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OSGMIS for Hospital Sustainability Reporting: Evaluating Advancements and Setbacks under Regulation 18/2022

Adjie Avinda[1*], Agel Septo Candra[1]

[1] Politeknik Negeri Padang, Limau Manis, Padang, 25164, Indonesia

*Corresponding Author email: adjiejiee25@gmail.com

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ABSTRACT

This study evaluates the progress and challenges associated with the implementation of the Open-Source Generic Management Information System (OSGMIS) in hospitals, framed by Government Regulation Number 18 of 2022 regarding One Health Data. Specifically, it examines how this system facilitates sustainability reporting. Employing a methodology that combines a structured literature review with a targeted case study at the West Pasaman Regional Hospital, the research identifies significant technical and operational advancements, including enhanced data integration and improved administrative efficiency. However, the findings also highlight critical setbacks, such as infrastructure limitations, low awareness of sustainability practices, and inadequate human resource capacity. The study underscores that the effective realisation of Government Regulation Number 18 of 2022 requires a synergetic approach involving the government, hospital management, technology providers, and clinical staff. To address the identified gaps, the research recommends a shift toward qualitative methodologies in future studies. Conducting intensive interviews with management, medical personnel, IT specialists, and patients would provide deeper insights into the direct experiences and perceptions of stakeholders. Such nuanced data is essential for formulating targeted strategies to optimise OSGMIS adoption and ensure the long-term success of sustainability reporting within the healthcare sector.

1.0 Introduction

Hospitals serve as critical health service facilities that require reliable information systems to ensure effective operations and improved patient care. In recent years, the integration of information technology into hospital systems has grown rapidly, transforming the way healthcare services are delivered and managed. In Indonesia, the implementation of Government Regulation Number 18 of 2022 mandates the integration of One Health Data across hospitals to ensure data accuracy, accessibility, and accountability. This policy has led to the adoption of Open-Source Generic Management Information Systems (OSGMIS) in several hospitals as a digital infrastructure to support administrative and clinical operations. However, the effectiveness of OSGMIS implementation remains inconsistent due to infrastructural, human resource, and technological limitations.

This study aims to evaluate the effectiveness of OSGMIS in the context of sustainability reporting in Indonesian hospitals, using the Regional Hospital of West Pasaman as a case study. The research identifies both advancements and setbacks, providing insights into how the system contributes to achieving sustainability goals in the healthcare sector.

Hospitals are health service facilities that provide various categories of care and empower trained and strong personnel to address and handle issues related to medical recovery and good health coping care. Information technology is considered a very important role in the field of health services. Considering that the quality of data processing is a very significant influence from health service institutions for successful health operations. A good Information System will support clinical workflows through various means so that it contributes to better patient care (Kristanti & Ain, 2021).

Currently, developments and information indicate that information technology is growing. Application systems in various fields must already be implemented by an agency/company or businesses including hospitals in utilizing information as an administrative basis and data processing to meet those needs, thus agencies/companies must carry out a number of activities related to the use of computer-based application systems and hopefully or able to solve problems more quickly, more accurately, more effectively, and more efficient in carrying out operational activities.

The Minister of Health of the Republic of Indonesia issued a policy that serves as a guideline for the development of health organized by both the government and private sectors as an effort to improve the quality of health services in hospitals in accordance with the Regulation of the Minister of Health of the Republic of Indonesia Number Regulation of the Minister of Health of the Republic of Indonesia Number 18 of 2022 which explains that every hospital is required to implement One Health Data with policies of government data governance to produce data that is accurate, up-to-date, integrated, and can be accountable, as well as easily accessible and shared among central and regional agencies to meet data standards through compliance with data standards, metadata, data interoperability, and using reference codes and master data. This indicates that all hospitals have implemented one health data, one of which is the use of Open-Source Generic Management Information System (Management Information System Hospital) that is accepted with a computerized process as a form of decision-making management.

Sustainability reporting, or sustainability reports, is a way for companies to show how transparent they are in conducting business in three main aspects: economic, social, and environmental. This report is important not only for many parties involved, but it can also help improve the company's reputation and ensure sustainability in the long term (Laudon, 2020; Mohamad Ghaffar et. al.,2024). When preparing sustainability reports, companies need data that is accurate and regular. Here, information systems play a quite important role. Systems such as Accounting Information System (AIS) and Enterprise Resource Planning (ERP) can help collect, Accounting Information System (AIS) and Enterprise Resource Planning (ERP) can help collect, store, process, and present data from various parts of the organization. With good data integration, this information system can help companies monitor carbon emissions, energy use, social impact, labour practices, and their contributions to the community (Laudon, 2020).

Thus, to determine the effectiveness of the use of Open-Source Generic Management Information System (Hospital Management Information System) at Regional Hospital of West Pasaman, where Regional Hospital of West Pasaman has used Open-Source Generic Management Information System (Hospital Management Information System) and is one of the government hospitals in West Sumatra under the auspices of the Minister of Health of the Republic of

Indonesia as a form of sustainability reporting. Therefore, this explanation will be discussed in this paper.

2.0 Literature Review

2.1 Theoretical Foundation Theoretical Framework and Hypothesis Development

The implementation of OSGMIS in hospitals aligns with several key theoretical frameworks related to digital transformation in healthcare:

2.1.1 Supply Chain Management (SCM)

Enables efficient coordination between hospitals and suppliers for inventory and resource planning, including real-time procurement and logistics optimization.

2.1.2 Enterprise Resource Planning (ERP)

Facilitates the integration of various hospital departments such as finance, pharmacy, and inpatient/outpatient services, ensuring accurate data exchange and centralized decision-making.

2.1.3 Customer Relationship Management (CRM)

Enhances the relationship between hospitals and stakeholders (e.g., patients and partners) by managing interactions and service feedback to ensure satisfaction and continuity.

2.1.4 Knowledge Management Systems (KMS)

Supports organizational learning and innovation by capturing and disseminating data-driven insights, enabling the development of new practices and improvements in patient care.

According to the Global Reporting Initiative (GRI), sustainability reporting in healthcare includes metrics related to environmental management, resource utilization, patient safety, and labour practices. OSGMIS can serve as a key enabler of these metrics when properly integrated with reporting tools.

OSGMIS (Management Information System) in computer-based hospitals will make hospitals more integrated as digital companies, that is, digital companies, where digital companies are companies where all business processes and customer relationships, suppliers, partners, and operators, as well as company assets, including intangible assets, which include intellectual property, core competencies, finance, and human resources, are carried out in digital form (Laudon, 2004).

OSGMIS (Management Information System) is inseparable from the management of information systems management digitally, where this system is not separate from digital decision making by management. The following is the digital management governance according to Laudon, 2004:

- **Supply Chain Management System**, where the relationship between hospitals and suppliers can be optimized. Planning activities, ordering, and alerts for raw materials for medicines and medical equipment are not separate from being good and efficient in this supply chain, hospitals need to launch information flows with suppliers or directly related very related, especially to confirm that OSGMIS treatment will yield efficient inventory management. This OSGMIS will also allow for managing with Just-in-time even Stockless Inventory method (Laundon, 2004) so that hospitals do not have difficulty in storing medical materials and equipment while the inventory of materials and medical equipment remains guaranteed.

- **Enterprise Systems**, this serves as Enterprise system systems here are the systems of hospitals so that it can breed the main internal processes of the hospital evenly or coordinate the main data that exists within the hospital and from various units such

as, front office, inpatient, outpatient, polyclinic, pharmacy, laboratory, finance, human resource, investment, inventory and others. The computerized system with integration technology from each unit allows that the management does not know the objective condition of the hospital in a general and per unit using reports that can be reported at any time quickly so that they can already make decisions in ways and then also be able to maintain quality control of services and other medical products. Meanwhile, patients can be directly provided with information on the costs that must be borne by them.

- **Customer Relationship Management Systems**, to digitize Customer Relationship Management Systems so that the relationship between the hospital and patients, users of health services and other related groups. Hospitals must build and maintain continuous relationships with every party around, to be able to provide a sense of security and comfort to the parties using the services, direction in collaborate in the field of hospital needs, and medical service resources, and supporting resources. With the existence of OSGMIS, hospitals can manage data of all related parties, so that hospitals can give equal attention to the related parties in a better way, usually to congratulate newborn patients, as well as to make the first offer to partners infrastructure providers that a hospital will do, and others.

- **Knowledge Management Systems**, this functions to computerize the recording, storage and dissemination of knowledge and skills. This system processes data transactions not only to create information or managerial reports but a new knowledge. It can also explore the data warehouse to guide new knowledge of a pattern or correlation among health service users in the hospital that it manages or related patterns in each unit creating new innovations.

The explanation of OSGMIS is inseparable from the system of how OSGMIS can be implemented in hospitals. Based on information from Regional Hospital of West Pasaman and from the Ministry's website of Health of the Republic of Indonesia, the following image in Figure 1 shows the flow of OSGMIS.

From Figure 1, it can be explained that the use of OSGMIS requires the assistance of internet devices or hotspots and external hard drives to back up data. All units will be integrated with the use of OSGMIS from the registration section, clinic section, installation pharmacy, laboratory, and cashier section. All these lines will generate reports to be accountable to management and can be shared with other hospital institutions.

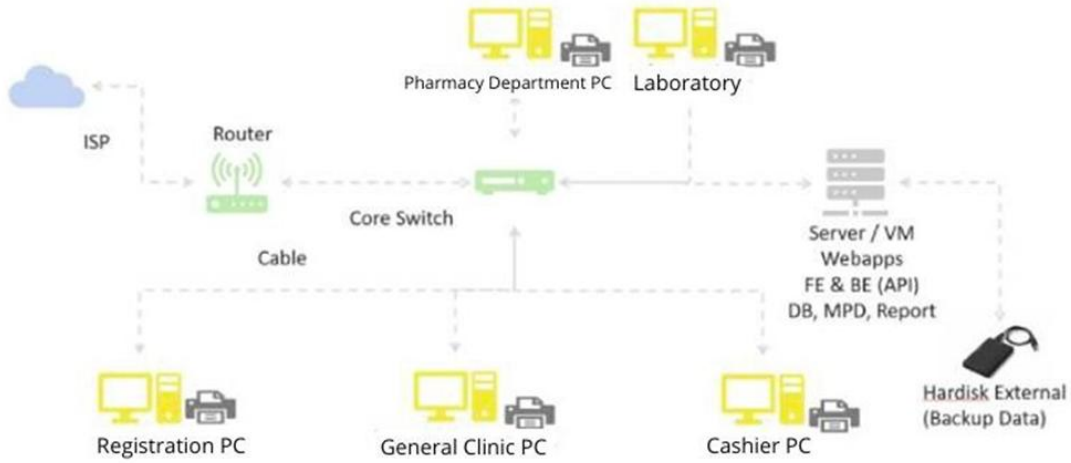

Figure 1. The flow of OSGMIS

According to the Global Reporting Initiative (GRI, 2021), sustainability reporting is a way for organizations to disclose information about the economic, social, and environmental impacts of their operations. This report is not only for communicating with stakeholders but is also important for strategic decision-making to improve the efficiency and reputation of the organization in the long term. In the health sector, including hospitals, sustainability reports include the use of resources such as energy and water, medical waste management, patient safety, ethics of service, and the welfare of healthcare workers. This is very important because hospitals have a significant impact on public health and the environment.

Hospital Management Information System (HMIS) According to Susanto (2013), information systems management is a procedure for processing data into information that aids in decision-making. In the context of hospitals, SIMRS is an integrated system that encompasses various aspects, such as clinical information, administration, human resources, logistics, and finance. HMIS plays a crucial role in improving service efficiency, managing patient data, recording operational activities, and supporting the accountability of health services.

The relationship between Sustainability Reporting and HMIS or OSGMIS is an important tool in helping to compile sustainability reports in hospitals. This system allows for:

i. Automatic and real-time data collection relevant to sustainability reports.

ii. Monitoring the use of resources (energy, water, medications) and the management of waste medical waste related to the environment.

iii. Reporting on social aspects, such as patient safety, working hours of medical staff, and customer satisfaction.

By integrating HMIS / OSGMIS and sustainability principles, hospitals can prepare sustainability reports that are more accurate and in accordance with global standards such as GRI Standards, ISQua, or regulations from the Ministry of Health of the Republic of Indonesia. (TNR 11, Justify) (if present) to explain the theoretical framework used as the logical basis to develop hypotheses or research proposition and research model.

3.0 Methodology

This research adopts a qualitative literature review combined with a descriptive case study. The literature review was conducted using academic databases such as Google Scholar and ScienceDirect, using keywords such as 'Hospital Management Information System,' 'OSGMIS,' and 'Sustainability Reporting.' Articles published between 2013 and 2024 were included, focusing on peer-reviewed journals related to information systems in healthcare.

The case study was conducted at the Regional Hospital of West Pasaman, which has implemented OSGMIS as part of its digital transformation strategy. The study reviewed hospital documents, system workflows, and secondary reports to evaluate system effectiveness. Future research may incorporate direct interviews and field observations to enrich data quality.

The research method used to compile the literature review is by using electronic database. The journal search method uses Google Scholar by using the keyword hospital management information system. The journals used in the literature review are obtained from various research journals including research journals in the field of information systems. In addition to using the research method, this research takes a case study at the Regional Hospital of West Pasaman, where this Regional Public Hospital has used OSGMIS as an application to support the operations of the Regional Public Hospital and has complied with Government Regulation Number 18 of 2022 concerning One Data Health.

4.0 Result and Discussion

The Regional Hospital of West Pasaman began implementing the Open-Source Generic Management Information System (OSGMIS) in 2022 under the name Hospital Management Information System (HMIS). The system integrates essential hospital functions including patient registration, pharmacy, laboratory services, billing, and reporting.

Key advancements observed include:

- Enhanced administrative efficiency and reduced manual processing.
- Real-time financial reporting that supports transparency and decision-making.
- Integrated medical records and billing, improving continuity of care.
- Improved inventory control for medical supplies and pharmaceuticals.

These operational improvements align with the objectives of Government Regulation Number 18 of 2022 regarding One Health Data and indicate that OSGMIS can support hospital functions effectively.

Despite these improvements, several challenges hinder optimal use of OSGMIS:

- **Lack of Sustainability Data Integration.** While administrative and clinical functions are integrated, data related to environmental and social sustainability—such as energy consumption, medical waste management, and staff welfare—is not yet fully incorporated.
- **Low Awareness and Commitment.** Some hospital leaders and staff perceive sustainability reporting as an additional administrative burden. As a result, sustainability-related functionalities in the system are underutilized or ignored.
- **Limited Infrastructure.** Especially in rural or underfunded hospitals, internet connectivity, server reliability, and basic technological infrastructure remain inadequate. This affects system performance and data reliability.
- **Inadequate Human Resources.** Many staff members lack the digital literacy required to operate OSGMIS optimally, particularly in areas such as report generation and sustainability metrics tracking.
- **Absence of Specialized Sustainability Modules.** Most current OSGMIS platforms focus on health administration and clinical data. Dedicated modules for environmental impact, resource utilization, or social indicators are missing.
- **Data Security and Backup Concerns.** Without robust cybersecurity and backup protocols, hospitals face risks related to data loss, breaches, and unauthorized access.

These issues echo the findings of Alboliteeh et al. (2023) and Deloitte (2024), who noted similar setbacks in digital sustainability initiatives in healthcare. The challenges highlight the need for targeted improvements, including staff training, better infrastructure, and policy support.

The use of OSGMIS at the Regional Hospital of West Pasaman has been implemented since 2022 named HMIS. The more significant difference between the two applications is the naming and upgrades of various supporting software from both applications. The use of OSGMIS at the Regional Hospital of West Pasaman emphasizes the function of the care section for care/service

medical services more professionally, the billing function by the finance department also provides discounts approached by the board of directors or the directors themselves. Medical staff do not need to worry about the financial capabilities of patients and will not discriminate against services to patients because medical staff will the financial capabilities of patients and will not differentiate services to patients because medical staff will dedicate the same incentives for the same actions from any medical service provider. Such a pattern has been proven to positively affect the performance of medical staff that will ultimately create a higher quality of hospital services (Handiwidjojo, 2009).

The process of inputting data on the use of medical actions has been entered into the system by operators from each unit but integrated with the finance department, so the data is accurate everything will always be updated, which has closed the possibility of data when patients are about to pay the cost of care. Although at the same time its social mission, the hospital director considers the position of the hospital's finances that can be obtained quickly and accurately from the information provided by the sub information system (Fadilla, 2021).

Thus, this is just some of the advantages of the integrated capabilities of SIMGO, apart from the author's results, other benefits such as mapping inpatient electronic medical records that one friend, the speed of administrative services, good inventory control, accurate financial functions, and the preparation of financial and maintenance reports is found to be presented quickly, accurately, and good (Fadilla, 2021).

The Hospital Management Information System (HMIS) or OSGMIS has great potential to support sustainability reports (Alboliteeh, 2023), but there are still some issues that make its use less effective. Here are some of the issues faced:

i. **Lack of Sustainability Data Integration.** Many hospitals only use OSGMIS for administrative and health service matters, while data related to sustainability, such as energy use, waste management, and water efficiency, have not been well integrated. As a result, data collection for sustainability reports is often done manually including at the Regional Hospital of West Pasaman.

ii. **Low Awareness and Commitment.** Some hospital managers are not yet aware of the importance of sustainability reports or consider it an additional workload. This makes OSGMIS not developed for those reporting needs.

iii. **Limited Infrastructure and Technology.** Hospitals located in rural areas or with limited budgets usually struggle to obtain appropriate technology, maintain systems, and access the internet or reliable servers. This causes OSGMIS to not function well in processing sustainability data.

iv. **Lack of Competent Human Resources.** Many technical and information management staff do not fully understand how to use OSGMIS for sustainability reports. This lack of training makes the utilization of OSGMIS not optimal for preparing reports according to international standards.

v. **No Special Module for Sustainability Yet.** Most OSGMIS systems are not equipped with modules or features that can process data for sustainability reports automatically. The system is more focused on health services daily, without considering the needs for sustainable reporting.

vi. **Data Security and Reliability Issues.** Data security and backup systems become important issues. If OSGMIS is not secure and data validation is inadequate, then the accuracy of the data in sustainability reports can be questioned, and this can damage the hospital's reputation.

OSGMIS plays an important role in sustainability reports, there are various technical challenges, structural, and cultural that make its utilization not optimal. Therefore, there needs to be improvements in policies, human resource training, and the development of sustainability modules so that reporting in hospitals can become better and more credible (Deloitte, 2024).

There are setbacks in the effectiveness of the use of OSGMIS at the Regional Hospital of West Pasaman, although it has been implemented in accordance with Government Regulation Number 18 of 2022, but the issue is the human resource constraints due to the lack of socialization regarding the work line (Kristianti & Ain, 2021) and the availability of medical devices is less compared to private hospitals in West Pasaman, so patients prefer to go to private hospitals that have better medical facilities. complete. This shows that fewer patients visit the Regional Hospital of West Pasaman, but the implementation of OSGMIS has a fairly high cost, resulting in overlaps or setbacks in the operational processes at the Regional Hospital of West Pasaman, thus requiring policies from the local government to make the availability of medical equipment more effective and accompanied by the implementation of OSGMIS.

5.0 Conclusion and Future Research

The implementation of OSGMIS at the Regional Hospital of West Pasaman demonstrates significant progress in digital transformation aligned with Government Regulation Number 18 of 2022. The system has led to improved operational efficiency and clinical data integration. However, its effectiveness in supporting sustainability reporting remains limited due to:

- Lack of integrated sustainability features,
- Human resource capacity gaps,
- Infrastructure constraints, and
- Limited organizational commitment to sustainability.

To enhance the value of OSGMIS, several steps are recommended:

- Develop specialized modules that address sustainability metrics (energy, waste, etc.),
- Provide continuous technical training to users across hospital departments,
- Strengthening supporting infrastructure, especially in under-resourced areas, and
- Encourage policy alignment to incentivize sustainability practices.

Future research should involve interviews with hospital personnel, patients, and administrators to gather qualitative insights. Such a holistic approach will support the development of more adaptive and sustainable digital health information systems.

The conclusion from the above writing is:

i. The implementation of OSGMIS at the Regional Hospital of West Pasaman is quite effective because it is supported by Government Regulation Number 18 of 2022 and has been implemented in accordance with those regulations.

ii. The implementation of OSGMIS at the Regional Hospital of West Pasaman has constraints regarding human resources who are not yet familiar with the application, due to insufficient socialization.

iii. The implementation of OSGMIS at the Regional Hospital of West Pasaman is also hindered by high costs due to the lack of availability of medical equipment causing patients to be more tending to visit private hospitals that have the availability of complete medical equipment and the implementation of OSGMIS.

Suggestions and limitations of this writing are for future writings to be able to further examine OSGMIS at the Regional Hospital of West Pasaman by conducting in-depth interviews with several personnel and patients regarding the implementation of OSGMIS so that it will become a writing that is quite complex. And the next suggestion is due to the time limitations of the research, thus only presenting some literature and the author's assumptions.

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Author Contributions

Avinda A.: Conceptualization, Methodology, Software, Data Curation, Writing- Original Draft; Chandra **A.S.**: Software, Validation, Writing-Reviewing and Editing.

Conflicts of Interest

The manuscript has not been published elsewhere and is not being considered by other journals. All authors have approved the review, agree with its Submission and declare no conflict of interest in the manuscript.

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