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The Role of Management Information Systems (MIS) in Improving Hospital Service Effectiveness and Efficiency

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Abstract: The development and progress of information technology are overgrowing today. Application systems in various fields are a must for an agency/company to utilize information as a basis for administration and data processing, including in hospitals. The goal of this study was to see how effective the Hospital Information System (HIS) was at improving the efficiency of health care. In the 2010-2021 time frame, the research method was a literature review related to HIS in improving the effectiveness and efficiency of hospital services. Databases used include Sciencedirect, PUBMED, Google Scholar, and Researchgate. Researchers used a thematic structure based on thinking to collect literature review data, organized by grouping and discussing literature sources according to the issue. The keywords used are "hospital information system," "information system effectiveness and efficiency," and "healthcare effectiveness and efficiency." The findings of this study show that HIS can reduce the complexity of health services by increasing the effectiveness and efficiency of a hospital as an organization through innovation in developing information systems. The results are business process redesign, automation of service flows, paradigm shifts, cost reduction, improved hospital performance, and improving the quality of human resources, organizational development, and technology to achieve effectiveness and efficiency in-hospital services. Nevertheless, there are still some obstacles to implementing HIS in Indonesia. These obstacles are mainly in terms of infrastructure and human resources. Organizational policies are expected to be more in favor of increasing the use of HIS in the future.

Keywords: Hospital information systems, healthcare, effectiveness and efficiency

INTRODUCTION

The Hospital Management Information System (HMIS) is one of the hospital's subsystems that processes all data relating to humans as users by their duties [1]. The Hospital Management Information System (HMIS) is critical in utilizing information technology to assist the entire hospital operation [2]. To integrate all hospital services, HMIS implementation is required; modern HMIS is a very comprehensive, integrated, and specialized information system designed to manage administrative processes, finances, and clinical aspects of hospitals and health care facilities, which is an essential focus and foundation for providing information. In the interchange of information, patient care and

integration with external institutions such as health insurance and other healthcare facilities are intertwined [3].

As healthcare facilities, hospitals have a variety of difficulties in each dimension, including situational complexity, system complexity, and medical complexity [4]. The complexity of hospitals is expanding due to different government rules and the national health insurance system, which are constantly updated to provide the best possible care to patients. This adds to the complexity of healthcare patient administration systems, with information technology helping to integrate the system. It becomes easier to reduce the adverse effects of this complexity and increase the quality of optimal care for patients to attain patient satisfaction [5]. Barriers to health services in the form of uncertainty in the patient care process are related to the hospital's complexity, particularly the relationship between services and the capacity of hospitals that are unable to properly process information regarding patients' conditions with all services in the hospital due to a lack of integration [6].

The Indonesian Ministry of Health has established an HMIS action strategy map with policy regulations as a standard for developing Hospital Management Information Systems to integrate all service flows in hospitals, thereby facilitating decision making and achieving efficiency in hospitals. This policy regulation, however, has not been fully implemented [7]. When it comes to implementing a Hospital Information System for the first time, there are several difficulties and obstacles to consider, including the high cost of first-time installation, the time it takes clinicians to learn how to use the system, technical issues, and new technology. Other significant obstacles include a lack of computer experience, the complexity of operations and functions, and ethical concerns such as certification, security, privacy, and confidentiality [8].

The HMIS can improve individual health status and health care provider performance while lowering expenses, which will improve hospital quality [9]. Human resources, systems, regulations, and infrastructure all have a role in improving the quality of health services. The Hospital Information System realizes one of these dimensions by ensuring that the hospital's business procedures are responsive, efficient, and effective. This technology will make it easier for hospitals to deliver reliable, integrated data and information to increase patient safety and happiness in hospitals [10].

As a supporter of activities and specialized health services with a broad scope, the HMIS is critical in the health business [11]. According to a past study, there are numerous advantages to implementing HMIS, including increased access to information, improved efficiency, reduced costs, increase the productivity of health care professionals, improve the efficiency and accuracy of codes and patient financial billing data, improve the quality of health services, improve clinical management in terms of patient diagnosis and treatment, reduce the cost of paper requirements for medical records, minimize medical errors, improve patient safety, improve the results of patient care, and increase patient satisfaction [12].

Implementing a system throughout its journey necessitates review and evaluation of the HMIS implementation, which is critical for improving system performance by identifying its shortcomings and strengths. To attain these aims, it is crucial to regularly review the deployment of HMIS, which plays an essential role in supporting health care and increasing the quality, effectiveness, and efficiency of services [13]. This evaluation should be done at every stage of the process, including feasibility studies, system development, implementation, post-implementation, and when making changes to the system to improve decision-making information and increase the success of information system implementation [14]. Evaluation is required to assess the effectiveness of hospital information systems in reducing complexity in various settings, as shown in (table 1) below.

Table 1. The Hospital Complexity Problem

Hospital Complexity	Example of The Condition
Medical complexity	1. Disease severity [4] 2. Disease comorbidities [4] 3. Chronic medical conditions [15]

	4. Disability [16] 5. The complexity of medical work [17]
Situational complexity	1. Environmental, personal, and activity-related factors interact [4] 2. Health culture [18] 3. The environment influences healthy culture [19]
Health service complexity	1. The difficulty of health care innovation [4] 2. Patient involvement [4] 3. Referral system [20] 4. Service fragmentation [21] 5. Restricted budget [22] 6. Health care professionals' varied thinking [23]

Based on some of the research findings above, it demonstrates the value of HMIS implementation in supporting hospital service efficiency and minimizing various complexities and impediments in existing health services, as detailed in (table 1) above, to achieve optimal service quality. As a result, it is required to evaluate literature from various sources that promote efficiency in the implementation of HMIS to gain complete information and a comprehensive image of HMIS in terms of many factors that support this success. So, how does the deployment of the HMIS affect the growth in the efficiency of health services, as stated in this article.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Healthcare Complexity

Multifactorial interactions produce complexity, including patient factors such as behavioral culture and socioeconomic status, health practitioner factors such as competence and training, health task factors such as workflow and time and technology availability, team factors such as communication barriers and leadership roles, physical and social environmental factors, and organizational factors such as organizational structure. Complexity has a significant impact on the health care process and its outcomes; complexity in health services increases the cost of health services due to comorbid conditions and the need for more sophisticated technology; complexity in health services also becomes a source of inequality in health services, such as the provision of health services according to certain ethnicities or socioeconomic conditions, which are entitled to health services so that they can influence the results and outcomes. Complexity in health services also becomes a source of inequality in health services, such as the provision of health services [4,21,22].

Health services entail interconnections with numerous other components in nonlinear systems involving health and other organizations; this is referred to as a complex adaptive system, conceptualized with four essential components, namely individual agents in health services involved. Many people play different roles in the healthcare system, including doctors, nurses, healthcare workers, managers, policymakers, and patients who provide and receive care from hospitals, independent practices, and other community-based healthcare facilities—a profession, a group, or a department that provides health services, for example. Another component is interconnection, there are many relationships and connections between individual agents that are intensively related in a complex adaptation system, although not isolated in the same room, but these agents behave interactively to complete health care tasks and achieve common goals through group action and teamwork. The next component is a dynamic system, with various agents and complex interactions; there is a dynamic relationship by processing information differently than before and responding to different environmental conditions, making the system dynamically adapt to changes that occur from time to time to minimize disturbances that arise, of this dynamic relationship. The final component, complexity, is based on the dynamics of policy rules developed and

adopted in small-scale groups and become expressions and embedded in the group's culture, limiting practitioners' authority in providing health services while maintaining doctor autonomy and prioritizing patients [6].

The complexity of health services is comprised of several elements, including medical complexity, situational complexity, and the complexity of the healthcare system, all of which interact to exacerbate existing issues [4]. *Medical complexity* is a collection of linked and complicated problems involving multi-organ systems with chronic illnesses, functional restrictions, minimal utilization of medical technology, and high human resource requirements [15]. Other factors that define medical complexity include the severity of the patient's illness, the difficulty of determining an accurate diagnosis, particularly in the case of patients with mental disorders, the degree of disability caused by medical conditions, and the need to provide comprehensive health services [4,24,25].

Because relatively simple medical issues can become complex due to the situational settings in which a person lives, works, and goes about their daily activities, situational complexity is essential for health promotion [4]. Situational factors both from the environment or individual conditions that contribute to complexity in health care include, environmental factors can contribute to the influence of others from the external environment on health conditions that have a positive or negative influence, other factors, namely the healthy culture in the group includes verbal and non-verbal built between doctors and patients that affect the health care relationship, other environmental factors that have a significant influence, namely the health service itself which provides access to convenience and comfort for medical personnel to provide care, as well as patients who get the optimal quality of care, factors Personality becomes the influence of situational complexity, especially the patient's condition before illness as well as the patient's activities in social life, work relationships, local culture that affect individual health conditions into consideration and in the complexity of health services [4,26,27].

The difficulty of the back referral reporting process, which is hampered by inadequate information, is a problem that is frequently encountered about systems such as the referral system from primary health services to a complex condition between general practitioners and other parts of the health system [20]. Another source of system complexity is service fragmentation in differentiation in specializations associated with the health system in terms of regulations, funding, organizational variations, and non-uniform service delivery [21]. The system's intricacy also includes funding. Poor medical conditions and comorbid diseases, for example, will raise the cost of health services because there is no general agreement on how to manage complex, ineffective, and efficient care, resulting in higher expenses [22]. The complexity of the system is also influenced by innovations in health care, particularly innovations in health care technology, with various perceptions in using technology that can either increase or reduce the workload for practitioners, increase the workload in the form of documenting data input activities into the system, thereby reducing meeting time with patients. can enhance healthcare employees' stress levels [4]. Meanwhile, according to Greenhalgh et al. [36], technical breakthroughs that enhance complexity in technologies that fail in the implementation process are described in his research. They are also only partially implemented, making it impossible for them to support healthcare services. Optimal technological assistance can help health services reduce complexity, allowing them to provide more efficient care.

Hospital Management Information System (HMIS)

The system is a coherent whole that comprises many related or considered to be related elements that interact and impact one another. These elements create the stage for achieving the objectives that have been set. In the meanwhile, data analysis, processing, and display product information are used to aid decision-making. Valid or invalid information is determined by the recipient's purpose, correctness, and information results from data analysis, manipulation, and presentation for the transmission and processing of data, time, space, or place, at the appropriate moment and in the appropriate forum [28]. In Hurtubise's

opinion, an information system is a system that offers technical information to support decision-making at all levels of the company [24].

The HMIS utilized in a hospital must be user-friendly and capable of overcoming the limitations of patient care in the hospital. Data, people, and processes are all part of an information system, which is made up of a combination of hardware, software, and communication technologies. In health care, information systems are frequently linked to illness data collection activities and outputs. In general, the health information system will be composed of two main components: information processing and the health information system's management structure. Every day, the demand for health data and information grows. People are becoming increasingly concerned about their health and the results of government-led health development, particularly in topics directly affecting their health. Health information will be highly beneficial to the growth of health [1,2,28,29].

Its function can be used to characterize HMIS by the information and services it provides. HMIS facilitates the exchange of data for patient care and administration. This information is mainly about the patient. It must be accurate, relevant, up-to-date, and conveniently accessible to the appropriate personnel at various locations and in a useable format. Data from service transactions is collected, stored, processed, and documented to generate information about the quality of patient care and hospital performance and costs. The hospital's information system must exchange high-quality data throughout its numerous departments [30].

Registration, order entry and results reporting, clinical documentation, scheduling, and patient billing are the five essential components of HMIS. The clinical system's screens will display registration data consistently and automatically. At the point of care, the system gathers and records patient demographics and visits. All clinical orders will be provided in order entry and result reporting, indicating what has been completed and what is still waiting. Electronic notifications will display when orders are duplicated, or errors occur, providing information to aid clinical decision-making [30]. All test results will be entered in the patient's computerized chart, along with any abnormal outcomes. HMIS also offers online clinical encounter recording in the form of flowcharts and organized notes. This information will eventually be shared among healthcare facilities. In this scenario, scheduling a patient entails doctor's appointments as well as tests and procedures. This system will access and process all billable health services, including private rooms and out-of-country coverage [30,31].

The Advantages of HMIS

HMIS can be used as a strategic tool to provide outpatient and inpatient treatments focused on patient satisfaction. Hatta's (2008) theory suggests that information systems are involved in processes [28]. The policies and procedures that system users must follow and apply are the processes in question. However, it is not impossible to encounter a variety of issues and impediments along with the procedure. Human and organizational variables can either help or hinder the implementation of HMIS. Attempts to use information systems are a step forward that must be implemented in the face of rapid changes in the current era of globalization. These efforts must be undertaken if not to fall behind. A limited portion of the Hospital Information System is already in place, but it needs to be expanded to integrate additional data. Health information systems are advantageous in data processing activities, where most procedures are carried out on computers that have been programmed with various applications [20,28].

Information systems have numerous significant goals, including a planned approach to work, accuracy, reliability, no redundancy, immediate retrieval of information, primary storage of information, and ease of use. Furthermore, The following are some of the advantages of using HMIS: (1) Easy access to doctors' data to generate various records, including demographic, gender, age, and other classifications. It is beneficial at the ambulatory (out-patient) level, allowing for better continuity of care. Furthermore, Internet-based access improves the ability to view such data remotely; (2) Improved patient care quality; (3) Assists hospital administrators in formulating comprehensive health-care policies

as a decision-support system; (4) Efficient and precise financial management, patient nutrition, engineering, and medical aid distribution. It is helpful to have a comprehensive perspective of hospital expansion; (5) Improved drug consumption tracking and effectiveness research. As a result, there are fewer adverse drug interactions and more appropriate pharmaceutical consumption; (6) Improved documentation quality; (7) Improves information integrity, decreases transcribing errors, and avoids duplication of data entries; (8) Hospital software is simple to use and eliminates handwriting errors, and 9) Develop a common clinical database using new technology computer systems that provide flawless performance when retrieving information from servers or cloud servers [20,26,28].

Benefits, functions, types of processed information and services given are all characteristics of HMIS. In all hospital human resources, including doctors, HMIS implemented Computerized Provider Order Entry (CPOE). HMIS can help doctors enhance accuracy, legibility, and patient medication access. HMIS will also help physicians be more efficient and effective by delivering crucial patient information (such as allergies) at the time of booking and conflict checks, order checks, and online access to best practice information. It is also possible to optimize maintenance by keeping track of all orders. For nurses and other healthcare workers, HMIS will give direct access to orders and results and patient demographics, treatment, and test findings. HMIS also allows for easier online access to information (i.e., recommended drugs or drug alerts) [28]. Furthermore, in the end, all of these factors will indeed reduce patient treatment errors.

In terms of clinical benefits, using HMIS has several advantages, including (1) Providing a general source of information about a person's medical history; (2) Improving health care professionals' ability to coordinate care by providing information on a person's health and visiting history at the location and time needed; (3) Linking information from diagnostic information systems such as X-rays and laboratories to the EPR; (4) Strengthening internal and external communication among Health care providers; (5) Allow service providers to access the patient's medical history and results between facilities; and (6) Provide better access to information online (i.e., recommended drugs or drug warnings). All of this information is accessible for use in all hospital care facilities [26].

Administratively, HMIS will provide better access to online information (e.g., about recommended drugs or drug warnings) and strengthen internal and external communication between Healthcare providers. It is also easier for administrative staff because information and registration are centralized, reducing the need for patient re-registration in several places. Of course, it will also have a good impact on reducing the need for paper usage [31].

Implementation Issues with HMIS

The implementation of the hospital management information system is divided into many domains. These domains, including data, technology, human resources, HR competencies, and management, can be either a driving force or an impediment to HMIS deployment [27].

Transaction data/business process in a hospital is not centralized but rather dispersed across several divisions. It does not flow according to established business processes. Differences might also hamper the integration process in data storage types and media. Because the technology for mass conversion of specific data is not accessible, part of the data migration procedure is done manually [27]. Connectivity between existing systems and HMIS must be guaranteed to maintain data integrity. Workarounds are needed to make available data types and relationships compatible with enterprise resource planning (ERP) systems [28].

The readiness of hardware and software on both the server and the terminal computer are technological issues (client). This element necessitates goods procurement with management as a decision-maker. The request for HMIS modification is common, and it must be fulfilled for the hospital's business procedures to function correctly. The hospital's failure to provide a specific team to act as a communication bridge during the HMIS reengineering process resulted in the HMIS business process being adjusted slowly [22,23,27].

Hospital employees' primary focus is on serving patients, and administrative tasks have traditionally relied on tangible mediums such as paper and books. The resistance to HMIS deployment stems from many hospital staff's reluctances to switch from a manual to a computerized approach employing HMIS. This HR domain is inextricably linked to management practices, particularly incentive and punishment systems [27].

Administrative and service management are the two primary areas that make up the working hours model in public and commercial hospitals. Employees with set working hours fall into the first category, whereas medical officers with shifts separated into three shifts per day fall into the second [27]. The lack of time available for administrative management and service workers is a stumbling block in the training process. As a result, the training procedure must be repeated until it is determined that staff have a thorough understanding of how to utilize HMIS. Another issue is the absence of information technology skills among potential HMIS users, as evidenced by the training and mentoring of system users [22,27].

As a decision-maker, effective management necessitates a significant amount of effort. Management is not always the deciding factor in every situation. Not every management is willing to delegate tasks, such as selecting administrators and operators to perform basic HMIS tasks. When hospital workers are unwilling to accept delegation, the matter becomes even more problematic. Furthermore, management failed to complete the HMIS socialization process and mobilization of workers at numerous hospitals, resulting in inadequate support for the deployment of HMIS. The lack of a reward and punishment policy causes hospital staff to undervalue the use of HMIS [27]. Table 2 shows some of the challenges that hospitals face when using HMIS.

Table 2. Themes of HMIS Challenges Identified [27]

Knowledge Factors	Organizational Factors	Hardware Factors
1. A lack of desire to learn HIS applications. 2. Employees are not being taught about the relevance of indicators and data entry. 3. Data management is not being used effectively. 4. Insufficient knowledge to make full use of HMIS. 5. Manual statistics reporting and HMIS are out of sync. 6. The data is not entered into the HIS system by the user. 7. Indicators for quality improvement are not being used.	1. Data recording systems come in a variety of shapes and sizes. 2. Top management's lack of support. 3. Data recording on paper and digital forms is duplicated. 4. Pay no mind to the significance of information systems in improving hospital performance. 5. Many indicators are not defined in HMIS systems. 6. There is no responsibility for managers and staff to use data correctly and on time.	1. There is a lack of proper IT infrastructure in the hospital. 2. Human resources shortages. 3. Low speed and not updated computer. 4. Internet connection speed is slow.

Current Application of HMIS In Indonesia

Every year, the HMIS is improved. In 2008, the Ministry of Health of the Republic of Indonesia created the eHealth HMIS to implement Law no. 14. In terms of public information, the eHealth program can be implemented in any hospital that has developed an HMIS, which can automate business activities, starting at the provincial and regional levels [32]. The system continued until the industrial era 4.0, where the principle of industry 4.0 combines digitizing clinical, medical, and laboratory data and implementing automation processes from manual processes that hospitals and other health services have long used. This system innovation will minimize delays and provide opportunities for medical information technology to improve health services significantly [7].

The utilization of HMIS in hospitals is adjusted to the Standard Operating Procedures (SOP). In general, HMIS in Indonesia is used for patient registration, inputting patient data, patient diagnoses, actions taken against patients, and mutations [33]. In today's Indonesian hospitals, the use of HMIS has progressed in a variety of ways. Some are already excellent, but many hospitals still have issues with their implementation. The key reason for establishing and developing HMIS is that hospitals do not yet have complete information technology management. In terms of infrastructure availability, one example is. Although some hospitals have computers, they are not yet fully functional. Many industries, particularly in the domains and breadth of health, are inextricably linked to the participation and use of computer technology. Computer technology is advancing at a breakneck pace, both in terms of software and hardware. Various categories of labor are also becoming increasingly accessible to do using computer media, with the caveat that people must continue to learn to keep up with technical advancements [21,22,33].

The internet-connected HMIS computerized system makes it simple to link with other businesses, such as insurance. The connection will undoubtedly improve access to numerous resources and hospital services [33]. In Indonesia, many hospitals have partnered with other organizations such as insurance companies. The government, such as BPJS or private insurance, manages this insurance. Patients who have insurance are usually served at a different counter than the general public. The system's flaw is that it still has issues from time to time, which makes it challenging to access cross-company collaboration, such as data across hospital units [22].

In terms of management support, the deployment of HMIS is often well-received by executives, owing to the relatively low expenses involved. The support and encouragement of HMIS users and the availability of suitable facilities in the hospital environment for its users influence the effectiveness of HMIS adoption. Of course, this has to do with leadership policies in the development of HMIS. Regarding human resources, the adoption of HMIS in several hospitals is still plagued. This issue is due to employees' propensity to use the manual system, making it difficult to adapt to these conditions [34]. The availability of IT units and IT workers has a significant impact on HMIS adoption. As a result, most hospitals place a greater emphasis on administrative rather than clinical functions. To attain quality hospitals in providing health services to the community, hospital staff require special training required of all employees.

The provision of services and actions in many ways will undoubtedly affect the condition and comfort of the patient. The sooner patients are served, of course, the better because it involves patient safety. Full support from various parties, such as human resources and infrastructure, is required to meet these needs. A complete and complete infrastructure will be conducive to providing health services. Hospitals that have complete infrastructure will very quickly assist employees in providing services to patients [35]. Included in this is HMIS.

To improve the quality of medical services, hospitals require effective management information system technology. Technology for HMIS is intended to be integrated to combine the hospital's primary tasks into a single integrated system that is kept in a central database [36]. Understanding the operations and infrastructure of information technology and proper mapping are essential for deploying HMIS successfully. The majority of hospitals in Indonesia have deployed HMIS. However, due to a lack of infrastructure, it has not been fully implemented. Future rules are projected to encourage infrastructure completeness so that management operations can function more smoothly [34,36].

In the future, HMIS technology needs (and is possible) to be continuously developed. The most possible, for example, is to connect HMIS in the form of an application that can be downloaded on a smartphone device. Internet-based medical information technology is a means of health education that sends information directly to patients via their smartphones. The information obtained will increase the patient's knowledge of his disease condition. Patients can also integrate it with pharmacological therapy as well as non-pharmacological treatments they receive. Another facility that patients get is self-monitoring of health conditions. Patients enter their data into available applications, and doctors can regularly monitor their condition and attitude towards their illness, making it easier for doctors to make medical decisions for patients. If this can be done, this will, of course, make it easier for the public to access the information provided by the hospital. As potential recipients of health

services, the public can access all of this information from their respective smartphones even before they leave their homes for the hospital.

METHODS

The method used in writing this article is a literature review, a systematic, explicit, and reproducible method using comprehensive strategies, such as searching articles in research journal databases, searching through the internet, reviewing articles. The aim is to identify, evaluate and synthesize the works of research results and the results of previous thoughts that previous researchers and practitioners have produced. International and national literature searches were conducted using the PUBMED, EBSCO, ScienceDirect, and Proquest, Researchgate, and Google Scholar databases. 60 articles published from 2010 to 2021 used "Management Information Systems", "Hospital Management Information Systems", “Information System Effectiveness and Efficiency” and “Healthcare Efficiency” as a keyword in the early stages of searching; for journal articles. The articles were identified and explored for their suitability with the theme and then compiled. By paying attention to the publication period in that decade, the literature searched is tailored to answer each topic in the mind map branch, literature in books and journals that employ systematic review research methods, quantitative studies, and qualitative studies. Litterateur employed the critical appraisal approach to analyze the journals used as the theoretical basis in this literature review, assessing the selected publications' differences, similarities, and flaws. Journals are screened to see which ones are best suited to answering research inquiries from the various branches of topics covered in the preceding notion of thinking. The litterateur synthesized and poured the literature review results into a new article that provides an overview of the implementation of the HMIS in supporting the effectiveness and efficiency of current health services after answering all of the topics from each branch of the concept of thought.

RESULT AND DISCUSSION

Information System Support Organizational Effectiveness and Efficiency

Organizational effectiveness refers to how an organization has attained complete self-awareness thanks to leaders setting well-defined goals for employees and laying out strategies for achieving those goals efficiently. Transparent decision-making processes and communication pipelines are being implemented by management. Meanwhile, efficiency is a method of achieving predetermined objectives with the best possible outcomes. According to this definition, the efficiency process is the attainment of appropriate organizational goals with minimal expenses and in a short amount of time-based on previously established targets [37].

Business process redesign

Organizations can improve their quality by evaluating the added value of business operations solely from diverse external and internal customers. A critical part of process-based organizational design is ensuring the quality of product and process outputs. A solid process-based organization has a substantial impact on hospital efficiency. Hence hospitals that want to increase their efficiency should establish process-based organizations. However, making fundamental regulations, particularly mobilizing the participation of doctors and other health professionals to develop an influential organizational culture, is critical to achieving optimal efficiency results [38]. Organizations can improve their efficiency by providing a positive work atmosphere and system, cutting costs, and improving production [39].

Organizational performance and competitiveness can both benefit from process orientation. To achieve appropriate financial performance, process orientation is dependent on the hospital employees. Process-oriented performance enhancements can help hospital

staff be more efficient while providing high-quality care. Process orientation can achieve numerous organizational goals, including lower workloads, higher hospital staff satisfaction, improved clinical quality and patient satisfaction, and eventually, hospital finances [40].

Identifying a hospital's business process, specifically patient medical care, is the starting point for developing a process-based organization. This process must be studied, optimized, and then managed by a team of health care providers that includes both doctors and nurses. A good business process with efficient cost accounting and financial control is the best way to realize the benefits of process-based companies. The current study's practical implications include that hospitals should employ process-based organizations to improve efficiency. Health workers must support creating a successful process-based organization in a hospital since they play an essential part in providing health services inside the hospital's organizational process. It needs interdisciplinary teamwork, knowledge exchange, customer orientation, and top executive levels that focus on organizational development [38]. Professional integration in sharing information and integration of health services can be achieved through the presence of a Hospital Information System that facilitates the exchange of data and information that can be accessed in real-time, resulting in improved service quality and patient satisfaction with the care provided, as well as a smooth and efficient hospital process.

As a modeling material for a business process, management combines management and information technology, involving all essential resources such as persons, organizations, applications, documents, and information resources [41]. The four steps in business process management are identifying business processes, documenting the process, evaluating and assessing the operational process, and optimizing the process. To improve health care quality, hospital organizations should use business process management to avoid the complexity of health services and focus on business processes [42].

Whether the hospital can tackle these issues or be negatively affected by them, digital transformation is one of the challenges for companies that can change the business process model developed previously. Enterprise systems models, such as software-based and service models, are critical because they can significantly improve organizational efficiency. Hospital Information System software that uses an internet-based digitalization architectural model to allow access to information for both health personnel and patients [43] is an example of a digitization model that can be applied.

Automation

The transition of manual tasks included in business processes into duties that can be performed or helped with information and communication technology is known as automation [44]. The automation process has been successfully applied in health care because it can improve patient information management and the clinician's workflow in storing and retrieving patient-related information [45]. Using the HMIS platform, document management systems and automation procedures seamlessly integrate laboratory data systems into the information centre till doctors validate them in less time than before. Clinicians gain data on the time it takes to request analysis, the time it takes to start the process, and the time it takes to get the results, minimizing patient complaints [46]. Implementing information and communication technology can simplify business processes in hospitals by reducing the number of overall work activities to a single control. Optimization of the process and time of providing health care is achieved by automating the implementation of information systems [44].

Paradigm shifts

The paradigm shift brought about by the advancement of information technology impacts social and technological transformation, necessitating creating an innovative knowledge-based healthcare system through the construction of an HMIS. This system can mix technology, humans, and existing procedures into a single unit to operate an integrated hospital care system distinct from the typical information system that lacks accuracy [47]. There has been a considerable paradigm shift in the processing of health care data.

Traditional manual data collection has given way to automation data as an essential source of information for centralized health services. As proof that information systems are replacing existing traditional systems, health care organizations and providers are more concerned with exchanging information connected to health services and patient information [48]. Computerization has shifted the paradigm, allowing for a new organizational, work, and living system. However, this automated method may introduce additional security and privacy problems. As a result of the amount of data inputted, computerized technology for health services necessitates infrastructure with high-security features [49].

The community-centred health services plan, connected with information technology, represents a fundamental paradigm shift in how health services are paid, administered, and delivered to those in need. This is critical for health care to meet the demands of a society with a long-lived population, high-cost chronic illness conditions, and a variety of avoidable diseases that necessitate sophisticated interventions regularly with a growing number of cases [50].

Cost reduction

Cost is a critical consideration in the development of the hospital business, and it is an essential factor in ensuring that hospital services continue to run at optimal levels. Patient satisfaction will rise as a result of better health care, resulting in more hospital visits. Investments in information technology such as electronic medical records, computerized patient scheduling systems, and human resource management improve the overall quality of health care. HMIS applications can minimize operational costs by providing information as functional decision-making materials in utilizing better resources, boosting staff efficiency, and limiting additional expenditures. This has far-reaching ramifications since it indicates the cost-effectiveness of hospital information technology [51].

Because of its advantages, using the software as a service system is an effective method to improve the competitiveness of corporate information technology. Fast installation at a cheaper initial cost eliminates the need for software maintenance and lowers the cost of information technology workers. The usage of software-based cloud services as a business model may be an alternative that offers benefits such as flexibility and a greater breadth of service integration at reduced prices [52]. The necessity to cut investment costs in information technology infrastructure and human resources and the ability to collaborate with internal users and customers, as well as other external institutions, drove the choice to deploy application-based software. The system's installation is tailored to several factors, including streamlining the organization's business procedures to make the process go more smoothly [53].

Hospital performance

The HMIS implementation paints a clear picture of the relationship between information technology and data processing and patient care quality and satisfaction. Through two hospital performance indicators, namely quality of care and patient satisfaction [54], this has a favorable impact both directly and as a supplement in increasing the quality of care. Information system assistance makes clinical flow easier to understand and apply, resulting in higher staff satisfaction and increased hospital service flow efficiency [55]. Hospitals are more efficient when medical technology and relevant information technology are used correctly. This is also influenced by the hospital's organizational and managerial elements. The ability of the hospital director to manage internal conflicts with a sound managerial system that does not contradict the hospital's mission has a good association with efficiency and the use of technology [56].

For healthcare practitioners, the installation of the HMIS has several advantages. With components of a clinical information system, clinical research support system, management information system, health education support system, and a referral system to deliver healthcare services, a considerable improvement in health care quality and hospital efficiency is expected. Electronic medical records, image archiving systems, and communication systems make up the clinical information system, supporting all clinical

activities [24]. The local, regional planning committee promotes using HMIS to correctly distribute doctors' and other medical personnel's resource demands. The National Hospital Information System can automatically monitor hospital performance, which would improve the quality of health services in the country [57].

Information System Development Goals

The goal of creating an HMIS is to aid in implementing adequate hospital functions for patient care. It includes patient administration while also considering the hospital's financial management, legalization, and other requirements to provide optimal health service functions [1]. The evolution of information systems impacts three key aspects: persons, organizations, and technology itself.

Human development

In emerging organizations, such as hospitals, humans are the most important player and valuable assets. Innovative technology must be utilized by adaptable professionals [58]. As users of the information system, humans play a critical role. The organization's effectiveness will be influenced by behavior that supports the growth of information systems, either directly or indirectly. It is high-level management's job to exert influence and be the institution's strength to motivate its people. Hospital management should give an overview of information system opportunities that can improve staff effectiveness, resulting in improved medical services through health information systems.

It is inseparable from user requirements in the construction of information systems, which are a factor in improving the implementation of HMIS. User feedback is critical for improving the treatment module, which is frequently utilized by medical personnel. The goals of establishing an information system will be met by ongoing system improvement. These goals include increasing system usage as well as improving service effectiveness and efficiency. Through features designed to increase the quality of care and patient safety, the service display was modified to make it easier to use and expanded the benefits to accommodate the work process in hospitals [59].

Organizational development

Organizations have emerged as the most critical determinant of information system implementation. Centralization of decision-making activities, hospital scale, infrastructure availability, and high-level management support are all organizational supporting variables [58]. Organizations must manage their activities and resources to direct their vision and mission and achieve their goals, according to Vilcahuamán, L., and Rivas, R. [60]. The health industry cannot deny that it operates in a globally competitive environment and market; the focus here is on attaining goals with good results rather than on how to survive and thrive in these conditions. As a result, hospitals require a standardized and widely recognized management structure that is results-oriented, patient-centred, well-led, and aligned with common objectives. One way is to increase technological innovation to support the attainment of quality service goals while remaining competitive.

Every clinical operation includes a technological component, making information system management integral to achieving efficacy and efficiency. Technology resources must be handled efficiently throughout the hospital process to attain optimal efficiency, which is the purpose of integrated information system management [60]. Its resources and technological capabilities further aid the hospital's ability to satisfy public health requirements. Hospitals can meet patient safety needs with a well-measured level of treatment risk through an integrated HMIS, reducing the risk of injury to patients, health care professionals, and the local community.

Technology development

The growth of technology in a company might be beneficial to the company. Compatible technology will reduce the complexity in the field, allowing the company to be more imaginative in the face of any issue. The attainment of technological innovation that is

judged better than the utilization of earlier technology is referred to as relative advantage. Reducing hospital running costs and other relative operational benefits are two examples of relative advantages of installing HMIS. This benefit can be obtained by designing compatible technology and matching the Hospital's needs with standard software and hardware equipment. It can be used to make changes to rules and procedures in the field. The difficulties that the organization faces in achieving its goals are one of the driving factors for implementing new technology, so new technologies are developed to enable the organization to deal with the dynamics of complexity that obstruct the achievement of organizational goals [58]. As a result, creating an innovative HMIS can encounter hurdles while also reducing the complexity of current health services.

CONCLUSIONS

HMIS is a technological advancement in hospital construction that aids in optimizing health services. The realization of the hospital's objective of enhancing effectiveness and efficiency through an integrated system capable of reducing the complexity of fragmented health services indicates optimal service. The provision of trustworthy, valid, and qualitative information is critical to the administration and management of hospital services. This is the reason for the HMIS existence and technology, and there is no arguing its superiority over manual operations.

Implementing HMIS targeted to the business process demands of each Hospital also improves effectiveness and efficiency. Using Hospital Information Systems to adjust business needs can help hospitals gain a competitive advantage and compete. The combination of human resources, organization, and technology quality in system development is critical to achieving the HMIS implementation goals, namely enhancing clinical flow, using technology safely and efficiently, controlling operational costs, and contributing to better patient care.

Despite the advantages, numerous issues have been documented throughout the introduction of health information systems in the healthcare setting. One of them is the fact that HMIS is still underutilized in several Indonesian healthcare organizations. The lack of supporting infrastructure for HMIS is the fundamental cause behind this. It demands a commitment from management to issue policies that enable better HMIS utilization in their institutions. However, despite being widely available in health institutions, this system cannot be used optimally in patient health services. This may be due to the lack of available human resource skills in operating the HMIS device. Adequate training is needed to introduce HMIS to them. It is hoped that this training will improve their ability to use HMIS. Users without proper training in their task allow for a substantially increased failure rate.

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REFERENCES

[1] Handayani, P.W., Hidayanto, A.N., Pinem, A A., Sandhyaduhita, P.I. and Budi, I. (2018). Hospital Information System User Acceptance Factors: User Group Perspectives. Informatics for Health and Social Care, 43(1), 84-107.

[2] Chen, R.-F. and Hsiao, J.-L. (2012). An Investigation on Physicians' Acceptance of Hospital Information Systems: A Case Study. International Journal of Medical Informatics, 81(12), 810-820.

[3] Ismail, A., Jamil, A.T., Rahman, A.F.A., Bakar, J.M.A., Saad, N.M. and Saadi, H. (2010). The Implementation of Hospital Information System (HIS) In Tertiary Hospitals In Malaysia: A Qualitative Study. Malaysian Journal of Public Health Medicine, 10(2), 16-24.
[4] Rahimi, B., Nadri, H., Lotfnezhad, A.H. and Timpka, T. (2018). A Systematic Review of the Technology Acceptance Model in Health Informatics. Applied Clinical Informatics, 9(3), 604-634.
[5] Mishra, A.N., Tao, Y., Keil, M. and Oh, J.-H. (2021). Functional IT Complementary and Hospital Performance in the United States: a Longitudinal Investigation. Information Systems Research.
[6] Braithwaite, J., Churruca, K., Ellis, L.A., Long, J., Williams, L.C., Damen, N., et al. (2017). Complexity Science In Healthcare - Aspirations, Approaches, Applications and Accomplishments: A White Paper. Australian Institute of Health Innovation, Macquarie University: Sydney, Australia.
[7] Handayani, P.W., Hidayanto, A.N., Ayuningtyas, D. and Budi, I. (2016). Hospital Information System Institutionalization Processes In Indonesian Public, Government-Owned and Privately Owned Hospitals. International Journal of Medical Informatics, 95, 17-34.
[8] Fadhil, N.F.M., Jusop, M., and Abdullah, .A.A. (2012). Hospital Information System (HIS) Implementation In a Public Hospital: a Case Study From Malaysia. Far East Journal of Psychology and Business, 8(3), 1-11.
[9] Pai, F. Y., & Huang, K. I. (2011). Applying the Technology Acceptance Model to the Introduction of Healthcare Information Systems. Technological Forecasting and Social Change, 78(4), 650-660.
[10] Handayani, P.W., Hidayanto, A.N., Sandhyaduhita, P.I. Kasiyah and Ayuningtyas, D. (2015). Strategic Hospital Services Quality Analysis in Indonesia. Expert System Application, 42(6), 3067-3078.
[11] Braa, J., Sahay, S., John, L. and Senyoni, W. (2017). Health Information Systems in Indonesia: Understanding and Adrressing Complexity. Conference Paper In; IFIP Advances in Information and Communication Technology, May 2017.
[12] O'Malley, A.S., Grossman, J.M., Cohen, G.R., Kemper, N.M. and Pham, H.H. (2010). Are Electronic Medical Records Helpful for Care Coordination? Experiences of Physician Practices. Journal of General Internal Medicine, 25(3), 177-185.
[13] Ahmadian, L., Nejad, S.S. and Khajouei, R. (2015). Evaluation Methods Used on Health Information Systems (HISs) in Iran and the Effects of HISs on Iranian Healthcare: a Systematic Review. International Journal of Medical Informatics, 84(6), 444-453.
[14] Alipour, J., Mehdipour, Y., Karimi, A. and Sharifian, R. (2021). Affecting Factors of Cloud Computing Adoption in Public Hospitals Affiliated with Zahedan University of Medical Sciences: A Cross-sectional Study in the Southeast of Iran. Digital Health, 7, 20552076211033428.
[15] Cohen, E., Friedman, J.N., Mahant, S., Adams, S., Jovcevska, V. and Rosenbaum, P. (2010). The Impact of a Complex Care Clinic in a Children Hospital. Child: Care, Health and Development, 36(4), 574-582.
[16] Benning, N.H. and Knaup, P. (2020). Hospital Information Systems. Studies in Health Technology and Informatics, 274, 159-173.
[17] Xu, T., Wu, A.W. and Makary, M.A. (2015). The Potential Hazards of Hospital Consolidation: Implications for Quality, Access and Price. Journal of the American Medical Association, 314(13), 1337-1338.
[18] Faridah, L., Rinawan, F.R., Fauziah, N., Mayasari, W., Dwiartama, A. and Watanabe, K. (2020). Evaluation of Health Information System (HIS) in the Surveillance of Dengue in Indonesia: Lessons from Case in Bandung, West Java. International Journal of Environmental Research and Public Health, 17, 1-13.
[19] Klein, J.H. and Young, T. (2015). Health Care: A Case of Hypercomplexity?. Health Systems, 4(2), 104-110.

[20] Ross, D.S. and Rajagopalan, V. (2016). Role of Hospital Information Systems in Improving Healthcare Quality in Hospital. Indian Journal of Science and Technology, 9(26), 1-5.
[21] Setiawan, A.T. and Permadani, R.P. (2016). Sistem Informasi Manajemen Rumah Sakit Welas Asih Ambarawa. Technology Acceptance Model Journal, 7, 52-60.
[22] Setyawan, D. (2016). Analisis Implementasi Pemanfaatan Sistem Informasi Manajemen Rumah Sakit (SIMRS) Pada RSUD Kardinah Tegal. Indonesian Journal on Computer and Information Technology, 1(2), 54-61.
[23] Silitonga, T.D. (2019). Implementation of Hospital Management Information System. Journal of Community Health, 5(3), 161-165.
[24] Handayani, P.W., Hidayanto, A.N. and Budi, I. (2018). User Acceptance Factors of Hospital Information Systems and Related Technologies: Systematic Review. Informatics for Health and Social Care, 43(4), 401-426.
[25] Sulivan, M. and Ozonoff, A. (2018). Functionality of Hospital Information Systems: Results From a Survey of Quality Directors at Turkish Hospitals. BMC Medical Informatics and Decision Making, 18(6), 1-12.
[26] Mehdipour, Y. and Zerehkafi, H. (2013). Hospital Information System (HIS): At A Glance. Asian Journal of Computer and Information System, 1(2), 54-61.
[27] Heshmati, B. and Joulaei, H . (2016). Iran's Healthcare System in Transition. Lancet, 387(10013), 29-30.
[28] Ebnehoseini, Z., Tabesh, H., Deldar, K., Mostafani, S.M. and Tara, M. (2019). Determining the Hospital Information System (HIS) Success Rate: Development of a New Instrument and Case Study. Macedonian Journal of Medical Science, 7(9), 1407-1414.
[29] Fadilla, N.M. and Setyonugroho, W. (2021). Sistem Informasi Manajemen Rumah Sakit Dalam Meningkatkan Efisiensi: Mini Literature Review. Jurnal Teknik Informatikan dan Sistem Informasi, 8(1), 357-374.
[30] Febrita, H., Martunis, Syahrizal, D., Abdat, M. and Bakhtiar. (2021). Analysis of Hospital Information Management System Using Human Organization Fit Model. Indonesian Journal of Health Administration, 9(1), 23-32.
[31] Hade, S., Djalla, A. and Rusman A.D.P. (2019). Analysis the Application of Hospital Management Information Systems in an Effort to Improve Health Services in Andi Makkasau Parepare. Jurnal Ilmiah Manusia dan Kesehatan, 2(2), 293-305.
[32] Indrawati, L., Dewi, D.R., Pramono, A.E. and Maryati, Y. (2018). Manajemen Informasi Kesehatan V: Sistem Klaim dan Asuransi Pelayan Kesehatan. Kementerian Kesehatan Republik Indonesia.
[33] Nengsih, M.K. and Yustanti, N.V. (2017). Analisis Sistem Antrian Pelayanan Adminis,trasi Pasien Rawat Jalan Pada Rumah Sakit Padmalalita Muntilan. Management Insight: Jurnal Ilmiah Manajemen, 12(1), 68-78.
[34] Luz, R., Mussi, C.C. and Dutra, A. (2019). Implementation of Large-Scale Health Information Systems. Revista de Gestao: Emerald Insight, 28(2), 106-132
[35] Murtola, L.M., Laine, H.L. and Salantera, S. (2013). Information Systems in Hospitals: a Review Article From a Nursing Management Perspective. International Journal of Networking and Virtual Organisations, 13(1), 81-100.
[36] Prayitno, L. and Siahaan, S. (2019). Description of Pharmaceutical Financing in Government Hospitals with BLU/BLUD Management. Buletin Penelitian Sistem Kesehatan, 22(4), 229-235.
[37] Nielsen, P. and Saebo, J.I. (2016). Three Strategies for Functional Architecting: Cases from the Health Systems of Developing Countries. Information Technology for Development, 22(1), 134-151.
[38] Kuo, K.M., Liu, C.F., Talley, P.C. and Pan S.Y. (2018). Strategic Improvement for Quality and Satisfaction of Hospital Information Systems. Journal of Healthcare Engineering, 1-14.
[39] Cleven, A.K., Winter, R., Wortmann, F. and Mettler, T. (2014). Process Management in Hospitals: an Empirically Grounded Maturity Model. Business Research, 7, 191-216.

[40] Axelsson, R., Axelsson, S.B., Gustaffson, J. and Seeman, J. (2014). Organizing Integrated Care in a University Hospita: Application of a Conceptual Framework. International Journal of Integrated Care, 14, 1-9.
[41] Handayani, P.W., Hidayanto, A.N., Pinem, A.A., Hapsari, I.C., Sandhyaduhita, P.I. and Budi, I. (2017). Acceptance Model of a Hospital Information System. International Journal of Medical Informatics, 99, 11-28.
[42] Lopez, J.D., Moreno, S., Moreno, L., Anzola, D., Lopez, F., Vilardy, A., et al. (2016). Business Processes Management Implementation in Health Sector. International Journal of Managing Public Sector Information and Communication Technologies, 7(4), 1-10.
[43] Clark, T., Frank, U. and Kulkarni, V. (2016). Supporting Organizational Eciency and Agility: Models, Languages and Software Systems. Dagstuhl Reports, 6(5), 31-35.
[44] Weber, B., Mutschler. B. and Reichert, M. (2010). Investigating the Effort of Using Business Process Management Technology: Results from a Controlled Experiment. Science of Computer Programming. 75(5), 292-310.
[45] Yusof, M.M., Khodambashi, S. and Mokhtar, A.M. (2012). Evaluation of the Clinical Process in a Critical Care Information System Using the Lean Method: a Case Study. BMC Medical Informatics and Decision Making, 12(1), 1-14.
[46] Ebnehoseini, Z., Tara, M., Tabesh, H., Dindar, F.H. and Hasibian, S. (2020). Understanding Key Factors Affecting on Hospital Electronic Health Record (EHR) Adoption. Journal of Family Medicine and Primary Care, 9(8), 4348-4352.
[47] Beglaryan, M., Petrosyan, V. and Bunker, E. (2017). Development of a Tripolar Model of Technology Acceptance: Hospital-based Physicians' Perspective on EHR. International Journal of Medical Informatics, 102, 50-61.
[48] Alalawi, Z.M., Eid, M.M. and Albarrak, A.I. (2016). Assessment of Picture Archiving and Communication System (PACS) at Three of Ministry of Health Hospitals in Riyadh Region - Content Analysis. Journal of Infection and Public Health, 9(6), 713-724.
[49] Almunawar, M.N., & Anshari, M. (2012). Health information systems (HIS): Concept and technology. arXiv preprint arXiv:1203.3923.
[50] Hemker, R.A., & Solomon, L.A. (2016). Building a Physician Culture for Healthcare Transformation: A Hospital's Leadership Challenge. Frontiers of Health Services Management, 32(3), 3–14.
[51] Himmelstein, D.U., Wright, A. and Woolhandler, S. (2010). Hospital Computing and The Costs and Quality of Care: a National Study. The American Journal of Medicine, 123(1), 40-46.
[52] Khajouei, R., Jahromi, M.E. and Ameri, A. (2019). Challenges of Implementing Picture Archiving and Communication System in Multiple Hospitals: Perspectives of Involved Staff and Users. Journal of Medical Systems, 43(7), 182.
[53] Eickhoff, M. and Muntermann, J. (2016). Stock Analyst vs The Crowd: Mutual Prediction and the Driver of Crowd Wisdom. Information and Management, 53(7), 835-845.
[54] Machta, R.M., Reschovsky, J.D., Jones, D.J., Kimmey, L., Furukawa, M.F. and Rich, E.C. (2020). Health System Integration with Physician Specialties Varies Across Markets and System Types. Health Services Research, 55(Suppl 3), 1062-1072.
[55] Suchodolski, K., von Dincklage, F., Lichtner, G., Friesdorf, W., Podtschaske, B. & Ragaller, M. (2019). Comparison of Current Critical Care Information Systems from the Perspective of Clinical Users: Summary of the Results of a German Nationwide Survey. Der Anaesthesist, 68(7), 436-443.
[56] Elabed, S., Shamayleh, A. and Daghfous, A. (2021). Sustainability-oriented Innovation in the Health Care Supply Chain. Computer and Industrial Engineering, 160, 475-485.
[57] Murphy, S.M. and Neven, D. (2014). Cost-effective: Emergency Department Care Coordination with a Regional Hospital Information System. The Journal of Emergency Medicine, 47(2), 223-231.
[58] Alipour, J., Mehdipour, Y. & Karimi, A. (2019). Factors Affecting Acceptance of Hospital Information Systems in Public Hospitals of Zahedan University of Medical Sciences: A Cross-Sectional Study. Journal of Medicine and Life, 12(4), 403-410.

[59] Nadri, H., Rahimi, B., Lotfnezhad A.H., Samadbeik, M. & Garavand, A. (2018). Factors Affecting Acceptance of Hospital Information Systems Based on Extended Technology Acceptance Model: A Case Study in Three Paraclinical Departments. Applied Clinical Informatics, 9(2), 238-247.
[60] Abdekhoda, M., Ahmadi, M., Dehnad, A. & Hosseini, A.F. (2014). Information Technology Acceptance in Health Information Management. Methods of Information in Medicine, 53(1), 14-20.
[61] Harras, H., Sugiarti, E., & Wahyudi, W. (2020). Kajian Manajemen Sumber Daya Manusia Untuk Mahasiswa.
[62] Wahyu, W., & Salam, R. (2020). KOMITMEN ORGANISASI (Kajian: Manajemen Sumber Daya Manusia).
[63] Wahyudi, W. (2020). KINERJA DOSEN: KONTRIBUSINYA TERHADAP AKREDITASI PERGURUAN TINGGI. *SCIENTIFIC JOURNAL OF REFLECTION: Economic, Accounting, Management and Business*, *3*(4), 401-410.