



## Integrated Hospital Payment Information System Modeling Analysis Using the Pieces Method

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### ABSTRACT

The integrated payroll information system modeling is the focus of this work. The Aisyiyah Bojonegoro hospital is the subject of the investigation. This case study underwent analysis in order to identify and then formulate any issues with the topic of the study. This study employs the PIECES analysis technique, which is thoroughly examined, and the results are presented in the form of a business process model based on Business Process Management Notation (BPMN). BPMN can be used to improve business processes in hospital payroll systems as well as increase effectiveness and efficiency.

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## **INTRODUCTION**

Through the provision of services and medical care to those in need, hospitals serve as key healthcare institutions in the system. Hospitals can also be thought of as healthcare establishments that offer inpatient, outpatient, and emergency medical services in addition to general personal health services Farlinda (2017). When it comes to situation complexity, system complexity, and medical complexity per se, hospitals have health facilities that are extremely complicated Kuipers (2011). An effective and well-integrated payroll information system is one of the factors that must be taken into consideration when managing hospital operations. A payroll information system is a system created to handle and process payroll data for the employees of a company or organization.

An integral component of managing hospital finances and human resources (HR) is an integrated payroll system. According on attendance, job schedule, location, experience, and other pertinent characteristics, employees are paid in this manner. Hospitals can effectively manage employee salaries for a variety of roles and activities, from doctors and nurses to administrative personnel, thanks to an integrated payroll system. Barata (2021); Waring (2004).

Hospitals are able to implement an integrated payroll system thanks to effective staff payroll administration. The system incorporates automatic calculations based on pertinent information, including tracked attendance and working hours and other elements influencing an employee's pay. Hospitals can prevent payroll mistakes made by humans and guarantee that each employee receives a salary in accordance with his work contract by deploying an integrated system. Villarama, 2018).

Increased accuracy and speed are two of an integrated payroll system's primary advantages. With this technology, the possibility of human error when processing payroll manually is reduced Rehman & Zafar (2017). The hospital's payroll procedure can be automated, which will help increase computation accuracy and lower the possibility of mistakes. Using an integrated system can also facilitate the creation of payroll and payment reports for employees.

Integrating or automating payroll information systems can lead to a lot of advantageous outcomes Viitanen (2023). In truth, a large number of businesses and organizations, including hospitals, continue to run their payroll systems by hand. Because hospitals play an important role in the medical industry, it is essential to create a more effective and integrated payroll system to enhance human resource management and have a significant impact on enhancing employee performance Aksenova (2020). It seeks to offer hospital patients as many beneficial health services as feasible.

In the end, the pay information system is a crucial one that needs to be enhanced in every business, even hospitals, which need sophisticated systems Silva and Lima (2018). As a result, hospitals require a payroll system model that enables them to comprehend and assess current processes, spot areas for development, and design solutions that can raise the caliber of human resource administration Sandiwarno (2018). The PIECES method is one of the modeling approaches that can be used.

A framework for system analysis is the PIECES (Performance, Information, Economy, Control, Efficiency, and Service) technique, which is used to assess and enhance business processes Anwardi (2020). Through this strategy, the system's performance, necessary data, effective use of resources, and process management are all identified as significant system components Sudiati and Didik (2017). Companies can gain a thorough understanding of their payroll system, identify its current shortcomings and strengths, and create the necessary adjustments by employing the PIECES technique Suyono (2016)

The goal of this study is to examine the PIECES method's modeling of an integrated payroll system. Other systems, including those for performance management, attendance tracking, and hospital resource planning, are connected to this payroll system. Companies can fully comprehend this procedure, pinpoint its advantages and disadvantages, and enhance the effectiveness and precision of the system by using the PIECES approach. The processes that will be covered include reviewing economic factors, controlling the payroll process, examining the effectiveness of resource utilization, and enhancing employee service. The performance of the payroll system will also be identified. Hospitals can optimize their total payroll and human resource management systems by comprehending and utilizing the PIECES technique.

## **THEORETICAL REVIEW**

### ***Pieces***

The parts technique is employed in this study as a framework for evaluating the effectiveness of a website or application Darmansah & Nengsih (2022). This approach is frequently employed as a tool for evaluating different system components or variables. There are various factors in system evaluation that demand focus. The first part of the performance element talks about how to measure and assess how well a system performs its functions. The system's capacity to convey information in adequate amounts and with sufficient clarity for users to grasp it is also evaluated by the information aspect. To make sure the benefits received match the expenditures incurred, the economic element of information systems is analyzing their costs. Access control, data protection, and general security are all evaluated as part of the control portion of the system. Efficiency is a factor that gauges how much of the system's resources are used to generate the intended output. The system's responsiveness to user requests, system availability, and the caliber of the services rendered are all evaluated by the service aspect. Users of the system can have a better grasp of the performance, information, economy, control, efficiency, and services offered by the system by paying close attention to these factors.

### ***Business Process Management and notation***

Every business process in a company is visually represented using the BPMN standard notation. This notation is now a widely recognized and utilized standard Chinosi and Trombetta (2012). Every business process in a company is visually represented using the BPMN standard notation Lodhi

(2014). This notation is now a widely recognized and utilized standard. Decision flows, repeating events, timing events, multiple task kinds (such as user tasks and script tasks), data objects, databases, and ongoing sub-processes are only a few of the elements used to define different parts of business processes in BPMN Pullonen (2019).

## **METHODOLOGY**

In order to evaluate and assess the payroll system in a practical setting, this study is a qualitative case study. The duration needed for this investigation was three months. Direct observation at the hospital, particularly in the finance and human resources departments, literature review, and interviews with relevant parties were used to gather data.

The PIECES (Performance, Information, Economic, Control, Efficiency, and Service) technique, which included factors such as performance, information, economy, control, efficiency, and service, was used to conduct a thorough analysis Puspitasari (2019). While the information variable entails assessing the data and reports the system generates, the performance of the payroll system is determined by how accurately and quickly salaries are generated. The cost effectiveness of the payroll system is evaluated as part of the economic element, whilst monitoring and security procedures are part of control. Efficiency evaluations look at staff data management and process automation, whereas service evaluations look at user experience, technical assistance, and system response. The analysis's conclusion will discuss the payroll system under investigation's advantages and disadvantages.

The creation of information systems and business process modeling are related to the PIECES and BPMN methodologies. With an emphasis on aspects of planning, information, architecture, components, expertise, and support systems, the PIECES technique is used to study and develop information systems. Using preset symbols, BPMN is used to visually depict business processes. When planning and assessing information systems as a whole, the PIECES technique is helpful, and BPMN clearly represents business processes. By combining the two, one can gain a deeper understanding and create systems that are efficient, effective, and tailored to specific needs.

## **RESULTS**

### *Pieces analysis*

The old payroll system had some issues with information delivery and performance. First, the old system's slower data processing slows down output in terms of throughput, which results in sluggish report generation. Second, the old system takes a very long time to respond when requesting information on employee payroll. Excel is still used for manual data collection tasks like collecting information about promotions, pay hikes, bonus calculations, and report generation.

Additionally, the former payroll system's information display is less accurate. Errors frequently occur while manually calculating payroll data with a calculator. Information systems are used in the new system to assist lower the likelihood of errors. Due to lengthy processing times or data loss, the outdated payroll system frequently fails to produce reports on time. The new technology allows for quicker processing with the aid of an information system, and data is safely kept in the database.

In addition, the outdated manual payroll system increased the cost of stationery, which in turn decreased the company's earnings. By making corporate spending more manageable and lowering the price of stationery purchases, the new approach has a positive impact on the economy.

Control issues with the outdated payroll system left it open to unauthorized access due to data security flaws. The new system uses passwords to ensure data protection. The old payroll system also made it harder to discover errors, and if something went wrong, the entire procedure had to be redone. Instantaneous fault detection is made possible by the new technology, saving time and effort.

Efficiency issues existed with the hospital's outdated payroll system as well. The manual processes for calculating pay and gathering data are time-consuming. In addition, if the finance department is absent, reliance on human resources causes delays. Efficiency rises with the introduction of the new computerized system since tasks may be completed automatically without requiring human intervention, saving time and minimizing errors. By doing this, Aisiyah Bojonegoro Hospital's payroll services will be of higher quality.

According to the aforementioned analysis, the business process of the payroll system can be clarified as follows:

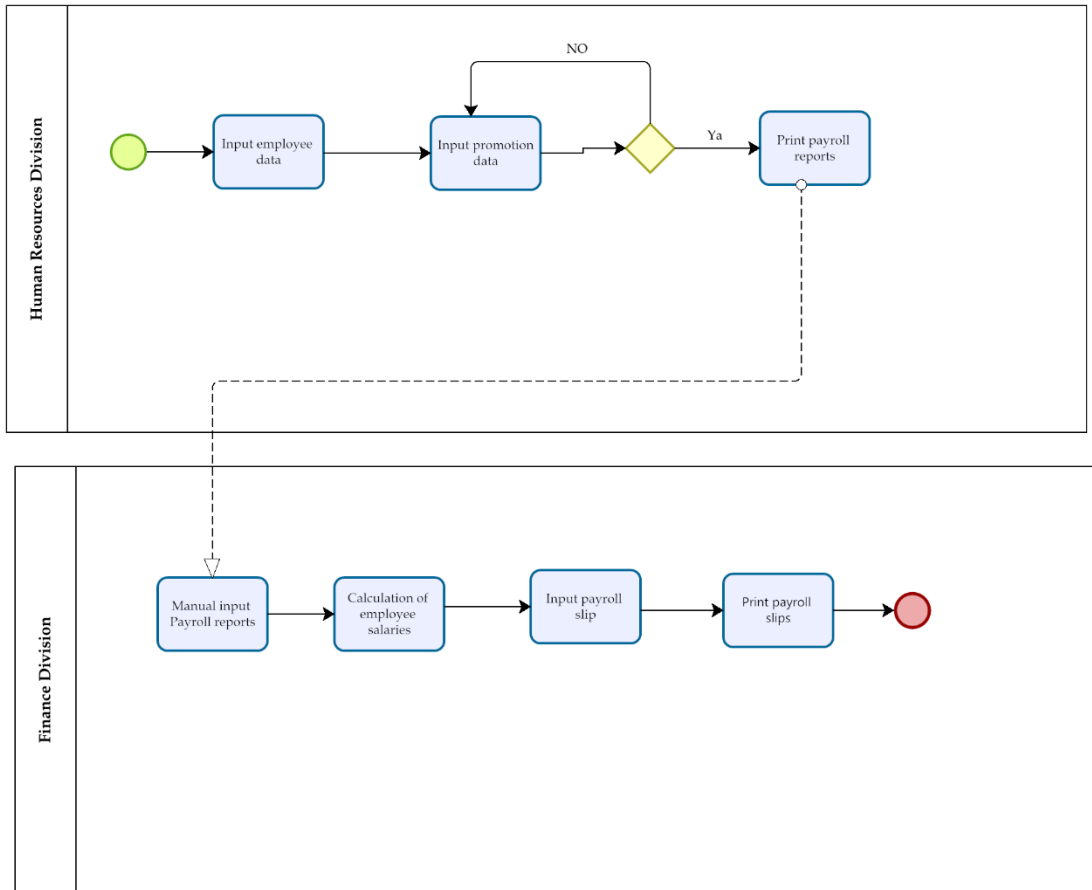


Figure 1. shows the business process for reporting petty cash (model as-is).

The old payroll system at Rumah Aisyiah Bojonegoro had multiple steps in the business process. First, adding new personnel to the system is the responsibility of the Human Resources (HR) division. Then, using the entered employee data, SDM generates payroll information for that time period. To verify proper payroll data, a promotion or class check is then performed. After that, the payroll report is printed out in an excel file and sent to the financial department. The financial team manually enters data before utilizing a calculator to calculate pay. A pay slip is prepared upon the conclusion of the calculation and sent to the employee via WhatsApp. This lengthy, labor-intensive technique has a high potential for error and relies heavily on manual data processing.

According to the PIECES study and the aforementioned business processes, the hospital's system is still largely manual, necessitating a lot of human contact and taking time. Manual input might raise the possibility of data errors and slow down the entire payroll process. In order to boost the effectiveness and accuracy of the payroll process, hospitals must employ technology and automation solutions, such as integrated payroll software.

By developing a novel model that intends to address hospitals' payroll management issues, researchers in this study offer answers for hospitals. This modeling is anticipated to offer practical answers, result in outstanding staff performance increases, and have a large positive effect on the institution. The

following stages of the suggested payroll process might be used to further clarify business process modeling:

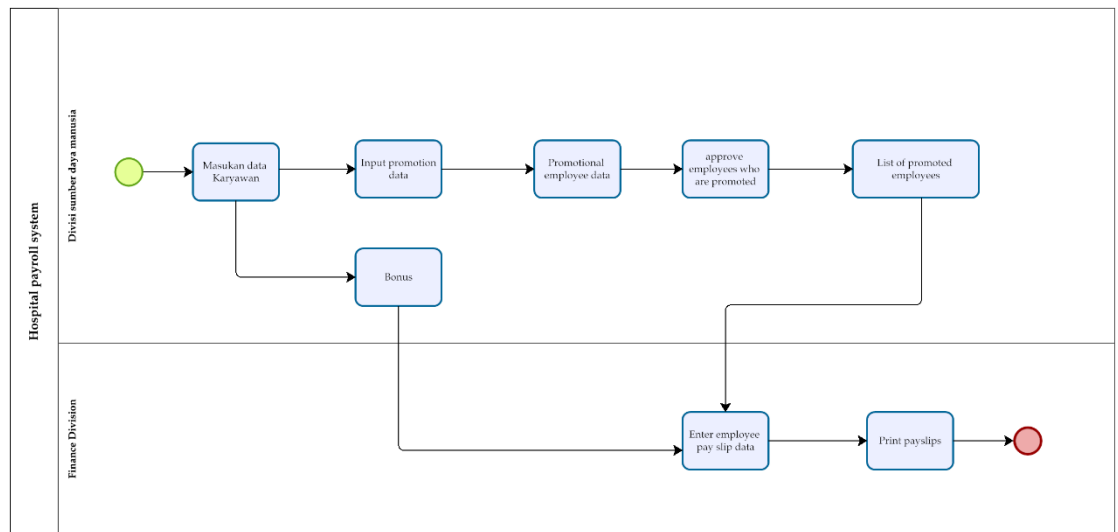


Figure 2. Payroll System Business Process (To-Be Model)

There are various steps completed in the planned salary system for hospitals. First, the HR division registers new hires by inputting their personal information and employment details into the system. The data is then added to the system each time an employee receives a promotion. Following that, using information about the employee and the promotion, salary calculations are made automatically. This estimate takes into account pertinent invoices and deductions. Following the completion of the compensation computation, the system immediately creates a payslip with a breakdown of each employee's individual salary components. This pay stub is accessible online through the employee portal and can also be emailed. It is anticipated that the payroll process will be more accurate and efficient with this payroll system.

## DISCUSSION

New suggestions to enhance the business operations of the organization to make them more effective and efficient Abu Salma (2021); Bae (2014). Saving time throughout the reporting procedure is the first of these. The procedure for entering payroll information and figuring out each employee's salary is drawn out and time-consuming, in contrast to employing the system in Figure 2, which can drastically save processing time. Reduced processing time is a sign that a company's or agency's business procedures have improved Susanto (2018). The efficiency of the subsequent process will improve over time if processing one output takes less time Reijers and Liman Mansar (2005).

In order to prevent mistakes and delays in employee wage payments, the suggested new business plan structurally enhances control over the payroll system, notably in calculating employee salary costs. The payroll information system is directly accessible to hospital administration, enabling direct oversight of the transfer of payroll reports from the human resources division to the finance division. Given the significance of the information found in financial data and maintained by the management team, effective data management is crucial Al-Dalabih (2018).

In the end, all businesses use the financial information system outlined in the model and have databases housed in the same location. As a result, the possibility of mistakes being made when saving and looking up payroll data that can be lost, as in the prior method, can be reduced. The role of the database in the system is very important to increase efficiency in archiving company financial data. Ensuring the process of archiving financial data goes well can improve the company's internal control. For the system to archive business financial data more effectively, the database's role is crucial. Internal control of the business can be strengthened by making sure the process of archiving financial data runs smoothly Kopp and O'Donnell (2005). In order to establish healthy and safe operations, this efficient internal control system strives to effectively manage and control risks in the hospital. Management can exert control in the organization in an ideal and effective manner by having an electronic database that is directly integrated with the company's financial system.

The hospital management's capacity to make the best strategic decisions and manage the payroll system is improved thanks to the business process modeling created for this study. The economic and financial data produced by this business strategy is of higher quality. As a result, hospital management may process business financial data more quickly and precisely. The hospital management can access the company's financial system in real-time and acquire pertinent financial data using the proposed business model. This is required since one of the most important pieces of information to affect future management strategies is financial information Al-Dalabih (2018)

## **CONCLUSIONS AND RECOMMENDATIONS**

The foundation of any activity carried out within a business or organization is its business procedures. Business procedures make use of all of the resources that the company has to offer in order to achieve its goals. In order to create a business process model that may solve the issues revealed in this study's analysis of the payroll process, a qualitative case study methodology was applied. The findings indicate that the suggested business process model, which is based on the Business Process Management System, can help hospitals improve the efficacy and efficiency of their operational procedures. The quality of business processes in hospitals can be considerably improved by implementing this paradigm. This methodology makes it possible to evaluate and develop continuously for the benefit of the hospital's future. In order to gauge the degree of progress that may be made, it is proposed that



future studies examine how the model developed in this study is actually being used in the hospital in question.

#### **FURTHER STUDY**

The recommendation for the next study is to analyze how the model developed through this research is actually being used in the hospital setting, with the goal of determining the degree to which progress can be accomplished through its implementation. A payroll information system that can be integrated with the hospital's performance rating system and other system elements is also recommended. As a result, this study will help us understand the model's true effects better and will help hospitals improve their entire system.

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