**THE ROLE OF GREEN INNOVATION IN MODERATING HOSPITAL AND ENVIRONMENTAL MANAGEMENT ACCOUNTING**

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| *ABSTRACT*With green innovation acting as a moderating factor, this paper explores the impact of the Environmental Management Accounting (EMA) application on hospital performance. KARS-accredited North Sumatra hospitals are investigated in this paper. The study looks at an internal control system and a specific financial department. There were 77 hospitals in total in the sample, which produced 129 responders. The findings of the study show how hospital performance is impacted by using environmentally friendly innovations and environmental management accounting. This paper unequivocally demonstrated how environmental management accounting helps to monitor and assess the effects of hospital activities on the surroundings. This indicator measures waste management, energy consumption, and emissions to find chances for hospitals to increase their environmental effect and lower their running costs. While green innovation directly improves financial performance, it does not amplify the impact of EMA implementation on hospital performance. The initial expense of implementing environmentally friendly innovations presents one of the key difficulties in including green innovation into hospital operations. Budget restrictions and the thought of upsetting present operations may make many hospitals reluctant to make investments in environmentally friendly technologies and practices. Along with lessening their environmental impact, many hospitals have witnessed acquires in employee satisfaction and patient results.*Keywords: EMA Implementation; Green Innovation; Hospital Performance*  |

**1. Introduction**

Organizations are finding methods to incorporate sustainable practices into their operational frameworks as environmental concerns receive more attention. Healthcare institutions are progressively acknowledging the significance of EMA in mitigating the environmental impact they have while concurrently enhancing overall performance. An chance to augment the beneficial effects of Employee Management Accounting (EMA) on hospital performance is to incorporate green innovation as a moderating factor. The creation and execution of innovative methods, instruments, and tactics that support environmental sustainability is termed "green innovation." Green innovation in hospital accounting substantially enhances EMA utilizes and, as a result, improves hospital performance. Derchi et al. (2013) claim that hospitals can integrate green innovation into their accounting systems to improve operational sustainability and environmental responsibility. This phenomena may lead to reduced environmental effect, improved financial savings, and enhanced resource efficiency. Furthermore, the success of hospitals and environmental management accounting seems to have a diminished correlation when green innovation is incorporated. Khan and Johl (2019) claim that the adoption of innovative methods and techniques can improve the efficacy and achievement of hospital environmental management accounting operations. These methods focus on the specific challenges and obstacles faced during the implementation of such practices. Green innovation includes several actions, such as building advanced technology for energy efficiency and waste management, implementing renewable energy systems, and adopting sustainable procurement procedures. In the study performed by Jabbouri and Ssa (2022). "Environmental management accounting" refers to a systematic methodology applied by enterprises to identify, quantify, and oversee the costs and advantages associated with environmental factors. Consequently, Derchi et al. (2013). Albelda (2011) asserts that the use of environmental management accounting in healthcare institutions might substantially affect their overall performance. This application allows hospitals to spot waste and inefficiencies in their operational systems, resulting in cost reductions and enhanced financial outcomes. Moreover, by diminishing their environmental impact and advocating for resource conservation, hospitals can enhance their overall sustainability through the implementation of EMA. Papaspyropoulos et al. (2012) assert that by carefully evaluating the environmental pros and cons, hospitals can make educated choices regarding resource allocation and investment in eco-friendly activities.

Green innovation serves as a moderating variable in the association between Environmental Management Accounting (EMA) and hospital performance. Altam and Associates (2020) The independent implementation of EMA may enhance hospital performance to some degree. Nonetheless, the efficacy and influence of these methods can be enhanced by integrating green innovation. Green innovation, as defined by The social security administration and Jabbouri (2022), refers to the application of novel concepts, methodologies, and technologies that empower hospitals to transcend mere management of environmental expenses and focus on enhancing their sustainability performance and mitigating their ecological footprint (Khoirina, 2016). Hospitals that include green innovation into their accounting practices might find potential for innovation while incorporating ecologically sustainable methods in their operations. The methods mentioned earlier consist of the integration of renewable energy sources, the execution of waste reduction and recycling activities, and the utilization of economically environmentally friendly resources in construction and acquisition processes.

The implementation of environmental management accounting could markedly improve hospital performance (Papaspyropoulos et al., 2012). Integrating environmental management accounting with sustainability principles in hospital operations can lead to cost reduction, enhanced resource efficiency, and diminished environmental impact. The community, government, and investors are significant stakeholders who have devoted considerable attention to environmental challenges. The business population is diligently improving their attempts to safeguard and manage the environment correctly. On August 23, 2023, CNBC News reported that 11 corporations were punished for air pollution. CNBC (C. Indonesia 2023), August 23, 2023. With coal accumulation, metal the smelting papers milling, and manufacturing processes as their principal activities, the government would levy administrative fines on the eleven businesses. fines for administrative offenses.

The purpose of this research is to investigate the intricate relationship that exists between hospital performance, green innovation, and environmental management accounting (EMA) and to provide insights into the potential advantages of putting these principles into reality. When it comes to helping businesses put environmental conservation policies into practice, environmental management accounting has grown in significance. It significantly affects several accounting disciplines, including cost, management, and financial accounting (Cox et al., 2022). Sustainability accounting strengthens financial statements by enabling organizations to disclose the activities and consequences linked with the financial, social, and environmental facets of their operations (Vasile & Man, 2012) (Burritt, 2004). Using environmental management accounting in hospitals is vital because it allows for effective assessment of sustainability operations in terms of cost and their influence on hospital performance (Al-Mawali, 2021). It also helps with the distribution and supervision of bills related with ecological management operations, according to research by Derchi et al. (2013) and Papaspyropoulos et al. (2012) (Man & Vasile, 2012).

**2. Literature Review**

Protocols in medical centers the notion of ecological management accounting, or EMA, has gained traction in recent years as firms across all industries strive to integrate environmental factors within their financial decision-making processes. " EMA (environmental management accounting) practices, including energy accounting, material flow the accounting profession, management of water accounting, managing carbon accounting, and ecological diversity accounting because are essential to improve ecological and customer service efficiency for the local governments of developing nations. These approaches are crucial for carrying out sustainable development and tackling ecological problems. (Huibrecht, 2024). The healthcare sector, particularly hospitals, can benefit from Environmental Management Accounting (EMA) to identify and quantify the environmental costs connected with their activities. Efforts like the Healthier Hospitals Initiative (HHI) and the American Hospitals Association's Sustainability Roadmap offer tools and resources for hospitals to shift to more sustainable operations. Clinicians also play a key role in resource conservation through efforts like the Choosing Wisely Campaign. However, there is a knowledge gap in the medical community regarding the indirect health repercussions of wasteful activities. " The healthcare sector, particularly hospitals, can benefit from Environmental Management Accounting (EMA) to identify and quantify the environmental costs connected with their activities. Organizations like the Healthier Facilities Institute (HHI) and the National Hospitals Association's Green Roadmap offer resources and assistance for hospitals to shift to more sustainable operations. Clinicians also play an essential part in resource conservation through efforts which include the Choosing Wisely Campaign. However, there is an information vacuum in the medical profession recognizing the indirect health effects of wasteful behaviors.

The U.S. healthcare system is energy-intensive, with hospitals being the second-most energy-intensive commercial buildings in the country after food service facilities. Despite the sector's significant greenhouse gas emissions, there is little work done to quantify these emissions and their impact on public health (Matthew & Jodi, 2016) (Chris, 2014). The U.S. healthcare system is energy-intensive, with hospitals being the second-most energy-intensive commercial buildings in the country after food service facilities. Despite the sector's significant greenhouse gas emissions, there is little work done to quantify these emissions and their impact on public health. (Matthew & Jodi, 2016) This research will help healthcare organizations make informed decisions that benefit both their bottom line and the environment. By incorporating EMA into their financial strategies, hospitals can not only reduce their environmental impact but also improve their overall efficiency and long-term sustainability.

Ultimately, the integration of environmental considerations into financial decision-making processes can lead to a healthier planet and healthier communities. Environmental management accounting (EMA) practices, such as energy accounting, material flow accounting, water management accounting, carbon management accounting, and biodiversity accounting, play a crucial role in improving environmental and service delivery performance in local governments of developing countries. These practices are key to achieving sustainable development and addressing environmental challenges (Huibrecht, 2024).

3. Method

The following criteria were used by the researchers to select participants or sample elements for this study:

1. Each healthcare facilities in the north Sumatra, such as overall and focused medical facilities.
2. Each medical facilities, such as general healthcare facilities and focused structures, that have gone licensed by KARS 2023.
3. The hospital's within inspection section and financing division.

The methodology adopted in this study is a sequential interpretive mixed approach, represented by an initial qualitative exploration and analysis, followed by another numeric phase that incorporates the findings from the qualitative phase. Similar to the sequential explanatory technique, the second data alters the outcomes of the initial database (Creswell 2013). The purpose for using this strategy is to be ready to explain the quantitative findings with qualitative data with the intended outcome being a deeper knowledge of the statistical results (Creswell 2013). to explain the link among factors by investigating assumptions.

Therefore, employing parametric tools to evaluate the importance of parameters is superfluous, as this model is non-parametric in. The assessment of The PLS method evaluating both the external model and the inside model. The outside model is a measurement model that forecasts the relationship among determined variables or factors and their root factors whereas the inside model is a model of structure that forecasts causal connections between behind factors.

The recommended AVE value for validity testing is 0.5; however, all the AVE values obtained are above 0.7. This visual representation illustrates a statistical analysis focused on assessing the influence of institutional pressure on the implementation of environmental management accounting. The road value corresponding to the effect for institutional pressure on the implementation of environmental management accounting is 0.476, suggesting that there is a positive correlation. The T-Statistic is 3.194, indicating an important distinction, whereas the P-Value of 0.001 offers substantial proof toward the null hypothesis. The elevated reading of the path value suggests organizational pressure benefits the execution of accounting for environmental management.

The path value indicating the effect of institutional constraints on the efficiency of hospitals is -0.013, which implies a lack of correlation. The T-statistic is 0.258, and the P-value is 0.797. The minus sign of the path value shows that institutional pressure is unlikely to have a significant impact on hospital performance. The trajectory coefficients illustrating the impact of the plan for environmental management on hospital performance is positive, measured at 0.179. The T-Statistic is determined at 3.218, suggesting a significant difference is present. The P-value is 0.001, providing strong evidence against the null hypothesis. The elevated reading of the route coefficient suggests the implementation of environmentally friendly measures has an advantageous impact on hospital performance. The implementation of ecological calculating exhibits a positive path coefficient of 0.337 regarding hospital performance. This T-Statistic is given as 2.551, and the P-Value is found to be 0.011. The favorable route value indicates that the adoption of accounting for environmental management has an important effect on the efficiency of hospitals.

The implementation of environmental management accounting exhibits an indirect effect of 0.121 on hospital performance, accompanied by a P-value of 0.059. This suggests that it does not significantly mediate the relationship between environmental management strategy and hospital performance. The implementation of environmental management accounting appears to have a negligible effect on hospital performance.

1. Environmental management accounting demonstrates a notable indirect influence on hospital performance, evidenced by a coefficient of 0.161 and a P-value of 0.034. Institutional pressure exerts an indirect influence on hospital performance by means of environmental management accounting.

The P-Values obtained for the moderating effect 1 -> KRS line are 0.509, which is greater than 0.05. This indicates that green innovation does not enhance the impact of environmental management accounting implementation on hospital performance.

**KRS = 0.337 IAML + 0.515 IH + 0.011 IAML\*IH**

The last test conducted is whether green innovation affects hospital performance.

**Tabel 1. Effect of Green Innovation on Hospital Performance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | 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\*\*\* | **0,000** |

**Note : \*\*\* P < 0,001**

Based on the results in table 5.12, the path coefficient value of green innovation on hospital performance is 0.515 with a P-value of 0.000 <0.05, it can be concluded that green innovation has a positive effect on hospital performance. This test results in the following equation model:

**KRS = 0.515 IH**

The following summary of the results of hypothesis testing is presented as follows

**Table 2. Recapitulation of Hypothesis Testing Results**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | Koef | T. Static | P. Values | Conclusion |
| TK vs IAML | 0,476 | 3,305\*\* | 0,001 | Ho is being rejected. |
| SML vs IAML | 0,358 | 2,660\*\* | 0,008 |  Ho is being rejected. |
| TK vs KRS | **0,147** | **1,938** | **0,053** |  Ho is being accepted. |
| SML vs KRS | 0,300 | 3,621\*\* | 0,000 |  Ho is being rejected. |
| IAML vs KRS | 0,337 | 2,885\*\* | 0,004 |  Ho is being rejected. |
| IH vs KRS | 0,515 | 4,333\*\* | 0,000 |  Ho is being rejected. |
| TK vs KRS \* IAML | 0,161 | 2,125\* | 0,034 |  Ho is being rejected. |
| SML vs KRS \* IAML | **0,121** | **1,895** | **0,059** |  Ho is approved. |
| IAML vs KRS \* IH | **0,011** | **0,661** | **0,509** | **Ho is Accepted** |

**Note : \*\* P < 0,01 \*\*\* P < 0,001 \* P < 0,05**

**Source: Processed Data**

 Institutional support plays an important part in the execution of ecological finance, helping to promote its adoption. Normative, coercive, and memetic factors facilitate the execution of accounting for environmental management. Healthcare firms encounter boosting institutional pressure to carry out that finance, as authorities and hospitals serve an essential part in encouraging pro-environmental practices and processes for making decisions. Federal laws order that hospitals follow to particular norms to avoid fees. This study supports institutional theory, suggesting that government and medical groups function as rule creators and regulate compliance with these rules. Yet, multiple investigations show that societal pressure has no impact on the execution of ecological accounting, opposing the current findings. This challenges the notion that institutional factors may produce environmental uncertainty and lead to inequitable competitiveness in relation to sustainable practices. The research indicated that the ecological management strategy positively impacts the execution of environmental accounting procedures, with a significant p-value of 0.008, which is below the threshold of 0.050. This indicates that effectively implemented environmental management solutions can enhance accounting processes, thereby increasing trust in upper management. Hospital managers and directors show increased commitment to sustainability, leading to improved execution of accounting procedures. Innovations in green innovation and technology can enhance the implementation and execution of green initiatives within hospitals. Useful approaches to environmental management can provide a competitive advantage, enhance the hospital's reputation, minimize operational costs, and connect competitive sustainability demands.

The research encourages the theory of contingency, claiming that successful leadership requires the context of the organization, task requirements, team dynamics, and environmental factors. Institutional pressure had little effect on hospital performance, differing from previous research findings. This indicates that healthcare firms in developing countries face challenges such as insufficient infrastructure development and subpar environmental performance. Institutional pressures may not align with the objectives and procedures established by the institution and may prove ineffective in various contexts. The data supports previous research indicating that institutional pressure does not affect organizational performance. The limited impact of institutional pressure is attributed to inadequate law enforcement, a lack of comprehension regarding environmental issues, and the absence of stringent legal penalties for regulatory violations.

The study opposes the legitimacy theory, which contends that decreasing public trust in health sector firms originates from weak oversight of hospital waste management standards. The study showed that the successful implementation of environmental management strategies can significantly enhance the efficiency of hospitals. The strategies include renewable energy, lowering emissions, and suffered dedication. The focus is on ecological safety and sustainability while improving the quality services offered by hospitals. Greater disposal of waste, the use of eco-friendly products, and adhering to ecological hygiene standards may decrease risk of infection, improve satisfaction among patients, and bolster the reputation of hospitals. These technologies facilitate the detection and handling of environmental risks linked to hospital operations, thereby preserving reputation, minimizing monetary damage, and guaranteeing sustainability. It aligns with legitimacy theory, which posits that confidence in medical corporations improves through the implementation of environmental management practices. Innovative green technology has been demonstrated to improve the performance of hospitals, with a statistically significant the p-value of 0.000, which is beneath the threshold of 0.050. It suggests that successful green innovation could improve hospital performance.

Green breakthroughs, such as the creation of medical service items, energy-efficient technologies, the upgrading of sustainable medical equipment, and online media promotion, have immediate effects on hospital performance. Hospital service quality can be improved through the implementation of contemporary medical technologies, increased testing and treatment efficacy, and sustainable practices, including improved waste management. Innovative green technology allows hospitals to differentiate themselves from rivals in the healthcare sector and attract mindful individuals. Yet, some research indicates that green innovation has no effect on business success due to a lack of human resources to implement environmentally friendly technology. The study demonstrated that pressure from institutions improves hospital performance via the implementation of environmentally friendly accounting, with a level of significance beneath 0.050. This corresponds to previous research suggesting that ecological and economic status strategies may improve hospital performance. Yet, the results oppose Lutfi et al.'s (2023) research, which indicates that accounting for environmental management fails to mitigate institutional demands on hospital performance.

**4. Conclusions**

 This study explores the affect of organizational forces and ecological leadership structures on the hospital performance, highlighting a role of ecological leadership calculating with green with envy creativity as a facilitating variable. The research attempts to aid hospitals in evaluating dangers and potential associated to green innovation, augment operational efficiency, and elevate patient care quality via the deployment of eco-friendly medical equipment. It also suggests that hospitals can apply environmental management accounting and green innovation into their leadership strategies to generate a competitive edge in the healthcare sector. Nevertheless, the study indicates that green innovation does not boost the influence of environmental leadership finance execution on hospital performance due to constrained financial resources and skilled personnel. The results show the demand for uniform accounting for environmental management standards and laws for the use of environmentally friendly technologies.

 The research revealed that the adoption of environmental management accounting did not substantially influence hospital performance, suggesting that the strategy's effect on performance is not facilitated by accounting. This results from constraints such as restricted budgeting, insufficient qualified workers, and a deficiency in awareness among management and staff. Legitimacy theory posits that organizations must secure stakeholder support to attain legitimacy. The study also contradicts findings that indicate environmental management accounting can mitigate the impact of environmental management measures on hospital performance. Accounting enables hospitals to assess their environmental impact, pinpoint opportunities for enhancement, and make informed decisions on their environmental strategy.

Green innovation can significantly improve the effectiveness of environmental management accounting in hospitals; nevertheless, its potential may be hindered by issues such as institutional readiness, insufficient funding, inadequate knowledge, skills, or cultural barriers. The upfront expenses associated with the adoption of green innovations, including technology and personnel training, may be excessively high, and the advantages may not be readily quantifiable. This study does not quite endorse the stakeholder theory, which posits that not all stakeholders will wholly support or embrace the innovation, leading to incomplete implementation of green innovation.

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