Reaching Sustainable Development Goals: An Examination of Climate Change's Impact and Green Intellectual Capital, Competitive Business Strategy as a Moderating Variable

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Abstract

The phenomenon of primary and company management attempts to reduce energy use and pollution is the basis for this paper's preparation. It follows that a green economy theme will undoubtedly be incorporated into the manufacturing sector's transformation model in the future. This is because businesses need to be able to manage how they use their resources and assets in order to maintain sustainable company continuity. The manufacturing sector and the adoption of the green economy are strongly correlated in this study, giving researchers the creative opportunity to use the sustainable development goals as achievement points and the phenomena of GIC and climate change as a supplementary variables toward the accomplishments in this paper into practice. This study presents findings about the phenomenon of the manufacturing sector attempting to apply green economic mechanisms.

The data gathered has clarified the relationship between CC and SDG's, in addition to the advantages of GHC, GSC, GRC, and total assets. Additionally, CBS can bolster the impact of GHC and GRC on sustainable development goals. To increase the success and sustainability of manufacturing industry businesses, all types of stakeholders concentrate on changes in competitiveness and the managerial implications of the green economy. However, they also ensure sustainability in key mechanisms and features to enable them to meet the demands and challenges of changing era. In order to address changes in the competitive environment among manufacturing industries, where process opportunities are abundant for companies to manage

competitive climate risk issues so that their implementation will enhance the welfare of stakeholders and society as a whole, this paper will develop a sustainable value approach.

Keywords: sustainable development goals, climate change, green intellectual capital, competitive business strategy, total asset

1.   ARTICLE INTRODUCTİON

The creation of a green economy is now a worldwide phenomenon. In order to ensure that environmental and economic development are synchronized, the process of building a green economy requires technology support. This is due to the fact that green technology, in contrast to traditional technology, is highly capable of decreasing the artificial and mechanical colors seen in traditional technology and is able to successfully fend off the detrimental impacts of technology on natural ecosystems. It will therefore be unable to go through a sustainable development process with true green innovation skills in the absence of innovation from green technology. Global businesses currently face intense competition in the field of sustainable development goals. To accomplish this, businesses must manage thoroughly and methodically in order to withstand the highly competitive climate that globalization has brought them. Theoretically, businesses, particularly those in the manufacturing sector, can outperform rivals and preserve the current state of sustainable development by utilizing green management that is blended with technology and developed and executed collaboratively. The manufacturing sector is the center of economic development and is expanding quickly in the new normal economy. Its quick development presents the natural environment with enormous challenges as well as fantastic opportunities for our society. The use of resources and contamination of the environment are getting worse.

The notion of green intellectual capital is meant to be associated with the contemporary economy and to be useful in tracking and identifying a company's intangible assets, which might impact the management performance of the organization (Todericiu & Stăniţ, 2015). In this instance, managing intellectual capital in relation to environmental awareness and dedication will present challenges that management of the organization must be able to help with. The green concept has emerged recently as a result of several businesses realizing how important it is to consider the environment in every step of the business process. This concept can be incorporated into intellectual capital management, allowing businesses to incorporate green intellectual capital into their overall business plan. This is

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crucial for protecting the environment by taking a preventive stance against pollution, but it's also critical for enhancing management concepts and business models to boost green innovation and opportunities. Customers and workers are two examples of stakeholders who should be informed about a company's environmental performance. If the firm isn't acting responsibly, these stakeholders have the right to take legal action against it. The increasing significance of environmental management in today's world, particularly in organizations or businesses, is what defines this shift. Effective environmental management, which comprises of components covering every facet of an organization's operations, can help counter this (Joshi & Rahman, 2015).According to (Chang & Chen, 2012a)'s literature, Environmental management proves to be more significant within the organization and will serve an important part in the enterprise business management. Companies can reap numerous benefits from implementing green business practices, including heightened consumer interest in their products and strong stakeholder involvement. Aside from that, the company's marketing division can benefit from green business initiatives. An example of proof that demonstrates a business's effectiveness in generating profits or benefits for the organization is an increase in the total amount of assets (Ruroh and Latifah (2018), n.d.). In order to reduce production waste and boost productivity, businesses aggressively promote environmental management and green intellectual capital. They also charge comparatively high prices for green economics, enhance their brand, and gain a competitive edge in line with global regulations and consumer trends toward environmental awareness. in the direction of environmental protection (Berry and Rondinelli (1998), n.d.).

2 LİTERATURE REVİEW

2.1 Theoretical Context

An organization can conduct operations in compliance with the laws of the community surrounding the business; a suggested agreement has already been reached by all parties. According to this, an entity will meet the needs of the business if it carries out suggestive agreements with stakeholders (*Gladia et.al, (2013)*, n.d.). This legitimacy theory can also be understood as a circumstance in which an entity's value rules, which it has adapted to the value rules of social rules, are regarded as the basis or component of the entity; any inconsistencies between the two rules may have an impact on the entity's ability to be legally recognized. (Mutmainnah & Wardhani, 2013). In Actuality, It is impossible to achieve information balance. This occurs as a result of the principal not being convinced that the agent can satisfy the needs of stakeholders through observation of the agent's routine

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operations. Agents, on the other hand, have access to more inside data and are more informed about the overall health of the workplace at the organization.

It goes without saying that this disparity in knowledge will affect the execution of effective agreements between principals and agents. Although the agency idea states that management should put shareholders' interests first as an agent, in reality, management occasionally puts its own interests first in order to maximize utility. In the long run, management's unprofitable decisions will undoubtedly hurt the corporation's interests (Jensen & Meckling, 1976). A different viewpoint proposes that there are three categories of firm resources—tangible, intangible, and human resource capabilities—that can give businesses a competitive edge. A company's capabilities demonstrate what it can accomplish with its resources. According to the RBV strategy, businesses that possess or manage strategic assets, both tangible and intangible, can gain a sustained competitive edge and generate higher profits (Fahy & Smithee, 1999).

2.2   Green Intellectual Capital

To make up for the absence of resources before environmental difficulties arise, proposed the devinition of GIC, which incorporates environmental principles become knowledge-based assets. According to (Chang & Chen, 2012), GIC is a reflection of a firm's non-tangible assets, such as its awareness, discernment, expertise, and inventiveness environmental safeguarding. GIC make it possible businesses meet stringent surroundings worldwide requirements, fulfill customers, cultivate surroundings consciousness, and generate operations reputaion.(Chang & Chen, 2012) According to their research, GHC is the worker's behavior main point, discernment, creativity, and dedication to green innovation or environmental preservation. Even if employees quit the enterprise, the organization cannot lose its GSC. The patent reserves, trademarks, hardware, software, databases, workpalce culture, and workplace competencies within a business are referred to as green structural capital. In the meantime, a business's interactive relationship reserves with clients, vendors, network participants, and allies in green innovation and sustainable development are known as green relational capital.

2.3   Climate Change

The SDGs are a new set of objectives addresses issues related to climate change adaptation as well as sustainability science and global environmental change. Creating common understandings has grown to be a fundamental aspect of sustainability science.

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Expanding business competitiveness has four characteristics: reputation, strategic assets, and internal and external core relationships. Rather than focusing solely on productivity metrics that are based on outcomes, the non-financial perspective places greater emphasis on both tangible and non-tangible reference as materials of sustainable competitive advantage. According to one definition, a company's competitiveness is its capacity to create, produce, and market goods that are more expensive and of higher quality while utilizing resources that are more effective than those offered by rivals.

Numerous studies have looked into how climate change affects the competitive surroundings operation and the companies serve in the last few quarters (Dannevig et al., 2022). A pertinent literature stream centers on the competitive advantage of sustainable operations, emerging from the notion of sustainable growth that concurrently highlights elements of social, environmental, and green economic development. (García-Sanz-Calcedo et al., 2021) offers three perspectives on the mechanisms behind climate change and sustainability that take into account various advancements in ecology, human rights, and human capabilities. To be able to establish and put into practice competitiveness in relation to competitive global variability, however, is crucial.

2.3 Sustainable Development Goals

The SDG's are a universally used method for measuring progress in the United Nations (UN) SDG's, because they allow comparisons across countries and regions. These indices generally do not offer any indication of how to progress on the SDGs (Zhang et al., 2022). Researchers took the initiative to analyze the impact of changes in competitiveness and green intellectual capital mechanisms on SDG in Indonesia. The SDG's Indices, collaboratively created by Bertelsmann Stiftung and the UN solutions collecive, has grow to be a crucial instrument for measuring SDG's advancements between nations (including Indonesia). However, although the SDG's indices enable measure on the SDGs and make it possible comparisons between nations, it cannot analyse where improvements need to improve (Schmidt-Traub et al., 2017).

3. RESEARCH METHODOLOGY

3.1 Acquisition of Data Data Samples

Obtaining data samples Quantitative research methods have been adopted in this literature, which involve the use of secondary data (archives) as the main source for obtaining information from financial reports and yearly reports from listed firms on the

Indonesia Stock Exchange (BEI) for 2019-2021 period which was able to produce 309 observations. However, 16 observations from 2019-2021 financial reports were not available, and therefore there were annual reports that were excluded, so the number was reduced to 293.

This number was later reduced to 281 because 12 companies used currencies other than IDR. And in the end, the data sample can be used in research totaling 252 industries after experiencing a decrease of 57 company data. Then obtaining these data will go through a data processing test process that includes descriptive statistical tests, classical assumption tests (normality, multiple linear regression, multicollinearity, autocorrelation, heteroscedasticity), F test, and T test. In this literature, researchers use a control variable in the form of total assets.

3.2 Data Instrument

The climate change variable uses content analysis, which is measured using a ratio scale symbolized by the symbol "GE," with a value 1 if an item is available and 0 if it isn't disclosed. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To calculate the climate change index, use the formula (Myung et al., 2019):

Table 1.Climate Change Instrument

Category	Indicator
The management approach and strategy	creation of management plans and tactics to deal with climate change challenges
	a methodical assessment of how climate change issues affect enterprises
	Simplifying business procedures in reaction to climate change
	Initiatives and organizations aimed at reducing climate change
	Implementing a scheme for carbon disclosure management
	Certified in relation to climate change
Carbon quantification	System level for inventories
	Carbon inventory's range.
	Connection between carbon inventory and mitigation strategies

	Added a carbon sink to the inventory mechanism
Operational efficiency	Percentage of waste reduction
	Amount of waste produced
	Level of recycling
	A rise in the recycling percentage
	Usage of water
	Water reuse percentage

The Green Intellectual Capital variable uses content analysis, which is measured with a ratio scale symbolized by the symbols "GHC" for green human capital, "GSC" for green structural capital, and "GRC" for green relational capital. Value 1 if there is an item available, and value 0 if the item is not available. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To determine the GIC index, apply the formula (Chang & Chen, 2012a):

Green Human Capital

- Company's workforce protects the environment and practices positive productivity;
- Company's worker are sufficiently knowledgeable about ecological preservation;
- Company's worker deliver high quality services and goods connected to surroundings protection;
- Within the organization, work teams that are involved in surroundings protection exhibit a high degree of cooperation;
- Supervisors provide their staff with unwavering support in doing their tasks in surroundings protect.

Green Structural Capital

- The operations has an advanced surroundings protection management mechanisms;
- Companies need to have established committees to advance key environmental protection issues;
- The operations has created comprehensive surroundings protection regulations;
- The operations invests enough account in infrastructures that safeguard the environment;

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- The proportion of knowledgeable personnel in the organization compared to the overall number of employees is high;
- The company's entire surroundings protection operational process operates without a hitch;
- The company's knowledge management system facilitates the acquisition and exchange of environmental management knowledge effectively;

Green Relational Capital
- Businesses create goods and services to fulfill customers' environmental demands;
- Customers are pleased by the company's efforts for surroundings protect;
- The cooperative operations connection with suppliers for surroundings protection is solid;
- The primary operations clients or consumers have a solid cooperative relationship with respect to surroundings protection;
- The business and its key partners have a positive and consistent working relationship when it comes to surroundings protection initiatives.

The SDG's variable is measured by SDG report 2022. Disclosure items include the following topics: economics, ecological, worker standards, human rights, and accountability for product. Value 1 if an item is available, and value 0 if the item is not available. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To calculate the sustainable development goals index, use the formula:

$$SDG = \frac{\sum xi}{n}$$

Description :
SDG   = SDG firm index

Σ Xi   = Number of item disclosed by the firm

n   = Total number items , n = 17

The Competitive Business Strategy variable uses content analysis, which is measured using a ratio scale symbolized by the symbol "CBS", a value 1 if an item is available and value 0 if the item is not available. After that, the amount disclosed will be divided by the total of all

criteria that must be disclosed. To calculate the competitive business strategy index, use the formula (Mile & and Snow, 1978):

Competitive Business Strategy
- In finance and production are the most effective elements of the ruling alliance;
- The dominant coalition has a long term of office;
- Prior to taking any action, extensive, cost-focused planning is done;
- The current pattern a functional operations with a wide division of labor and a high degree of formalization;
- Long looped vertical information loop with centralized mechanism;
- There are simple method processes for coordination, and hierarchical channels are used to resolve disputes;
- Production and financial success are supported by the reward mechanism, and operations performance is assessed and compared to prior years.

4.   RESULT AND DISCUSSION
4.1   Classical Assumption Test

a.   Normality Test

Table 2. Normality Test – K.Smirnov

Model	Sig		Decision
Asymp. Sig. (2-tailed)c	0,098		H0 Agreed
Monte Carlo Sig. (2-tailed)d	0,098		

Based on data processed with SPSS 29.

Considering the outcomes of Kolmogorov-Smirnov normality test, a value of 0.098 has been acquired. This is validated by the probability value ($0.098 > 0.05$) that it is well distributed.

b.   Autocorrelation Test
The correlation between residuals of one observation and the other data in regression model is standard assumption of autocorrelation, and the autocorrelation test is used to

assess whether or not this assumption is being violated. By comparing determined Durbin-Watson number, the Durbin-Watson statistical test was used to perform the autocorrelation test (DW) with the critical values (dL and dU).

Table 3.

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.510[a]	0,660	0,558	0,035243	0,705

Based on data processed with SPSS 29.

with the dL and dU values in the Durbin-Watson table. For $\alpha = 0.05$, k = 5 and n = 360, dL = 1.805 and dU = 1.850 are obtained. The regression has no autocorrelation since the Durbin- Watson value is between dU and 4-dU (1.850 < 2.010 < 2.150).

c.   Multicollinearity test

Table 4.

Coefficients[a]			
		Collinearity Statistics	
Model		Tolerance	VIF
1	GHC	0,336	2,974
	GSC	0,343	2,918
	GRC	0,410	2,440
	CC	0,714	1,400
	CBS	0,001	1,226
	TA	0,890	1,124
	CBS*CC	0,061	1,456
	CBS*GHC	0,001	1,604
	CBS*GSC	0,001	1,796
	CBS*GRC	0,002	1,818

Based on data processed with SPSS 29.

Considering the outcomes above, it might be show to be safe when the VIF score is < 10, so it might be concluded that all dependent variables, independent variables, and control

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variables are free from multicollinearity. However, all moderating variables that support the relation between the variables that are independent and dependent not free from the multicollinearity test.

4.2   Linear Regression Analysis (LRA)

The formula from research regression analysis is used to determine the influence of the independent variable on the dependent variable. The regression formula includes:

$$SDG = \alpha_0 + \beta_1.CC + \beta_2.GHC + \beta_3.GSC + \beta_4.GRC + \beta_5.CBS*CC$$
$$\beta_6.CBS*GHC +$$
$$\beta_7.CBS*GSC + \beta_8.CBS*GRC + \beta_9.TOTAL\ ASSET + e$$

SDG = Sustainable development goals; CC= Climate change; GHC= Green human capital; GSC= Green structural capital; GRC= Green relational capital; CBS= Competitive business strategy; e= Error / unidentified factors.

Table 5.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0,631	0,035		18,254	0,000
	GHC	0,108	0,037	0,275	2,879	0,004
	GSC	0,097	0,042	0,221	2,340	0,020
	GRC	0,011	0,029	0,032	0,370	0,038
	CC	0,017	0,012	0,091	1,386	0,007
	CBS	0,057	0,061	1,750	0,947	0,034
	TA	5,932E-15	0,000	0,395	6,717	0,000
	CBS*CC	-0,003	0,016	-0,047	-0,211	0,133
	CBS*GHC	0,055	0,072	1,351	0,769	0,023
	CBS*GSC	-0,149	0,087	-3,668	-1,721	0,087
	CBS*GRC	0,027	0,054	0,673	0,505	0,009

Coefficients[a]

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Considering outcomes of the multiple linear regression test above, it shows that there is a unidirectional connection between GHC (X2A) and SDG's (Y). This means that the role of employees who have more skills and insight into the green economy is able to increase productivity in implementing sustainable development goals. Apart from that, GSC (X2B) also has a relevance connection with sustainable development goals (Y). This can be defined as an agency or organization that already has a patent or trademark, is more dominant in going public, and tends to be accepted in international business.

Manufacturing industries that are able to maintain and renew their Business assets owned by the corporation have a higher chance of survive for long-term business continuity, so it might be found that there is a unidirectional and significant relationship between total assets (C1) and sustainable development goals (Y). Meanwhile, from the perspective of other variables, they cannot provide a unidirectional relationship because the relevance score is still higher than the alpha score of 0.05.

a. The CC variable has a relevance score of 0.007, which gives the conclusion that this score is greater (0.007 < 0.05), so that CC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

b. The GHC variable has a relevance score of 0.004, which gives the conclusion that this score is smaller (0.004 < 0.05), so that GHC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

c. The GSC variable has a relevance score of 0.020, which gives the conclusion that this score is smaller (0.020 < 0.05), so that GSC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

d. The GRC variable has a relevance score of 0.038, which gives the conclusion that this score is greater (0.038 < 0.05), so that GRC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

e. The CBS*CC variable has a relevance score of 0.133, which gives the conclusion that this score is greater (0.133 > 0.05), so that CBS cannot strengthen the influence of CCC on the sustainable development goals (Y) variable, so H0 can be accepted.

f. The CBS*GHC variable has a relevance score of 0.023, which gives the conclusion that this score is smaller (0.023 < 0.05), so that CBS can strengthen the influence of GHC on the sustainable development goals (Y) variable, so H0 cannot be accepted.

g. The CBS*GSC variable has a relevance score of 0.087, which gives the conclusion that this score is greater (0.087 > 0.05), so that CBS cannot strengthen the influence of GSC

on the sustainable development goals (Y) variable, so H0 can be accepted.

h. The CBS*GRC variable has a relevance score of 0.009, which gives the conclusion that this score is smaller (0.009 < 0.05), so that CBS can strengthen the influence of GRC on the sustainable development goals (Y) variable, so H0 cannot be accepted.

4.3 Coefficient Determination Test

The coefficient of determination or goodness of fit (R2) test, is accustomed to determine the magnitude of the influence of variations in all independent variables on the dependent variable. The value of the coefficient of determination (R2) is between zero and one (0 < R2 < 1). The coefficient of determination test is observed through the adjusted R2 value. The results of statistical data processing testing the coefficient of determination (goodness of fit) obtained in Table 6 are as follows:

Table 6.

Adjusted R²	Description
0,558	Explains variations in the dependent variable of 55,8%.

4.4 Hypothesis Analysis
a. **Simultaneous Test (F Test)**

Table 7.

Model		Sum of Squares	df	Mean Square	F	Sig.
				ANOVAa		
1	Regression	0,105	10	0,011	8,461	<.001b
	Residual	0,299	241	0,001		
	Total	0,404	251			

Based on the results of simultaneous significance testing (F statistical test), table 6 shows that simultaneous testing of the moderated regression model produces an F statistical value of 8.461 with a sig value of 0.001 < alpha 0.05. So H0 is rejected, meaning that

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simultaneously the independent variables, namely climate change, green human capital, green structural capital, green relational capital, CBS*CC, CBS*GHC, CBS*GSC, CBS*GRC, and literally total assets have a significant influence on company value.

5.   CONCLUSION

The SDGs benefit according to socioeconomic status from the sustained and sustainable application of GIC practices. Greater environmentally friendly innovation is eventually the result of GIC's facilitation of the creation of information regarding environmentally friendly management. The growth of knowledge about sustainable development goals is significantly influenced by these three forms of social capital, both directly and indirectly. Customers now see inclusive development and the planet Earth with more regard. Similar to environmental sustainability, businesses can leverage their dedication to the SDGs for promotional and publicity activities (Lafont-Torio et al., 2024).

Findings from the research can also be used to demonstrate how climate change significantly advances the objectives of sustainable development. A sustainable resource investment that can sustain stakeholder trust is the large number of employees with environmental insight and skills. It is stated that changes and renewals of business concepts are able to increase economic value due to competent industry practices and experience (Elleuch Lahyani, 2022). The idea of a green economy and technological advancements are closely tied to everyday operations and natural resources. in order for the majority of business managers to be better informed about the present situation known as the effects of unsustainable development. In addition, according to our research, CBS can strengthen GIC, which consists of GHC and GRC practices. This can help businesses maintain their business practices for sustainable investment for stakeholders, as well as reduce environmental damage through environmentally friendly and successful business strategies. Making sustainability a primary business strategy can also lead to new market opportunities and stimulate innovation, both of which boost a company's competitiveness (Abdelfattah et al., 2024).

The majority of corporate management is taking commercial measures to enhance human resources, equipping workers with critical skills for protecting ecosystems and fostering an organizational culture of environmental awareness. Research findings demonstrate that business strategies can increase the influence of GHC on the SDGs since doing so facilitates companies' achievement of the SDGs (Shazali et al., 2023). According to a different perspective, there is proof that enhancing GRC has a noteworthy positive impact on

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the Sustainable Development Goals (SDGs). This is because companies prioritize sustainable business practices by incorporating eco-friendly elements into their operations, encouraging consumers to choose organic products, and raising public awareness of the need of environmental protection. The study's findings demonstrated that a secure environment is necessary for the phenomena of growing corporate competition amongst enterprises. This outlines how businesses may create the Sustainable Development Goals (SDGs) more easily by implementing an effective business strategy, which starts with reducing greenhouse gas emissions and advancing environmentally friendly technology. An alternative perspective gives business management a strong opportunity to grow over the long run and keep stakeholders' trust at a level that is sustainable (Baer, n.d.). GSC is one component of the organization's infrastructure that helps to consistently and quantifiably develop environmental consciousness. There is evidence to suggest that corporate business strategies are insufficient to enhance the impact of GSC on the SDGs. According to the research findings, the majority of businesses have not been able to successfully implement GSC because they have not been able to include environmentally friendly components into their operational systems through the adoption of green economy-related policies and certifications (Shazali et al., 2023).

6. RESEARCH LIMITS

First of all, only secondary data from Indonesian manufacturing businesses' annual reports was used in this study's findings. Because of this, the research paper lacks longitudinal data results to thoroughly investigate surroundings consciousness and the three categories of environmentally friendly intellectual capital at different steps of Indonesia's manufacturing industry. Second, since the focus of this paper is a manufacturing organization, it is not possible to generalize the findings to other sectors of the economy, such the service sector. Third, the research findings are analyses within the framework of Indonesia, a developing nation. As a result, the findings of this study might not hold true in other developed or developing nations.

7. FUTURE RESEARCH OPPORTUNITIES

It is advised that future studies look into potential policy interventions in more detail in order to produce pertinent results. Future studies must evaluate the programs that are now in place and suggest new laws that prioritize environmental justice and ethics in order to accomplish this. In order to investigate environmental consciousness and

environmentally friendly intellectual capital in greater detail at different phases, future study can potentially gather longitudinal data. Future studies could compare and contrast present research with other factors that could impact the three categories of GIC. Lastly, we anticipate that the findings of this paper it might be beneficial to researchers, educators, and regulators, and that they will be able to inform other studies on the relationship between environmental performance and green economy in the future.

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Reaching Sustainable Development Goals: An Examination of Climate Change's Impact and Green Intellectual Capital.

by Hendar Muhammad Rifoaffa

Reaching Sustainable Development Goals: An Examination of Climate Change's Impact and Green Intellectual Capital.
Competitive Business Strategy as a Moderating Variable

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Abstract

Purpose – The phenomenon of primary and company management attempts to reduce energy use and pollution is the basis for this paper's preparation. It follows that a green economy theme will undoubtedly be incorporated into the manufacturing sector's transformation model in the future. This is because businesses need to be able to manage how they use their resources and assets in order to maintain sustainable company continuity.

Design/methodology/approach – The manufacturing sector and the adoption of the green economy are strongly correlated in this study, giving researchers the creative opportunity to use the sustainable development goals as achievement points and the phenomena of GIC and climate change as a supplementary variables toward the accomplishments in this paper into practice.

Findings – This study presents findings about the phenomenon of the manufacturing sector attempting to apply green economic mechanisms. The data gathered has clarified the relationship between CC and SDG's, in addition to the advantages of GHC, GSC, GRC, and total assets. Additionally, CBS can bolster the impact of GHC and GRC on sustainable development goals.

Practical implications – To increase the success and sustainability of manufacturing industry businesses, all types of stakeholders concentrate on changes in competitiveness and the managerial implications of the green economy. However, they also ensure sustainability in key mechanisms and features to enable them to meet the demands and challenges of changing era.

Originality/value – In order to address changes in the competitive environment among manufacturing industries, where process opportunities are abundant for companies to manage competitive climate risk issues so that their implementation will enhance the welfare of stakeholders and society as a whole, this paper will develop a sustainable value approach.

Keywords: Sustainable development goals, Climate change, Green intellectual capital, Competitive business strategy, Total asset

1. Article Introduction

The creation of a green economy is now a worldwide phenomenon. In order to ensure that environmental and economic development are synchronized, the process of building a green economy requires technology support. This is due to the fact that green technology, in contrast to traditional technology, is highly capable of decreasing the artificial and mechanical colors seen in traditional technology and is able to successfully fend off the detrimental impacts of technology on natural ecosystems. It will therefore be unable to go through a sustainable development process with true green innovation skills in the absence of innovation from green technology. Global businesses currently face intense competition in the field of sustainable development goals. To accomplish this, businesses must manage thoroughly and methodically in order to withstand the highly competitive climate that globalization has brought them. Theoretically, businesses, particularly those in the manufacturing sector, can outperform rivals and preserve the current state of sustainable development by utilizing green management that is blended with technology and developed and executed collaboratively. The manufacturing sector is the center of economic development and is expanding quickly in the new normal economy. Its quick development presents the natural environment with enormous challenges as well as fantastic opportunities for our society. The use of resources and contamination of the environment are getting worse.

The notion of green intellectual capital is meant to be associated with the contemporary economy and to be useful in tracking and identifying a company's intangible assets, which might impact the management performance of the organization (Todericiu & Stăniţ, 2015). In this instance, managing intellectual capital in relation to environmental awareness and dedication will present challenges that management of the organization must be able to help with. The green concept has emerged recently as a result of several businesses realizing how important it is to consider the environment in every step of the business process. This concept can be incorporated into intellectual capital management, allowing businesses to incorporate green intellectual capital into their overall business plan. This is crucial for protecting the environment by taking a preventive stance against pollution, but it's also critical for enhancing management concepts and business models to boost green innovation and opportunities. Customers and workers are two examples of stakeholders who should be informed about a company's environmental performance. If the firm isn't acting responsibly, these stakeholders have the right to take legal action against it. The increasing significance of environmental management in today's world, particularly in organizations or businesses, is what defines this shift. Effective environmental management, which comprises of components covering every facet of an organization's operations, can help counter this (Joshi & Rahman, 2015).

According to (Chang & Chen, 2012a)'s literature, Environmental management proves to be more significant within the organization and will serve an important part in the enterprise business management. Companies can reap numerous benefits from implementing green business practices, including heightened consumer interest in their products and strong stakeholder involvement. Aside from that, the company's marketing division can benefit from green business initiatives. An example of proof that demonstrates a business's effectiveness in generating profits or benefits for the organization is an increase in the total amount of assets (*Ruroh and Latifah (2018)*, n.d.)

In order to reduce production waste and boost productivity, businesses aggressively promote environmental management and green intellectual capital. They also charge comparatively high prices for green economics, enhance their brand, and gain a competitive edge in line with global regulations and consumer trends toward environmental awareness. in the direction of environmental protection (Berry and Rondinelli (1998), n.d.).

2. Theoritical Context

An organization can conduct operations in compliance with the laws of the community surrounding the business; a suggested agreement has already been reached by all parties. According to this, an entity will meet the needs of the business if it carries out suggestive agreements with stakeholders (*Gladia et.al, (2013)*, n.d.). This legitimacy theory can also be understood as a circumstance in which an entity's value rules, which it has adapted to the value rules of social rules, are regarded as the basis or component of the entity; any inconsistencies between the two rules may have an impact on the entity's ability to be legally recognized. (Mutmainnah & Wardhani, 2013). In Actuality, It is impossible to achieve information balance. This occurs as a result of the principal not being convinced that the agent can satisfy the needs of stakeholders through observation of the agent's routine operations. Agents, on the other hand, have access to more inside data and are more informed about the overall health of the workplace at the organization. It goes without saying that this disparity in knowledge will affect the execution of effective agreements between principals and agents. Although the agency idea states that management should put shareholders' interests first as an agent, in reality, management occasionally puts its own interests first in order to maximize utility. In the long run, management's unprofitable decisions will undoubtedly hurt the corporation's interests (Jensen & Meckling, 1976). A different viewpoint proposes that there are three categories of firm resources—tangible, intangible, and human resource capabilities—that can give businesses a competitive edge. A company's capabilities demonstrate what it can accomplish with its resources. According to the RBV strategy, businesses that possess or manage strategic assets, both tangible and intangible, can gain a sustained competitive edge and generate higher profits (Fahy & Smithee, 1999).

3. Basic Concepts as a Glance

3.1 *Green Intellectual Capital*

To make up for the absence of resources before environmental difficulties arise, proposed the devinition of GIC, which incorporates environmental principles become knowledge-based assets. According to (Chang & Chen, 2012), GIC is a reflection of a firm's non-tangible assets, such as its awareness, discernment, expertise, and inventiveness environmental safeguarding. GIC make it possible businesses meet stringent surroundings worldwide requirements, fulfill customers, cultivate surroundings consciousness, and generate operations reputaion.

(Chang & Chen, 2012) According to their research, GHC is the worker's behavior main point, discernment, creativity, and dedication to green innovation or environmental preservation. Even if employees quit the enterprise, the organization cannot lose its GSC. The patent reserves, trademarks, hardware, software, databases, workpalce culture, and workplace competencies within a business are referred to as green structural capital. In the meantime, a business's interactive relationship reserves with clients, vendors, network participants, and allies in green innovation and sustainable development are known as green relational capital.

3.2 Climate Change

The SDGs are a new set of objectives addresses issues related to climate change adaptation as well as sustainability science and global environmental change. Creating common understandings has grown to be a fundamental aspect of sustainability science. Expanding business competitiveness has four characteristics: reputation, strategic assets, and internal and external core relationships. Rather than focusing solely on productivity metrics that are based on outcomes, the non-financial perspective places greater emphasis on both tangible and non-tangible reference as materials of sustainable competitive advantage. According to one definition, a company's competitiveness is its capacity to create, produce, and market goods that are more expensive and of higher quality while utilizing resources that are more effective than those offered by rivals. Numerous studies have looked into how climate change affects the competitive surroundings operation and the companies serve in the last few quarters (Dannevig et al., 2022). A pertinent literature stream centers on the competitive advantage of sustainable operations, emerging from the notion of sustainable growth that concurrently highlights elements of social, environmental, and green economic development. (García-Sanz-Calcedo et al., 2021) offers three perspectives on the mechanisms behind climate change and sustainability that take into account various advancements in ecology, human rights, and human capabilities. To be able to establish and put into practice competitiveness in relation to competitive global variability, however, is crucial.

3.3 Sustainable Development Goals

The SDG's are a universally used method for measuring progress in the United Nations (UN) SDG's, because they allow comparisons across countries and regions. These indices generally do not offer any indication of how to progress on the SDGs (Zhang et al., 2022). Researchers took the initiative to analyze the impact of changes in competitiveness and green intellectual capital mechanisms on SDG in Indonesia. The SDG's Indices, collaboratively created by Bertelsmann Stiftung and the UN solutions collecive, has grow to be a crucial instrument for measuring SDG's advancements between nations (including Indonesia). However, although the SDG's indices enable measure on the SDGs and make it possible comparisons between nations, it cannot analyse where improvements need to improve (Schmidt-Traub et al., 2017).

4. Research Methodology

4.1 Acquisition of Data Samples

Obtaining data samples Quantitative research methods have been adopted in this literature, which involve the use of secondary data (archives) as the main source for obtaining information from financial reports and yearly reports from listed firms on the Indonesia Stock Exchange (BEI) for 2019-2021 period which was able to produce 309 observations. However, 16 observations from 2019-2021 financial reports were not available, and therefore there were annual reports that were excluded, so the number was reduced to 293. This number was later reduced to 281 because 12 companies used currencies other than IDR. And in the end, the data sample can be used in research totaling 252 industries after experiencing a decrease of 57 company data. Then obtaining these data will go through a data processing test process that includes descriptive statistical tests, classical assumption tests (normality, multiple linear regression, multicollinearity, autocorrelation, heteroscedasticity), F test, and T test. In this literature, researchers use a control variable in the form of total assets.

4.2 Data Measurement

The climate change variable uses content analysis, which is measured using a ratio scale symbolized by the symbol "GE," with a value 1 if an item is available and 0 if it isn't disclosed. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To calculate the climate change index, use the formula (Myung et al., 2019):

Category	Indicator
The management approach and strategy	Establishment of strategies and management system to address climate change issues
	Systematic evaluation of the impact of climate change issues on businesses
	Streamlining corporate practices in response to climate change
	Initiatives and organizations aimed at reducing climate change
	Implementing a scheme for carbon disclosure management
	Certified in relation to climate change
Carbon quantification	System level for inventories
	Carbon inventory's range.
	Connection between carbon inventory and mitigation strategies
	Added a carbon sink to the inventory mechanism
Operational efficiency	Percentage of waste reduction
	Amount of waste produced
	Level of recycling
	A rise in the recycling percentage
	Usage of water
	Water reuse percentage

The Green Intellectual Capital variable uses content analysis, which is measured with a ratio scale symbolized by the symbols "GHC" for green human capital, "GSC" for green structural capital, and "GRC" for green relational capital. Value 1 if there is an item available, and value 0 if the item is not available. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To determine the GIC index, apply the formula (Chang & Chen, 2012a):

a. Green Human Capital

- Company's workforce protects the environment and practices positive productivity;
- Company's worker are sufficiently knowledgeable about ecological preservation;
- Company's worker deliver high quality services and goods connected to surroundings protection;
- Within the organization, work teams that are involved in surroundings protection exhibit a high degree of cooperation;
- Supervisors provide their staff with unwavering support in doing their tasks in surroundings protect.

b. Green Structural Capital

- The operations has an advanced surroundings protection management mechanisms;
- Companies need to have established committees to advance key environmental protection issues;
- The operations has created comprehensive surroundings protection regulations;
- The operations invests enough account in infrastructures that safeguard the environment;
- The proportion of knowledgeable personnel in the organization compared to the overall number of employees is high;
- The company's entire surroundings protection operational process operates without a hitch;
- The company's knowledge management system facilitates the acquisition and exchange of environmental management knowledge effectively;

c. Green Relational Capital

- Businesses create goods and services to fulfill customers' environmental demands;
- Customers are pleased by the company's efforts for surroundings protect;
- The cooperative operations connection with suppliers for surroundings protection is solid;
- The primary operations clients or consumers have a solid cooperative relationship with respect to surroundings protection;
- The business and its key partners have a positive and consistent working relationship when it comes to surroundings protection initiatives.

The SDG's variable is measured by SDG report 2022. Disclosure items include the following topics: economics, ecological, worker standards, human rights, and accountability for product. Value 1 if an item is available, and value 0 if the item is not available. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To calculate the sustainable development goals index, use the formula:

$$SDG = \frac{\sum xi}{n}$$

Description :

SDG   = SDG firm index
Σ Xi   = Number of item disclosed by the firm
n   = Total number items , n = 17

The competitive business strategy variable uses content analysis, which is measured using a ratio scale symbolized by the symbol "CBS," with a value 1 if an item is available and value 0 if the item is not available. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To calculate the competitive business strategy index, use the formula. The Competitive Business Strategy variable uses content analysis, which is measured using a ratio scale symbolized by the symbol "CBS", a value 1 if an item is available and value 0 if the item is not available. After that, the amount disclosed will be divided by the total of all criteria that must be disclosed. To calculate the competitive business strategy index, use the formula (Mile & and Snow, 1978):

a.   *Competitive Business Strategy*
-   In finance and production are the most effective elements of the ruling alliance;
-   The dominant coalition has a long term of office;
-   Prior to taking any action, extensive, cost-focused planning is done;
-   The current pattern a functional operations with a wide division of labor and a high degree of formalization;
-   Long looped vertical information loop with centralized mechanism;
-   There are simple method processes for coordination, and hierarchical channels are used to resolve disputes;
-   Production and financial success are supported by the reward mechanism, and operations performance is assessed and compared to prior years.

5.   Findings and Discussion
5.1   Normality Test

Table 1.
Normality Test
K.Smirnov

Model	Sig	Decision
Asymp. Sig. (2-tailed)c	0,098	H0 Agreed
Monte Carlo Sig. (2-tailed)d	0,098	

Based on data processed with *SPSS 29*.

Considering the outcomes of Kolmogorov-Smirnov normality test, a value of 0.098 has been acquired. This is validated by the probability value (0.098 > 0.05) that it is well distributed.

5.2   Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	GHC	0,336	2,974
	GSC	0,343	2,918
	GRC	0,410	2,440
	CC	0,714	1,400
	CBS	0,001	1,226
	TA	0,890	1,124
	CBS*CC	0,061	1,456
	CBS*GHC	0,001	1,604
	CBS*GSC	0,001	1,796
	CBS*GRC	0,002	1,818

Table 2.
Multicollinearity
Test

Considering the outcomes above, it might be show to be safe when the VIF score is < 10, so it might be concluded that all dependent variables, independent variables, and control variables are free from multicollinearity. However, all moderating variables that support the relation between the variables that are independent and dependent not free from the multicollinearity test.

5.3 Autocorrelation Test

The correlation between residuals of one observation and the other data in regression model is standard assumption of autocorrelation, and the autocorrelation test is used to assess whether or not this assumption is being violated. By comparing determined Durbin-Watson number, the Durbin-Watson statistical test was used to perform the autocorrelation test (DW) with the critical values (dL and dU).

Criteria:
- If DW < dL or DW > 4 - dL, autocorrelation is significant.
- If dU < DW < 4 - dU, autocorrelation isn't significant.
- If dL ≤ DW ≤ dU or 4 - dU ≤ DW ≤ 4 - dL, then the Durbin-Watson test does not produce a convincing conclusion.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.510^a	0,660	0,558	0,035243	0,705

Based on data processed with *SPSS 29*.

Table 3.
Autocorrelation Test

Considering outcomes of the table above, the Durbin-Watson value is 0.705. With a total data sample of 252 industries, the dL value is (1.7846) and the dU value is (1.8007). It can be concluded that there is autocorrelation because the dL value (1.7846) > DW (0.705).

5.4 Linear Regression Test

The formula from research regression analysis is used to determine the influence of the independent variable on the dependent variable. The regression formula includes:

$$SDG = \alpha_0 + \beta_1.CC + \beta_2.GHC + \beta_3.GSC + \beta_4.GRC + \beta_5.CBS*CC + \beta_6.CBS*GHC + \beta_7.CBS*GSC + \beta_8.CBS*GRC + \beta_9.TOTAL\ ASSET + e$$

Description:

SDG = Sustainability Development Governance

CC = Climate Change

GHC = Green Human Capital

GSC = Green Structural Capital

GRC = Green Relational Capital

CBS = Competitive Business Strategy

E = Errors / unidentified factors

Considering the outcomes of several linear regression testing by SPSS 29 on the data obtained in this research are presented in Table 4 below:

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	0,631	0,035		18,254	0,000
GHC	0,108	0,037	0,275	2,879	0,004
GSC	0,097	0,042	0,221	2,340	0,020
GRC	0,011	0,029	0,032	0,370	0,038
CC	0,017	0,012	0,091	1,386	0,007
CBS	0,057	0,061	1,750	0,947	0,034
TA	5,932E-15	0,000	0,395	6,717	0,000
CBS*CC	-0,003	0,016	-0,047	-0,211	0,133
CBS*GHC	0,055	0,072	1,351	0,769	0,023
CBS*GSC	-0,149	0,087	-3,668	-1,721	0,087
CBS*GRC	0,027	0,054	0,673	0,505	0,009

Based on data processed with *SPSS 29*.

Table 4.
Linear Regression Test

Considering outcomes of the multiple linear regression test above, it shows that there is a unidirectional connection between GHC (X2A) and SDG's (Y). This means that the role of employees who have more skills and insight into the green economy is able to increase productivity in implementing sustainable development goals. Apart from that, GSC (X2B) also has a relevance connection with sustainable development goals (Y). This can be defined as an agency or organization that already has a patent or trademark, is more dominant in going public, and tends to be accepted in international business.

Manufacturing industries that are able to maintain and renew their Business assets owned by the corporation have a higher chance of survive for long-term business continuity, so it might be found that there is a unidirectional and significant relationship between total assets (C1) and sustainable development goals (Y). Meanwhile, from the perspective of other variables, they cannot provide a unidirectional relationship because the relevance score is still higher than the alpha score of 0.05.

5.5   Significance Test of Individual Parameters (T Test)

a.   The CC variable has a relevance score of 0.007, which gives the conclusion that this score is greater (0.007 < 0.05), so that CC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

b.   The GHC variable has a relevance score of 0.004, which gives the conclusion that this score is smaller (0.004 < 0.05), so that GHC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

c.   The GSC variable has a relevance score of 0.020, which gives the conclusion that this score is smaller (0.020 < 0.05), so that GSC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

d.   The GRC variable has a relevance score of 0.038, which gives the conclusion that this score is greater (0.038 < 0.05), so that GRC has an influence on the sustainable development goals (Y) variable, so H0 cannot be accepted.

e.   The CBS*CC variable has a relevance score of 0.133, which gives the conclusion that this score is greater (0.133 > 0.05), so that CBS cannot strengthen the influence of CCC on the sustainable development goals (Y) variable, so H0 can be accepted.

f.   The CBS*GHC variable has a relevance score of 0.023, which gives the conclusion that this score is smaller (0.023 < 0.05), so that CBS can strengthen the influence of GHC on the sustainable development goals (Y) variable, so H0 cannot be accepted.

g.   The CBS*GSC variable has a relevance score of 0.087, which gives the conclusion that this score is greater (0.087 > 0.05), so that CBS cannot strengthen the influence of GSC on the sustainable development goals (Y) variable, so H0 can be accepted.

h.   The CBS*GRC variable has a relevance score of 0.009, which gives the conclusion that this score is smaller (0.009 < 0.05), so that CBS can strengthen the influence of GRC on the sustainable development goals (Y) variable, so H0 cannot be accepted.

5.6   Coefficient of Determination Test

Adjusted R^2	Description
0,558	Explains variations in the dependent variable of 55,8%.

Based on data processed with *SPSS 29*.

Table 5. Coefficient of Determination Test

The coefficient of determination or goodness of fit (R2) test, is accustomed to determine the magnitude of the influence of variations in all independent variables on the dependent variable. The value of the coefficient of determination (R2) is between zero and one ($0 < R2 < 1$). The coefficient of determination test is observed through the adjusted R2 value. The results of statistical data processing testing the coefficient of determination (goodness of fit) obtained in Table 5 are as follows:

5.7   F Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0,105	10	0,011	8,461	<.001[b]
	Residual	0,299	241	0,001		
	Total	0,404	251			

Table 6. Statistical moderation regression model

Based on the results of simultaneous significance testing (F statistical test), table 6 shows that simultaneous testing of the moderated regression model produces an F statistical value of 8.461 with a sig value of 0.001 < alpha 0.05. So H0 is rejected, meaning that simultaneously the independent variables, namely climate change, green human capital, green structural capital, green relational capital, CBS*CC, CBS*GHC, CBS*GSC, CBS*GRC, and literally total assets have a significant influence on company value.

6. Conclusion

The SDGs benefit according to socioeconomic status from the sustained and sustainable application of GIC practices. Greater environmentally friendly innovation is eventually the result of GIC's facilitation of the creation of information regarding environmentally friendly management. The growth of knowledge about sustainable development goals is significantly influenced by these three forms of social capital, both directly and indirectly. Customers now see inclusive development and the planet Earth with more regard. Similar to environmental sustainability, businesses can leverage their dedication to the SDGs for promotional and publicity activities (Lafont-Torio et al., 2024).

Findings from the research can also be used to demonstrate how climate change significantly advances the objectives of sustainable development. A sustainable resource investment that can sustain stakeholder trust is the large number of employees with environmental insight and skills. It is stated that changes and renewals of business concepts are able to increase economic value due to competent industry practices and experience (Elleuch Lahyani, 2022). The idea of a green economy and technological advancements are closely tied to everyday operations and natural resources. in order for the majority of business managers to be better informed about the present situation known as the effects of unsustainable development. In addition, according to our research, CBS can strengthen GIC, which consists of GHC and GRC practices. This can help businesses maintain their business practices for sustainable investment for stakeholders, as well as reduce environmental damage through environmentally friendly and successful business strategies. Making sustainability a primary business strategy can also lead to new market opportunities and stimulate innovation, both of which boost a company's competitiveness (Abdelfattah et al., 2024).

The majority of corporate management is taking commercial measures to enhance human resources, equipping workers with critical skills for protecting ecosystems and fostering an organizational culture of environmental awareness. Research findings demonstrate that business strategies can increase the influence of GHC on the SDGs since doing so facilitates companies' achievement of the SDGs (Shazali et al., 2023). According to a different perspective, there is proof that enhancing GRC has a noteworthy positive impact on the Sustainable Development Goals (SDGs). This is because companies prioritize sustainable business practices by incorporating eco-friendly elements into their operations, encouraging consumers to choose organic products, and raising public awareness of the need of environmental protection. The study's findings demonstrated that a secure environment is necessary for the phenomena of growing corporate competition amongst enterprises.

This outlines how businesses may create the Sustainable Development Goals (SDGs) more easily by implementing an effective business strategy, which starts with reducing greenhouse gas emissions and advancing environmentally friendly technology. An alternative perspective gives business management a strong opportunity to grow over the long run and keep stakeholders' trust at a level that is sustainable (Baer, n.d.). GSC is one component of the organization's infrastructure that helps to consistently and quantifiably develop environmental consciousness. There is evidence to suggest that corporate business strategies are insufficient to enhance the impact of GSC on the SDGs. According to the research findings, the majority of businesses have not been able to successfully implement GSC because they have not been able to include environmentally friendly components into their operational systems through the adoption of green economy-related policies and certifications (Shazali et al., 2023).

7.   Research limits

First of all, only secondary data from Indonesian manufacturing businesses' annual reports was used in this study's findings. Because of this, the research paper lacks longitudinal data results to thoroughly investigate surroundings consciousness and the three categories of environmentally friendly intellectual capital at different steps of Indonesia's manufacturing industry. Second, since the focus of this paper is a manufacturing organization, it is not possible to generalize the findings to other sectors of the economy, such the service sector. Third, the research findings are analyses within the framework of Indonesia, a developing nation. As a result, the findings of this study might not hold true in other developed or developing nations.

8.   Future research opportunities

It is advised that future studies look into potential policy interventions in more detail in order to produce pertinent results. Future studies must evaluate the programs that are now in place and suggest new laws that prioritize environmental justice and ethics in order to accomplish this. In order to investigate environmental consciousness and environmentally friendly intellectual capital in greater detail at different phases, future study can potentially gather longitudinal data. Future studies could compare and contrast present research with other factors that could impact the three categories of GIC. Lastly, we anticipate that the findings of this paper it might be beneficial to researchers, educators, and regulators, and that they will be able to inform other studies on the relationship between environmental performance and green economy in the future.

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