Archives of Business Research – Vol. 10, No. 10
Publication Date: October 25, 2022
DOI:10.14738/abr.1010.13254.
Renaldo, N., & Augustine, Y. (2022). The Effect of Green Supply Chain Management, Green Intellectual Capital, and Green Information System on Environmental Performance and Financial Performance. Archives of Business Research, 10(10). 53-77.

The Effect of Green Supply Chain Management, Green Intellectual Capital, and Green Information System on Environmental Performance and Financial Performance

Nicholas Renaldo
Economic and Business Faculty, Trisakti University, Indonesia

Yvonne Augustine
Economic and Business Faculty, Trisakti University, Indonesia

ABSTRACT

Environmental degradation is increasing and resource depletion has become a problem. Based on the results of the preliminary survey, the majority of respondents are more concerned with financial performance than environmental performance. This study aims to examine the effect of green supply chain management (GSCM), green intellectual capital (GIC), and green information system (GIS) on environmental performance (EnvP) and financial performance (FinP). The sample in this study was 219 respondents who came from manufacturing companies in Riau Province. Data analysis used structural equation analysis with SMART PLS application. The results show that only green supply chain management has a positive effect on financial performance. Then green intellectual capital and environmental performance each have a positive effect on financial performance. This research develops a new measurement for green supply chain management and green information system variables. Companies can develop systems and information technology that can reduce waste so that their environmental and financial performance can be better.

Keywords: GSCM, GIC, GIS, EnvP, FinP

INTRODUCTION

The measurement of company performance is generally carried out using financial performance which cannot be avoided anymore that this is a valid performance measurement. Measurement of financial performance using the return on assets indicator is the most phenomenal ratio to use. In fact, financial performance is not only the main pawn in the company, but other performance measurements also need to be considered. One of them is environmental performance, because it refers to the principle of sustainability, of course, the company wants to be a going concern to be able to maximize the wealth of the company owner. In recent times, increasing environmental degradation and resource depletion have become a perplexing problem worldwide. Environmental practices are considered a threat to the profitability of companies due to the significant investments required for technology investments and the long-term uncertainty and maturity associated with green investments (Acquah, Agyabeng-Mensah, & Afum, 2020). The preliminary survey results show that 87.5% of company representatives attach greater importance to financial performance than environmental performance. From the results of this preliminary investigation, it can be seen

that the industry in the city of Pekanbaru is still interested in financial performance rather than environmental performance.

Green Supply Chain Management (GSCM) Practices involves introducing environmental practices into supply chain activities to ensure that sustainable supply chains continue to have inconsistent and confusing impacts on business performance across all sectors, countries, and continents GSCM is a subsystem of sustainable supply chains. Research (Kenneth W. Green, Inman, Sower, & Zelbst, 2018) shows a positive effect of GSCM on environmental performance while research results (Çankaya & Sezen, 2019) show a negative effect. Research (Kenneth Wilburn Green, Toms, & Clark, 2015) shows a positive effect of GSCM on financial performance while research results (Baah et al., 2020) show a negative effect of GSCM on financial performance.

In this context, the practice of Green Intellectual Capital (GIC) has been increasingly promoted over the past decade as a proactive response that organizations can take to improve environmental performance. Intellectual capital is very important to companies in today's conditions where companies face intense competition. Research (Widyastuti, Parianom, & Permana, 2021) shows the positive influence of GIC on sustainability performance that is included in the context of environmental performance. Research (Zalfa & Novita, 2021) shows the negative effect of green human capital on (environmental) sustainability performance, the insignificant effect of green structural capital on (environmental) sustainability performance, and the positive influence of relationship capital green on sustainability (environmental) performance. Research (Dwianika & Gunawan, 2020) shows a positive effect of the green entrepreneur's intellectual capital on financial performance in the BSD city sample, but there is no effect on the Bintaro city sample.

GSCM and GIC practices have become an important factor in improving the company's environmental and financial performance. In addition to the supply chain and sustainable human resources, the application of an accounting information system (T. Chandra, Renaldo, & Putra, 2018) is also important for evaluating the company's performance. Applying a green information system (GIS) that provides management information to make better decisions requires information technology. Since it is related to environmental performance, the green information system (GIS) application variable used in the study (Susanto & Meiryani, 2019) has a positive influence on environmental performance. Research (Kwarteng & Aveh, 2018) shows the positive effect of implementing an accounting information system on company performance, while research (Hutahayan, 2020) shows an insignificant effect of implementing a management accounting information system on financial performance.

It is undeniable that climate change conditions have disturbed the earth. The melting of polar ice will continue so environmental factors are very important for companies to pay attention to. A good company not only benefits financially, but also benefits environmentally, socially, and others.

Based on the phenomena and differences in the results of these studies, it would be interesting to further discuss the effect of green supply chain management practices, green intellectual capital practices, and the adoption of green information systems on environmental performance and financial performance. This study is designed to determine, first, whether this

green factor will be able to influence environmental performance and sustainable financial performance. Second, to determine the function of environmental performance as a mediating variable. This study also uses three control variables to reinforce the research model (robustness) to consider the factors of age, size, and company certification.

The difference between this research and the previous research is that it uses the environmental performance variable as the mediating variable. This study also provides a combination of the use of operational/industrial management variables (green supply chain management practices), human resource management (green intellectual capital practices), accounting information systems (adoption of green information systems), and environmental accounting (environmental performance) and financial accounting (financial performance). This study seeks to develop green supply chain management indicators and green information system variables. Another difference is the measurement of all variables using primary data which previously used secondary data.

LITERATURE REVIEW AND FORMULATION OF HYPOTHESES

Resource-based Theory

The resource-based theory states that the internal factors in achieving competitive advantage are more important than the external factors of the company (industry). The resource-based theory debate is about how a company can compete with other companies to gain a competitive advantage in managing its resources based on the capabilities of the company (Hutahayan, 2020). Green supply chain management enables organizations to understand and analyze their assets effectively and make their procedures easy to gain a competitive advantage (Shafique, Asghar, & Rahman, 2017).

Contingency Theory

Contingency theory refers to situational factors or contingency factors that affect organizational performance. No organizational project can be universally applied anywhere or in any circumstance effectively. Designs may only be appropriate in certain contexts or conditions. The implementation of contingency theory encourages researchers to identify suitable conditions for specific organizational design and the development of supporting theories. The thesis behind the Contingency Theory is that no single organizational concept or project can be implemented effectively anywhere (universally) or under any circumstances. Furthermore, contingency theory also states that the effect of strategy (including innovative strategies) on performance depends on structural management, which includes management control systems, human resources, and internal process performance (Hutahayan, 2020).

Legitimacy Theory

Legitimacy can be interpreted as recognition and acceptance of the existence of the company by the community. The main assumption of legitimacy theory is the fulfillment of the organization's social contract, which allows for the recognition of its goals. Legitimacy is a general perception or assumption that an entity's actions are desirable, appropriate or appropriate within a socially constructed system of norms, values, beliefs, and definitions (Ifada, Indriastuti, Ibrani, & Setiawanta, 2021).

URL: http://dx.doi.org/10.14738/abr.1010.13254

Financial Performance

Financial performance is a description of the achievement of the implementation, program, or policy in achieving an organization's goals, objectives, mission and vision. Financial performance is an analytical tool carried out to see to what extent the company has implemented the financial implementation rules correctly (Derila, Evana, & Dewi, 2020).

Environmental Performance

Environmental performance refers to the organization's ability to reduce emissions of air, liquid, and solid waste, as well as the ability to reduce the consumption of hazardous and toxic materials and reduce the frequency of environmental accidents (Younis & Sundarakani, 2020).

Green Supply Chain Management

Supply chain processes and activities play an important role in companies' efforts to reduce the negative impact of their activities on the environment and society in the context of improved operational, market, and financial performance. Green Supply Chain Management (GSCM) practices consist of incorporating environmentally friendly practices into supply chain processes and activities to minimize or eliminate solid waste, reduce pollution, reduce energy consumption and improve the conservation of resources from the phase of the product design process to the final product (Acquah et al., 2020).

Green Intellectual Capital

Green intellectual capital is a total reservoir of all intangible assets, knowledge, skills, and relationships related to environmental protection and green innovation both at an individual and organizational level in a company. The green intellectual classification is composed of green human capital, green structural capital, and green relational capital (Widyastuti et al., 2021).

Green Information System

Management accounting information systems play an important role in generating reliable information for managers to make better tactical and strategic decisions. The innovation strategy requires specific information that is different from other business strategies. A reliable management accounting information system can produce the information managers need to make better decisions in creating good financial performance (Hutahayan, 2020).

Hypothesis Development

Green Supply Chain Management (GSCM) practices create green capabilities and competitive advantages, reduce the impact of an economic downturn and improve the company's market position and ensure operational efficiency. By paying attention to this environment-based supply chain, it is expected to reduce pollution in terms of improving the company's environmental performance. Research (Acquah et al., 2020), (Abdallah & Al-Ghwayeen, 2020), (Baah et al., 2020), (Thongrawd, Pichetsiraprapa, Somthong, & Sudprasert, 2019), and (Rakhmawati, Rahardjo, & Kusumawati, 2019) shows the positive effect of GSCM on environmental performance. Based on the description above, the first hypothesis can be formulated as follows:

H_1: Green supply chain management has a positive effect on environmental performance.

By having a strong green intellectual capital, it is expected that environmental performance will also be good. Human capital, structural capital, and relational capital will further strengthen

their impact on environmental performance. Research (Asiaei, Bontis, Alizadeh, & Yaghoubi, 2021) and (Nisar et al., 2021), show a positive effect of GIC on environmental performance.

Based on the description above, the second hypothesis can be formulated as follows:
H_2: Green intellectual capital has a positive effect on environmental performance.

From the green intellectual capital dimension, it can be tested per dimension so that the second hypothesis can be developed into three expansion hypotheses as follows:
H_{2a}: Green human capital has a positive effect on environmental performance.
H_{2b}: Green structural capital has a positive effect on environmental performance.
H_{2c}: Green relationship capital has a positive effect on environmental performance.

Green Information System (GIS) can encourage green company innovation. GIS enables companies to acquire environmental sustainability data in manufacturing, purchasing, sales, and logistics processes and analyze this data to generate valuable information needed for green initiatives and innovations that can improve environmental sustainability (Liu, Wang, & Li, 2018). Research (Breliastiti & Augustine, 2018), (Arulrajah, Senthilnathan, & Rathnayake, 2020), (Susanto & Meiryani, 2019), (Ahmed, Khan, Paul, & Kazmi, 2019), and (Liu et al., 2018) shows the positive effect of GIS on environmental performance. Based on the description above, the third hypothesis can be formulated as follows:
H_3: Green information system has a positive effect on environmental performance.

There are three schools of thought in this regard; first, those who believe that implementing green supply chain management (GSCM) practices may be a burden on the organization and require a large initial investment whose results may not materialize in the short term. Second, to believe that the implementation of GSCM practices is nothing more than a compromise between economic and environmental performance. Thirdly, there is a positive relationship between the adoption of GSCM practices and business performance and organizations can reap many benefits from such implementation such as reducing operating costs, improving corporate image, and increasing job satisfaction. of customers, increasing employee job satisfaction and creating more market opportunities (Younis & Sundarakani, 2020). Research (Rizki & Augustine, 2022), (Acquah et al., 2020), (Mensah et al., 2020), (Abdallah & Al-Ghwayeen, 2020), (Thongrawd et al., 2019), and (Yusof, Tabassi, & Esa, 2019) show the positive influence of GSCM practice on financial performance. Based on the description above, the fourth hypothesis can be formulated as follows:
H_4: Green supply chain management has a positive effect on financial performance.

GIC practices promote green values and principles within the company, which improves environmental performance. With the GIC practice, various parties will be more concerned about the environment and try to maintain its sustainability. After the good environmental performance, financial performance is also expected to be good. Research (M. Chandra & Augustine, 2019) and (Dwianika & Gunawan, 2020) show the positive influence of GIC on financial performance. Based on the description above, the fifth hypothesis can be formulated as follows:
H_5: Green intellectual capital has a positive effect on financial performance.

URL: http://dx.doi.org/10.14738/abr.1010.13254

From the green intellectual capital dimension, it can be tested per dimension so that the fifth hypothesis can be developed into three expansion hypotheses as follows:
H_{5a}: Green human capital has a positive effect on financial performance.
H_{5b}: Green structural capital has a positive effect on financial performance.
H_{5c}: Green relationship capital has a positive effect on financial performance.

To implement the strategy effectively, the management of the organization needs a reliable information system that can provide information for better decision-making. Matching information to the needs of decision-makers will improve the quality of decision making, ultimately the performance of the company (Hutahayan, 2020). Research (Sariwulan, 2020), (Hutahayan, 2020), (Susanto & Meiryani, 2019), (Fuzi, Habidin, Janudin, Ong, & Bahador, 2019), and (Kwarteng & Aveh, 2018) state the positive influence of accounting information systems management, preparation of environmental accounting information systems, and information systems with various terms on the company's performance. Based on the description above, the sixth hypothesis can be formulated as follows:
H_6: Green information system has a positive effect on financial performance.

The ISO 14001 standard considers environmental performance as a measurable result of an organization's management of its environmental aspects. The environmental performance of the company includes the efforts made by the company in the rational use of resources, reducing the environmental impact of its activities on the environment, and improving the environmental management in which the company operates. Well-managed environmental performance can be a marketing tool that can be used to provide a competitive advantage to an organization. So that the resulting product gets added value in the eyes of consumers and better sales value. Companies sensitive to environmental issues will implement environmental policies to improve financial performance. Environmental policies such as improving environmental performance will help direct management strategies improve the financial performance of the company. Based on research (Rusli, Augustine, Murwaningsari, & Breliastiti, 2019), (Ifada et al., 2021), (Siregar, 2020), (Saputra, 2020), and (Baah et al., 2020), the environmental performance has a positive effect on financial performance. Based on the description above, the seventh hypothesis can be formulated as follows:
H_7: Environmental performance has a positive effect on financial performance.

METHODOLOGY

Population and Sample

The stages of sample selection in this study refer to the techniques used in the research (Çankaya & Sezen, 2019). The target group of this research is a limited liability company operating in the city of Pekanbaru. The source used to identify these companies is based on the Integrated and Accountable Industrial Electronic System of Riau Province which was accessed on November 12, 2021 on the https://sepat.riau.go.id/industriall page, there are a total of 10,964 industries in Riau Province with details in table 1.

Table 1. Number of Industries in Riau Province

Industry Classification	Limited Company	Limited Partnership	Other	Total
Big	176	2	1	**179**
Middle	67	19	99	**185**
Small	56	207	10.337	**10.600**
Total	**299**	**228**	**10.437**	**10.964**

Source: https://sepat.riau.go.id/industriall, 2021

The researcher will conduct an analysis on industries that have a limited liability company form of business entity because it is believed that a limited liability company has better capital than other forms of business entities. So that after the first criteria, there are 299 companies that will be the sample. Then, out of 299 companies, Limited Liability Companies, especially some industrial sectors that carry out supply chain management activities, have procedures for human resource management. As well as certain sector-limited companies can also implement a better information system than other forms of business entity. This generally applies to limited liability companies belonging to large industrial classifications. So there are 176 limited liability companies that will be sampled in this study.

Researchers will distribute questionnaires to each company and the questionnaire will be filled out by at least one person per company with minimum qualifications at the operational/supply chain manager level, human resources manager, accounting manager, and several strategic positions in companies that are considered competent and have a minimum of three years work experience. This indicates that respondents have the skills and experience required to take part in the research to provide insightful data (Acquah et al., 2020). All companies that took part in this study held at least one of the positions mentioned above.

According to (Hair, Black, Babin, & Anderson, 2019), the minimum ratio between observations and variables is 5:1. Because there are 47 indicators, the minimum sample size is 235. Researchers got 219 respondents, so the response rate is 93.2%.

URL: http://dx.doi.org/10.14738/abr.1010.13254

Table 2. Definition of Operational Variables

Attribute	Dimention	Indicator	Source
		Financial Performance	
FinP1	*Managerial Performance*	The company experienced an increase in earnings per share	(Acquah et al., 2020)
FinP2		The company experienced an increase in return on investment	
FinP3		The company experiences gross profit growth	
FinP4		The company experiences net profit growth	
FinP5		The company is experiencing growth in equity	
FinP6		The company is experiencing asset growth	
		Environmental Performance	
EnvP1	*Waste Reduction*	The company reduces air emissions	(Acquah et al., 2020; Sudarno et al., 2022)
EnvP2		The company reduces liquid waste	
EnvP3		The company reduces solid waste	
EnvP4	*Environmental Impact*	The company reduces the use of hazardous/toxic substances	
EnvP5		The company reduces the frequency of environmental accidents	
EnvP6		The company makes improvements in the company's environmental situation	
		Green Supply Chain Management	
GSCM1	*Green Purchasing*	The company implements green purchases	(Acquah et al., 2020)
GSCM2		The company selects suppliers based on environmental criteria	(Çankaya & Sezen, 2019)
GSCM3		The company ensures that the supplier's products do not pollute the environment in the production process	Peneliti
GSCM4	*Green Colaboration*	The company implements green cooperation with customers	(Acquah et al., 2020)
GSCM5		The company applies cross-functional cooperation for environmental improvement	
GSCM6		The company works with suppliers for environmental purposes	(Çankaya & Sezen, 2019)
GSCM7	*Environmental Monitoring*	The company implements total quality environmental management	(Acquah et al., 2020)
GSCM8		The company implements environmental compliance and audit program	
GSCM9		The company implements an environmental management system	
GSCM10	*Eco-design*	The company implements green distribution and packaging	(Acquah et al., 2020)
GSCM11		Product design to reduce material/energy consumption	(Younis, Sundarakani, & Vel, 2016)
GSCM12		Product packaging can be reused for other purposes	Peneliti
		Green Intellectual Capital	
GIC1	*Green Human Capital*	Employee productivity and contribution to environmental protection in the company is better than its main competitors	(Chang & Chen, 2012)
GIC2		The competence of employees in environmental protection in the company is better than its main competitors	
GIC3		The environmental protection products and services provided by the company's employees are better than its main competitors	

Attribute	Dimention	Indicator	Source
GIC4		The level of teamwork related to environmental protection in the company is more than its main competitors	
GIC5		Managers in companies can fully support their employees to achieve environmental protection goals	
GIC6	*Green Structural Capital*	The company's eco-friendly approach is better than its major competitors	(Chang & Chen, 2012)
GIC7		The company's advantages resulting from its environmental activities outperform most of its competitors	
GIC8		The company's R&D investment to sales ratio is higher than that of its major competitors	
GIC9		Innovation on environmental protection of the company than its major competitors	
GIC10		Investment in green facilities of the company than its major competitors	
GIC11		The company's environmental knowledge management system is useful for gathering and sharing environmental management knowledge	
GIC12	*Green Relationship Capital*	The company designs its products or services according to the preferences of its customers	(Chang & Chen, 2012)
GIC13		The company's cooperative relationship on environmental protection with its upstream suppliers and downstream customers is strong	
GIC14		The company has a strong and collaborative relationship on environmental protection with its strategic partners	
		Green Information System	
GIS1	*Process*	The company has a formal system of environmental improvement in operations	(Liu et al., 2018; Sudarno et al., 2022)
GIS2		The company has a formal department that is responsible for environmental affairs	
GIS3		Companies have real-time processes for data analysis	Authors
GIS4	*System*	Practices and measures in the system regarding green practices are widely available	(Liu et al., 2018; Sudarno et al., 2022)
GIS5		The company officially tracks and reports on environmental performance within the company	
GIS6		Companies regularly track, monitor, and share environmental information within the company	
GIS7	*Technology*	The company has a well-developed database to track and monitor environmental issues	(Liu et al., 2018; Sudarno et al., 2022)
GIS8		Companies use computers and electricity-saving machines	Authors
GIS9		Companies prefer more efficient use of computing resources such as server consolidation	Authors

Source: Researcher and Research Article Elaboration, 2021

There are three indicators that the researcher added as a novelty in this study. The first argument about the green supply chain management variable is related to the environment, which is to maintain environmental sustainability in the supply chain process and reduce product packaging which can add to waste. The second argument is for a green information system variable with increasingly sophisticated technology, the electricity load will be cheaper, so it is more environmentally friendly.

URL: http://dx.doi.org/10.14738/abr.1010.13254

As for the control variable, company age is measured by how long the company has been operating (in years), and company size is measured by the number of employees at the time of the study (Ren, Tang, & Jackson, 2020). Company certification is measured through certifications related to the environment, prevention, and others such as ISO 14001 (Younis & Sundarakani, 2020), and other forms of certification.

DATA ANALYSIS METHOD

Descriptive Statistics

Descriptive analysis is used to find out the general description of the search object. This analysis includes the mean, median, standard deviation, and the number of respondents. What will be analyzed are the demographics of the respondents and the respondents' responses to each of the questionnaire statements.

Structural Equation Analysis

A model is created based on a certain theory, then SEM (Structural Equation Modeling) is used to check whether the model can be accepted or rejected (Ginting, 2009). The realized model is already based on a certain theory, so the SEM is not used to build a new model without a pre-existing theoretical basis.

The SEM model that will be used in this research is as follows:

$EnvP = b_1GSCM + b_2GIC + b_3GIS + b_4FS + b_5FA + b_6FS + e_1$

$FinP = b_7GSCM + b_8GIC + b_9GIS + b_{10}KL + b_{11}FS + b_{12}FA + b_{13}FS + e_2$

Information: EnvP: Environmental Performance; FinP: Financial Performance; GSCM: Green Supply Chain Management; GIC: Green Intellectual Capital; GIS: Green Information System; FS: Firm Size; FA: Firm Age; FS: Firm Certification; $b_1 \ldots b_{13}$: Structural equation coefficient; $e_1 \ldots e_2$: Error.

Structural Equation Modeling (SEM) analysis requires that the research model conforms to analytical standards. Before testing the effect, a preliminary test of the primary data is first performed. Validity describes to what extent the collected data covers the actual survey area. Validity basically means measuring what you intend to measure. The load factor greater than 0.40, which is the minimum recommended value in the study, is considered for further analysis. The second test is reliability which concerns the extent to which the measurement of a phenomenon provides stable and consistent results. Reliability is also related to repeatability. For example, a scale or a test is said to be reliable if repeated measurements made under constant conditions will give the same result. The most commonly used measure of internal consistency is Cronbach's alpha coefficient or composite reliability. Reliability is recommended to be 0.60 or higher (Putra & Renaldo, 2020; Taherdoost, 2016).

Meanwhile, according to (Hair et al., 2019), the minimum loading factor value is adjusted to the number of existing samples. In the case of 219 samples, the minimum loading factor value is 0.4. Average Variance Extracted (AVE) is part of the data (non-variable variables) described by each construct or latent variable, each for its variable group or how many, the average variable that is positively correlated with the construct of each variable latent. The AVE value must be greater than 0.50 (Ringle, Da Silva, & Bido, 2014). In SMART PLS, there is a discriminant validity condition that needs to be met, namely the Fornell-Larcker Criterion, with the condition that

the diagonal value must be higher than the value of the criteria below it. After that, it was continued with the multicollinearity test with the condition that the VIF value was < 10.

Hypothesis Testing

The test of influence between variables will be accepted if the significance value is less than the specified alpha (Hafni, Renaldo, Chandra, & Thaief, 2020). The hypothesis to be tested is both a stand-alone hypothesis and an expansion hypothesis.

Sensitivity Test

This test is needed to see whether the new indicator can provide better measurement results or not than the old indicator. Tests still use the same method. The results will be compared from the accepted/rejected hypotheses and the coefficient of determination. Then to make a decision, in addition to statistical analysis, also with the assessment of the researcher.

RESULTS AND DISCUSSION

Descriptive Statistics

Prior to the structural equation analysis, an analysis of the respondent's profile will be conducted. The results of the descriptive statistical analysis are shown in table 3.

URL: http://dx.doi.org/10.14738/abr.1010.13254

Table 3. Descriptive Statistics of Respondent Profile

Gender	**n**	**%**	**Departement**	**n**	**%**	**City**	**n**	**%**
Male	98	44.7 %	Operational	58	26.5 %	Pekanbaru	174	79.5 %
Female	121	55.3 %	HRD	11	5.0%	Outside Pekanbaru	45	20.5 %
Total	**219**	**100 %**	Accounting	29	13.2 %	**Total**	**219**	**100 %**
			Finance	53	24.2 %			
Age	**n**	**%**	Others	68	31.1 %	**Number of Firm's Employees**	**n**	**%**
26-30 years old	139	63.5 %	**Total**	**219**	**100 %**	under 50 peoples	104	47.5 %
31-35 years old	56	25.6 %				51-100 peoples	53	24.2 %
36-40 years old	16	7.3%	**Work Experience**	**n**	**%**	101-150 peoples	20	9.1%
41-45 years old	2	0.9%	3-5 years	149	68.0 %	151-200 peoples	6	2.7%
46-50 years old	2	0.9%	6-10 years	50	22.8 %	more than 200 peoples	36	16.4 %
above 50 years old	4	1.8%	11-15 years	11	5.0%	**Total**	**219**	**100 %**
Total	**219**	**100 %**	16-20 years	3	1.4%			
			over 20 years	6	2.7%	**Firm's Ownership**	**n**	**%**
Education	**n**	**%**	**Total**	**219**	**100 %**	Government	18	8.2%
Bachelor	139	63.5 %				Domestic Private	171	78.1 %
Post-graduated	10	4.6%	**Firm Age**	**n**	**%**	Foreing	3	1.4%
Others	70	32.0 %	1-10 years	99	45.2 %	Mix	27	12.3 %
Total	**219**	**100 %**	11-20 years	64	29.2 %	**Total**	**219**	**100 %**
			21-30 years	27	12.3 %			
Position	**n**	**%**	31-40 years	13	5.9%	**Number of Certification**	**n**	**%**
Manager, Senior Manager, Director	44	20.1 %	41-50 years	7	3.2%	No Certification	128	58.4 %
Supervisor	17	7.8%	51-60 years	1	0.5%	1	76	34.7 %
Secretary	17	7.8%	61-70 years	6	2.7%	2	4	1.8%
Auditor	2	0.9%	71-80 years	0	0.0%	3	8	3.7%
Accountant	35	16.0 %	81-90 years	0	0.0%	4	2	0.9%
Others	104	47.5 %	91-100 years	2	0.9%	5	1	0.5%
Total	**219**	**100 %**	**Total**	**219**	**100 %**	**Total**	**219**	**100 %**

Source: Data processing results, 2022

Based on descriptive statistics on the characteristics of the respondents, it can be seen that the interviewees are dominated by women, with an age range of 26-30 years. Respondents are dominated by undergraduate education and other positions. The respondents' work experience is 3-5 years at the age of the company with a range of 1-10 years. Most of the companies where respondents work are domiciled in the city of Pekanbaru, with the number of company employees in the range below 50 people. The ownership of the company is dominated by the domestic private sector and most of the companies do not have certifications related to the environment and others.

Table 4. Analysis of Outer Loading Dimensions and Indicators of Research Variables

Attribute	Outer Loading	Attribute	Outer Loading	Attribute	Outer Loading
FP1	0,869	EP_DL	0,941	GIC_HC	0,951
FP2	0,835	EP_PL	0,929	GIC_RC	0,950
FP3	0,764	GSCM_ED	0,904	GIC_SC	0,961
FP4	0,790	GSCM_EM	0,944	GIS_P	0,948
FP5	0,850	GSCM_GC	0,890	GIS_S	0,948
FP6	0,778	GSCM_GP	0,905	GIS_T	0,926

Source: Data processing results, 2022

Based on the results of the outer loading test for each variable, all of them have met the specified criteria. After all the outer loadings meet the requirements, then proceed with the analysis of construct reliability and validity.

Table 5. Construct Reliability and Validity Test

Atribut	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
EnvP	0,857	0,862	0,933	0,874
FinP	0,899	0,903	0,922	0,665
FA	1,000	1,000	1,000	1,000
FC	1,000	1,000	1,000	1,000
FS	1,000	1,000	1,000	1,000
GIS	0,935	0,937	0,959	0,885
GIC	0,950	0,951	0,968	0,910
GSCM	0,932	0,934	0,951	0,830

Source: Data processing results, 2022

Based on the test results, Cronbach's Alpha, rho_A, Composite Reliability, and Average Variance Extracted (AVE) values have met all the criteria. The conditions that must be met are Cronbach's Alpha, rho_A, and Composite Reliability which is worth above 0.7. While the requirements for Average Variance Extracted (AVE) are above 0.5. After construct reliability and validity have been met, the next is discriminant validity testing.

URL: http://dx.doi.org/10.14738/abr.1010.13254

Table 6. Discriminant Validity Test

Attribute	EnvP	FinP	FA	FC	FS	GIS	GIC	GSCM
EnvP	0,935							
FinP	0,659	0,815						
FA	0,032	0,019	1,000					
FC	0,012	-0,038	0,121	1,000				
FS	0,052	0,095	0,392	0,187	1,000			
GIS	0,775	0,644	0,072	0,049	0,049	0,941		
GIC	0,797	0,699	0,125	-0,003	0,038	0,916	0,954	
GSCM	0,847	0,673	0,068	0,063	0,036	0,861	0,899	0,911

Source: Data processing results, 2022

Based on the results of the discriminant validity test, all have met the specified criteria. The condition that must be met is that the diagonal value must be higher than the value of the criteria below it by ignoring the positive or negative sign. Then proceed with the multicollinearity test.

Table 7. Summary of Hypothesis Testing Results and Other Tests

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	VIF	R Square Adjusted
GSCM → EnvP	0,657	7,734	0,000	5.614	0.722
GIC → EnvP	0,100	0,633	0,527	9.388	
GIS → EnvP	0,120	1,014	0,311	6.664	
FS → EnvP	0,044	0,988	0,324	1.215	
FA → EnvP	-0,047	1,406	0,160	1.238	
FC → EnvP	-0,037	0,790	0,430	1.077	
GSCM → FinP	0,083	0,553	0,580	7.212	0.515
GIC → FinP	0,510	2,987	0,003	9.425	
GIS → FinP	-0,076	0,480	0,631	6.717	
FS → FinP	0,108	2,129	0,034	1.222	
FA → FinP	-0,088	1,403	0,161	1.246	
FC → FinP	-0,051	0,952	0,341	1.082	
EnvP → FinP	0,238	2,209	0,028	3.697	

Source: Data processing results, 2022

Based on the results of the multicollinearity test, it can be seen that the VIF value is below 10, which means that it is free from multicollinearity symptoms. Although the green intellectual capital variable has a fairly high VIF value, this variable can still be used. This is because the variables in this study are dominated by green factors, so they have similar green indicators or other environmental variables.

Coefficient of Determination Test

Based on the coefficient of determination test, for the environmental performance variable, the R Square Adjusted value is 0.722. This means that the variables of green supply chain management, green intellectual capital, green information system, firm size, firm age, and firm certification have an effect of 72.2% while the rest is influenced by other factors. For the financial performance variable, the R Square Adjusted value is 0.515. This means that environmental performance variables, green supply chain management, green intellectual

capital, green information system, firm size, firm age, and firm certification have an influence of 51.5% while the rest is influenced by other factors.

Structural Equation

From the test results with SMART PLS, the following structural equations can be formed:

EnvP = 0,657GSCM + 0,100GIC + 0,120GIS + 0,044FS – 0,047FA – 0,037FC

and

FinP = 0,238EnvP + 0,083GSCM + 0,510GIC – 0,076GIS + 0,108FS – 0,088 FA – 0,051FS

Hypothesis Testing

The results of testing the effect of green supply chain management on environmental performance provide a positive and significant direction at alpha 1% so that the first hypothesis which reads that green supply chain management has a positive effect on environmental performance is accepted. The results of testing the effect of green intellectual capital on environmental performance provide a positive and insignificant direction, so the second hypothesis which reads that green intellectual capital has a positive effect on environmental performance is rejected. The result of testing the effect of green information system on environmental performance gives a positive and insignificant direction, so the third hypothesis which reads that green information system has a positive effect on environmental performance is rejected. The results of testing the effect of green supply chain management on financial performance provide a positive and insignificant direction, so the fourth hypothesis which reads that green supply chain management has a positive effect on financial performance is rejected. The results of testing the effect of green intellectual capital on financial performance provide a positive and significant direction at alpha 1% so the fifth hypothesis which reads that green intellectual capital has a positive effect on financial performance is accepted. The results of testing the effect of the green information system on financial performance give a negative and insignificant direction, so the sixth hypothesis which reads that the green information system has a positive effect on financial performance is rejected. The results of testing the effect of environmental performance on financial performance provide a positive and significant direction at alpha 5% so that the seventh hypothesis which reads that environmental performance has a positive effect on financial performance is accepted.

Mediation Test

Mediation test was conducted to see whether the mediating variable could mediate the influence between variables.

Table 8. Mediation Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
GSCM → EnvP → FinP	0,157	0,160	0,077	2,030	0,043
FC → EnvP → FinP	-0,009	-0,010	0,013	0,692	0,489
FS → EnvP → FinP	0,010	0,012	0,013	0,797	0,426
GIC → EnvP → FinP	0,024	0,024	0,041	0,580	0,562
FA → EnvP → FinP	-0,011	-0,012	0,010	1,070	0,285
GIS → EnvP → FinP	0,029	0,030	0,035	0,825	0,410

Source: Data processing results, 2022

URL: http://dx.doi.org/10.14738/abr.1010.13254

Based on the results of the mediation test, the environmental performance variable mediates the effect of green supply chain management on financial performance at an alpha of 5%. This means that good green supply chain management practices supported by good environmental performance will improve financial performance. Meanwhile, environmental performance cannot mediate the effect of green intellectual capital and green information system on financial performance.

Expansion Test

The expansion test was conducted to see the effect of the green intellectual capital dimension on environmental performance and financial performance.

Table 9. Expansion Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
EnvP → FinP	0,245	0,243	0,108	2,261	0,024
FA → EnvP	-0,044	-0,043	0,032	1,383	0,167
FA → FinP	-0,087	-0,084	0,057	1,523	0,128
FC → EnvP	-0,036	-0,038	0,045	0,789	0,430
FC → FinP	-0,050	-0,050	0,053	0,942	0,347
FS → EnvP	0,042	0,042	0,041	1,003	0,316
FS → FinP	0,107	0,102	0,049	2,199	0,028
GIC HC → EnvP	0,181	0,189	0,107	1,690	0,092
GIC HC → FinP	0,175	0,183	0,150	1,171	0,242
GIC RC → EnvP	0,054	0,055	0,110	0,490	0,624
GIC RC → FinP	0,068	0,056	0,126	0,541	0,589
GIC SC → EnvP	-0,112	-0,111	0,116	0,965	0,335
GIC SC → FinP	0,292	0,287	0,159	1,843	0,066
GIS → EnvP	0,120	0,116	0,126	0,950	0,343
GIS → FinP	-0,073	-0,075	0,156	0,466	0,641
GSCM → EnvP	0,641	0,635	0,094	6,803	0,000
GSCM → FinP	0,073	0,093	0,141	0,517	0,605

Source: Data processing results, 2022

The results of the expansion test show that only the human capital dimension has a positive influence on environmental performance with an alpha of 10% and structural capital has a positive effect on financial performance with an alpha of 10%. Meanwhile, the results of the expansion test of other dimensions of green intellectual capital have not yet been able to have an effect on environmental performance and financial performance.

Sensitivity Test

Sensitivity test is used to see if the new measurement indicator can explain better than the old measurement indicator.

Table 10. Sensitivity Test

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	R Square Adjusted
GSCM → EnvP	0,610	6,971	0,000	0.713
GIC → EnvP	0,203	1,385	0,167	
GIS → EnvP	0,062	0,553	0,580	
FS → EnvP	0,049	1,063	0,288	
FA → EnvP	-0,049	1,361	0,174	
FC → EnvP	-0,035	0,750	0,454	
GSCM → FinP	0,170	1,253	0,211	0.518
GIC → FinP	0,403	2,752	0,006	
GIS → FinP	-0,011	0,079	0,937	
FS → FinP	0,108	1,899	0,058	
FA → FinP	-0,081	1,305	0,193	
FC → FinP	-0,061	1,171	0,242	
EnvP → FinP	0,201	1,875	0,061	

Source: Data processing results, 2022

Based on the results of the sensitivity test for hypothesis testing, it still shows the same results as the previous hypothesis test. This can also be proven by the R Square Adjusted value using the new indicator whose value is higher than the R Square Adjusted value using the old indicator. In the model using the new indicator, the R Square Adjusted value for environmental performance is 0.722, higher than 0.713 in the model with the old indicator. In the model that uses the new indicator, the R Square Adjusted value for financial performance is 0.515, slightly lower than the model with the old indicator, which is 0.518.

DISCUSSION

Green supply chain management has a positive effect on environmental performance. This means that the application of good green supply chain management practices will improve environmental performance. The results of the study are in line with research (Acquah et al., 2020) and (Mensah et al., 2020) but are not in line with research (Younis et al., 2016) and (Çankaya & Sezen, 2019).

In a more specific sense, implementing good green supply chain management practices, will reduce air, liquid, and solid emissions, as well as reduce the consumption of hazardous materials. The green supply chain management practices that can be carried out are green purchasing, green collaboration, environmental monitoring, and applying ergonomic designs. Meanwhile, environmental monitoring has the highest validity value, with indicators of companies implementing environmental compliance. With the good implementation of environmental monitoring, hazardous wastes will be reduced and ultimately environmental performance will be good. The results of this study are in line with resource-based theory because companies can compete with other companies to gain a competitive advantage in managing their resources in accordance with the capabilities of the company.

Green intellectual capital has a positive but not significant effect on environmental performance. This means that a good application of green intellectual capital will improve

URL: http://dx.doi.org/10.14738/abr.1010.13254

environmental performance even though it will not have a big impact. The results of this study are in line with research (Nisar et al., 2021) but not in line with research (Asiaei et al., 2021).

The indicator with the highest average score is “the managers in the company can fully support their employees in achieving the objectives of environmental protection”. This indicator is included in the green human capital dimension. This means that leaders have effectively implemented a standard in environmental management that ensures that the company's environmental performance is good. While the indicator "environmental protection innovation in the company more than its main competitors" has the highest average on the size of green structural capital, this means that the company develops innovations to reduce the impact of environmental pollution. Thus the indicator "the company designs its products or services according to the wishes of the customer's environment" has the highest average on the size of the green relationship capital. This indicates that the company has set specific goals for its customers, especially customers who wish to take care of the environment. The results of the study are not in line with the resource-based theory because it is shown that environment-based capital is not yet able to adequately improve environmental performance.

Green information system has a positive but not significant effect on environmental performance. This means that the implementation of a good green information system will improve environmental performance even though it will not have a big impact. The results of this study are in line with research (Gholami, Sulaiman, Ramayah, & Molla, 2013) but are not in line with research (Arulrajah et al., 2020).

The indicator with the highest average value is the indicator that the company has a formal environmental improvement system in operations that are included in the process dimension. This means that the environmental process system implemented by the company can increase the efficiency of the company's work by reducing environmental waste, although it has not yet had a great impact. The results of the study are not in line with the resource-based theory because it is shown that the application of a green information system has not been able to adequately improve environmental performance.

Green supply chain management has a positive but not significant effect on financial performance. This means that the implementation of good green supply chain management will improve financial performance even though it will not have a big impact. The results of this study are in line with research (Rizki & Augustine, 2022), (Acquah et al., 2020) and (Çankaya & Sezen, 2019) but are not in line with research (Kenneth W. Green, Inman, Sower, & Zelbst, 2019) and (Thongrawd et al., 2019).

At least with the practice of green supply chain management, the company has experienced an increase in asset growth because the production wastes have been well organized. This causes companies to reduce waste management costs and save funds for other purposes. So that the company's assets can grow slowly, although not significantly. The results of the study are not in line with the contingency theory because the existing supply chain system has not been able to improve the financial performance of manufacturing companies in the city of Pekanbaru.

Green intellectual capital has a positive effect on financial performance. This means that a good application of green intellectual capital will improve financial performance. The results of this

study are in line with research (Dwianika & Gunawan, 2020) and (Kartika, Indriastuti, & Sutapa, 2021) but are not in line with (Agustia, Asyik, & Midiantari, 2021) and (M. Chandra & Augustine, 2019).

Employee productivity and contributions on the green human capital dimension, environmental innovation on the green structural capital dimension, and cooperative relationships with partners on the green relationship capital dimension have been proven to strengthen the company's financial performance, thereby increasing the return on investment. From the results of the expansion test, it is also evident that it is the size of green structural capital that has the greatest influence on financial performance. This is evident from the high score of the indicator of the good working relationship of the company with the upstream suppliers and the downstream customers so that at least the production cost of the company can be minimized and achieve good profit growth gross. The study findings are consistent with legitimacy theory where the legitimacy of the perception or general assumption that an entity's actions are desirable, appropriate, or appropriate in a socially constructed system of norms, values, beliefs, and definitions. This is evident from the significant influence of structural capital which has a significant influence on financial performance.

Green information system has a negative but not significant effect on financial performance. This means that the application of a green information system will reduce financial performance even though it will not have a big impact. The results of this study are in line with research (Hariyati, Tjahjadi, & Soewarno, 2019) and (Hutahayan, 2020) but are not in line with research (Sariwulan, 2020) and (Fuzi et al., 2019).

The decline in financial performance was due to investments in sophisticated and up-to-date electronic systems requiring large funds, which could reduce the company's stock of funds. If interpreted in reverse, it means that if the company does not implement a sophisticated electronic system, then the financial performance will be good, although it will not have a big impact. Efficient application of computing resources can reduce equity growth due to the length of time for the company's return on capital. The results of the study are not in line with contingency theory where the same system if applied by every organization may not necessarily provide the same results. Some Riau manufacturing companies are not yet able to use information systems capable of supporting the achievement of financial performance due to the large initial investment required.

Environmental performance has a positive effect on financial performance. This means that good environmental performance will improve financial performance. The results of this study are in line with research (Ifada et al., 2021) and (Abdallah & Al-Ghwayeen, 2020) but are not in line with research (Thongrawd et al., 2019) and (Voinea, Hoogenberg, Fratostiteanu, & Hashmi, 2020).

With proper waste management followed by a reduction in environmental impact, this will reduce the company's costs, so that the company's profit can increase. This also indicates the efficiency of resources and waste generated by the company. The results of the study are in line with resource-based theory because utilizing good environmental performance, can improve the company's financial performance. If the existing resources continue to be utilized, it will be able to maintain business sustainability.

URL: http://dx.doi.org/10.14738/abr.1010.13254

The size of the firm has a positive effect on environmental performance, although the impact is not large, it has a significant positive effect on financial performance. This is because large-scale manufacturing companies in Riau only carry out their obligations according to local government regulations, even though they have not paid attention to details and the sample from large companies tends to be small. While the influence of company size on financial performance, as is well known, the greater the equity owned by the company, the more productive it will be to gain company profits.

The age of the company has a negative effect on both environmental performance and financial performance, although it does not have a significant impact. This is because generally, early-stage companies are very concerned about the environment, but gradually the company's desire to protect the environment will fade and focus only on achieving financial performance. The number of company certifications has a negative impact on both environmental and financial performance, although it does not have a major impact. This is due to the same thing as the age of the company. Companies generally take certifications that are appropriate to their fields and gradually begin to leave them.

Environmental performance has been shown to mediate the positive effect of green supply chain management on financial performance. This means that good green supply chain management practices, followed by good environmental performance, will translate into good financial performance. Environmental performance and green supply chain management practices will tune to achieve good financial performance through green purchasing methods and environmental monitoring to reduce waste and improve corporate capital efficiency.

Environmental performance is not proven to mediate the positive effect of green intellectual capital on financial performance. This means that good green intellectual capital practices, followed by good environmental performance, have not resulted in good financial performance. Environmental performance and the practice of green intellectual capital have not been able to synergize toward achieving good financial performance through. This is due to the practice of green intellectual capital that does not fully support environmental performance.

Environmental performance is not proven to mediate the positive effect of green information systems on financial performance. This means that good green information system practices, followed by good environmental performance, have not resulted in good financial performance. Environmental performance and green information system practices have not been able to synergize toward achieving good financial performance through. This is due to the practice of green information systems that do not fully support environmental performance. Although the initial investment is quite large for information systems to achieve environmental performance improvements, it has not been able to boost financial performance.

CONCLUSION

Based on the research results, it can be concluded that:

1. Green supply chain management has a positive effect on environmental performance
2. Green intellectual capital has no effect on environmental performance
3. Green information system has no effect on environmental performance
4. Green supply chain management has no effect on financial performance
5. Green intellectual capital has a positive effect on financial performance

6. Green information system has no effect on financial performance
7. Environmental performance has a positive effect on financial performance

Based on the results of the study, the implications of this research are:
1. Green supply chain management has the greatest impact on environmental performance, so companies implement this practice well in order to get increase environmental performance.
2. Green intellectual capital has the weakest influence on environmental performance, so companies still have to pay attention to this factor. Previous studies have proven to improve environmental performance, but the results of this study differ. Green human capital which can still provide a factor in environmental performance, which means companies must maintain sustainable human capital.
3. Green intellectual capital has the greatest influence on financial performance so that the company can maintain its current intellectual capital, but still cannot improve environmental performance. Companies must pay attention to and evaluate each dimension of these factors to maintain environmental and financial performance.
4. Green information system has the weakest influence on financial performance. Companies should be able to pay attention to this information system because in other studies it has been proven to improve company performance, so companies in Pekanbaru should start gradually investing in the latest information systems.

Based on the conclusions of the study, the following suggestions can be made:
1. Companies must implement good green supply chain management practices to improve environmental performance. Practices that can be used can be in the form of green purchasing, ecological collaboration, environmental monitoring, and ergonomic design (eco-design). Things that can be implemented such as implementing green cooperation with customers and suppliers, implementing environmental compliance systems, and ergonomic designs that can be reused for other purposes.
2. Companies need to implement good green intellectual capital practices to improve financial performance. Practices that can be used can be the application of green human capital, green structural capital, and green relationship capital. The results of the expansion test show that green intellectual capital with structural capital size has the greatest influence on financial performance, which means that companies need to innovate well, followed by environmentally related investments to achieve good financial performance.
3. The practice of green information systems needs to be improved because although it has not yet had an impact on environmental performance and financial performance, other studies have proven to be very important. Companies can start by investing slowly in technology in line with increasing human resource capabilities for the operation of the system and technology.
4. Policy for the Ministry of Environment and other government agencies to make strict environmental regulations so that companies can control (Renaldo, Sudarno, & Hutahuruk, 2020; Renaldo, Sudarno, Hutahuruk, Suyono, & Suhardjo, 2021) their environmental activities. Government agencies can emphasize advanced licensing where one of the requirements is waste or emissions that must be managed properly or other environmental-related matters that are important to be followed up.
5. For the next researcher, he can use the new measurements used in this study. Future researchers can also develop more precise measurements for better environmental and financial performance.

URL: http://dx.doi.org/10.14738/abr.1010.13254

References

Abdallah, A. B., & Al-Ghwayeen, W. S. (2020). Green supply chain management and business performance: The mediating roles of environmental and operational performances. *Business Process Management Journal*, *26*(2), 489–512. https://doi.org/10.1108/BPMJ-03-2018-0091

Acquah, I. S. K., Agyabeng-Mensah, Y., & Afum, E. (2020). Examining the link among green human resource management practices, green supply chain management practices and performance. *Benchmarking*, *28*(1), 267–290. https://doi.org/10.1108/BIJ-05-2020-0205

Agustia, D., Asyik, N. F., & Midiantari, N. (2021). Intellectual Capital Terhadap Financial Performance Dan Sustainable Growth. *EKUITAS (Jurnal Ekonomi Dan Keuangan)*, *5*(2), 159–179. https://doi.org/10.24034/j25485024.y2021.v5.i2.4744

Ahmed, S., Khan, A., Paul, S., & Kazmi, S. H. A. (2019). Role of Green Information System and Information Cycle in Environmental Performance. In *Proceedings ofthe Twelfth International Conference on Management Science and Engineering Management* (pp. 465–476). Springer International Publishing. https://doi.org/10.1007/978-3-319-93351-1_37

Arulrajah, A. A., Senthilnathan, S., & Rathnayake, M. P. (2020). Green information technology and environmental performance of the banks. *Journal of Governance and Regulation*, *9*(3), 27–39. https://doi.org/10.22495/jgrv9i3art2

Asiaei, K., Bontis, N., Alizadeh, R., & Yaghoubi, M. (2021). Green intellectual capital and environmental management accounting: Natural resource orchestration in favor of environmental performance. *Business Strategy and the Environment*, (March), 1–18. https://doi.org/10.1002/bse.2875

Baah, C., Opoku-Agyeman, D., Acquah, I. S. K., Agyabeng-Mensah, Y., Afum, E., Faibil, D., & Abdoulaye, F. A. M. (2020). Examining the correlations between stakeholder pressures, green production practices, firm reputation, environmental and financial performance: Evidence from manufacturing SMEs. *Sustainable Production and Consumption*, *27*, 100–114. https://doi.org/10.1016/j.spc.2020.10.015

Breliastiti, R., & Augustine, Y. (2018). The Role of Environmental Information System Mediation on the Effect of Environmental Strategy and Compliance with Government Regulation on Environmental Performance (Pilot Study of Companies in Indonesia). *Research Journal of Finance and Accounting*, *9*(14), 102–111.

Çankaya, S. Y., & Sezen, B. (2019). Effects of green supply chain management practices on sustainability performance. *Journal of Manufacturing Technology Management*, *30*(1), 98–121. https://doi.org/10.1108/JMTM-03-2018-0099

Chandra, M., & Augustine, Y. (2019). Pengaruh Green Intellectual Capital Index dan Pengungkapan Keberlanjutan terhadap Kinerja Keuangan dan Non Keuangan Perusahaan dengan Transparansi sebagai Variabel Moderasi. *Jurnal Magister Akuntansi Trisakti*, *6*(1), 45–70. https://doi.org/10.25105/jmat.v6i1.5066

Chandra, T., Renaldo, N., & Putra, L. C. (2018). Stock Market Reaction towards SPECT Events using CAPM Adjusted Return. *Opción*, *Año 34*(Especial No.15), 338–374.

Chang, C. H., & Chen, Y. S. (2012). The determinants of green intellectual capital. *Management Decision*, *50*(1), 74–94. https://doi.org/10.1108/00251741211194886

Derila, C. P., Evana, E., & Dewi, F. G. (2020). Effect of Environmental Performance and Environmental Costs on Financial Performance with CSR Disclosure as Intervening Variables. *International Journal for Innovation Education and Research*, *8*(1), 37–43. https://doi.org/10.31686/ijier.vol8.iss1.2054

Dwianika, A., & Gunawan, J. (2020). SME's Green Entrepreneurial Intellectual Capital. *International Journal of Business, Economics and Law*, *23*(1), 322–332.

Fuzi, N. M., Habidin, N. F., Janudin, S. E., Ong, S. Y. Y., & Bahador, K. M. K. (2019). Environmental management accounting practices and organizational performance: the mediating effect of information system. *Measuring Business Excellence*, *23*(4), 411–425. https://doi.org/10.1108/MBE-12-2018-0109

Gholami, R., Sulaiman, A. B., Ramayah, T., & Molla, A. (2013). Senior managers' perception on green information systems (IS) adoption and environmental performance: Results from a field survey. *Information & Management*, *50*(7), 431–438. https://doi.org/10.1016/j.im.2013.01.004

Ginting, D. B. (2009). Structural Equation Model (SEM). *Media Informatika*, *8*(3), 121–134. https://doi.org/10.3109/9781439822463.209

Green, Kenneth W., Inman, R. A., Sower, V. E., & Zelbst, P. J. (2018). Impact of JIT, TQM and green supply chain practices on environmental sustainability. *Journal of Manufacturing Technology Management*, *30*(1), 26–47. https://doi.org/10.1108/JMTM-01-2018-0015

Green, Kenneth W., Inman, R. A., Sower, V. E., & Zelbst, P. J. (2019). Comprehensive supply chain management model. *Supply Chain Management*, *24*(5), 590–603. https://doi.org/10.1108/SCM-12-2018-0441

Green, Kenneth Wilburn, Toms, L. C., & Clark, J. (2015). Impact of market orientation on environmental sustainability strategy. *Management Research Review*, *38*(2), 217–238. https://doi.org/10.1108/MRR-10-2013-0240

Hafni, L., Renaldo, N., Chandra, T., & Thaief, I. (2020). The Use of Regression Models with Supply Chain Management to Increase Financial Satisfaction of Generation Z. *International Journal of Supply Chain Management*, *9*(5), 1641–1650.

Hair, J. F. H., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis* (Eighth). Hampshire: Cengage. https://doi.org/10.1002/9781119409137.ch4

Hariyati, Tjahjadi, B., & Soewarno, N. (2019). The mediating effect of intellectual capital, management accounting information systems, internal process performance, and customer performance. *International Journal of Productivity and Performance Management*, *68*(7), 1250–1271. https://doi.org/10.1108/IJPPM-02-2018-0049

Hutahayan, B. (2020). The mediating role of human capital and management accounting information system in the relationship between innovation strategy and internal process performance and the impact on corporate financial performance. *Benchmarking*, *27*(4), 1289–1318. https://doi.org/10.1108/BIJ-02-2018-0034

Ifada, L. M., Indriastuti, M., Ibrani, E. Y., & Setiawanta, Y. (2021). Environmental Performance and Environmental Disclosure: The Role of Financial Performance. *Journal of Asian Finance, Economics and Business*, *8*(4), 349–362. https://doi.org/10.13106/jafeb.2021.vol8.no4.0349

Kartika, I., Indriastuti, M., & Sutapa. (2021). The Role of Intellectual Capital and Good Corporate Governance Toward Financial Performance. *Jurnal ASET (Akuntansi Riset)*, *13*(1), 50–62. https://doi.org/10.17509/jaset.v13i1.33999

Kwarteng, A., & Aveh, F. (2018). Empirical examination of organizational culture on accounting information system and corporate performance: Evidence from a developing country perspective. *Meditari Accountancy Research*, *26*(4), 675–698. https://doi.org/10.1108/MEDAR-01-2018-0264

Liu, Z., Wang, H., & Li, P. (2018). The Antecedents of Green Information System and Impact on Environmental Performance. *International Journal of Services, Economics and Management*, *9*(2), 111–124. https://doi.org/10.2139/ssrn.3177907

Mensah, Y. A., Ahenkorah, E., Afum, E., Agyemang, A. N., Agnikpe, C., & Rogers, F. (2020). Examining the influence of internal green supply chain practices, green human resource management and supply chain environmental cooperation on firm performance. *Supply Chain Management: An International Journal*, *25*(5), 585–599. https://doi.org/10.1108/SCM-11-2019-0405

Nisar, Q. A., Haider, S., Ali, F., Jamshed, S., Ryu, K., & Gill, S. S. (2021). Green human resource management practices and environmental performance in Malaysian green hotels: The role of green intellectual capital and pro-environmental behavior. *Journal of Cleaner Production*, *311*(127504), 1–11. https://doi.org/10.1016/j.jclepro.2021.127504

Putra, R., & Renaldo, N. (2020). Peningkatan Kepuasan Kerja dan Kinerja Guru melalui Komitmen, Budaya Organisasi, Motivasi, dan Gaya Kepemimpinan Guru SLTA Sederajat di Kabupaten Rokan Hilir. *Procuratio: Jurnal Ilmiah Manajemen*, *8*(1), 125–139.

Rakhmawati, A., Rahardjo, K., & Kusumawati, A. (2019). Faktor Anteseden dan Konsekuensi Green Supply Chain Management. *Jurnal Sistem Informasi Bisnis*, *9*(1), 1–8. https://doi.org/10.21456/vol9iss1pp1-8

Ren, S., Tang, G., & Jackson, S. E. (2020). Effects of Green HRM and CEO ethical leadership on organizations' environmental performance. *International Journal of Manpower*, *42*(6), 961–983. https://doi.org/10.1108/IJM-09-2019-0414

Renaldo, N., Sudarno, S., & Hutahuruk, M. B. (2020). Internal Control System Analysis on Accounts Receivable in SP Corporation. *The Accounting Journal of Binaniaga*, *5*(2), 73. https://doi.org/10.33062/ajb.v5i2.382

Renaldo, N., Sudarno, S., Hutahuruk, M. B., Suyono, & Suhardjo. (2021). Internal Control System Analysis on Accounts Receivable in E-RN Trading Business. *The Accounting Journal of Binaniaga*, *6*(2), 81–92. https://doi.org/10.33062/ajb.v5i2.382

Ringle, C. M., Da Silva, D., & Bido, D. D. S. (2014). Structural Equation Modeling with the SMARTPLS. *Revista Brasileira de Marketing*, *13*(2), 56–73. https://doi.org/10.5585/remark.v13i2.2717

Rizki, A. F., & Augustine, Y. (2022). Green supply chain management practices: direct effects sustainability performance. *Technium Social Sciences Journal*, *28*, 389–407.

Rusli, Y. M., Augustine, Y., Murwaningsari, E., & Breliastiti, R. (2019). The Moderating Effect of Competitive Business Strategy on Corporate Environmental Performance and Corporate Carbon Emission Disclosure Towards Corporate Financial Performance. *Journal of Economics and Sustainable Development*, *10*(6), 117–126. https://doi.org/10.7176/jesd/10-6-13

Saputra, I. (2020). The Influence of Environmental Performance, Organizational Reputation, Environmental Disclosure, and Environmental Strategy on Bussiness Performance. *International Journal of Contemporary Accounting*, *2*(2), 173–190. https://doi.org/10.25105/ijca.v2i2.8273

Sariwulan, T. (2020). Influence of Customization Strategy Against Company Performance with Management Accounting Information System as Intervening Variable. *International Journal of Contemporary Accounting*, *2*(1), 19–42. https://doi.org/10.25105/ijca.v2i1.6296

Shafique, M. N., Asghar, M. S., & Rahman, H. (2017). The Impact of Green Supply Chain Management Practices on Performance: Moderating Role of Institutional Pressure with Mediating Effect of Green Innovation. *Business, Management and Education*, *15*(1), 91–108. https://doi.org/10.3846/bme.2017.354

Siregar, T. (2020). The Effect of Belief System Implementatation and Interactive Control System on Economic Performance with Environmental Performance as Moderator. *International Journal of Contemporary Accounting*, *2*(2), 103–122. https://doi.org/http://dx.doi.org/10.25105/ijca.v2i2.7367

Sudarno, Renaldo, N., Hutahuruk, M. B., Suhardjo, Suyono, Putri, I. Y., & Andi. (2022). Development of Green Trident Measurements to Improve Environmental Performance: Literature Study. *International Journal of Advanced Multidisciplinary Research and Studies*, *2*(1), 53–57.

Susanto, A., & Meiryani. (2019). The Impact of Environmental Accounting Information System Alignment on Firm Performance and Environmental Performance: A Case of Small and Medium Enterprises of Indonesia. *International Journal of Energy Economics and Policy*, *9*(2), 229–236. https://doi.org/10.32479/ijeep.7511

Taherdoost, H. (2016). Validity and Reliability of the Research Instrument: How to Test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management (IJARM)*, *5*(3), 28–36. https://doi.org/10.2139/ssrn.3205040

Thongrawd, C., Pichetsiraprapa, P., Somthong, N., & Sudprasert, K. (2019). The Mediating Role of Operational and Environmental Performance in the Relationship between Green Supply Chain Management and Financial Performance. *International Journal of Supply Chain Management*, *8*(4), 258–268.

Voinea, C. L., Hoogenberg, B. J., Fratostiteanu, C., & Hashmi, H. B. A. (2020). The Relation between Environmental Management Systems and Environmental and Financial Performance in Emerging Economies. *Sustainability*, *12*(5309), 1–21. https://doi.org/10.3390/su12135309

Widyastuti, T., Parianom, R., & Permana, E. (2021). Green Intellectual Capital and Sustainability Performance Companies in Indonesia. *Turkish Journal of Computer and Mathematics Education*, *12*(14), 5555–5565.

Younis, H., & Sundarakani, B. (2020). The impact of firm size, firm age and environmental management certification on the relationship between green supply chain practices and corporate performance. *Benchmarking: An International Journal*, *27*(1), 319–346. https://doi.org/10.1108/BIJ-11-2018-0363

Younis, H., Sundarakani, B., & Vel, P. (2016). The impact of implementing green supply chain management practices on corporate performance. *Competitiveness Review*, *26*(3), 216–245. https://doi.org/10.1108/CR-04-2015-0024

Yusof, N., Tabassi, A. A., & Esa, M. (2019). Going beyond environmental regulations - The influence of firm size on the effect of green practices on corporate financial performance. *Corporate Social Responsibility and Environmental Management*, *27*(1), 32–42. https://doi.org/10.1002/csr.1771

Zalfa, A. N., & Novita, N. (2021). Green Intellectual Capital dan Sustainable Performance. *InFestasi*, *17*(2), 93–104. Retrieved from http://repository.ibs.ac.id/id/eprint/3273