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The Role of Environmental Management Accounting (EMA) in Hospital Performance Moderating the Effect of Green Innovation

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Abstract: This study investigates the impact of implementing Environmental Management Accounting (EMA) on hospital performance, with green innovation as a moderating factor. This research focused on KARS-accredited hospitals in North Sumatra. This research examines a specific finance department and an internal supervisory unit. The sample size consisted of 77 hospitals with 129 respondents. The findings indicate that the adoption of environmental management accounting and green innovation impacts hospital performance. However, green innovation does not enhance the influence of environmental management accounting implementation on hospital performance. This study effectively demonstrated that the use of environmental management accounting enables monitoring and assessment of the environmental effects of hospital operations. This metric involves assessing energy use, waste management, and emissions to identify areas where hospitals can enhance efficiency and minimize their environmental footprint. Although green innovation has a direct impact on financial performance, it cannot enhance the effect of EMA implementation on hospital performance. This is attributed to the insufficient initial funds for investment in medical facilities, such as modern medical equipment, as well as the absence of resources for staff training and other infrastructure necessary to provide services to the community.

Keywords: (Environmental Management Accounting) EMA implementation, green innovation and hospital performance.

环境管理会计 (EMA) 在医院绩效中的作用调节绿色创新的影响

摘要: 本研究调查了实施环境管理会计 (EMA) 对医院绩效的影响, 其中绿色创新是一个调节因素。本研究重点关注北苏门答腊的 KARS 认证医院。本研究考察了一个特定的财务部门和一个内部监督单位。样本量包括 77 家医院, 共有 129 名受访者。研究表明, 采用环境管理会计和绿色创新会影响医院绩效。然而, 绿色创新并没有增强环境管理会计实施对医院绩效的影响。本研究有效地表明, 使用环境管理会计可以监测和评估医院运营对环境的影响。该指标涉及评估能源使用、废物管理和排放, 以确定医院可以提高效率并最大限度地减少环境足迹的领域。虽然绿色创新对财务绩效有直接影响, 但它不能增强 EMA 实施对医院绩效的影响。这是因为投资医疗设施 (如现代医疗设备) 的初始资金不足, 以及缺乏为社区提供服务所需的员工培训和其他基础设施的资源。

关键词: (环境管理会计) EMA实施、绿色创新和医院绩效。

1. Introduction

With the increasing prominence of environmental issues, organizations are actively seeking methods to incorporate sustainable practices into their operational frameworks. Hospitals in the healthcare sector are

progressively acknowledging the significance of EMA as a method to not only diminish their ecological footprint but also enhance overall efficiency. The incorporation of green innovation as a moderating factor presents a promising prospect for augmenting

the favorable impacts of Employee Management Accounting (EMA) on hospital performance.

Green innovation refers to the development and application of new methods, technologies, and techniques that promote environmental sustainability. Green innovation in hospital accounting can greatly enhance EMA practices and thus impact hospitals' overall performance. According to [1], hospitals can improve their operational sustainability and environmental friendliness by integrating green innovation into their accounting systems. These phenomena have the potential to lead to cost savings, increased efficiency in resource usage, and reduced environmental impact. Furthermore, the integration of green innovation seems to work as a reducing element in the link between environmental management accounting and hospitals' performance. As argued in [2], the utilization of innovative methods and techniques can enhance the efficiency and achievement of environmental management accounting procedures in hospitals. These approaches specifically address the distinctive challenges and obstacles faced during the implementation of such practices. Green innovation involves various actions, including developing new technologies for waste management and energy efficiency, implementing renewable energy systems, and adopting sustainable procurement strategies.

Environmental management accounting refers to a methodology employed by organizations to identify, quantify, and effectively handle the costs and benefits associated with environmental factors. According to [3], the operationalization of environmental management accounting in healthcare facilities can yield substantial effects on their overall performance. The use of this tool can help hospitals identify instances of inefficiency and waste in their operational processes, thereby resulting in cost reductions and enhanced financial outcomes. In addition, the implementation of EMA can enhance the overall sustainability of hospitals through the mitigation of their environmental footprint and the facilitation of resource preservation. According to [4], hospitals can make well-informed decisions about resource allocation and investment in eco-friendly activities by precisely considering environmental costs and benefits.

In the context of the relationship between EMA and hospital performance, green innovation serves as a moderating factor. As reported in [5], the implementation of EMA in isolation has the potential to enhance hospital performance to a certain degree. However, the incorporation of green innovation can further augment the efficacy and influence of these practices. Green innovation is defined as the introduction of novel concepts, technologies, and approaches that empower hospitals beyond the mere management of their environmental expenses and instead focus on actively enhancing their sustainability performance [6] and reducing their environmental

impact. Hospitals can find opportunities for innovation and use environmentally friendly practices in their operations by incorporating green innovation into their accounting practices. The aforementioned measures encompass the integration of sustainable energy sources, the execution of waste minimization and recycling efforts, and the use of environmentally friendly products in building and procurement procedures [7].

The adoption of environmental management accounting in hospitals can greatly improve hospital performance [4]. Implementing sustainability principles in hospital operations with environmental management accounting can result in cost savings, enhanced resource efficiency, and minimized environmental impact.

Environmental issues have gained significant attention from various stakeholders, including the government, investors, and the community. The business community is also actively enhancing its initiatives to effectively manage and safeguard the environment. For instance, CNBC news reported on August 23, 2023, that 11 companies faced sanctions for air pollution. When the 11 companies are engaged primarily in coal stockpiling, metal smelting, paper milling, and factory operations, the government will enforce administrative sanctions. Penalties for administrative violations.

This study aims to examine the complex relationship between EMA (Environmental Management Accounting), green innovation, and hospital performance and to offer insights into the possible benefits of implementing these practices. Environmental management accounting has become increasingly important in firms' efforts to implement environmental conservation strategies. It has a crucial impact on different accounting areas, such as financial, cost, and management accounting [8]. Environmental accounting enhances financial statements by providing companies with the means to disclose their activities and outcomes related to the economic, social, and environmental dimensions of their operations [9]-[10]. It also assists in the allocation and control of costs related to environmental management activities, as noted in [1] and [4]. Implementing environmental management accounting in hospitals is essential because it enables efficient evaluation of environmental activities in terms of cost and their impact on hospital performance [9].

2. Literature Review

2.1 Theoretical Review

Management has the same authority as the owner in inspiring the company and is responsible for the company's owner. Owners and managers both have rights and duties, so the relationship between them will continue because it is seen as mutually necessary and can be mutually beneficial. As explained in [11], the

relationship between principals and agents does not always run smoothly because of the various problems that can arise in such a relationship. The owner of the firm cannot fully control the agent's behavior because of the information gap between the agent and the principal regarding the state of the firm. The difference in the depth of information between the owner and management leads to disagreement between the owner of the firm about various policies taken by management due to the limited information the owner has. In this situation, management may also work for the benefit of management rather than for the benefit of the owner because management has a deeper understanding of the firm than the owner. In this study, agency theory is described in terms of the impact of hospital performance evaluation, which is supported by the use of green innovation in the form of medical service innovation. Medical service innovation is expected to strengthen the implementation of environmental management accounting on hospital performance. This is in line with the proposed theory [12] that the use of environmental management accounting can lead to innovation. Hospital performance, in this case environmental and socio-economic performance, if properly implemented will be able to reduce conflicts between owners and managers. This agrees with the contract agreed upon by both parties to ensure good performance.

Performance is commonly defined as the execution or accomplishment of a task, activity, or function, typically measured against predetermined criteria or standards. Performance is the outcome of an individual's or organization's endeavors, accomplished via the presence of abilities and behaviors in particular circumstances. Performance quantifies the level of success attained in the execution of tasks, considering the individual capability'. Performance can be defined as the correlation between exertion, aptitude, and the perception of a task. Performance is crucial for a corporation because it represents the outcomes that the company has accomplished. Measuring organizational performance is conducted to assess the extent to which the organization has effectively accomplished its intended organizational objectives. Performance is categorized into two distinct aspects: environmental and socioeconomic [13].

According to [14], environmental performance refers to the quantifiable outcome of an environmental management system in relation to the regulation of its environmental factors. Environmental management systems are integral to comprehensive management systems. It establishes criteria for developing policies and objectives in compliance with legal obligations and the associated significant environmental consequences. Additionally, it facilitates the identification, comprehension, and regulation of the company's adverse environmental effects. Environmental performance is defined as firms' specific actions that

directly impact the natural environment in their vicinity [15]-[16].

An all-encompassing framework for environmental management accounting should be based on a wider concept of environmental accounting. Within the field of environmental accounting, there is a widely accepted agreement that business actions are linked to two primary categories of environmental consequences [10]. As identified by [17], environmental effects on the firm's economic status and the firm's effects on the environment. Monetary environmental information reflects environmental effects on the economic system. Monetary environmental information encompasses the comprehensive assessment of a company's historical, present, or projected stock and financial transactions, expressed in monetary terms. This includes measures such as clean production expenses, penalties incurred for breaches of environmental regulations, and financial valuation of environmental assets. The monetary environmental accounting system can be viewed as an expansion or enhancement of traditional accounting in monetary terms. The proposed system uses the same methods as conventional accounting systems, as described by [10] and [17].

Green innovation practices encompass the implementation of environmental management policies and processes, with the ultimate goal of implementing the most effective green practices [18]. Green innovation strategy encompasses a comprehensive plan and systematic implementation of discernible corporate environmental management practices, as described and suggested by the organization's top management [19]. Concrete green innovation actions refer to specific environmental protection initiatives conducted by employees and organizations. These acts can manifest as eco-conscious product design, renewable energy utilization through technological implementation, or environmentally efficient procedures.

Both green innovation concepts and concrete measures mitigate adverse environmental impacts such as air pollution, material waste, and product disposal. Prior studies indicate that adequately planned methods can enhance environmental performance. Developing and implementing a green innovation strategy helps satisfy various stakeholders' requirements and prevent losses resulting from failure to comply with environmental regulations. However, firms can adopt a more proactive approach toward the environment and ensure sustainable development by creating and implementing environmental policies and processes that align with environmental standards. Adopting an environmental mindset and implementing effective management practices can lead to advantageous business outcomes.

The leader's interpretation of external events and perspectives on environmental issues as either opportunities or difficulties will greatly influence dedication and behaviors related to sustainable

practices [20]. Put simply, the leadership styles of top managers inspire businesses to accomplish environmental goals and performance by conducting business in a proactive manner that prioritizes the environment. The use of a specific leadership style by top managers will exert influence over the internal values, culture, beliefs, and orientations of the company, resulting in significant effects at both functional and operational levels [21]. Environmental leadership is a style of leadership that involves implementing environmentally-sustainable practices and holding top managers accountable for driving change, as stated in [22].

2.2 The Impact of Institutional Pressures on EMA Adoption

Companies are inherently bound by regulations and policies because they face fines for non-compliance with rules and regulations [23]. Governments can incentivize enterprises to use environmental management accounting by establishing targets that benefit firms. Typically, when organizations encounter coercive constraints, adopting environmental management accounting can assist them in obtaining government backing, social legitimacy and economic advantages, thus motivating companies to adopt management accounting.

Companies that receive significant support from their management are more inclined to use environmental management accounting due to the influence of institutional forces. Institutional pressure, as described in [24], refers to the influence exerted on corporate decisions that extends beyond purely rational considerations centered on economic factors. Industry and trade associations play a crucial role in establishing the fundamental criteria for the application of environmental management accounting. Behavioral norms have an impact on association members. According to [25], firms can enhance their resources, knowledge, and management expertise by engaging in communication with managers and government officials from other organizations.

2.3 The Impact of EMS on the EMA Implementation

Environmental performance, as defined by [14], refers to the quantifiable outcomes of an environmental management system in terms of controlling its environmental characteristics.

An environmental management system is an integral component of a comprehensive management system that establishes standards for developing policies and objectives in compliance with legal obligations and significant environmental consequences. It also involves the identification, comprehension, and regulation of the company's adverse environmental effects.

2.4 The Impact of EMS on the EMA Application

Business strategy encompasses the methods and approaches that an organization will employ to accomplish its objectives. Environmental management accounting is a crucial component of management control systems. This strategy emphasizes efficient and effective use of an organization's resources. Therefore, if a strategy plays a crucial role in the management control system, it is evident that the strategy influences the extensive adoption of environmental management accounting [26].

The level of complexity in implementing environmental management accounting may be influenced by the environmental strategy of the company. The principles of contingency theory were employed to investigate the present and future adoption of environmental management accounting in Australian organizations [27]. The researchers determined that the use of environmental management accounting in conjunction with an organization's environmental plan may be effectively used by any company.

2.5 The Impact of Institutional Pressures on Hospital Performance

The main method of exerting coercive influence is regulation. Strict environmental rules serve as the primary impetus for organizations to take pro-environmental actions [28]. Due to environmental legislation, organizations are obligated to adhere to the government's environmental rules and policies, necessitating the fulfillment of their environmental duties. Environmental rules have been identified as a significant motivator for small- and medium-sized enterprises (SMEs) to adopt environmentally responsible practices. Failure to comply with these regulations increases the risk of penalties and fines [29].

Coercive pressure influences the environmental performance of small- and medium-sized enterprises (SMEs). For instance, as discovered in [30], SMEs are motivated to enhance their environmental performance in the face of significant regulatory pressure. Moreover, government laws have a positive impact on the environmental performance of small- and medium-sized enterprises (SMEs). According to institutional theory, it is anticipated that, in Indonesia, particularly in North Sumatra, all hospitals, both public and specialist, will enhance their environmental performance in response to significant coercive demand.

According to [31], clients exert significant influence in assessing the legitimacy or reputability of an organization, thereby creating normative pressure. Customers who prioritize environmental conservation may consider environmental protection a crucial factor when choosing products.

2.6 An Impact of EMS on Hospital Performance

An environmental management strategy refers to a collection of measures aimed at minimizing the negative effects of a company's operations on the natural environment. These measures can include actions such as reducing energy consumption and waste, utilizing sustainable resources, and implementing environmental management systems. [32]. The company's ability to develop proactive environmental plans is influenced by the management's focus on environmental issues [33], as discussed in [34]. According to [35], companies that implement a proactive orientation strategy experience enhanced environmental performance. This will be observed in the utilization of environmental performance metrics. Every modern corporation must maintain the proactive development of environmental strategies, environmental information systems, and environmental management control systems.

The level of focus and consideration that management devotes to environmental matters impacts the company's capacity to develop a proactive environmental plan [33]. Firms must go beyond basic compliance with existing requirements and adopt proactive methods to enhance their environmental performance [35]. Effective corporate environmental and socio-economic performance are outcomes of a carefully planned and executed business environment. It is advisable for companies to persist in recording and enhancing environmental performance indicators to tackle current environmental problems [35].

Several studies in the environmental management literature have investigated the correlation between environmental management strategies and environmental performance, with varying outcomes [32]. For instance, according to [36], environmental management techniques are crucial in incentivizing organizations to implement actions aimed at enhancing their environmental performance. Environmental management solutions play a crucial role in effectively managing wastewater and air pollutants, and minimizing the environmental consequences of accidents.

According to [37] and [38], companies that adopt a more extensive environmental management strategy are more dedicated to enhancing the environment. An effectively planned environmental management strategy can help organizations oversee, quantify, and enhance the ecological aspects of corporate operations. [18]. Implementing environmental management systems can decrease the probability of unintentional violations of environmental standards [36].

Furthermore, implementing a thorough environmental management plan can aid managers in discovering cost-effective methods to achieve environmental goals, leading to enhanced performance [36]. Environmental management strategies can provide valuable insights into regulatory compliance

and internal environmental protocols, facilitating the resolution of internal control concerns that could potentially result in adverse environmental consequences.

2.7 The Impact of Implementing EMA on Hospital Performance

Implementing environmental management accounting enables organizations to attain environmental advantages and comprehend their corporate duty [27]. Environmental management accounting is used to quantify, regulate, and reveal the environmental and socioeconomic performance of a corporation. According to [26] and [39], the implementation of environmental management accounting has a beneficial impact on companies' overall performance. As management accounting methods become more advanced, the control and decision-making process improves, and the impact of environmental management accounting on environmental and social economic performance intensifies.

The attainment of sustainability goals cannot be achieved without the synchronization of managers, departments, and owners. Integrating departmental collaboration into contemporary company procedures has been demonstrated to guarantee success. Environmental management accounting is an effective instrument that integrates information technology, management, and accounting to help companies achieve their organizational and environmental objectives [36]. Implementing environmental management accounting is beneficial for enhancing ecological management by facilitating the availability of internal and external data to support environmental and corporate decision-making.

Most of the current literature on EMA has examined environmental disclosure and cost measurement. The impact of implementing environmental management accounting on corporate environmental expenses was specifically investigated in [40]. The investigation findings demonstrate the significant impact of implementing environmental management accounting on company environmental costs using example data from accounting subdivisions.

The role of environmental management accounting in supporting carbon management and the effectiveness of company disclosure capacity were analyzed in [41]. A comprehensive assessment of the role of environmental management accounting was conducted in [42]. The researchers examined the direct influence of environmental management accounting on business performance and the contribution of other environmentally driven factors on firm performance.

2.8 The Impact of Institutional Pressure on EMA Implementation and Hospital Performance

Environmental management accounting is a valuable tool for making informed environmental management decisions. It offers many forms of accounting information to support this process [22], [43]. Environmental management techniques and accounting are implemented to maintain the company's environmental performance. Prior research highlights that environmental management accounting implementation is more likely to occur when coercive, normative, and mimetic pressures. Optimal implementation of environmental management accounting enhances a company's environmental and socio-economic performance. Prior studies have also observed that environmental management accounting serves as a mediator between different institutional pressures and corporate firm performance. This implies that environmental management accounting can act as a mediator between institutional pressures and corporate performance.

Institutional theory posits that constraints stemming from environmental needs originate from diverse sources, including the need to adhere to government laws for regulatory compliance. The social expectations of customers and suppliers, the pressure to emulate competitors to sustain a comparative competitive advantage can impact the policies and actions of hospitals toward the environment and lead them to adopt environmental management techniques. Hospitals can efficiently meet institutional actors' criteria, such as the government using environmental management principles [44]. Implementing environmental management strategies to mitigate waste production, pollutants emissions, soil contamination, resource consumption, local environmental concerns, and the occurrence of environmental incidents serve as measures of environmental effectiveness.

2.9 The Impact of EMS on EMA implementation and hospital performance

An environmental strategy refers to a collection of actions aimed at minimizing the negative effects of a company's operations on the natural environment. These actions can include measures such as reducing energy consumption and waste, utilizing sustainable resources, and implementing environmental management systems. According to [33], when management pays close attention to environmental challenges, it enables organizations to develop proactive environmental initiatives. According to [35] companies that adopt a proactive strategic orientation experience enhanced environmental performance. This will be observed in the utilization of environmental performance metrics. Every modern corporation must maintain the proactive development of environmental strategies, environmental information systems, and environmental management control systems.

The adoption of environmental management accounting and control systems is contingent upon the company's environmental strategy, which is an integral component of its overall business plan. Implementing environmental management accounting can assist organizations in meeting their environmental obligations and recognize financial advantages through enhanced environmental and economic outcomes [26]-[28]. These sources discuss a method for information disclosure that assists organizations in improving their environmental and financial performance.

2.10 Implementing Green Innovation can either enhance or diminish the EMA Impact on Hospital Performance

There is a positive correlation between the implementation of environmentally friendly innovations and companies' competitive advantage and environmental performance. Green supply chain management impacts this relationship. The adoption of green practices by supply chain partners can enhance environmental performance. If suppliers adhere to the requirements set by companies and customers, the entire supply chain will transition to an environmentally sustainable model.

Indeed, the strategies adopted by suppliers have been proven to enhance eco-friendly innovation, leading to improved environmental outcomes and a competitive edge. Moreover, there exists a significant correlation between the implementation of environmentally-friendly methods in the supply chain and the overall success of a company in terms of market, operational, and accounting aspects. This further strengthens the influence of sustainable supply chain management on firm performance [45].

Green innovation encompasses the integration of green product and process innovations, which are then transformed into service innovations that focus on minimizing energy consumption, pollution emissions and waste generation as well as promoting sustainable product design. Corporate environmental culture and principles have been demonstrated to influence the competitive advantage through green innovation, alongside internal and external challenges Corporate environmental ethics is a crucial component. of the organizational structure and serves as a significant driver of green innovation and the competitive advantage.

Corporate ethics refers to ethical conduct and organizational values that promote environmentally friendly innovation and a competitive edge. According to [46], organizational culture can improve the competitive advantage and sustainable development if the culture is valued and unique. Furthermore, sustainable development is attained when the incorporation of environmentally-friendly management and innovative practices align with the company's overarching objectives [47].

3. Data and Methodology

3.1 Data

In this study, the researchers selected participants or sample elements based on the following criteria:

1. All general and specialized hospitals in North Sumatra.
2. All general and specialized hospitals that were accredited by KARS in December 2023.
3. The finance department and internal audit unit (SPI) of the hospital.

3.2 Data Analysis Technique

The research approach employed in this study is a sequential explanatory mixed technique, characterized by an initial qualitative exploration and analysis, followed by a subsequent quantitative phase that incorporates the findings from the qualitative phase. Similar to the sequential explanatory strategy, the second database influences the outcomes of the initial database [48]. The reason for using this method is to be able to explain the quantitative results with qualitative data, with the expected end result being a deeper understanding of the quantitative results to explain the relationship between variables by testing hypotheses [48].

The application of data analytic techniques, such as descriptive statistics and Structural Equation Model (SEM) analysis, is employed to address hypothesis testing. The data gathered in this study will be analyzed using the statistical method Smart-PLS, as proposed by [49]. Partial least squares (PLS) analysis is a multivariate statistical method used to compare numerous dependent and independent variables. PLS does not make any assumptions about the specific distribution to estimate parameters or infer causal linkages. Hence, the use of parametric methodologies to assess the significance of parameters is unnecessary as this model is non-parametric. The evaluation of the PLS model involves assessing both the outside and inside models. The outer model is a measuring model that predicts the correlation between estimated indicators or parameters and their underlying variables, whereas the inner model is a structural model that predicts the causal relationship between underlying variables.

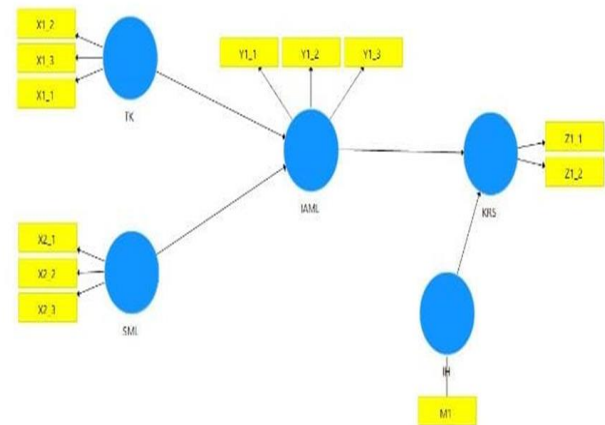


Fig. 1 Initial design of the research structural equation model (developed by the authors)

4. Results and Discussion

Convergent validity is a key criterion used in structural equation modeling with partial least squares (SEM-PLS) or the measurement model. In correlation-based structural equation modeling with partial least squares (SEM-PLS), the corresponding term for the outer model is used; however, in covariance-based SEM, it is referred to as confirmatory factor analysis (CFA). Two criteria are used to evaluate whether the outer model satisfies the requirements of convergent validity for reflective constructs. The minimum acceptable outside loading was 0.70, as stated in [50]. The Smart PLS 3 program presents the research model. Fig. 2 presents the assessment of validity and reliability through the evaluation of the outer loading value, average variance extracted (EVA), Cronbach's alpha (CA), and composite reliability (CR). The research model is depicted in Fig. 2.

The results of the validity and reliability tests based on outer loading, average variance extracted (EVA), Cronbach's alpha (CA), and composite reliability (CR) are presented in Table 1. Validity testing results based on average variance extracted (AVE) values based on institutional pressure variables, environmental management strategies, management accounting implementation, green innovation, and hospital performance. For validity testing using the AVE, the recommended value is 0.5; however, the value of all AVEs is greater than 0.7. This means that the proposed model has met the validity requirements based on the AVE.

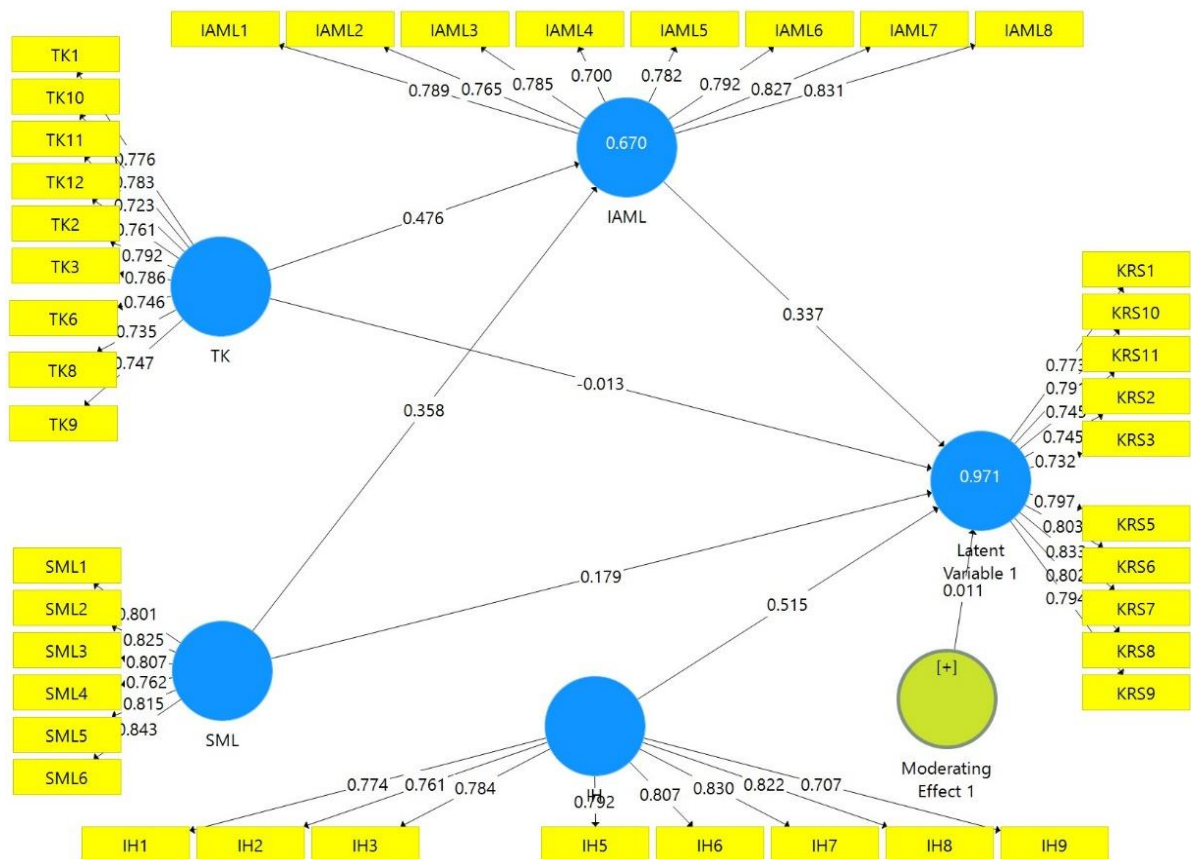


Fig. 2. Outer model diagram of the of SEM PLS (Source: Processed Data, 2023)

Table 1. Construct validity test (developed by the authors)

Questionnaire	TK	SML	IAML	IH	KRS	Critical Value	Description
TK1	0.776					0.7	Valid
TK2	0.792					0.7	Valid
TK3	0.786					0.7	Valid
TK4	0.666					0.7	Invalid
TK5	0.683					0.7	Invalid
TK6	0.746					0.7	Valid
TK7	0.665					0.7	Invalid
TK8	0.735					0.7	Valid
TK9	0.747					0.7	Valid
TK10	0.783					0.7	Valid
TK11	0.723					0.7	Valid
TK12	0.761					0.7	Valid
SML1		0.801				0.7	Valid
SML2		0.825				0.7	Valid
SML3		0.807				0.7	Valid
SML4		0.762				0.7	Valid
SML5		0.815				0.7	Valid
SML6		0.843				0.7	Valid
IAML1			0.789			0.7	Valid
IAML2			0.765			0.7	Valid
IAML3			0.785			0.7	Valid
IAML4			0.700			0.7	Valid
IAML5			0.782			0.7	Valid
IAML6			0.792			0.7	Valid
IAML7			0.827			0.7	Valid
IAML8			0.831			0.7	Valid
IH1				0.774		0.7	Valid
IH2				0.761		0.7	Valid
IH3				0.784		0.7	Valid
IH4				0.695		0.7	Invalid
IH5				0.792		0.7	Valid
IH6				0.807		0.7	Valid
IH7				0.830		0.7	Valid
IH8				0.822		0.7	Valid

IH9	0.707	0.7	Valid
KRS1	0.773	0.7	Valid
KRS2	0.745	0.7	Valid
KRS3	0.732	0.7	Valid
KRS4	0.681	0.7	Invalid
KRS5	0.797	0.7	Valid
KRS6	0.803	0.7	Valid
KRS7	0.833	0.7	Valid
KRS8	0.802	0.7	Valid
KRS9	0.794	0.7	Valid
KRS10	0.791	0.7	Valid
KRS11	0.745	0.7	Valid

Based on the results of Table 1, it can be seen that the outer loading value of each variable is greater than 0.7, so it can be considered valid.

The following describes the path coefficient and P-values for testing the significance of the direct effect (Fig. 3).

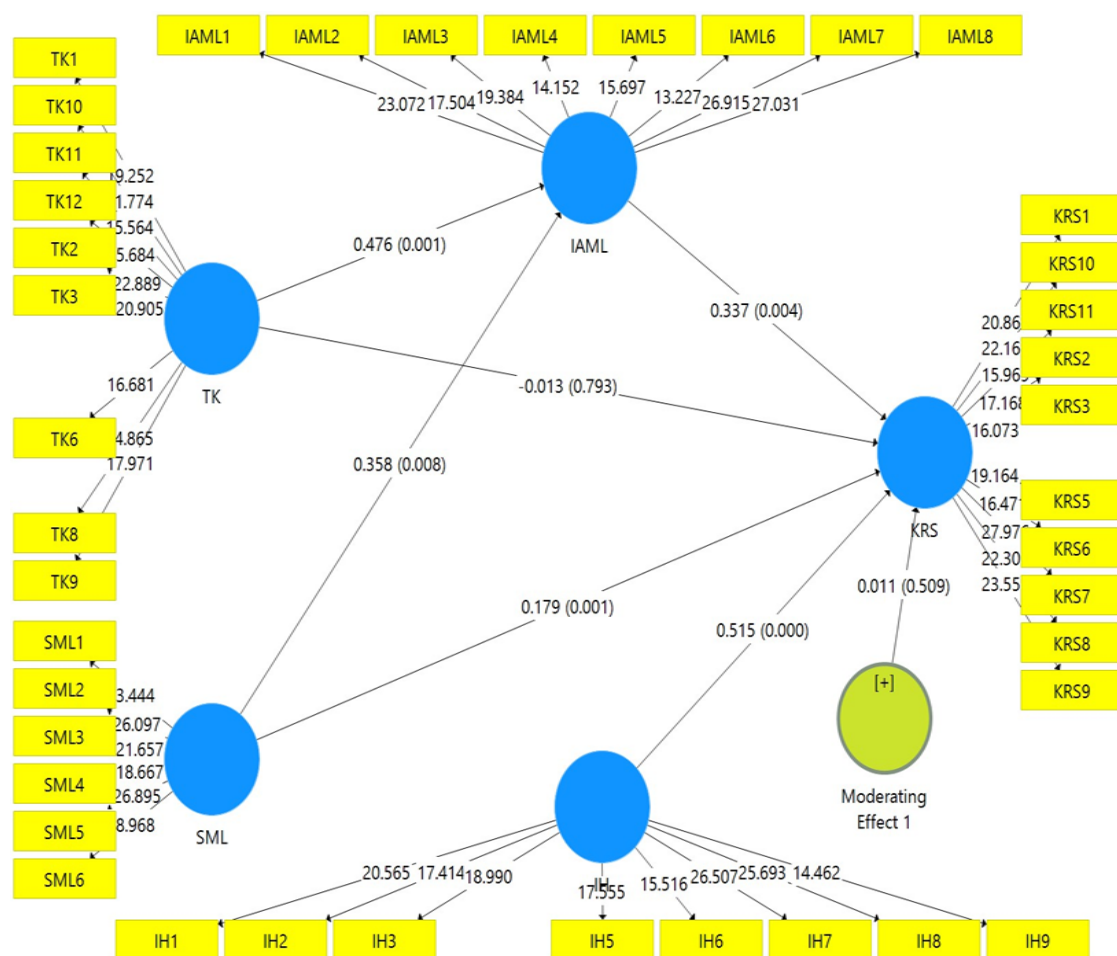


Fig. 3. Hypothesis testing results (developed by the authors)

4.1 Impact of Institutional Pressure on Implementing EMA

This is a graphical depiction of a statistical test that investigates the influence of institutional pressure on the implementation of environmental management accounting. The path coefficient for the influence of institutional pressure on environmental management accounting implementation is 0.476, indicating a favorable correlation. The t-statistic value was 3.194, indicating a substantial difference, and the p-value was 0.001, demonstrating compelling evidence against the null hypothesis. Because the route coefficient is

positive, we conclude that institutional pressure has a favorable effect on the implementation of environmental management accounting.

4.2 Impact of Institutional Pressure on the Adoption of EMA

The path coefficient for the influence of institutional pressure on environmental management accounting implementation is 0.476, indicating a positive correlation. The t-statistic value was 3.194, which indicates a notable difference, and the p-value was 0.001, providing compelling evidence against the null

hypothesis. Since the route coefficient is positive, institutional pressure can be deduced to have a beneficial effect on the application of environmental management accounting. The impact of environmental management strategy on the execution of environmental management accounting. This is a visual representation of a significance test that examines the impact of an environmental management strategy on the execution of environmental management accounting. The path coefficient value for the relationship between environmental management strategy and accounting execution is positive, with a magnitude of 0.358. The t-statistic was 2.587, and the p-value was 0.010. Given that the route coefficient value is positive, we can infer that the environmental management strategy has a favorable impact on the implementation of environmental management accounting.

4.3 Impact of Institutional Pressure on Hospital Performance

The path coefficient representing the impact of institutional pressure on hospital performance is -0.013, indicating a negative relationship. The t-statistic and p-values are 0.258 and 0.797, respectively. Given the negative route coefficient value, institutional pressure

might not have a significant impact on hospital performance.

4.4 The Impact of Environmental Management Strategy on Hospital Performance.

The path coefficient of the environmental management plan's impact on hospital performance is positive, with a magnitude of 0.179. The t-statistic value was 3.218, indicating a significant difference. The p-value was 0.001, suggesting strong evidence against the null hypothesis. Given that the route coefficient value is positive, it can be inferred that the implementation of environmental management measures has a favorable impact on hospital performance.

4.5 The Impact of Implementing Environmental Management Accounting on Hospital Performance

The path coefficient for implementing environmental management accounting on hospital performance is positive, with a magnitude of 0.337. The t-statistic was 2.551, and the p-value was 0.011. Given the positive route coefficient value, it can be inferred that adopting environmental management accounting has a significant impact on hospital performance (Table 2).

Table 2 Specific indirect effect (developed by the authors)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (St Dev)	T Statistics	P Values
SML ->IAML-> KRS	0.121	0.114	0.064	1.895	0.059
TK->IAML->KRS	0.161	0.158	0.076	2.125*	0.034

Note: * P < 0.05

a. The indirect effect of environmental management strategy on hospital performance through environmental management accounting implementation was 0.121 with p-values of 0.059. Thus, it can be concluded that environmental management accounting implementation does not significantly mediate the effect of environmental management strategy on hospital performance. In other words, environmental management strategies indirectly do not significantly affect hospital performance through the implementation of environmental management accounting.

b. The indirect effect of institutional pressure on hospital performance through the implementation of environmental management accounting is 0.161, with p-values of 0.034. Thus, the implementation of environmental management accounting has a significant effect on mediating institutional pressure on hospital performance. In other words, institutional pressure indirectly has a significant effect on hospital performance through the implementation of environmental management accounting.

Table 3. Testing green innovation in moderating the effect of environmental management accounting implementation on hospital performance (developed by the authors)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (St Dev)	T Statistics	P Values
IAML->KRS	0.337	0.326	0.117	2.885**	0.004
IH->KRS	0.515	0.525	0.119	4.333***	0.000
Moderating Effect 1->KRS	0.011	0.012	0.017	0.661	0.509

Note: ** P < 0.01; *** P < 0.001

Based on Table 3, the results of the p-values in the moderating effect 1 -> KRS line are 0.509 > 0.05, implying that green innovation does not strengthen the effect of environmental management accounting implementation on hospital performance. Then, the equation model is as follows:

$$\text{KRS} = 0.337 \text{ IAML} + 0.515 \text{ IH} + 0.011 \text{ IAML} * \text{IH}$$

The last test verified whether green innovation affects hospital performance.

Table 4. Effect of green innovation on hospital performance (developed by the authors)

Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
IH -> KRS	0.515	0.525	0.119	4.333***

Note: *** P < 0.001

Based on the results in Table 4, the path coefficient value of green innovation on hospital performance is 0.515, with a p-value of 0.000 < 0.05, indicating that green innovation has a positive effect on hospital performance. This test result was obtained using the following equation model:

$$\text{KRS} = 0.515 \text{ IH}$$

The summary of the results of the hypothesis testing is provided in Table 5:

Table 5. Recapitulation of the hypotheses testing results (developed by the authors)

Variables	Koef	T. Static	P. Values	Conclusion
TK vs IAML	0.476	3.305**	0.001	Ho is Rejected
SML vs IAML	0.358	2.660**	0.008	Ho is Rejected
TK vs KRS	0.147	1.938	0.053	Ho is Accepted
SML vs KRS	0.300	3.621**	0.000	Ho is Rejected
IAML vs KRS	0.337	2.885**	0.004	Ho is Rejected
IH vs KRS	0.515	4.333**	0.000	Ho is Rejected
TK vs KRS * IAML	0.161	2.125*	0.034	Ho is Rejected
SML vs KRS * IAML	0.121	1.895	0.059	Ho is Accepted
IAML vs KRS * IH	0.011	0.661	0.509	Ho is Accepted

Note: ** P < 0.01 *** P < 0.001 * P < 0.05

4.6 Impact of Institutional Pressure on Implementing EMA

Institutional pressure plays a crucial role in the implementation of environmental management accounting, with a significant positive effect on its adoption. Factors such as normative, coercive, and memetic pressures encourage the adoption of environmental management accounting. Healthcare businesses face greater institutional pressure to implement this accounting because governments and healthcare organizations play a vital role in protecting pro-environmental behavior and decision-making processes. Regulations issued by the government require hospitals to comply with established standards and avoid penalties. This study supports the role of institutional theory, which holds that government and health organizations act as rule makers and monitor the implementation of rules. However, other studies have found that institutional pressure does not affect the implementation of environmental management accounting, which contradicts the current findings. This contradicts the idea that institutional pressure can lead to environmental uncertainty and unfair competition regarding environmentally friendly practices.

4.7 Impact of EMS on EMA Implementation

The study found that environmental management strategy positively impacts the implementation of environmental management accounting, with a significance level of 0.008 lower than 0.050. This indicates that well-implemented environmental management strategies can improve accounting implementation, increasing trust in top management. Hospital managers and directors are more committed to sustainability, leading to better accounting

implementation. Advances in green technology and innovation can make it easier for hospitals to adopt and implement environmental practices. Effective environmental management strategies can create a competitive advantage, improve hospital image, reduce operational costs, and meet market sustainability requirements. This study supports contingency theory, stating that effective leadership depends on the organizational situation, task, team relationships, and environmental conditions.

4.8 Impact of Institutional Pressure on Hospital Performance

The study found that institutional pressure does not significantly impact hospital performance, contrary to previous research. This suggests that healthcare companies in developing countries face challenges such as low infrastructure development and poor environmental performance. Institutional pressures may not align with the goals and strategies set by the hospital and may not be effective in different contexts. This study supports previous research that found that institutional pressure has no effect on organizational performance. The non-strong influence of institutional pressure can be attributed to weak law enforcement, a lack of awareness of environmental concerns, and the lack of maximum legal sanctions for violations of regulations. This study contradicts the legitimization theory, which suggests low public trust in health sector companies due to the weak supervision of hospital waste handling regulations.

4.9 Impact of EMS on Hospital Performance

The study found that the proper implementation of environmental management strategies can significantly

improve hospital performance. These strategies include renewable energy, reduced emissions, and long-term commitment. They also focus on environmental sustainability and safety and improve the quality of healthcare services provided by hospitals. By implementing practices like better waste management, using environmentally friendly materials, and adhering to environmental hygiene standards, hospitals can reduce infection risks, improve patient satisfaction, and enhance their reputation. These strategies help identify and manage environmental risks associated with hospital operations, protect reputation, and avoid financial losses while maintaining sustainability. This aligns with legitimation theory, which suggests that public trust in health-sector companies improves with the implementation of environmental management strategies.

4.10 Impact of Green Innovation on Hospital Performance

Green innovation has been found to positively impact hospital performance, with a significance level of 0.000 lower than 0.050. This indicates that well-implemented green innovation can improve hospital performance. Green innovations, such as medical service product development, energy-saving technology, environmentally friendly medical equipment, and online media promotion directly influence hospital performance. The quality of services provided by hospitals can be improved through advanced medical technologies, improved diagnosis and treatment effectiveness, and sustainable practices like better waste management. Green innovation can help hospitals differentiate themselves from competitors in the healthcare industry and attract environmentally conscious patients. However, some studies suggest that green innovation has no effect on company performance due to human resources' weak ability to operationalize environmentally friendly technology.

4.11 Impact of Institutional Pressure on Hospital Performance through EMA Implementation

The study found that institutional pressure positively impacts hospital performance through the implementation of environmental management accounting, with a significance level lower than 0.050. This finding aligns with previous research suggesting that environmental and social economic practices can improve hospital performance. However, the study contradicts the results of [51], which suggested that environmental management accounting cannot mediate institutional pressure on hospital performance.

5. Conclusions

This study explores the impact of institutional pressures and environmental management strategies on hospital performance, focusing on the implementation of environmental management accounting with green

innovation as a moderating variable. This research aims to help hospitals identify the risks and opportunities associated with green innovation, improve operational efficiency and enhance patient service quality through the use of environmentally friendly medical technology. This study also suggests that hospitals can integrate environmental management accounting and green innovation into management strategies to create a competitive advantage in the health sector. However, the study revealed that green innovation cannot strengthen the effect of environmental management accounting implementation on hospital performance due to limited funds and qualified resources. The findings suggest the need for standardized environmental management accounting standards and regulations for environmentally friendly technology use.

The study found that the implementation of environmental management accounting did not significantly impact hospital performance, indicating that the strategy impact on performance is not mediated by accounting. This is due to factors such as limited budgeting, lack of qualified personnel, and lack of awareness among management and employees. Legitimacy theory suggests that organizations must obtain stakeholder support to achieve legitimacy. This study also contradicts research that suggests that environmental management accounting can mediate the effect of environmental management strategies on hospital performance. This is because accounting allows hospitals to measure their environmental impact, identify areas for improvement, and make better decisions when planning their environmental strategies.

Green innovation has the potential to enhance the impact of environmental management accounting implementation on hospital performance, but it may not be fully realized due to factors such as hospital readiness, lack of financing, knowledge, skills, or culture. The initial costs of implementing green innovations, such as technology and employee training, may be too high, and the benefits may not be directly measurable. This study does not fully support the stakeholder theory, which suggests that not all stakeholders will fully support or accept the innovation, resulting in a lack of full implementation of green innovation.

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