

Factors affecting green innovation among convection industry employees in West Jakarta



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ABSTRACT

This study aims to identify the factors that drive the emergence of green innovation among employees working in convection businesses located in West Jakarta. A quantitative descriptive approach was employed through the distribution of questionnaires to 100 respondents selected using a purposive sampling method. The findings reveal that several internal and external company elements contribute to enhancing environmentally friendly practices, such as the efficient use of raw materials, the development of sustainable products, and the firm's ability to respond to environmentally conscious market demands. Nonetheless, not all organizational aspects were found to exert a significant influence, indicating that green innovation efforts still require stronger support, particularly in terms of leadership. This study is limited to a specific region and industrial characteristics, and therefore future research is recommended to expand the research context and incorporate additional factors to achieve a more comprehensive understanding.

Keywords: Green Human Capital; Green Structural Capital; Green Relational Capital; Green Transformational Leadership; Green Innovation



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INTRODUCTION

Economic growth is crucial for a country, as a stable economy can improve national welfare (Wijaya et al., 2020). In Indonesia, the manufacturing sector is a key driver of economic growth (Nurhayani, 2022). The manufacturing industry plays a crucial role in the national economy, directly driving economic growth (Azwina et al., 2023).

The manufacturing industry is a business field that processes raw materials into products that have utility value or sale value (Amin & Rahmiati, 2018). One of the subsectors in the manufacturing industry is the textile industry (Kumbara, 2020). The textile industry itself is divided into five types of subsectors, namely fiber, yarn, knitting, garments, and other textiles (Asmara et al., 2015).

One of the most dominant business in the textile industry is the convection business, due to the high demand for clothing products (Ikhwan Yunus, 2021). The convection industry is a business that produces various types of ready-to-wear clothing (Christianto & Herlambang, 2021). The area with the highest number of convection factories is in West Jakarta (Sondra et al., 2021). The high number of convection businesses in West Jakarta has led to environmental pollution from waste from convection. Addressing this issue requires the application of green innovation to develop new ideas or technologies to reduce negative environmental impacts and improve business sustainability (Rizqya et al., 2025).

To realize the implementation of environmentally friendly innovations, companies need environmentally friendly human resources, namely the knowledge, skills, and competencies possessed by employees. Green human capital plays a crucial role because it is a key component in integrating environmentally friendly principles into production processes, resource management, and product and service development (Kumar et al., 2025). With strong green human capital, companies can improve their environmental performance and strengthen their competitiveness (Taleb & Pheniqi, 2023).

Organizational resource support is also an important element in ensuring that green innovation can be integrated properly and optimally (widodo., 2024). This is reflected in green structural capital, which includes infrastructure, processes, and organizational systems that are oriented towards environmental sustainability, enabling companies to develop and produce innovative products that also reduce negative impacts on the environment (Li et al., 2023).

The success of green innovation cannot be separated from an organization's ability to build cooperation and knowledge exchange with business partners, customers, and external networks that contribute to strengthening the implementation of green innovation (Akbar et al., 2018). This role is realized through green relational capital, which serves to encourage new ideas from external parties and strengthen sustainable innovation strategies (Li et al., 2023).

Leadership is also able to motivate and inspire employees, because leaders have a significant influence on the success and implementation of green innovation (Rudy et al., 2025). This form of leadership is known as green transformational leadership, which encourages employees to play an active role in implementing sustainability values while generating innovative ideas (Alifia et al., 2025). With this leadership, companies are directed to produce environmentally friendly products, processes, and technologies (Malik et al., 2024).

LITERATURE REVIEW

Green Human Capital

Green human capital refers to the knowledge, skills, abilities, and pro-environmental values possessed by employees to support sustainability (Pujilestari et al., 2025); Tjahjadi et al., (2023). It reflects individuals' capacity to implement green practices through intelligence, creativity, experience, and commitment to environmental protection (Kumar et al., 2025; Onubi et al., 2024). Green human capital is also viewed as an intangible employee asset that plays a critical role in fostering green innovation (Nureen et al., 2023). Overall, green human capital can be defined as intangible assets embedded within individuals encompassing skills, knowledge, competencies, creativity, experience, values, and beliefs related to environmental preservation.

Green Structural Capital

Green structural capital includes various organizational assets such as management systems, corporate culture, information technology, and operational processes that are designed to support sustainability (Anser et al., 2024; Pujilestari et al., 2025). These intangible assets encompass management mechanisms, business processes, organizational commitment, and structural arrangements that enable the development of environmentally friendly innovation (Saglam, 2023; Liu et al., 2022). It also refers to environmental databases, management systems, and elements associated with environmental innovation (Wei et al., 2024). So, green structural capital represents intangible organizational assets, ranging from management systems and IT infrastructure to operational processes, organizational culture, and corporate policies.

Green Relational Capital

Green relational capital is defined as the relationships a company maintains with customers, suppliers, industry networks, government bodies, and other stakeholders that help manage the interaction between the environment and the business (Anser et al., 2024; Maaz et al., 2022). These external relationships facilitate knowledge exchange, strategic collaboration, and access to green resources, all of which strengthen the implementation of environmentally friendly innovation (Saglam, 2023; Xi et al., 2023). Additionally, stakeholder interactions support companies in addressing environmental issues more effectively, leading to competitive advantages (Li et al., 2023). Therefore, green relational capital can be understood as an intangible asset characterized by interactive relationships with stakeholders to support sustainable environmental management, drive green innovation, and enhance overall business performance.

Green Transformational Leadership

Green transformational leadership refers to a leadership style that inspires, motivates, and empowers employees to engage in pro-environmental behaviors and support sustainability (Begum et al., 2022; Lituhayu et al., 2024). This leadership style focuses on motivation, creative encouragement, and establishing a clear environmental vision to promote green innovation (Bhatti et al., 2023; Priyadarshini et al., 2023). Green transformational leadership is also defined as a set of behaviors that encourage employees to achieve performance levels beyond expectations (Cahyadi et al., 2023). In essence, green transformational leadership emphasizes the leader's influence in building trust, loyalty, and motivation among followers to contribute to environmental

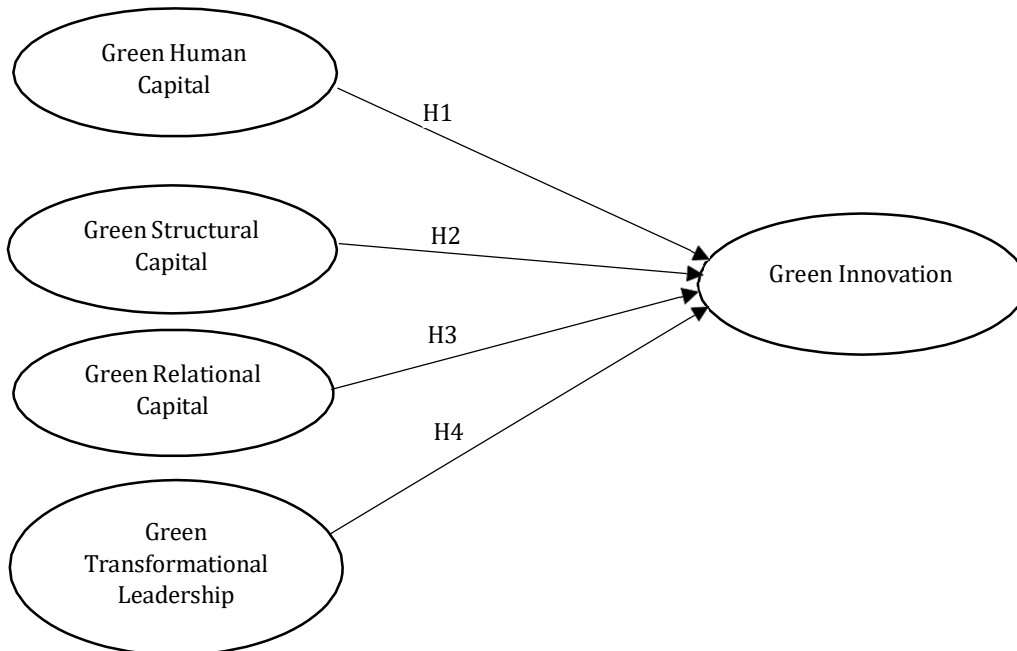
goals.

Green Innovation

Green innovation is defined as an organization's effort to develop processes, technologies, and products that reduce negative environmental impacts while improving environmental performance (Chen et al., 2018; Safitri et al., 2024). It also encompasses technological, managerial, and organizational practices aimed at promoting sustainability (Cahyaningtyas et al., 2022). Moreover, green innovation creates new market opportunities and enhances competitiveness through more efficient environmental solutions (Novitasari & Agustia, 2021; Sun & Han, 2022). Thus, green innovation can be understood as a concept that includes various forms of innovation products, processes, systems, managerial, and organizational intended to minimize environmental harm and improve both environmental and organizational performance.

Research Framework

Based on the previous explanation, the influence of green human capital, green structural capital, green relational capital, and green transformational leadership on green innovation can be outlined. This framework can be described as follows:



Source: Constructed by the author, 2025

Figure 1 Research Framework

Hypotheses

In conducting the analysis, the hypotheses formulated for this study are as follows:

H1: Green human capital has a positive influence on green innovation among convection industry employees in West Jakarta

H2: Green structural capital has a positive influence on green innovation among convection industry employees in West Jakarta

H3: Green relational capital has a positive influence on green innovation among convection industry employees in West Jakarta.

H4: Green transformational leadership has a positive influence on green innovation among convection industry employees in West Jakarta.

METHOD

This study employs a quantitative descriptive approach to examine the effects of green human capital, green structural capital, green relational capital, and green transformational leadership on green innovation among convection industry employees in West Jakarta. The research design refers to prior studies conducted by Kumar et al., (2025) and Demir et al., (2025). The quantitative descriptive method was selected because the data collected are numerical and analyzed statistically (Rusydi et al, 2024). A cross-sectional design was adopted, involving a one-time data collection process conducted in 2025 within a non-contrived setting, meaning respondents were observed in their actual work environment (Emilisa et al., 2025). The sampling technique applied was purposive sampling, with respondents selected according to predetermined research criteria (Masa et al., 2025). Based on the total of 19 questionnaire items, the minimum sample size requirement was determined using the formula from Hair et al (2022), which suggests five times the number of items, resulting in a minimum of 95 respondents. This study utilized a total of 100 respondents.

This research uses data primary data were obtained through questionnaires administered via Google Forms and distributed to employees of convection businesses in West Jakarta. Primary data is data obtained directly from the first source (Amastya & Emilisa, 2023). The collected data were processed using statistical tools, with descriptive analysis conducted through SPSS 22, including descriptive statistics, validity and reliability testing, and multiple linear regression analysis to examine the influence of each independent variable on green innovation.

RESULTS AND DISCUSSION

Validity Test

Validity testing is used to ensure that the statement items are adequate and accurately represent the ideas. Validity testing is a step taken to ensure that the statement instruments used in research represent the concepts or ideas being measured (Rahmah & Emilisa, 2022). According to Hair et al., (2022) an indicator is considered valid if it has a factor loading $\geq 0,55$ because the sample consisted of 100 respondents. All indicators in this research variable have loading factors ≥ 0.55 , which means that each item is valid and can be measured.

Reliability Test

The reliability test is conducted to assess the extent to which a responden answare are consistent in measuring a variable (Sofiyan et al., 2024). The determination of whether a research instrument is reliable is based on its coefficient value. If the Cronbach's Alpha coefficient is greater than 0.60, the questionnaire items are considered reliable, and vice versa. All variables in this study have Cronbach's alpha coefficients ≥ 0.60 , indicating that all research variables are reliable.

Hypothesis Testing

The results of hypothesis testing can be seen in Table 1.

Table 1
Results of Hypothesis Testing 1–5 (Direct Effect)

	Estimate	p-value	Decision
GHC --> GI	0,380	0,001	H1 supported
GSC ---> GI	0,297	0,000	H2 supported
GRC --> GI	0,637	0,000	H3 supported
GTL ---> GI	0,231	0,333	H4 not supported

Source: Primary Data, SPSS, 2025

H1 Green Human Capital → Green Innovation

The results of this study indicate that green human capital has a positive and significant impact on green innovation among convection factory employees in West Jakarta. Employees' environmentally oriented knowledge, skills, and awareness enable them to generate sustainability-oriented ideas, both in improving production processes and developing environmentally friendly products. This confirms that green human capital is a crucial driver of sustainable innovation and strengthens a company's competitiveness through environmentally responsible business practices.

This finding aligns with previous research by Liu et al., (2022); Pramudita et al., (2022); Tran et al., (2023), which also emphasized that strong green human capital enhances employees' ability to contribute to green innovation. Higher levels of green human capital among convection factory employees can play a significant role in enabling companies to continuously generate environmentally friendly ideas, solutions, and work practices.

H2 Green Structural Capital → Green Innovation

Research has found that green structural capital has a positive and significant impact on green innovation among convection employees in West Jakarta. Companies with sustainability-oriented work systems, infrastructures, and procedures are considered capable of generating innovative ideas through work processes and developing environmentally friendly products.

A well-organized organizational structure, supporting technology, and environmentally focused operational systems help companies increase competitiveness through more sustainable business practices, in line with the findings of Ali et al., (2021); Liu et al., (2022); Tran et al., (2023). Green structural capital encourages the creation of more organized operational systems, thereby supporting the implementation of green practices and producing sustainable processes and products.

H3 Green Relational Capital → Green Innovation

Research shows that green relational capital has a positive and significant impact on green innovation among convection workers in West Jakarta. A company's ability to build and maintain strong relationships with suppliers, customers, and business partners creates opportunities for information and knowledge exchange that foster

innovative, environmentally friendly ideas.

These results align with the findings of Liu et al. (2022), Tran et al. (2023), and Ali et al. (2021), who emphasized that collaboration with external parties is crucial for companies to gain new insights that strengthen green innovation. Green relational capital serves as a crucial foundation for companies to obtain resources, information, and collaboration opportunities that enhance sustainable innovation capabilities. Companies with strong green relational capital can develop business practices that support green innovation.

H4 Green Transformational Leadership → Green Innovation

The research findings indicate that green transformational leadership has a positive but insignificant effect on green innovation among convection factory employees in West Jakarta. Although leaders provide motivation and encouragement regarding environmentally friendly practices, this influence is not statistically strong enough to stimulate the emergence of sustainability-oriented innovative ideas or processes. This condition suggests that the implementation of green transformational leadership has not made a significant contribution to enhancing green innovation in the workplace.

These results are consistent with the findings of Chen et al., (2018); Gerpott et al., (2022) ; Mehraein et al., (2023), which state that transformational leadership can negatively affect innovation when leaders exert excessive control over work processes, thereby limiting employees' freedom of thought. Such control can suppress creativity and reduce employees' motivation to generate sustainability-oriented ideas.

CONCLUSION AND SUGGESTION

Based on the analysis conducted, this study shows that green human capital (GHC), green structural capital (GSC), and green relational capital (GRC) have a positive and significant influence on green innovation. These findings indicate that employees' abilities, knowledge, and environmental awareness, along with supportive organizational systems, procedures, and strong external relationships, can effectively strengthen the development of environmentally friendly innovations in the operational and production activities of convection businesses. Conversely, green transformational leadership (GTL) has a positive but insignificant effect on green innovation. This suggests that environmentally oriented leadership alone does not necessarily lead to green innovation unless it is accompanied by robust organizational support.

Based on these findings, it is recommended that future researchers broaden the research scope by examining different sectors and regions, and by increasing the sample size to enhance the reliability of the study. Future research may also consider incorporating additional variables that could influence green innovation, such as green human resource management (Bindeeba et al., 2025)

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Appendix

Table 2 Measurement scales

Measurement items	Constructs	Items	Sources
Green Human Capital (GHC)		<p>GHC1: I feel that the level of cooperation between colleagues in maintaining the environment where I work is quite high.</p> <p>GHC2: I feel that the leadership where I work is very supportive of efforts to achieve goals related to the environment</p> <p>GHC3: I realized that the abilities of the employees where I work are better than those of employees in other places</p>	(Kumar et al., 2025)
Green Structural Capital (GSC)		<p>GSC1: I feel that the place where I work has a better work management and supervision system compared to other companies</p> <p>GSC2: The place I currently work has a system that supports building and sharing knowledge about the environment</p> <p>GSC3: I feel that the way I work in maintaining environmental sustainability is better than other convection companies</p> <p>GSC4: I feel that the place I work has more facilities that support environmental sustainability compared to other convection companies</p>	(Kumar et al., 2025)
Green Relational Capital (GRC)		<p>GRC1: I feel that the products made at my workplace are in accordance with customer desires</p> <p>GRC2: I realize that there is a good relationship between the company and customers</p> <p>GRC3: I feel that the place where I work maintains good relationships with work partners or other parties</p>	(Kumar et al., 2025)
Green Transformational Leadership (GTL)		<p>GTL1: The leadership where I work inspires employees through work plans that care about the environment</p> <p>GTL2: The leadership where I work provides a clear environmental vision for employees to follow</p> <p>GTL3: The leadership where I work</p>	(Demir et al., 2025)

encourages employees to work together to achieve goals that care about the environment

GTL4: The leadership where I work encourages employees to achieve goals related to the environment

GTL5: The management at my workplace pays attention to employee opinions on environmental matters
GTL6: The leadership at my workplace encourages employees to think and generate environmentally friendly ideas

Green Innovation (GI)

GI1: I realized that the place I currently work in uses less raw materials
GI2: I feel that the place I currently work is actively creating

environmentally friendly products and services

GI3: I realized that the place I currently work is able to easily find new markets for environmentally friendly products

(Kumar et al., 2025)
