to protect the environment and contribute to a greener future.

Environmental knowledge

Environmental knowledge refers to understanding and awareness of environmental issues, processes, systems, and solutions. It encompasses knowledge about ecosystems, natural resources, climate change, pollution, conservation, and sustainable practices (Ahmad et al., 2021). Environmental knowledge enables individuals and organizations to make informed decisions and take actions that contribute to environmental protection and sustainable development.

The effect green intellectual capital, environmental knowledge on Eco-innovation

According to Asiaei et al., (2022), have demonstrated that green GHC within an organization, which promotes the application of environmental governance such as Green Supply Chain Management (GSCM), green production lines, and reverse logistics, contributes to achieving sustainability. Unlike GHC, Green Structural Capital (GSC) does not disappear when employees leave. In the context of environmental and cultural factors associated with global development, businesses need to continuously find ways to implement environmental strategies to seek opportunities, create value, and gain competitive advantages, thus establishing a sustainable organizational structure. In response to this, (Irfan et al., 2022), defined GSC as the organizational capacity, organizational commitment, knowledge management system, organizational culture, trademarks, patents, copyrights, and trademarks related to environmental protection or green innovation in an enterprise.

Additionally, (Irfan et al., 2022), developed the concept of Green Relational Capital (GRC), which encompasses the relationships between stakeholders regarding corporate environmental management and green innovation. External organizations and business stakeholders are often more concerned about environmental issues than businesses themselves. To maintain close relationships and receive resource support from external organizations and stakeholders for survival and growth, businesses need to invest more resources in developing relationships that leverage shared environmental benefits. This is particularly relevant for Vietnam's textile and garment industry, which has a significant impact on the environment and plays a crucial role in addressing employment issues, making it necessary to find solutions to promote GIC.

In the era of increasing environmental management awareness and sustainable energy development, GHC plays a crucial role in organizational innovation as employees possess valuable knowledge and expertise that can be harnessed for green innovation (Joghee, Alzoubi and Alshurideh, 2021). (Dereń and Skonieczny, 2022), argue that GHC serves as a platform connecting employees' environmental knowledge with green innovation. Businesses can leverage their GHC potential to drive GPC and GPD, thereby enhancing operational efficiency. Wang and Juo, (2021) find that discrepancies in GHC investment requirements can lead to significant disparities in the likelihood of success when implementing green innovation among businesses.

On the other hand, unlike GHC, GSC is independent of employees. (Azam et al., 2022) contend that managers must invest in and establish robust GSC to enhance their ability to acquire environmental knowledge and sustain green innovation. Moreover, (Ali et al., 2021), support the importance of GRC for green innovation, suggesting that managers can cultivate green relationships with strategic partners, facilitate the exchange of external environmental knowledge, and foster the development of green innovation.

Based on the aforementioned rationales, the following hypotheses are proposed:

H1: GHC has a positive impact on green innovation.

H2: GSC has a positive impact on green innovation.

H3: GRC has a positive impact on green innovation.

By examining these hypotheses, researchers aim to further understand the relationship between GIC and green innovation, shedding light on the mechanisms through which GIC influences the development and implementation of environmentally sustainable practices in organizations.

The study conducted by Wang and Juo (2021) aimed to examine the relationship between GIC, including green human capital (GHC), green structural capital (GSC), and green relational capital (GRC), with environmental knowledge and green innovation. The authors collected data from 138 high-tech companies in Taiwan using surveys and employed descriptive statistics, correlation analysis, and structural equation modeling to test their hypotheses.

The authors argued that organizations with high potential in GHC, GSC, and GRC can acquire quality environmental knowledge. This knowledge, combined with the capacity to address environmental issues, creates a platform for green innovation.

A similar study by Ali et al. (2021) investigated the relationships among GIC, including GHC, GSC, and GRC, environmental knowledge, and green innovation. The study surveyed 235 small and medium-sized enterprises (SMEs) in the textile, chemical, steel, and pharmaceutical sectors in Pakistan. Multiple regression analysis was used to assess the proposed relationships. The findings indicated that higher potential in GHC, GSC, and GRC improved professionals' environmental knowledge, leading to green innovation in terms of energy reduction, environmental pollution mitigation, and waste management.

Yong et al. (2019) examined the relationship between GIC (including GHC, GSC, and GRC) and environmental knowledge and green innovation. They surveyed 112 significant manufacturing companies in Malaysia using a quantitative research method. Partial least squares regression analysis was conducted to analyze the proposed associations. The study suggested that integrating green practices into GHC, GSC, and

GRC enhances understanding of environmental changes and promotes environmental preservation. The increased environmental knowledge guides management in fostering green innovation.

H4: GHC has a positive impact on environmental knowledge.

H5: GSC has a positive impact on environmental knowledge.

H6: GRC has a positive impact on environmental knowledge.

According to Chen et al. (2014), green knowledge is the process through which firms obtain knowledge related to environmental protection. This knowledge is crucial for firms to effectively utilize environmental information and enhance their environmental technology resources, enabling them to engage in ambidextrous green innovation. In order to survive and comply with environmental regulations, firms must acquire and integrate green knowledge to drive innovation, as highlighted by Cainelli et al. (2015). In the study conducted by Liao (2018), it was revealed that knowledge acquisition has a positive influence on green innovation. This finding aligns with the principles of resource-based theory, which suggests that knowledge is a crucial resource for firms' innovation endeavors. Therefore, this research hypotheses that:

H7: Environmental knowledge has positive significant relationship with eco-innovation.

Environmental knowledge as mediate

Environmental knowledge plays a crucial mediating role between green intellectual property (IP) and eco-innovation, fostering a sustainable and eco-friendly business landscape. Green intellectual property encompasses patents, trademarks, and copyrights that protect environmentally friendly technologies, processes, and products (Dat et al., 2023). On the other hand, eco-innovation refers to the development and implementation of novel green solutions that reduce environmental impact. Environmental knowledge acts as a bridge between these two concepts by providing firms with essential insights and information on environmentally sound practices, cutting-edge technologies, and sustainable methodologies. Firms equipped with a strong understanding of environmental issues are more likely to recognize the potential value of green intellectual property (Dat et al., 2023). This awareness motivates them to invest in and protect eco-friendly innovations through intellectual property rights. Moreover, environmental knowledge empowers firms to identify gaps in existing green technologies or processes, leading to opportunities for eco-innovation. By leveraging their understanding of environmental challenges and solutions, businesses can devise creative and inventive ways to address ecological concerns. Through eco-innovation, they can develop greener products, services, and processes that align with sustainable practices while enjoying the protection and incentives offered by green intellectual property.

H8: Environmental knowledge mediates the relationship between GHC and green innovation.

H9: Environmental knowledge mediates the relationship between GSC and green innovation.

H10: Environmental knowledge mediates the relationship between GRC and green innovation.

Moderate effect of learning orientation

The relationship between green intellectual property and eco-innovation is influenced by the learning orientation, which has a moderate effect. Previous research has emphasized the significance of a learning orientation as a catalyst for innovation in businesses (Chau et al., 2023). Studies conducted by Secundo et al. (2020) have further suggested that the direction of learning has positive effects on innovation. With this in mind, a strong learning orientation (GLO) within an organization can serve as a foundation for promoting green innovation. GLO impacts the learning orientation of human resources and employee attitudes, leading to the acquisition of new skills (Dat et al., 2023). This fosters a sense of initiative and enthusiasm among employees, particularly those involved in green innovation efforts. Businesses with GLO are more likely to embrace environmental changes and encourage proactive thinking among their employees (Nirino et al., 2022). As a result, ideas and thoughts focused on environmental issues and meeting green innovation goals are

accumulated and facilitated. Moreover, businesses with a strong learning orientation tend to be better equipped to respond quickly to customer needs and market changes, enabling them to effectively pursue eco-friendly initiatives. The ability to learn and adapt to new challenges is crucial for the sector's sustainability efforts and meeting environmental goals. Therefore this research hypotheses that:

H11: learning orientation outcomes moderate the relationship between GHC and green innovation.

Table 1. Literature review summary

No	Authors / Year	Title	Journal	Finding
1	Agyabeng-Mensah, and Tang, (2021)	The relationship among green human capital, green logistics practices, green competitiveness, social performance and financial performance	Journal of Manufacturing Technology Management	The study examines the relationship between green human capital, green logistics practices, green competitiveness, social performance, and financial performance.
2	Ahmad et al., (2021)	Promoting green behavior through ethical leadership: a model of green human resource management and environmental knowledge	Leadership and Organization Development Journal	The study proposes a model linking ethical leadership, green human resource management, and environmental knowledge to promote green behavior in organizations.
3	Ali et al., (2021)	Does green intellectual capital matter for green innovation adoption? Evidence from the manufacturing SMEs of Pakistan	Journal of Intellectual Capital	The study investigates the significance of green intellectual capital in green innovation adoption among manufacturing SMEs in Pakistan.
4	Asiaei et al., (2022)	Green intellectual capital and environmental management accounting: Natural resource orchestration in favor of environmental performance	Business Strategy and the Environment	The study explores the role of green intellectual capital in environmental management accounting and its impact on environmental performance.
5	Cao and Chen, (2019)	The driving effect of internal and external environment on green innovation strategy-The moderating role of top management's environmental awareness	Nankai Business Review International	The study explores the driving effect of internal and external environment on green innovation strategy, considering the moderating role of top management's environmental awareness.
6	Chau et al., (2023)	Impact of eco-innovation and sustainable tourism growth on environmental degradation: the case of China	Economic Research-Ekonomska Istrazivanja	The study investigates the impact of eco-innovation and sustainable tourism growth on environmental degradation, focusing on China as a case study.

7	Dat et al., (2023)	The impact of green intellectual capital on green innovation in Vietnamese textile and garment enterprises: mediate role of environmental knowledge and moderating impact of green social behavior and learning outcomes	Environmental Science and Pollution Research	The study explores the impact of green intellectual capital on green innovation in Vietnamese textile and garment enterprises, considering the mediating role of environmental knowledge and the moderating impact of green social behavior and learning outcomes.
8	Fawehinmi et al., (2020)	Assessing the green behaviour of academics: The role of green human resource management and environmental knowledge	International Journal of Manpower	The study assesses the green behavior of academics, focusing on the role of green human resource management and environmental knowledge.
9	Kim and Lee, (2012)	Stakeholder pressure and the adoption of environmental logistics practices: Is eco-oriented culture a missing link?	International Journal of Logistics Management	The study investigates the role of stakeholder pressure in the adoption of environmental logistics practices, considering the influence of eco-oriented culture.

Source(s): The study's authors

These results are in line with those of previous studies that report a positive and significant relationship amongst these variables (Agyabeng-Mensah, and Tang, (2021); Dat et al., (2023); Dat et al., (2023) and Fawehinmi et al., (2020)). The research aims to make significant contributions to the existing literature in several ways. Firstly, in previous studies, authors have debated the relationship between GIC and green innovation, but have overlooked the examination of specific dimensions of GIC. Therefore, this study focuses on analyzing the three dimensions of GIC: green human capital, green structural capital, and green relational capital, individually, and their respective impacts on green innovation.

Secondly, unlike previous studies, this research takes a novel approach by investigating the moderating role of green social behavior and green learning outcomes. It seeks to understand how these factors interact with green human capital and influence green innovation. By considering these moderating variables, a more comprehensive understanding of the relationships between different aspects of GIC and green innovation can be attained.Lastly, while prior research has primarily examined the direct effects of environmental knowledge on green innovation, this study aims to broaden the understanding by introducing the mediating role of environmental knowledge. It recognizes that environmental knowledge may serve as a mediator between different dimensions of GIC and the actual implementation of green innovation.

The proposed framework for the research

The primary focus of the research is to gain insights into how green intellectual property influences eco-innovation among employees. Eco-innovation refers to the introduction of new ideas, products, processes, or practices that enhance environmental performance and sustainability within the industry. In this context, the extent of employees' engagement in eco-innovation serves as the dependent variable. Furthermore, the study recognizes the critical role of environmental knowledge as a mediating variable in the relationship between green intellectual property and eco-innovation. Environmental knowledge represents employees' understanding and awareness of environmental issues, solutions, and the potential implications of eco-innovation initiatives. This knowledge mediates the pathway through which green intellectual property affects eco-innovation outcomes, emphasizing its importance in driving sustainable practices and innovations.

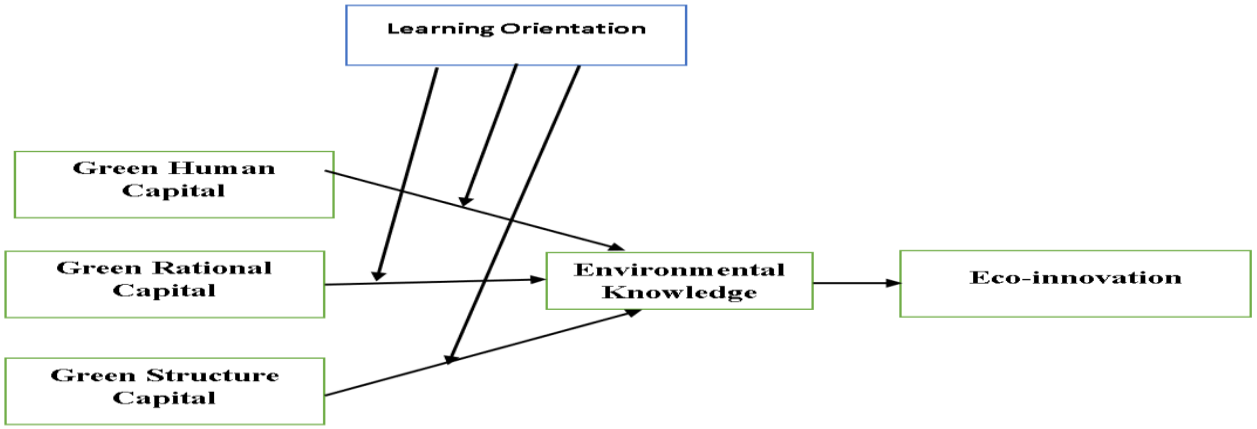

Figure 1. Proposed framework Research

METHODOLOGY

A review of literature has been carried out as appropriate methodology, in order to produce a reliable knowledge inventory, according to what is proposed by Tranfield et al (2003). Several authors have used systematic review of literature to carry out their research, for example, (Agyabeng-Mensah, and Tang, (2021); Dat et al., (2023); Dat et al., (2023) and Fawehinmi et al., (2020)). For this research, the searching process is limited to published literature, including books, conference proceedings, and literature obtained from electronic sources, mainly databases of scientific data. The searching engines used were ProQuest, Scopus, Emerald Insight, Science Direct, and Google Scholar. The keywords used are green intellectual capital and green innovation.

DISCUSSION

Based on previous results (Agyabeng-Mensah, and Tang, (2021); Dat et al., (2023); Dat et al., (2023) and Fawehinmi et al., (2020)), there are positive relationships between GIC and Eco-innovation. Based on the research objectives, the hypotheses of the study, which is green intellectual capital positively correlated to green innovation, were statistically supported. These hypotheses are also in line with Marr and Schium (2001) in that intellectual capital is associated with the organization and a positive effect on the competitive advantage as well as performance. The results of this study also prove that, under the umbrella of green intellectual capital, employees who are more concerned and have competency, skills, and knowledge leads to competitive advantage, which tends to increase the economic performance of an organization. These results are also in line with the Intellectual Capital-based View Theory, which explains that knowledge capital has a direct relationship with a competitive advantage and organizational performance (Youndt & Snell, 2004).

The results align with previous studies that have acknowledged that human capital is an important factor, and human abilities make a significant contribution to the rectification of environmental pollution issues and energy consumption (Pablo-Romero & Sánchez-Braza, 2015). These results also align with the Intellectual Capital-based View Theory that explains that knowledge capital has a direct relationship with a competitive advantage and organizational performance (Youndt & Snell, 2004). Therefore, an employee's knowledge, competencies, skills, and attitudes are not applied only to environmental protection but are important characteristics of green intellectual capital, which helps in cleaner production activities. Employees who have greater skills and knowledge of green activities help in improving the efficiencies, such as reduction of waste, cost, and consumption.

CONCLUSION

This framework integrates Green Intellectual Capital (GIC) with key drivers and processes that lead to green innovation. It emphasizes how the three dimensions of GIC—Human Capital, Structural Capital, and

Relational Capital—interact with organizational enablers to foster green innovation. The framework also highlights the mediating role of environmental knowledge and learning orientation.

This proposed framework illustrates the direct and indirect effects of GIC on green innovation. By leveraging GIC through environmental knowledge and fostering a learning-oriented culture, organizations can drive impactful green innovation. The framework can guide industry and other sectors in aligning sustainability with business goals. The study has contributed to the existing body of knowledge in achieving a higher level of green innovation in the organizations. The role of green intellectual capital was found to be significant, which helps firms to achieve green innovation. Green intellectual capital was found to be a critical dimension in environmental related issues. Not limited only to environmental issues, the study has provided evidence that green intellectual capital is also associated with green innovation. Hence, this study provided evidence that green intellectual capital tends to influence little but has a positive association with eco-innovation in the organizations.

ACKNOWLEDGEMENT

The authors would like to thank Universiti Teknikal Malaysia Melaka (UTeM), Institute of Technology Management and Entrepreneurship and RG SUITE for the direct and indirect contributions.

REFERENCES

1. Aboelmaged, M., 2018. Direct and indirect effects of eco-innovation, environmental orientation and supplier collaboration on hotel performance: An empirical study. Journal of Cleaner Production, 184, pp.537-549.
2. Agyabeng-Mensah, Y., and Tang, L., 2021. The relationship among green human capital, green logistics practices, green competitiveness, social performance and financial performance. Journal of Manufacturing Technology Management, 32(7), pp.1377–1398.
3. Ali, W., Wen, J., Hussain, H., Khan, N.A., Younas, M.W., and Jamil, I., 2021. Does green intellectual capital matter for green innovation adoption? Evidence from the manufacturing SMEs of Pakistan. Journal of Intellectual Capital, 22(5), p. 868-888.
4. Asiaei, K., Bontis, N., Alizadeh, R., and Yaghoubi, M., 2022. Green intellectual capital and environmental management accounting: Natural resource orchestration in favor of environmental performance. Business Strategy and the Environment, 31(1), pp.76–93.
5. Azam, T., Songjiang, W., Jamil, K., Naseem, S., and Mohsin, M., 2022. Measuring green innovation through total quality management and corporate social responsibility within SMEs: green theory under the lens. TQM Journal, (202203).
6. Chau, K.Y., Lin, C.H., Tufail, B., Tran, T.K., Van, L., and Nguyen, T.T.H., 2023. Impact of eco-innovation and sustainable tourism growth on the environmental degradation: the case of China. Economic Research-Ekonomska Istrazivanja, 36(3), p.2150258.
7. Christensen, J., Aarøe, L., Baekgaard, M., Herd, P., and Moynihan, D.P., 2020. Human Capital and Administrative Burden: The Role of Cognitive Resources in Citizen-State Interactions. Public Administration Review, 80(1), pp.127-136.
8. Dat, T., Doan, T., Huan, M., Thu, T., Phan, H., and Lan, H., 2023. The impact of green intellectual capital on green innovation in Vietnamese textile and garment enterprises : mediate role of environmental knowledge and moderating impact of green social behavior and learning outcomes. Environmental Science and Pollution Research, (0123456789).
9. Dereń, A.M., and Skonieczny, J., 2022. Green Intellectual Property as a Strategic Resource in the Sustainable Development of an Organization. Sustainability (Switzerland), 14(8), p.4758.
10. Ferreira, A., and Franco, M., 2020. The influence of strategic alliances on human capital development: A study applied to technology-based SMEs. EuroMed Journal of Business, 15(1), pp.65–85.
11. Haldorai, K., Kim, W.G., and Garcia, R.L.F., 2022. Top management green commitment and green intellectual capital as enablers of hotel environmental performance: The mediating role of green human resource management. Tourism Management, 88, p.104431.

12. Huang, C.L., and Kung, F.H., 2011. Environmental consciousness and intellectual capital management: Evidence from Taiwan's manufacturing industry. Management Decision, 49(9), pp.1405-1425.
13. Irfan, M., Razzaq, A., Sharif, A., and Yang, X., 2022. Influence mechanism between green finance and green innovation: Exploring regional policy intervention effects in China. Technological Forecasting and Social Change, 182(November 2021), p.121882.
14. Janahi, N.A., Durugbo, C.M., and Al-Jayyousi, O.R., 2021. Eco-innovation strategy in manufacturing: A systematic review. Cleaner Engineering and Technology, 5, p.100343.
15. Joghee, S., Alzoubi, H.M., and Alshurideh, M., 2021. The Role of Business Intelligence Systems on Green Supply Chain Management : Empirical Analysis of FMCG in the UAE. In pringer International Publishing, pp. 539–552.
16. Kim, S.T., and Lee, S.Y., 2012. Stakeholder pressure and the adoption of environmental logistics practices: Is eco-oriented culture a missing link? International Journal of Logistics Management.
17. Nirino, N., Ferraris, A., Miglietta, N., and Invernizzi, A.C., 2022. Intellectual capital: the missing link in the corporate social responsibility–financial performance relationship. Journal of Intellectual Capital, 23(2), pp.420–438.
18. Pham, N.T., Vo Thanh, T., Tučková, Z., and Thuy, V.T.N., 2020. The role of green human resource management in driving hotel's environmental performance: Interaction and mediation analysis. International Journal of Hospitality Management, 88, p.102392.
19. Rennings, K., 2000. Redefining innovation — eco-innovation research and the contribution from ecological economics. Ecological Economics, 32(2), pp.319–332.
20. Schmidt-Keilich, M., Buhl, A., and Süßbauer, E., 2023. Innovative green employees: the drivers of corporate eco-innovation? International Journal of Innovation and Sustainable Development, 17(1–2), pp.182-204.
21. Wang, C.H., and Juo, W.J., 2021. An environmental policy of green intellectual capital: Green innovation strategy for performance sustainability. Business Strategy and the Environment, 30(7), pp.3241–3254.
22. Wang, J., Xue, Y., Sun, X., and Yang, J., 2020. Green learning orientation, green knowledge acquisition and ambidextrous green innovation. Journal of Cleaner Production, 250, p.119475
23. Waqar, A., Othman, I., Shafiq, N., and Mansoor, M.S., 2023. Applications of AI in oil and gas projects towards sustainable development: a systematic literature review. Artificial Intelligence Review.
24. Yong, J.Y., Yusliza, M.Y., Ramayah, T., and Fawehinmi, O., 2019. Nexus between green intellectual capital and green human resource management. Journal of Cleaner Production, 215, pp.364–374.