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ADOPTION OF GREEN OPERATION STRATEGIES AND BEST PRACTICES IN THE ERA OF SUSTAINABLE DEVELOPMENT GOALS (Study of Public Limited Hospitals in Indonesia)

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Abstract

This study aims to identify the best practices for implementing green (environmentally friendly) operating strategies in hospitals. This study is a preliminary study on the best practices of environmentally friendly operating strategies in limited public hospitals in Indonesia with the support of sustainability report data implemented in 2018 in Indonesia based on POJK 51 of 2017. The data used are annual sustainability reports taken from the publication of the Sustainability Reporting on Index (GRI) and the implementation of POJK 03/51/2017 from 9 (nine) limited public hospital companies in Indonesia studied. The findings of this study found 4 (four) main taxonomies of green operating strategies in hospitals, namely good waste management, waste prevention, water and wastewater management, energy conversion, and emission reduction. This is an important issue in the development of further research where further research can also connect the other two pillars of sustainability to find the relationship between environmental performance and social or financial performance.

Keywords: Green Operation Strategy, Sustainable Development Goals, Public l Limited Hospitals

A. INTRODUCTION

Sustainability is an interesting topic and an important phenomenon in today's life; the environmentally friendly movement with the term "green" is a call to action towards sustainability. The dynamics of sustainability are increasingly phenomenal in the health services sector, including hospitals (Saviano et al., 2018). Hospitals are an industry that consumes much energy, produces waste, emits gases that pollute the environment and requires intensive labor in community service, considering that they operate 24 hours non-stop. The health sector needs to develop operational thinking in environmental and social dimensions that contribute to sustainability for human and planetary well-being (Borges de Oliveira & de Oliveira, 2022). The direction of Indonesian government policy increasingly supports the progress of implementing sustainability with the issuance of guidelines for implementing environmentally friendly hospitals (Ministry of Health of the Republic of Indonesia/Kemenkes, 2018), which is real evidence of the government's efforts to support the progress of developing hospitals with an environmentally friendly concept in Indonesia. The dynamics of research related to green operation in the green hospital concept have become of interest to many researchers in the field of hospitals in developing countries (Kumari & Kumar, 2020), (Shen, 2020), (Intraruangsri, 2018), (Philip & Ruiz, 2022). The importance of adapting to the era of sustainable development is that hospitals can practice environmentally friendly concepts in green operations

strategies to meet the interests of health, environmental, economic, socio-cultural, and productivity aspects.

According to the international accreditation standards, Joint Commission International Accreditation (2008), in the future, hospitals must be healthy places both inside and in the surrounding environment by reducing the level of toxicity in the materials used by hospitals, must efficiently use energy resources and water, as well as reducing the production of waste, aligning environmental health in considering health system priorities in accordance with green building provisions, and incorporating a "sustainable concept" in health services (Tarkar, 2022). Sustainability in the health context is a challenging opportunity in strategy and social development, so it is necessary to develop a sustainable business model (Tarkar, 2022).

Concrete action by companies in responding to environmental challenges is a phenomenon that continues to grow. This was followed by the involvement of various stakeholders, including business people, policymakers, industrial experiments, and academics who agreed that environmental degradation, namely carbon dioxide emissions, rising water levels, resource scarcity, and the use of hazardous materials are some of the main catalysts in environmental degradation (Iqbal et al., The strategic driving factor for companies in taking action on environmentally friendly business practices cannot be separated from regulatory authorities non-governmental organizations and other stakeholders to urge companies to carry out various innovation efforts from an environmental management perspective, including through green innovation strategy *practices.* (J. Zhang et al., 2020), (Wang & Liu, 2022), (Song & Yu, 2018), (X. Zhang et al., 2022). (Soewarno et al., 2019), (Cao & Chen, 2019).

Environmental quality has become very important and valuable in the era of climate change. This must be addressed immediately and can be seen and felt by all humans globally. Climate change is closely related to human activities and harmful emissions, which are the main contributors to climate change. Environmental quality is the main criterion in choosing health service buildings and the hospital industry. Various research in the USA states that the health industry contributes carbon emissions to 4.4% of the world's total greenhouse gas emissions (Hensher & McGain, 2020), and based on the Paris Agreement in mitigating climate change, England in 2040 is committed to becoming a zero-carbon country through *the National Health Service*.

Previous studies related to green organizational issues are a very valuable challenge, namely in implementing effective operational strategies, green operational practices in *Green Supply Chain Management* in Ghana through *Operational Competitive Capabilities* are seen as an effective strategy for competitive advantage and have an impact on competitive performance (Famiyeh et al., 2018)Public health services in Europe (Chiarini & Vagnoni, 2016)have implemented standards such as *Green Public Procurement, Eco-Management* and Audit Scheme and ISO 14001 and so on. Research in Australia regarding best practices in green procurement shows that the main challenge categories in procuring environmentally friendly health services are related to government, NGO, and public issues, as well as organizational green issues. The most critical challenges found were the lack of legislation regarding the procurement of environmentally friendly goods, senior management support for green goods, government incentives for purchasing environmentally friendly goods, and lack of financial support.

Previous research related to best practices of *Green Operational Strategy (GOS)* in health services is still very limited. From several previous studies, GOS research was concentrated on the manufacturing industry. Previous studies only explained the green

strategy in the manufacturing sector (Song & Yu, 2018; X. Zhang et al., 2022; Soewarno et al., 2019). Service organizations seen as " *silent destroyers of the environment* " receive less special attention (Molina-Azorín et al., 2009). The objective of this study is to discuss the pattern of green operations strategies in public limited hospitals in Indonesia and also to know what the best practices in GOS in public limited hospitals in Indonesia are.

This study tries to identify green surgery actions to find out best practices in green surgery strategies according to the Regulation of the Financial Services Authority (OJK Regulation/POJK) no 51 of 2017 and the *Global Reporting Initiative (GRI)* in the sustainability report database which is accessed via the website of each public l limited hospital at Indonesia.

B. LITERATURE REVIEW

1. Green Operation Strategy

This *Green Operation Strategy study* is framed in *triple bottom line* sustainability terminology, where this framework involves the three pillars of sustainability which were first popularized by Elkington in 1997, which states that it is important for organizations to consider three factors, namely people, planet and profit in making strategic decisions. Sustainable (Elkington, 1997). *Green Operation Theory* refers to (Nunes, 2011), which developed two main approaches from *Green Operation Theory*, namely the strategic approach and the approach to supporting green operations. In his research in the automotive industry, Nunes 2011 proposed *Green Operations Practices and innovation as part of the Environmental Strategy*, namely innovations from *eco design, green building, research logistics, green manufacturing, and green supply chains,* which were model developments carried out in research at Henry Ford. Several previous studies have highlighted the influence of supply chains on corporate sustainability performance. Researchers in the field of operations management have made great efforts to incorporate sustainable operations into the mainstream of operations strategy literature review (Marchant, 2006); there are five dimensions of sustainable operations strategy: external context, competitive dimensions, strategic decisions, operations value chain activities, as well as learning and organizational knowledge.

2. Corporate Sustainability Theory (CST)

CST is a concept of corporate sustainability that influences the company's relationship with society and shapes the way business leaders interpret changes in their organizations (Appelbaum et al., 2016). Corporate Sustainability Theory is a theoretical approach that looks at transformational changes that impact business culture and company relationships with stakeholders, namely owners, customers, employees, suppliers, government, investors, political groups, trade associations, and communities(Mishra & Mishra, 2013). Corporate Sustainability Theory (CST) has developed since the Brundland report (Chang et al., 2017). The evolution of Sustainability Theory developed from Corporate Social Responsibility, Stakeholder Theory, Corporate Sustainability, and Green Economics. CST evolved as it further expanded the boundaries of the system by focusing on changing the policy environment for companies in 2005 towards green economics. (Chang et al., 2017). Corporate Sustainability is defined as "adopting business strategies and activities that meet the current needs of the company and its stakeholders while protecting, maintaining and enhancing human and natural resources that will be needed in the future" quoted from the International Institution of

Sustainable Development (IISD). Business strategy for sustainable development: leadership and accountability for the 90s, (Munton & Collins, 1998).

3. Sustainable Development Goals (SDGs)

Sustainable development (SD) has become a global strategy that underlies organizations carrying out social, environmental, and economic transformation. Sustainability requires balancing organizational goals with the preservation of people and the planet (Philip & Ruiz, 2022). Sustainable development evolved very quickly, and this concept originated in 1974 (Chang et al., 2017). It was then brought into the mainstream political realm by the Brundland Report in 1987, which underscored the complexity of sustainability. The green hospital guidelines provide guidelines such as reduced energy consumption, rainwater collection, energy audits, use of environmentally friendly materials, handwashing facilities, food safety, environmentally friendly procurement, use of renewable and clean energy, biophilic design, and healing gardens.

In 2016, World Health Organization (WHO) expanded the 8 MDGs Millennium development goals in early 2000 to 17 SDGS goals (Shi et al., 2019). In 2016, WHO further encouraged the expansion of the "2030 Sustainable Development Goals" (Sustainable Development Goals; SDGs) program to 17 core goals, including goal 3, namely Good health and well-being, Ensuring healthy lives, and promoting well-being for all at all ages. The United Nations (UN) 2030 Agenda and 17 Sustainable Development Goals (UN_SDGs) pose new challenges for the health sector to adapt by developing appropriate environmentally friendly operations and strategies in line with the SDG's direction. Hospitals need to develop sustainability strategies to be more environmentally friendly and fairer and improve the quality of health services to be more prosperous (Borges de Oliveira & de Oliveira, 2022). Hospitals are in a dynamic business environment, are one of the most complex organizations to manage, and require fast and precise decision making, with several peculiarities in their business operation processes with the support of health technology equipment that absorbs natural resources and human resources with special skills so that Health services in the community can run optimally.

The Indonesian state has implemented an approach that involves the entire government and the entire community in implementing the SDGs with national actions based on law to ensure resilience, including in the health sector. Indonesia, through the Ministry of Health, has issued Environmentally Friendly Hospital Guidelines as a guide for hospitals in Indonesia to implement green hospitals (Kemenkes RI, 2018). This guide is the basic instrument used by KARS to assess hospital accreditation. The implementation of the environmentally friendly hospital program in Indonesia requires partnerships to achieve harmony in its implementation, namely the Indonesian Ministry of Health cq. Directorate General of Health Services, Indonesian Ministry of Environment, Indonesian Ministry of Energy, Resources and Minerals, Indonesian Ministry of Public Works and Public Housing, Indonesian Hospital Association (PERSI), Regional Environmental Management Agency, Environmental Service, Environmental Office Regional Life, Regional Health Service, Green Building Council Indonesia. And Non-Governmental Organizations and Community Empowerment Institutions.

C. RESEARCH METHOD

This research adopts a benchmarking method between Public limited Hospitals in Indonesia based on secondary data in the 2022 Sustainability Reporting using quantitative

content analysis in the Sustainability Reporting. Content analysis, as explained by Rosengren (1981), is "a collection of analytical approaches starting from impressionistic, intuitive, interpretative to systematic and detailed textual analysis," namely a quantitative method for studying qualitative data.

The first phase selected cases, namely the target population of Public limited hospitals in Indonesia that implemented the rain operation strategy and stated their environmental performance through Sustainability Reporting reports via the official website. Search phrase using Sustainability Reporting "Hospital." The sample in this research is *a non-probability convenience sample* chosen based on data availability. A total of 9 hospitals out of 11 hospitals were found to be issuers on the IDX in 2022 in accordance with the accessibility of reports and the availability of sustainability reports,

The second stage is to identify data sourcing. Data was collected from the availability of SR on each company's official website. The following are 11 Public limited hospitals in Indonesia listed in 2022.

Table 1: Public limited hospitals in Indonesia listed in 2022

No	Name of Open Hospital in Indonesia	Description of Research Sample
1	PT Medikaloka Hermina Public limited - HEAL	44 hospitals with a capacity of 6,063 beds
2	PT Siloam International Hospitals Public Limited - SILO	41 hospitals with a capacity of 3,693 beds in Sumatra, Java, Kalimantan, Sulawesi, Bali, Nusa Tenggara, and Maluku.
3	PT Mitra Keluarga Karyasehat Public limited - MIKA	26 hospitals with 3,320 bed capacity
4	PT Sarana Meditama Metropolitan Public Limited - SAME	8 hospitals with a capacity of 1,454 beds, of which 6 are EMC hospitals, and 2 are GRHA hospitals
5	PT Kedoya Adyaraya Public limited - RSGK	2 hospitals: GRHA Kedoya and GRHA MM2100. RSGK is part of the Sarana Meditama Metropolitan Public Limited (SAME).
6	PT Metro Healthcare Indonesia Public Limited - CARE	Care has a total of 9 hospitals, including Mitra Husada Hospital, Bunda Mulia Hospital, Metro Hospitals, Kartini Hospital Mojokerto, Bunda Sejahtera Hospital, Santo Yusuf Hospital, and RSIA Bina Sehat Mandiri Hospital.
7	PT Royal Prima Public Limited - PRIM	3 hospitals with a capacity of 1,600 beds in Medan and Jambi, namely Royal Prima Medan (RPM), Royal Prima Marelan, and Royal Prima Jambi Hospital (RPJ)
8	PT Sejahteraraya Anugrahjaya Public limited - SRAJ	PT Sejahteraraya Anugrahjaya Public Limited provides health services and began operating in July 1995. Now, it has five hospitals called Mayapada Hospital, which has a capacity of 791 beds.

Table 1: Public limited hospitals (continued…)		
No	**Name of Open Hospital in Indonesia**	Description of Research Sample
9	PT Bundamedik Public Limited - BMHS	The health service provider who has modern medical technology in Jakarta
10	PT Murni Sadar Public limited - MTMH	Health services and oversees several public l hospitals in Medan, Jakarta, Tangerang, and Bali, with a total bed capacity of 858.
11	PT Famon Awal Bros Sedaya Public Limited - PRAY	The Primaya Group has a capacity of 1,926 beds, employs 263 general practitioners (including general dentists), 808 specialist doctors (both full-time and part-time and including specialist dentists), and 2,078 nurses and midwives, as well as 895 other medical support personnel.

Source: https://snips.stockbit.com/investasi/saham-rumah-sakit

The third phase is identifying and reporting the contents of *the Green Operation Strategy*, which consists of operational actions (practices and tactics) summarized from many keywords that appear in the sustainability report of all hospital data.
The analysis was carried out with careful content analysis of the 2022 Global Reporting Initiative (GRI) *Sustainability Reporting* in the green operating practice indicators (Table 2) carried out by the hospital.

Table 2: Green Operation Strategy Actions in Hospitals

1	Reduce Paper Consumption
2	Reduce Water Consumption
3	Reducing Plastic Consumption
4	Reduce electricity fuel consumption
5	Reducing Hazardous Waste
6	Reduces Non-hazardous Waste
7	Greening Activities
8	Environmentally Friendly Procurement Practices
9	Responsible Waste Management
10	Energy conversion and emission control
11	Proper handling of water and wastewater

Source: sustainability report data

D. RESULT AND DISCUSSION

This section presents the findings of detailed and systematic data analysis, which through 12 *Green Operational Strategy actions* can be classified into 4 (four) main GOS taxonomies carried out by nine hospitals in implementing *Green Operation Strategy*.

The 4 *Green Operational Strategy (GOS) Taxonomies* identified based on *sustainability reporting* in 2022 are:

1. Managing Waste Well (GRI 306 1-5, POJK F.13)

Hospitals and medical facilities produce significant waste, which is classified as hazardous waste and requires appropriate management to prevent disease transmission and contamination of soil and groundwater. Hospitals require waste management and develop procedures to ensure the safe disposal of hazardous waste by collaborating with third parties to transport hazardous and infectious waste in collaboration with incineration service vendors for safe destruction.

2. *Waste prevention (GRI 303-3, POJK F.8)*
   Waste prevention initiatives that involve housekeeping in reducing waste by recycling plastic waste that can be reused. Hospitals can also switch from mercury-based medical equipment to digital equipment, reducing the production of hazardous waste. Hospitals can also work with partners, pharmaceutical vendors, and the PMI blood bank to return remaining expired medicines, blood, and plasma. This practice not only encourages *sustainable* practices but ensures the safety and well-being of patients and the surrounding environment. Hospitals can also carry out green movements to become green hospitals by making green efforts in the hospital area and implementing *green procurement*.

3. *Water and wastewater management (GRI 303-3,6,6 and POJK F.8)*
   Hospitals need to ensure access to clean and safe water so that the hospital environment remains clean and hygienic, reducing the risk of spreading disease—the importance of having a proper wastewater treatment system to avoid hazardous discharge into the environment. Hospitals must have an IPAL in each hospital and ensure that no wastewater is discharged directly into the environment. Hospitals have sanitation staff that monitor water quality daily, including factors such as dissolved oxygen, temperature, pH level, and discharge flow rate. RS carries out monthly monitoring with an accredited laboratory, and the results are always below the limits set by the Ministry of Health.

4. *Energy Conservation and reducing emissions (GRI 302-4 and POJK B.2b, POJK F6, F7, F11, F12).*
   Hospitals have a major impact on energy consumption on the environment and potential risks to human health. The release of CO2 into the atmosphere due to energy contributes to the greenhouse gas effect and is responsible for climate change. Initiatives carried out to reduce the carbon footprint are not only energy savings but also rehabilitating ambulances, generators, and vehicles that are more than 10 years old.

Table 3 *Green Operation Strategy Practices* in accordance with The 4 GRI Taxonomy Categories and POJK 51/2019

No	GOS Best Practices at PT Open Indonesia Public l Hospital	GOS taxonomy based on GRI and POJK 51/2017
1	Reducing paper consumption by utilizing digitalization innovation by implementing a medical record system (an e-medical record), reducing the printing of medical documents with paperless technology and email policies, and carrying out a *Go Green campaign.*	Waste prevention (GRI 303-3, POJK F.8)

Table 3 ***Green Operation Strategy Practices (continued..)***

No	GOS Best Practices at PT Open Indonesia Public l Hospital	GOS taxonomy based on GRI and POJK 51/2017
2	Reduce Water Consumption	Water and wastewater management (GRI 303-3,6,6 and POJK F.8)
3	Reducing plastic consumption by developing environmentally friendly control practices by purchasing pharmaceutical ingredients and bottled mineral water, replacing the use of plastic bags with environmentally friendly paper packaging, and environmental awareness campaigns to reduce the consumption of plastic bottled mineral water.	Waste prevention (GRI 303-3, POJK F.8)
4	Reducing electricity consumption by taking the initiative to install LED lights, maximizing natural lighting through the installation of glass windows, efficient use of evaluators, room lighting, and air conditioning, especially after working hours, and installing solar power for parking area lighting.	PJOK B.2b, FJOK F6, F7, F11, F12
5	Reducing Hazardous Waste	PJOK F,13
6	Reduces Non-hazardous Waste	PJOK F,14
7	Greening activities by planting trees in the green area of the hospital, as well as implementing a green hospital	Waste prevention (GRI 303-3, POJK F.8)
8	Environmentally Friendly Procurement Practices by prioritizing environmentally friendly purchasing and reducing purchases of non-renewable materials.	Waste prevention (GRI 303-3, POJK F.8)
9	Waste Management Responsibility for hospital operational activities in 3 waste categories, namely non-medical domestic waste, medical waste, and hazardous waste.	Managing Waste Well (GRI 306 1-5, POJK F.13)
10	Energy conversion and emission control by utilizing solar-powered lighting technology to save electricity. Control greenhouse gas emissions by carrying out regular tests to ensure transportation facilities and diesel generators meet applicable standards.	Energy Conservation and reducing emissions (GRI 302-4 and POJK B.2b, POJK F6, F7, F11, F12).
11	Proper handling of water and wastewater by operating an accurate water monitoring system to control water use and implementing water use restriction policies to prevent excessive water consumption.	Water and wastewater management (GRI 303-3,6,6 and POJK F.8)

Source: sustainability report data according to PJOK 51.2017 and GRI (Financial Services Authority Regulations 51, 2017 and Global Reporting Index

Discussion

The cases investigated in this study were 9 PT Public Limited hospitals in Indonesia. These nine hospitals were classified into clusters to find a taxonomic strategic pattern for *the Green Operation Strategy* based on GRI and POJK 51/2017. Of the 11 hospitals, nine have implemented *the Green Operation Strategy*. The Taxonomy Model was developed from research on 25 hospital industries in Jordan (Migdadi & Omari, 2019), which was taken from the *Global Reporting Index (GRI) database*, which adopts

the quantitative content of financial reports. However, this research uses the PJOK indicator no.51 of 2017 in the context of regulations in Indonesia.

Green Operation Strategy is carried out for sustainability purposes; its implementation requires leaders who can implement sustainability in strategy and operations, so it requires extraordinary leadership abilities (Metcalf & Benn, 2013). The role of leaders in realizing the vision and sustainability priorities carried out by developing a green operations strategy will be closely connected to the Sustainable Goals (SDG) in Indonesia. This can also ensure closer integration with other stakeholder priorities.

E. CONCLUSION

The results of this study identify best practices in the hospital industry as a high commitment of leaders and players in the hospital industry in Indonesia in implementing green operations strategies towards green hospital practices in achieving sustainability goals, in addition to meeting environmental management regulations, a high level of awareness, the importance of making sustainability efforts becomes evident in implementing energy-saving, environmentally friendly principles in hospital operations as a form of concern for ensuring the security and safety of patients and all stakeholders. The hospital industry in Indonesia has implemented a green operations strategy as an integrated part of the business model. Sustainability has become a strategic issue in terms of social, environmental, and financial impacts, so it is ready to be competitive in innovating and adapting to climate change, which is both a challenge and an opportunity in developing sustainable strategies.

This research focuses on green operations strategies in the hospital services sector in Indonesia. This study identifies best practice *green operational strategies* in accordance with OJK regulation 51, 2017, as the regulations that apply in Indonesia. The methodology adopted in this research is unique in that it builds four main taxonomies in hospitals, namely managing waste wells, waste prevention, water and wastewater management, energy conversion, and reducing emissions.

This research studies various dimensions that are limited in the literature, especially in the field of green operational strategy practices in the field of hospital strategy. The limitation of this research is that it does not identify performance and make comparisons with the previous year. Future research should develop on the evaluation of sustainability performance in environmental aspects so that time series will help track the progress of all indicators. Future studies could also link with the other two pillars of sustainability to find links between environmental performance and social or financial performance.

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