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Absorptive Capacity, Green Entrepreneurship, and Sustainable Human Capital Effects on Green Innovation in SMEs

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Abstract
Purpose: This study utilizes existing research on knowledge capabilities and firms' Natural Resource-Based View (NRBV) to explore how absorptive capacity and green entrepreneurship orientation influence green innovation. Additionally, it examines the mediating influence of sustainable human capital within this context.
Methods: This study was conducted using an associative design and a quantitative approach. The number of samples gathered was 100 valid respondents, and the questionnaire was spread online. The data collected will then be processed and analyzed with the PLS-SEM analysis using SmartPLS software.
Results: The results revealed that green entrepreneurship orientation significantly predicted both sustainable capability and the adoption of green innovation. Additionally, sustainable human capital is a critical determinant of green innovation adoption. Surprisingly, absorptive capacity did not significantly influence green innovation. Hence, several hypotheses were proven to be correct.
Conclusion: The results indicate that increasing R&D investment, e-commerce employment, and transaction volume can significantly boost Indonesia's economic growth, demonstrating the importance of these factors in driving the digital economy's growth.
Limitations: This study was limited to SMEs in Greater Jakarta with small samples.
Contribution: These results have several implications for SMEs to further enrich the understanding of how the Natural Resource-Based View (NRBV) and relational theory facilitate adaptation to green innovation.

Keywords: *Absorptive Capacity, Green Innovation, Green Entrepreneurship Orientation, Natural Resource-Based-View, Sustainable Human Capital*

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1. Introduction

Small and medium-sized businesses are pivotal in fostering economic growth and ensuring sustainability, especially in urban environments such as DKI Jakarta, Indonesia (Gherghina, Botezatu, Hosszu, & Simionescu, 2020; Tjahjadi, Agastya, Soewarno, & Adyantari, 2023). Economic growth has led to increased industrial activity and intensive resource exploitation, resulting in environmental degradation (Tran, 2024). Amidst growing concerns regarding environmental degradation and the need for sustainable development, the concept of green entrepreneurship has gained significant attention Demirel, Li, Rentocchini, and Tamvada (2019) and Muo and Azeez (2019), explained that green entrepreneurship emphasises the integration of environmental considerations into business activities, including the adoption of green practices and the development of green innovations.

The discussion initially focused on the connection between absorptive capacity and an organization's ability to acquire, assimilate, and effectively apply external knowledge for the implementation of green practices and resources, emerging as a critical factor influencing green innovation in SMEs (Aboelmaged & Hashem, 2019). Research by Zhou, Govindan, Xie, and Yan (2021) explained that cultivating green absorption capacity enables SMEs to identify and capitalise on green innovation opportunities, thereby improving their environmental performance and competitive advantage. In addition, we underscore that green entrepreneurial orientation can impact green innovation. This was described by Mao, Wang, and Yi (2021) in their research that green entrepreneurial orientation, characterised by a commitment to environmental sustainability and the application of green business models, can shape the strategic priorities and decision-making processes of SMEs.

This is relevant to what Majali, Alkaraki, Asad, Aladwan, and Aledeinat (2022) revealed that SMEs with a strong green entrepreneurial orientation are more likely to invest in green innovation initiatives and develop environmentally responsible products and services. However, the realization of green innovation in SMEs also hinges on the presence of sustainable human resources (Muñoz-Pascual, Galende, & Curado, 2021). SME with high-quality, sustainable human resource bases are well placed to pursue green innovation. The implementation of sustainable human resource practices is conducive to employee engagement and performance, thereby creating a favorable environment for the development of innovative solutions (Gupta & Jangra, 2024).

Sustainable human capital includes employees' knowledge, skills, and abilities that are aligned with sustainable business practices. Through continuous training, education, and skills development, SMEs can cultivate a workforce capable of driving green innovation and facilitating the implementation of green initiatives (Vanka, Singh, & Rao, 2020). This study aims to investigate how absorptive capacity, GEnO, and sustainable human capital interact to influence green innovation within the SME sector of DKI Jakarta. By exploring the mediating role of sustainable human capital, this study seeks to uncover the pathways through which absorptive capacity and green entrepreneurial orientation contribute to concrete outcomes in green innovation. The findings offer valuable insights for policymakers, business leaders, and other key stakeholders on effective strategies to promote environmental sustainability and stimulate innovation within SMEs.

2. Literature Review

2.1 Research Gap

The increasing focus on green innovation, particularly in small and medium-sized enterprises (SMEs), has prompted extensive research on the roles of absorptive capacity and green entrepreneurial orientation. However, a critical research gap remains regarding the interaction between these factors and sustainable human capital. While previous studies have explored how absorptive capacity and green entrepreneurial orientation individually influence green innovation, there is limited understanding of how sustainable human capital mediates or moderates this relationship.

Furthermore, most research has focused on single industries or geographic regions, limiting the generalizability of the findings across different sectors and cultural contexts. This gap highlights the need for more comprehensive studies that integrate sustainable human capital as a core element influencing the dynamics' green innovation in SMEs. Such research would not only expand theoretical frameworks but also provide practical insights for businesses aiming to enhance sustainability through innovation in the future.

2.2 Absorptive Capacity and Green Innovation

A vast body of literature has delved into the definition of absorptive capacity. Throughout this extensive research, scholars have agreed that absorptive capacity encompasses a set of organizational routines and processes that enable companies to acquire, assimilate, transform, and utilize knowledge effectively, thereby strengthening their dynamic capabilities. In essence, for a company to grow, it must acquire diverse knowledge to develop its capabilities. Absorptive capacity comprises four dimensions: acquisition, assimilation, transformation, and exploitation. According to Kim, acquisition refers to a

company's ability to identify and obtain external knowledge essential for its operations. Second, according to Kim and Szulanski,

Green innovation includes innovative processes, equipment, systems, practices, products, and methods aimed at improving business value by minimizing environmental harm and promoting sustainability (Leal-Millán, Roldán, Leal-Rodríguez, & Ortega-Gutiérrez, 2016). The concept of Absorptive Capacity is closely related to green innovation, which focuses on creating advances designed to minimize environmental damage (Takalo & Tooranloo, 2021). Therefore, Absorptive Capacity plays an important role in achieving the goal of Green Innovation. Organizations with strong absorptive capacity are more adept at recognizing and understanding external information on the latest environmental practices, technologies, and regulations.

This capability enables companies to swiftly identify green innovation opportunities. Previous studies suggest that companies must effectively gather, exchange, and utilize knowledge from both internal and external sources to embrace innovative practices in manufacturing or services. For instance, they found that the capacity to transfer and absorb knowledge significantly enhances innovation and the performance of organizations in knowledge-intensive sectors in Taiwan. Recent research underscores the robust relationship between absorptive capacity and innovation focused on sustainability (i.e., green innovation). This association is reinforced by studies such as Aboelmaged and Hashem (2019), which illustrate that absorptive capacity can positively influence the adoption of green innovation.

In addition, Albort-Morant, Leal-Rodríguez, and De Marchi (2018) revealed that absorptive capacity contributes positively to green innovation. Although absorptive capacity has a direct effect, it can also strengthen green innovation (Zhou et al., 2021). Argued that absorptive capacity is promising for the development of green innovation. This is in line with the research of Du and Wang (2022). Based on the mapping of research findings above, a hypothesis can be formulated: absorptive capacity can increase when adopting green innovation.
H1: Absorptive Capacity has a positive effect on Green Innovation.

2.3 Absorptive Capacity and Sustainable Human Capital

Absorptive capacity, first proposed consists of four key elements: knowledge acquisition, assimilation, transformation, and exploitation. This theoretical framework is critical for understanding how firms can utilize external knowledge to drive green innovation. Green innovation, characterized by environmentally friendly innovations and sustainable practices, requires a strong absorptive capacity to integrate different knowledge sources and adapt them to create new solutions that address environmental issues. Research has repeatedly shown that absorptive capacity significantly aids the adoption of new technologies and innovations, especially in the realm of green innovation (Aboelmaged & Hashem, 2019). This capability is considered a crucial driver of innovation, as it allows organizations to leverage external knowledge and incorporate it into their internal operations.

The formal concept of human capital emerged in the 1960s from a group of economists affiliated with the University of Chicago. However, the notion that investing in education results in enduring economic and social advantages for individuals and society can be traced back to Adam Smith. According to research, human capital encompasses collective investments in education, health, on-the-job training, and migration, all of which boost individual productivity in both market and non-market activities. Provide notable definitions of human capital, saying that Human Capital encompasses not just inherent abilities but also the knowledge and skills individuals amass throughout their lives. It is posited that because the acquisition of diverse skills over a lifetime partly builds upon initial abilities, these potential forms a crucial aspect of the human capital framework.

Statement from the researcher Yerlitas and Bučiūnienė (2024) reveal that the Sustainable Human Capital Model begins with the initial hiring phase (akin to raw materials), moves through onboarding (similar to the design stage), training and development (akin to the production stage), establishing external partnerships and integrating employees within the ecosystem (akin to the distribution stage), fostering internal relationships through mentoring (similar to the use and maintenance stage), and

concludes with employee exits via succession planning (similar to the recovery stage). Sustainable human capital is essential for innovation, alongside traditional metrics such as formal education and practical experience, providing avenues for collaborative creation and knowledge expansion. We conclude by examining the implications of implementing such a model in today's workplace (Yerlitas & Bučiūnienė, 2024).

Absorptive capacity is believed to enhance the implementation of proactive environmental initiatives, especially when these initiatives are strategically directed at the corporate level, such as within the framework of corporate sustainability orientations. Prior research has shown that absorptive capacity enables companies to participate in collaborative efforts with diverse stakeholders. This capacity enables them to access stakeholder knowledge and build confidence in their collaborative endeavors in a dynamic environment. For example, within the framework of a company's commitment to sustainability, its capacity to acquire, integrate, and apply external information can enrich its human capital's knowledge and expertise regarding environmental initiatives and their implementation strategies.

Several previous studies have affirmed the relationship between absorptive capacity and sustainable human capital. Evidence of support from Martínez-Sánchez, Vicente-Oliva, and Pérez-Pérez (2021) shows that the mediating effects of human resources and absorptive capacity are positively related to innovation performance, which suggests that firms can combine them with R&D efforts more effectively to enhance innovation. Support for this argument is substantiated by who found a significant positive correlation between absorptive capacity and human capital. A positive relationship between absorptive capacity and human capital was observed.

This consensus is echoed by Abualoush (2022), who also affirmed a positive link between absorptive capacity and innovation, where human capital has the strongest impact on innovation, providing empirical evidence to managers that mastering external knowledge through absorptive capacity can strengthen their ability to innovate. In addition, having strong Human Capital is effective in encouraging and motivating more innovation. Finally, the unidirectional thinking of Ahmed, Guozhu, Mubarik, Khan, and Khan (2020) confirms that absorptive capacity is realized as measured by the transformation and exploitation of knowledge toward sustainable human capital.
H2: Absorptive Capacity has a positive effect on Sustainable Human Capital

2.4 Green Entrepreneurship Orientation and Green Innovation

The first precedents of green entrepreneurship can be traced back to the 1960s, when the impact of environmental degradation and industrialization increased the establishment of environmental protection regulations in developed countries. X. Zhang, Le, Meng, and Teng (2023)assert that the definition of Green Entrepreneurship Orientation refers to businesses that promote sustainable production processes and introduce environmentally friendly products and services. This plays an important role in the research framework that analyzes how green entrepreneurship influences green innovation. GEO emphasizes environmental conservation, social responsibility, and innovation, all of which are essential for achieving a sustainable competitive advantage (Makhloufi, Laghouag, Meirun, & Belaid, 2022).

Green Entrepreneurship Orientation (GEO) is a strategy adopted by companies that emphasizes entrepreneurial activities focusing on the environment. GEO includes aspects such as green innovation, proactivity in seeking green opportunities, and the courage to take risks to implement environmentally friendly practices (Tze San, Latif, & Di Vaio, 2022). A robust dedication to sustainability defines a company's identity and values, driving shifts in its sustainable behavior, including the allocation of environmental resources and the adoption of green practices (Peng & Liu, 2016). According to Hermundsdottir and Aspelund (2022), a company's sustainability awareness motivates enhancements to existing products and services and drives the creation of new environmentally friendly products.

The attachment of the relationship found in Green Entrepreneurship Orientation (GEO) and Green Innovation also gets strong support based on the support statements from previous research, which can

be seen from researchers Guo, Wang, and Chen (2020) that the Green Entrepreneurial Orientation relationship has a positive relationship with Green Innovation. Opinions similar to Muangmee, Dacko-Pikiewicz, Meekaewkunchorn, Kassakorn, and Khalid (2021) state that Green Entrepreneurial Orientation serves as an autonomous framework that represents a company's strategic efforts to increase green innovation and improve sustainable business performance across environmental, economic, and social dimensions.

There are concurrent opinions from different researchers that show a significant relationship between green innovation and SME development, which highlights the mediating role of GEO (Ebrahimi & Mirbargkar, 2017). Guo et al. (2020) found opinions similar to those stated by Teece, that GEO can encourage the creation of green innovation products, thereby improving sustainable business performance. A similar opinion is given by Q. Zhang, Zhu, and Lee (2024), that green entrepreneurship orientation positively influences green innovation.
H3: Green Entrepreneurship Orientation has a positive effect on Green Innovation.

2.5 Green Entrepreneurship Orientation and Sustainable Human Capital

Recent research by Coelho, Ferreira, and Proença (2024) shows that Green Entrepreneurship Orientation (GEO) significantly influences company performance. For instance, one study revealed that GEO improves an organization's capacity for innovation and adaptation to evolving market dynamics, potentially resulting in sustainable competitive advantages. Within the dynamic capability framework, companies with strong GEOs can effectively reorganize their resources and processes to meet environmental and market demands (Dias et al., 2021). Sustainable human capital development refers to long-term efforts to enhance and nurture the human capital of an organization or society, ensuring its effective contribution to economic, social, and environmental goals (Chams and García-Blandón, 2019).

Green entrepreneurship often requires specialized skills related to sustainability practices, such as knowledge of renewable energy, green technology, and environmental regulations (Gast, Gundolf, & Cesinger, 2017; Masri & Jaaron, 2017). Masri and Jaaron (2017) showed that companies with a green orientation tend to spend more time on training and development programs to provide these skills to employees, and that employees in such organizations may experience an increase in their skill development, which in turn increases their human capital in the context of sustainability. Green entrepreneurship orientation reflects dedication to ethical and sustainable practices, fostering a positive work environment and enhancing employee satisfaction (Muangmee et al., 2021). Organizations with a strong green orientation tend to be more active in achieving sustainable development goals, such as reducing carbon emissions, safeguarding natural resources and promoting social justice (Du & Wang, 2022).

Previous researchers have also substantiated the connection between Green Entrepreneurship Orientation and Sustainable Human Capital. This supports the relationship between these variables, such as the statement that employees' knowledge and experience of environmental issues can only be effectively applied if the company has a strong commitment from management to provide the means needed to engage, educate, and develop human resources concerned with sustainability, from the top to the bottom. In line with the statement that the better the implementation of green entrepreneurship orientation, the higher the human capital.

In addition, good employee attitudes, habits, and knowledge are the main factors in understanding consumer demand (Jabbour & de Sousa Jabbour, 2016). It is argued that green human capital can be cultivated by aligning human resource management practices with an organization's sustainability goals, encompassing everything from analyzing environmental policies to achieving tangible outcomes. According to Capelleras, Martin-Sanchez, Rialp, and Shleha (2018), the greater the export focus of entrepreneurs, the greater their ambitions for growth, which are significantly influenced by their human capital assets. Finally, they agreed that entrepreneurial orientation drives the need for strong organizational learning capabilities, while human resource development practices serve as a mechanism to develop these capabilities.

H4: Green Entrepreneurship Orientation has a positive effect on Sustainable Human Capital.

2.6 Sustainable Human Capital and Green Innovation

Research in innovation and technology management emphasizes the crucial role of human capital management, which includes individual attributes such as knowledge, skills, abilities, and other qualities that contribute to value creation. The human resource management function can promote Sustainable Human Capital by implementing initiatives like environmentally conscious recruitment practices, training programs focused on environmental issues, and incentives to encourage involvement in green initiatives (Renwick, Jabbour, Muller-Camen, Redman, & Wilkinson, 2016). For example, many organizations frequently incorporate sustainability topics and issues into their training and change management initiatives.

Several earlier studies have demonstrated the connection between these two variables, such as the views of Albort-Morant, Henseler, Leal-Millán, and Cepeda-Carrión (2017), who found that organizations that embrace green innovation achieve greater success and outperform their competitors. This is due to their ability to utilize green resources and capabilities effectively, enabling them to respond to customer needs while enhancing the organization's value and intangible assets (Allameh et al., 2018). Del Giudice et al. and Scuotto (2018) promptly and effectively. Sustainable human capital plays a crucial role in fostering green innovation adoption. Scarpellini, Ortega-Lapiedra, Marco-Fondevila, and Aranda-Usón (2017) demonstrate that the concrete and abstract resources, skills, and expertise of managers and employees trained in environmental practices can enhance green entrepreneurship and the development of environmentally sustainable products. Similarly, Chowhan (2016) found that human capital drives innovation. Finally, green human capital is the collection of knowledge, skills, abilities, and other attributes possessed by employees that are aimed at environmental management.
H5: Sustainable Human Capital has a positive effect on Green Innovation.

2.7 Absorptive Capacity, Green Innovation, and Sustainable Human Capital

Absorptive Capacity refers to an organization's ability to discern the value of external information, incorporate it, and apply it for operational purposes. In the context of green innovation, absorptive capability enables companies to adopt and utilize new green technologies and environmentally friendly practices. Green innovation focuses on innovations that promote sustainability and environmental efficiency, such as using environmentally friendly materials, reducing emissions, and improving energy efficiency.

Sustainable Human Capital comprises the skills, knowledge, and competencies of employees that not only support organizational goals but also contribute to environmental and social sustainability (Nisar et al., 2021). Developing sustainable human capital involves improving skills relevant to green innovation and implementing sustainable practices in the workplace. The investigation of how sustainable human capital mediates the impact of absorptive capacity on green innovation builds on insights from several previous studies. For instance, Arfi, Hikkerova, and Sahut (2018) argued that knowledge from external sources can greatly boost innovation, provided that employees, teams, and entire organizations have the necessary skills, experience, and capabilities to create value. Similarly, suggest that firms encounter significant hurdles in effectively utilizing knowledge exploitation for innovation outcomes unless they possess substantial capabilities.

Therefore, studying the connection between absorptive capacity and the adoption of green innovation without considering the impact of sustainable capabilities overlooks a crucial factor (Aboelmaged & Hashem, 2019). This is in line with Munawar, Yousaf, Ahmed, and Rehman (2022), who concluded that green human resource management plays a beneficial role in fostering green innovation within organizations, with statistically significant mediation from green human capital and environmental knowledge. Last, Fang, Shi, Gao, and Li (2022) argue that sustainable human capital helps build an organizational culture that supports green innovation. A sustainability culture encourages employees to actively seek and implement green solutions. Thus, the hypothesis for this study is as follows:
H6: Absorptive Capacity has a positive effect on Green Innovation, which is mediated by Sustainable Human Capital.

2.8 Green Entrepreneurship Orientation, Green Innovation, and Sustainable Human Capital

Green Entrepreneurship Orientation (GEO) is a concept that refers to a company's strategic attitude that prioritizes environmental sustainability along with economic goals (Habib, Bao, & Ilmudeen, 2020). This encourages companies to innovate by reducing environmental impact and creating environmentally friendly products, services, or processes. Green Innovation is an important aspect in this regard, encompassing environmentally friendly advancements that contribute to sustainability. Sustainable Human Capital is pivotal in the link between Green Entrepreneurship Orientation and Green Innovation. Chams and García-Blandón (2019) explain that sustainable human capital practices involve recruitment, training, development, and retention strategies that emphasize sustainability values and competencies among employees.

This ensures that the workforce is aligned with the company's green goals and is ready to drive green innovation. This is in line with Bombiak and Marciniuk-Kluska (2018), who state that sustainable human capital practices ensure that new hires share the company's green values and have the necessary skills for green innovation. In addition, Muisyo and Qin (2021) found that through sustainable human resource practices, resources are allocated to develop green innovation, supported by green entrepreneurship orientation. Thus, it can be said that sustainable human capital practices prioritize sustainability values and employee competencies to ensure alignment with the company's green goals and readiness to drive green innovation. In agreement with Roscoe, Subramanian, Jabbour, and Chong (2019), companies with strong sustainable human capital practices are more successful in translating GEnO into concrete green innovation. Firms with strong, sustainable human resource practices also report higher levels of green innovation, mediated by a commitment to sustainability in their practices (Haldorai, Kim, & Garcia, 2022). Based on previous studies, this study proposes the following hypothesis:

H7: Green Entrepreneurship Orientation positively influences Green Innovation, mediated by Sustainable Human Capital.

The Conceptual Model is shown in Figure 1.

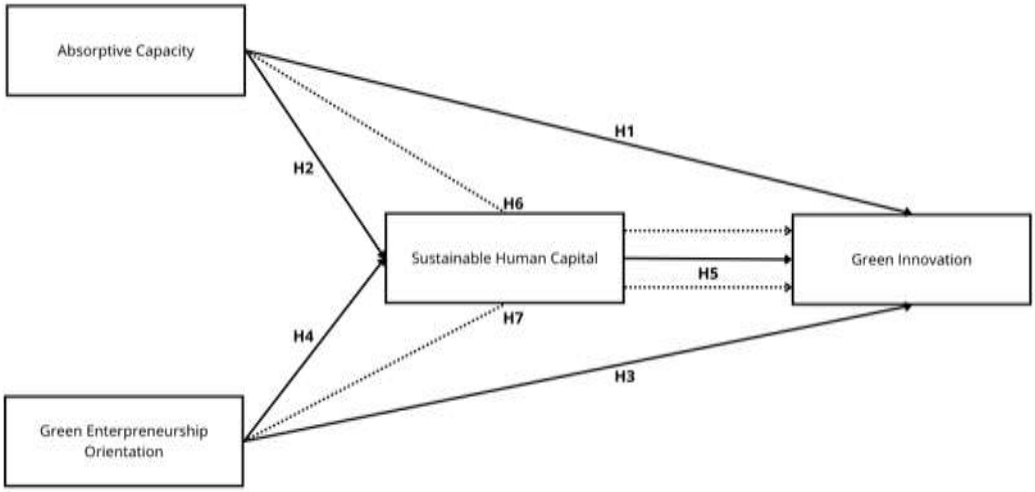

Figure 1. Conceptual Model

3. Research Methodology

This study investigates the emerging challenge of implementing green business practices, particularly among SMEs, seeking to integrate sustainability into their operations. Given the unknown number of SMEs interested in this area, the minimum sample size was determined using the recommended methodology. The sample was selected using purposive sampling based on specific criteria: (1) participants needed to reside in Jakarta; (2) participants were required to be at least 18 years of age; and (3) participants must own a small-to medium-sized business. The survey, consisting of 21 statements assessed using a five-point Likert scale ranging from "strongly disagree" to "strongly agree," was distributed via Google Forms. This approach yielded 100 valid responses, comprising 60 male and 40

female participants. The data collected were analyzed using Partial Least Squares (PLS) techniques within the framework of Structural Equation Modeling (SEM), ensuring compliance with the specified minimum sample size guidelines outlined by Hair and Alamer (2022). The analysis consisted of three phases: measurement (outer model), structural (inner model), and path coefficient analyses.

4. Results and Discussions

4.1 Respondent Profile

A comprehensive overview of the survey participant characteristics, including gender distribution, age demographics, business tenure, educational attainment, and monthly income levels. Each category was well defined. The data show that 60% of the respondents were male. The largest age group, comprising 63% of the participants, was 20–30-year-old range. Regarding education, 60% had completed high school. The income category of IDR 1–2 million was the most prevalent, encompassing 52% of the sample. This distribution provides an insightful portrayal of SME profiles in Indonesia.

4.2 Validity and Reliability Test

This study analyzed the measurement model by assessing the validity and reliability of 18 items categorized into four variables. This assessment considered the distinct attributes of each variable, the reliability of composite measures, and the consistency of measurements to uphold their validity. As detailed in Table 1, the composite reliability (CR) values for each construct exceeded the recommended threshold of 0.70 (Hair, Risher, Sarstedt, & Ringle, 2018). This indicates robust reliability and consistency in the use of this instrument. Regarding convergent validity, the initial testing indicated that three indicators—GI4, ACAP7, and SHC5—did not meet the criteria, as their loading values were below 0.60.

These indicators were subsequently removed and retested. Upon retesting, as shown in Table 3, the findings confirmed their efficacy. This confirms that all items meet the criteria for outer loading, with values surpassing the recommended threshold of 0.60 (Hair et al., 2018). Furthermore, the discriminant validity analysis showed that each indicator met the specified criteria, with the average variance extracted (AVE) for each indicator exceeding the recommended threshold of 0.50 (Hair et al., 2018). This affirms the robustness and reliability of the measurement model employed in this study, establishing a strong foundation for the subsequent analysis and interpretation of the findings.

Table 1. Indicator test results

Variable	Item	Description	Loading Factor	CR	AVE
Green Innovation	GI1	My business reduces inputs to minimize environmental impacts.	0.663	0.9	0.7
	GI2	My business embraces cleaner technologies.	0.846		
	GI3	My business practices include input, material, and waste reuse and recycling.	0.678		
Absorptive Capacity	ACAP1	My company recognizes valuable new knowledge.	0.79	0.9	0.6
	ACAP2	My company assimilates valuable external knowledge.	0.827		
	ACAP3	My company applies new knowledge to enhance its performance.	0.869		
	ACAP4	My company identifies novel and beneficial ideas.	0.876		
	ACAP5	My company utilizes innovative ideas to enhance its performance.	0.848		

	ACAP6	My company encourages the development of new and beneficial ideas.	0.815		
Green Entrepreneurship Orientation	GEO1	Our business uses less or no polluting/toxic materials.	0.732	0.8	0.5
	GEO2	Our business has a strong inclination toward environmentally friendly product development projects that are high-risk and have very high profit opportunities.	0.755		
	GEO3	Our business places great emphasis on green research and development, technological leadership, and innovation.	0.864		
	GEO4	We tend to take proactive steps toward environmental initiatives that prompt competitor responses.	0.813		
	GEO5	Our business strives to maintain a leadership position in the market by consistently introducing environmentally friendly products, services, and technologies ahead of others.	0.751		
Sustainable Human Capital	SHC1	Our employees actively participate in environmental conservation.	0.881	0.9	0.8
	SHC2	Our employees deliver environmentally friendly products and services to our customers.	0.898		
	SHC3	Our employees collaborate in teams to enhance environmental sustainability.	0.868		
	SHC4	Our employees receive comprehensive support for environmental conservation initiatives.	0.912		

4.3 Evaluation of Model's Goodness and Fit

The R-squared value quantifies the proportion of variance in the dependent variable that is explained by the independent variable. The R-squared values were categorized as strong (0.75), moderate (0.50), and weak (0.25). In Table 4, the R-squared values for the GI and SHC are 0.590 and 0.540, respectively. Both values approached 0.75 and exceeded 0.50, indicating that the independent variables explained 59% and 54% of the variation in SHC and GI, respectively, classifying them as moderate.

Table 2. The R-Square Values

Construct/Variable	***R-Square***	***R-Square Adjusted***
Green innovation (Y)	0.590	0.578
Sustainable human capital (Z)	0.540	0.530

4.4 Hypothesis Testing

In this study, we hypothesized seven causal relationships. Following the statistical analysis, five hypotheses were supported, while two were not. Hypothesis testing involved T-statistics, P-values, SmartPLS software, and the bootstrapping method. The success criteria comprised a T-statistic above

1.96, a P-value below 0.05 (5%), and a positive β coefficient. The comprehensive results are presented in Table 3.

Table 3. Hypothesis Test Results

Hypothesis	Construct Interrelationship	T-Statistics	P Values
H1	ACAP -> GI	0.378	0.705
H2	ACAP -> SHC	1.96	0.050
H3	GEO-> GI	2.673	0.008
H4	GEO -> SHC	7.887	0.000
H5	SHC -> GI	5.013	0.000
H6	ACAP -> SHC -> GI	1.847	0.065
H7	GEO -> SHC -> GI	4.019	0.000

Hypothesis 1: There is a positive relationship between Absorptive Capacity (ACAP) and Green Innovation (GI). However, with a significance value above 0.05 and a t-statistic below 1.96, absorptive capacity does not have a statistically significant impact on green innovation. Therefore, H1 is rejected.

Hypothesis 2: The analysis reveals that Absorptive Capacity (ACAP) has a positive effect on Sustainable Human Capital (SHC), with a significance level below 0.05 and a t-statistic exceeding 1.96. This confirms that absorptive capacity significantly affects sustainable human capital. Therefore, H2 is supported.

Hypothesis 3: There is a positive relationship between Green Entrepreneurship Orientation (GEO) and Green Innovation (GI), with a significance level below 0.05 and a t-statistic exceeding 1.96. This demonstrates that GEO has a significant impact on the GI. Therefore, H3 is supported.

Hypothesis 4: Green Entrepreneurship Orientation (GEO) has a positive effect on Sustainable Human Capital (SHC), with a significance level below 0.05 and a t-statistic exceeding 1.96. This indicates that the GEO significantly influences the SHC. Therefore, H4 is supported.

Hypothesis 5: Sustainable Human Capital (SHC) has a positive effect on Green Innovation (GI), with a significance level below 0.05 and a t-statistic exceeding 1.96. This indicates that the SHC has a substantial influence on the GI. Therefore, H5 was upheld and confirmed.

Hypothesis 6: The results indicate that Sustainable Human Capital (SHC) acts as a mediator between Absorptive Capacity (ACAP) and Green Innovation (GI). However, the results show that ACAP does not exert a statistically significant effect on the relationship between ACAP and GI mediated by SHC, as indicated by a significance value above 0.05 and a t-statistic below 1.96. Therefore, H6 is rejected.

Hypothesis 7: The results show that Sustainable Human Capital (SHC) mediates the relationship between Green Entrepreneurship Orientation (GEO) and Green Innovation (GI). Positive path analysis values with significance below 0.05 and t-statistics above 1.96 indicate that SHC serves as a mediator between GEO and GI. Therefore, H7 is supported.

The Path Model is shown in Figure 2.

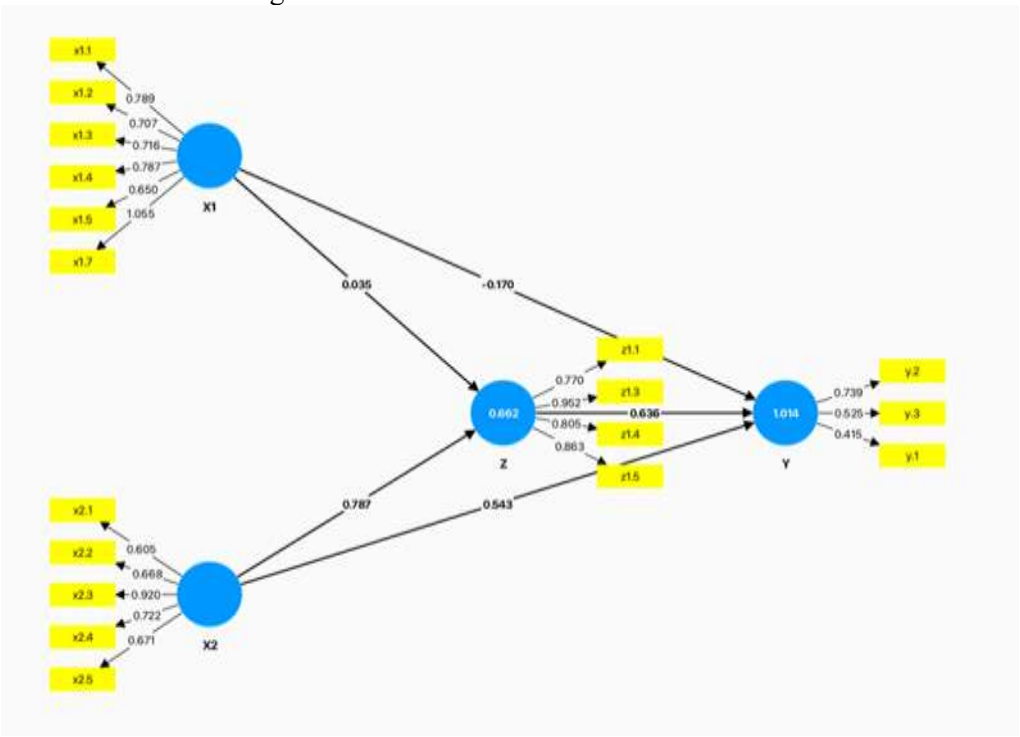

Figure 2. Path Model Specification Results from Outer Loading

4.5 Implications

The first hypothesis explored how firms' Capacity of knowledge affects Green Innovation. Despite noting the impact of absorptive capacity on knowledge, our results did not show a significant correlation with green innovation. This unexpected discovery diverges from our initial hypothesis, which suggested that a company's capability to acquire, assimilate, transform, and leverage knowledge affects green innovation. This disparity suggests that other variables may moderate this relationship, indicating that absorptive capacity alone may not always result in green innovation. This observation aligns with previous research by (Abdullah, Zailani, Iranmanesh, & Jayaraman, 2016). Despite having a high absorptive capacity, other barriers, such as high costs, lack of management support, or strict regulations, may hinder green innovation. The results revealed a notable connection between Absorptive Capacity and Sustainable Human Capital within the realm of Green Business.

This result is consistent with previous studies. They also found that absorptive capacity positively and significantly influences sustainable human capital. Absorptive capacity manifests through the transformation and exploitation of knowledge into sustainable human-capital. The third hypothesis investigates the relationship between Green Entrepreneurship Orientation and Green Innovation. Our analysis revealed a notable correlation between green entrepreneurship orientation and green innovation within the realm of green business. This outcome aligns with the research conducted by Guo et al. (2020), which indicates that a positive green entrepreneurship orientation towards green innovation can encourage the creation of green innovation products, thereby improving sustainable business performance. A strong absorptive capacity will be more adept at recognizing and understanding external information regarding the latest environmental practices, technologies, and regulations. This allows them to quickly identify opportunities for green innovation.

The fourth hypothesis investigates the relationship between Green Entrepreneurship Orientation and Sustainable Human Capital. Our analysis shows a notable relationship between green entrepreneurial orientation and sustainable human capital within the context of green business among MSMEs. This result is consistent with the findings, which indicate that green entrepreneurial orientation is positive for sustainable human capital. Employees' knowledge and experience of environmental issues can only be applied effectively if the company has a strong commitment from management to provide the means

needed to engage, educate, and develop human resources who care about sustainability from the top to the bottom.

The fifth hypothesis investigates the link between Sustainable Human Capital and Green Innovation. Our analysis uncovered a meaningful correlation between sustainable human capital and green innovation within the realm of green businesses. This result aligns with the study conducted by Scarpellini et al. (2017), emphasizing how the concrete and abstract assets, skills, and knowledge of environmentally knowledgeable managers and employees contribute to fostering green entrepreneurship and the creation of environmentally sustainable products.

The sixth hypothesis investigates whether Sustainable Human Capital acts as an intermediary between Absorptive Capacity and Green Innovation. Our results demonstrate that sustainable human capital significantly mediates the relationship between absorptive capacity and green innovation. However, despite identifying this mediating effect, our analyses did not demonstrate a significant correlation. This unexpected result contradicts our initial hypothesis, which suggests that internal organizational relationships can facilitate the acquisition of knowledge and capabilities necessary to achieve green innovation. In line with previous research by Aboelmaged and Hashem (2019), we conclude that although absorptive capacity and sustainable human capital are important for green innovation, the mediating role of sustainable human capital is not significant. The practical implication of this finding is the need for a more holistic and strategic approach to enhancing green innovation, considering other factors that may contribute to the effectiveness of knowledge absorption and application for green innovation.

The seventh hypothesis examined the mediation of Sustainable Human Capital in the relationship between Green Entrepreneurship Orientation and Green Innovation. Our findings indicate that sustainable human capital plays a significant mediating role in linking GEO to GI. This finding is in line with Bombiak and Marciniuk-Kluska (2018), who state that sustainable human capital practices ensure that new employees share the company's green values and have the necessary skills for green innovation. In addition, Muisyo and Qin (2021) argue that through sustainable human resource practices, resources are allocated to develop Green Innovation, with the support of green entrepreneurship orientation. Thus, it can be said that sustainable human capital practices prioritize sustainability values and employee competencies to ensure alignment with the company's green goals and readiness to drive green innovation.

Nevertheless, respondents recognized the diverse advantages of green businesses, encompassing their benefits and impacts. Most affirmed their commitment to prioritizing green practices in their businesses. Therefore, this finding has significant implications for SME stakeholders, including owners and employees. This underscores the importance of not only focusing on perceived business benefits but also on strategies, knowledge, green practices, and their implementation. This is especially crucial for SME owners who are highly profit-sensitive, as it can positively influence future opportunities.

5. Conclusions

5.1 Conclusions

Based on the analyses performed, this study underscores the significance of specific factors in the realm of green innovation within Small and Medium Enterprises (SMEs). It was found that absorption capacity and green entrepreneurial orientation play a significant role in influencing green innovation. However, what is interesting about this finding affirms the role of sustainable human capital in underpinning the green innovation process. Sustainable human capital, which includes knowledge, skills, and adaptability to environmental issues, strongly influences enhancing absorption capacity and promoting green entrepreneurial orientation. This indicates that by investing in employee development through sustainable human capital, a company enhances its internal knowledge base and its ability to absorb external knowledge relevant to green innovation.

Thus, measures focused on sustainable human capital development are crucial to enhance green innovation among SMEs. Training programs, continuous education, and efforts to build an

organizational culture that supports environmental awareness are effective strategies for strengthening green innovation capacity at the enterprise level. In this context, stakeholders, including governments, educational institutions, and the private sector, play an important role in supporting and encouraging investment in sustainable human capital development among SMEs. Therefore, while absorption capacity and green entrepreneurial orientation play an important role in promoting green innovation, investment in sustainable human capital is a critical factor that also needs to be considered. Only through a comprehensive and sustainable approach to human capital development can SMEs significantly contribute to creating innovative solutions for global environmental challenges and promoting sustainable economic growth.

5.2 Suggestions

Owing to the limitations of this study, further research can investigate the importance of sustainable human capital, absorption capacity, and entrepreneurial orientation, which vary across different industries or sectors, with a larger number of respondents. Future research could explore the long-term impact of sustainable human capital development on green innovation in SMEs. This would help determine causality and track changes over time in the study population. Furthermore, how external factors, such as government policies, technological advancements, or market pressures, affect the relationship between human capital and green innovation can be an interesting and useful topic for SMEs.

5.3 Limitations and Further Studies

This study is limited by its focus on Indonesia and the variables of ZIS, taxes, and poverty alleviation funds. Future research should explore cross-country comparisons to identify different models of poverty alleviation and integrate additional variables such as education, healthcare, and employment rates. Further studies could also assess the impact of specific poverty alleviation programs on long-term economic growth, considering broader socio-economic factors.

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