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COMPETITIVE ADVANTAGE BASED ON GREEN INTELLECTUAL CAPITAL AND GREEN INNOVATION

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ABSTRACT:

In the limited use of natural resources, companies must use the intelligence of their human resources to produce environmentally friendly and energy-efficient products and avoid environmental damage for the company's survival. This study investigates how green intellectual capital and innovation affect the competitive advantage of companies operating in the primary consumer goods industry. The research question is whether companies need more natural resources that are limited in quantity and quality. To ensure business sustainability, increased green intellectual capital, expensive green innovation, and long-term research are needed. Primary consumer goods sector manufacturing companies listed on the Indonesian Stock Exchange (BEI) from 2018 to 2020 are the subject of the research used. With the purposive sampling method, 62 companies were used, thus obtaining 179 samples. Research data is obtained from annual reports, sustainability reports, or company websites on the Indonesian Stock Exchange (BEI). The data analysis model is track analysis. Studies show that green intellectual capital affects competitive advantages, while green innovation does not. Innovative green innovations must be well integrated into the corporate accounting system to ensure corporate survival. This will involve increased research and development to improve resource access by increasing R&D.

Keywords: Green Intellectual Capital, Green Innovation, Competitive Advantage

INTRODUCTION

The company's production activity is increasing using fossil fuels, coal, and non-renewable natural resources. This leads to energy crises, increased air pollution and noise, food crises, and water crises. In today's industrial era, increasingly stringent business competition requires businesses to innovate and improve waste management technologies, perform waste recycling to add value to customers, and pay attention to their intangible assets and human resources to improve performance and get maximum profits. Companies must enhance the intellectual green human resource, or green human resource, to produce environmentally friendly products, energy-saving products, efficient use of natural resources, waste recovery, and green design. This will ensure that customers are satisfied that their products are safe and fit their needs and desires.

In the primary consumer goods industry listed on the Indonesian Stock Exchange, there is a phenomenon with a competitive advantage. (dengan proksi ROIC). In theory, to win competition and increase the value of a company, thereby boosting investor confidence and ensuring business sustainability, a company needs an ever-increasing competitive advantage. However, from 2018 to 2020, the ROIC value dropped slightly from the previous year.

In today's era of digitalization, corporate management must have the intangible assets of environmentally sensitive human resources and the ability to manage natural resources to enhance their competitive advantage. This is related to the intellectual value of green human resources. To enhance competitive advantages, the recruitment and selection process of

employees must consider environmental competencies when providing education and training to employees from various fields in the corporate department. This is in line with research (Altarawneh, 2017) that shows that the power of green intellectual capital significantly impacts the competitive advantage of Jordanian pharmaceutical companies (Rezaei et al., 2016). Other research shows that electronics companies in Taiwan have a positive competitive advantage (P.-C. Chen & Hung, 2014). However, green intellectual resources hurt competitive advantage (Firmansyah, 2017).

To open up new opportunities in the global market, green innovation contributes to a competitive advantage. In production, companies must improve their products or processes compared to their competitors by saving energy, recycling waste, and using green designs. According to empirical research, green innovation positively impacts competitive advantage (Al-Abdallah & Al-Salim, 2021) but has a negative impact (Fabiola & Khusnah, 2022).

Since unsustainable raw materials will run out as the needs of society increase, the research uses companies that produce primary consumer goods. Repair takes a long time. Therefore, companies must use energy efficiently and be environmentally friendly during the production process, which can improve their competitiveness while keeping an eye on the environmental aspects.

In order to increase green resources and green innovation, companies have to undertake time-consuming and costly research. In addition, companies face damage due to continuous production processes, a shortage of natural resources in terms of quantity and quality, and the use of environmentally unfriendly raw materials.

The Study aims to see the impact of green intellectual capital on competitive advantage and investigate the impact of green innovation on competitive advantage.

According to Legitimacy Theory theory, companies should consider the rights of investors and the general public to gain legitimacy from the public. By doing this, companies can develop green innovation and intellectual capital to produce environmentally friendly, energy-efficient, and recyclable products without reducing quality, thus meeting customer needs. Companies can face sanctions if they violate public rights. These sanctions can restrict the company's operations, resources, and product demand (Alhaj, 2012).

In Signaling Theory, Companies that show green intellectual capital, green innovation, and competitive advantage communicated through sustainability reports and annual reports can give good signals to investors, such as a good name and a positive image that companies are competitive, attracting investors to invest (Josephine et al., 2020).

Stakeholders reserve the right to information about the profits obtained by the company. In addition, the company must provide information about its social, intellectual, and environmental performance (Rokhlinsari, 2016). In this case, companies must ensure that, to gain stakeholders' support, their green intellectual capital is communicated, accessed, and received. Companies will have a greater competitive advantage if they get full support from stakeholders.

The resource-based view theory (RBV) explains that companies can possess, process, and disclose the advantages of superior natural resources. It can produce

environmentally friendly, green-technology, and energy-saving products and enhance its competitive advantage in the market. To gain a competitive advantage, a company must find an innovation that can give more value to its customers than its competitors. It is known as a competitive advantage (Altarawneh, 2017). Companies use competitive advantage strategies to occupy positions that competitors cannot replicate.

Real assets, such as property and equipment, are crucial to producing goods or services, but the importance of intangible assets, like green human capital, has increased in the industry. Intellectual assets are essential for generating revenue (Luthy, 1998). According to (P.-C. Chen & Hung, 2014) green intellectual property is one of the primary sources of economic wealth creation. It is the integration of environmental concepts into intellectual property to meet previous inadequacies related to environmental issues.

Intellectual green capital refers to specifications, empowerment, and supporting infrastructure for developing sustainability or environmental protection strategies (Huang & Kung, 2011). Financial Accounting Standard (FAS) No. 19 statement relating to unmeasurable assets led to this development. According to (Y.-S. Chen, 2008), the GIC classification consists of human green capital (GHC), green capital structure (GSC), and green capital relationships (GRC).

Green human wealth is called knowledge, expertise, abilities, experience, behavior, wisdom, creativity, and employee commitment to environmental protection (Y.-S. Chen, 2008). Although technological progress is accelerating, human resources remain important in determining a company's ability to thrive and survive. Human resources

are also the core resources companies need to gain a competitive advantage.

Green structural capital can be defined as organizational capabilities, commitments, knowledge management systems, managers' philosophy, culture, corporate image, patents, copyrights, and trademarks about environmental protection (Y.-S. Chen, 2008); (Huang & Kung, 2011). They also describe specifications, empowerment, and supporting infrastructure related to environmental protection or the development of sustainable strategies.

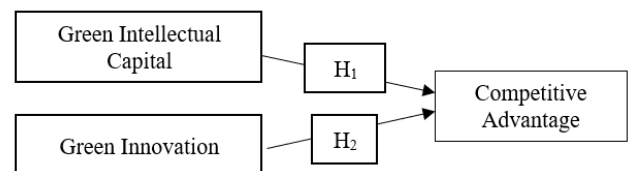
Corporate interactive relationships with suppliers, customers, network members, and partners in environmental management are known as green relationship capital (Y.-S. Chen, 2008). This relationship can only work well if the company can give confidence to its customers. Thus, a trusted company can improve customer relationships and expectations.

Green innovation consists of product and process innovation. Green product innovation promotes the efficient use of raw materials, minimizes raw material costs, and can generate additional revenue by turning waste into ready-to-sale products. Green process innovation creates environmental welfare using efficient raw materials and energy in production processes.

Green process innovations include better products or processes that save energy, prevent pollution, recycle waste, design green products, and improve corporate environmental management (P.-C. Chen & Hung, 2014). By implementing green innovation, they can increase product value and balance output by increasing environmental impact. According to Devi and (Dewi & Rahmianingsih, 2020), green innovation is a strategy to achieve a

company's strategic goals by using new or modified production methods, systems, practices, and processes to reduce the negative impact on the environment. Green innovation consists of two categories: product innovation and process innovation.

Green products produce products that can be recycled and minimize environmental pollution. Green innovation involves applying corporate creative ideas in the production process to reduce the negative impact on the environment (Wang, 2019).



Picture 1. Theoretical Framework

RESEARCH METHODS

The study uses quantitative research methods. The secondary data used in this study was obtained from annual sustainability reports accessed from the websites of manufacturing companies in the primary consumer goods sector registered in the EIB from 2018 to 2020. The research used a purposive sampling of 179 samples from 62 companies. Data analysis model using path analysis and SEM-PLS.

Variable Operationalization

Table 1. Variable Operationalization

Variable	Indicator	Measurement Scale
Green intellectual capital (X1)	Green human capital(Huang & Kung, 2011) $GHC = \frac{n}{k}$	Nominal
	Green structural capital(Huang & Kung, 2011) $GSC = \frac{n}{k}$	Nominal
	Green relational capital(Huang & Kung, 2011) $GRC = \frac{n}{k}$	Nominal
Green innovation (X2)	Green product innovation(Xie et al., 2019) $GPD = \frac{n}{k}$	Nominal
	Green process innovation(Xie et al., 2019) $GPC = \frac{n}{k}$	Nominal
Competitive advantage (Y)	$ROIC = \frac{NOPLAT}{InC}$	Ratio
Firm size	$In (Total Assets)$	Ratio
leverage	$\frac{Total Debt}{Total Equity}$	Ratio
Sales growth	$\frac{net sales t - net sales t - 1}{net sales t - 1} \times 100\%$	Ratio

Hypothesis

- H1 : Green intellectual resources have an impact on competitive advantage.
- H2 : green innovation have an impact on competitive advantage.

RESULTS AND DISCUSSION

Measuring Model Design (Outer Model Test)

One way to determine the convergence validity of a measurement model is to look at the correlation between the indicator score and its construction score, also known as the filling factor. Fill factor values above 0.5 are considered valid, while values below 0.5 are removed from the model (Yamin & Kurniawan, 2011).

Table 2. Combined Loading and Cross-Loading Outout

Variable	Indicator	Loading Factor	P- value
Green Intellectual Capital (GIC)	Green Human Capital (GHC)	0.902	<0.001
	Green Structural Capital (GSC)	0.878	<0.001
	Green Relational	0.523	<0.001

Variable	Indicator		Loading Factor	P- value
	Capital (GRC)			
Green Innovation (GI)	Green Product Innovation (GPD)		0.959	<0.001
	Green Process Innovation (GPC)		0.959	<0.001
Competitive Advantage (CA)	-		1.000	<0.001
Firm Size (FS)	-		1.000	<0.001
Leverage (LV)	-		1.000	<0.001
Sales Growth (SG)	-		1.000	<0.001

Source: 2022 behavior data

Table 2 shows that the green independent variables, i.e., green intellectual capital, green structural capital, and green relationship capital, as well as the green innovation variable, represented by the green human capital, the green product, and the green process innovation, have an added value of more than 0.50, which meets the P-value convergence validity criteria.

Structural Model Evaluation (Inner Model)

In the next step, an internal model evaluation is carried out. This includes model matching tests (model fit), band ratio, and R². Model matching testing consists of three indices: average band ratio (APC), average band ratios (ARS), and average variance ratio (AVIF). APC and ARS criteria are accepted because the p-value value is not more than 0.05, and AVIF is not greater than 5.

Table 3. Model Model Fit Indices

	Index	P-Value	Criteria	Description
APC	0.120	0.013	P<0.05	Accepted
ARS	0.113	0.017	P<0.05	Accepted
AVIF	1.082	-	AVIF≤5	Accepted

Source: 2022 behavior data

The above results indicate that APC has an index of 0.120 with a p-value of < 0.013, while ARS has an index of 0.113 with a p-value of < 0.017. Thus, APC meets the criteria based on the requirements because the p-value must be < 0.05, as required for ARS. According to the table above, the AVIF value is 1.082, which indicates that AVIF values must not be less.

Than 5, therefore, the inner model is acceptable. The ARS value, with a value of 0.113, indicates that the competitive advantage variable of 11.3% is influenced or can be explained by green intellectual resources, green innovation, company size, strength, and sales growth in research. Other variables outside the research model affect 88.7% of the rest.

Test the hypothesis

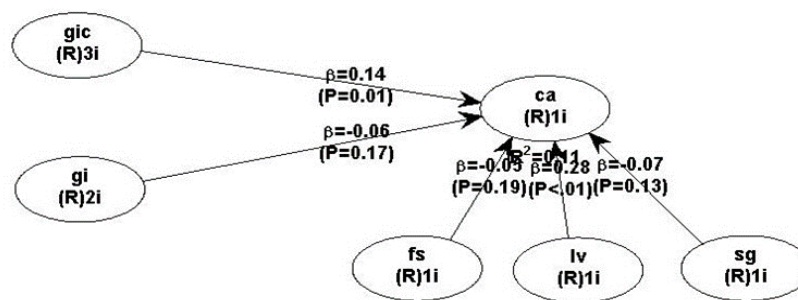


Figure 1. Research Model

The correlation between structures is measured by looking at the path coefficient and the degree of significance. The degree of significance used in this study is 5%.

Table 4. Indirect & Total Effect

Criteria	Variable	GIC	GI	FS	LV	SG
Path coefficient	CA	0.136	-0.059	-0.053	0.284	-0.068
p-value	CA	0.013	0.167	0.192	<0.001	0.133
	CA	0.019	0.006	0.005	0.078	0.005

Source: 2022, WarpPLS 7.0

$$CA = 0.136 \text{ GIC} - 0.059 \text{ GI} - 0.053 \text{ FS} + 0.284 \text{ LV} - 0.068 \text{ SG} + e$$

Competitive advantages are influenced by green intellectual capital. Based on table 4, that the variable green intellectual capital has a value of p-values 0,013 <0,05, it is concluded that the higher the company reveals green human capital, i.e. employees who have broad knowledge, skills, abilities, experiences, attitudes, wisdom, creativity and commitment to environmental protection embedded in them, the greater the competitive advantage of the company. Green structural capital is a supporter of green human capital because GSC is the

facility owned by an organization that facilitates employees in carrying out environmental protections, thus increasing competitive advantages. The green relational capital revealed by the company shows that the manufacturer of primary industrial goods has established good relationships with customers, suppliers, and partners to protect and manage the environment efficiently and effectively so as to maintain its prosperity. To gain a competitive advantage, companies must concentrate on resources that are scarce, valuable, and difficult to imitate. Through good management of green

intellectual resources, companies can get more creative employees with good skills and good structural facilities so that their relationships with stakeholders run efficiently and effectively. The results are consistent with previous studies (Y.-S. Chen, 2008);(Chandra & Augustine, 2019); and Ayuni & Muafi, 2020). However, previous research (Altarawneh, 2017) and (Firmansyah, 2017) showed that green intellectual strength does not affect competitive advantage.

Green innovation influences competitive advantage. According to Table 4, green innovation has no impact on competitive advantage, with a p-value of 0.167 > 0.05. The company is implementing environmentally friendly innovations as a start-up target and uses new production techniques, systems, practices, and processes to reduce negative impacts and environmental damage. However, the high cost of environmentally friendly product processes makes product sales prices rise, and the disclosure of eco-friendly innovation boosts the company's image. The results show (Fabiola & Khusnah, 2022) that green innovation does not affect the competitiveness of a company. However, green innovation can improve the competitive capacity of an enterprise by optimizing cost efficiency and productivity.

CONCLUSION

Competitive advantage is influenced by green intellectual resources. Competitive advantage is not affected by green innovation. Companies are expected to enhance green intellectual resources and green innovation through, increase investment in technology research and

development, provide training and development for environmentally innovative employee, develop recycling technology to use renewable raw materials and reduce waste, and develop environmentally friendly, energy-efficient, and recyclable products to improve competitiveness. Build relationships and communicate with other business partners related to environmentally friendly raw materials. When choosing an investment, pay attention to a sustainable and environmentally friendly business.

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