

Original Research Paper

# Mapping a Strategic Human Resource Information System for Society 5.0

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**Abstract:** Technology implementation in the Society 5.0 era has significant consequences for every industry, especially in the freight service sector. Era Society 5.0 emerged in anticipation of disruption due to the industrial revolution 4.0, which would degrade Human Resources (HR). The amount of information that must be managed related to HR raises problems, namely untidy data management, difficulty accessing employee data and difficulty finding pay slips, causing HR to be unable to contribute appropriately to the industry. In addition to experiencing problems with data completeness, the freight service industry is also experiencing problems with employees attending to be fully recorded due to manual data collection to the confusion of performance appraisal, which causes errors in giving bonuses. Based on the background of these problems, a new management solution is needed, namely the Human Resource Information System (HRIS). However, before implementing HRIS, the freight service industry needs to develop an HR management planning strategy using the help of the Plan, Do, Control, Act (PDCA) method. The research phase begins with a literature study and data collection. Mapping business processes and problems experienced is the basis for mapping the HR management strategy for making HRIS. Then, the HRIS realization process is measured by defining the cycles that go through based on the previous strategy design. The results of this study are in the form of proposed strategies for how HRIS impacts industry, especially in the Society 5.0 era, using analysis Performance, Information, Economic, Control, Efficiency, Service (PIECES). This study aims to develop the primary human resource management strategy used in the HRIS of the freight forwarding service industry. Thus, this strategy hopes to be used to face the defiance of the Society 5.0 era.

**Keywords:** Strategic Human Resource Information System, PDCA Method, PIECES Analysis

## Introduction

Digital transformation shows the process of rapid evolution of information and communication technology (Pucihar, 2020; Andry *et al.*, 2023). Technological innovation can affect the short-term performance of industries and economies in the long term (Andry *et al.*, 2022). Currently, the industry in Indonesia is dealing the era of the industrial revolution 4.0, which opened new avenues for the use of IT. Anticipation of the disruption turbulence from the Industrial Revolution 4.0, which can

potentially reduce the human role, a new concept, "Society 5.0," has emerged (Pereira *et al.*, 2020; Ahamed and Vignesh, 2022). Era Society 5.0 creates conditions for a better-prepared society to solve various social challenges. The concepts of Society 5.0 and revolution of industry 4.0 are similar (Kurt, 2019; Potočan *et al.*, 2020). The revolution of industry 4.0 uses technology as its main component, but it is known as the era of degradation of the human role. The concept of society 5.0 is the development of the revolution of industry 4.0. It is built on harmony between humans living alongside technology to help with

daily processes. However, the competence of human resources in the industry must meet the proper requirements to coexist with technology.

Failure to meet human resource competencies in the industry occurred in freight services, resulting in reduced competitiveness in information management. Therefore, effective, and efficient HR management is essential in the freight forwarding service industry. Human resource management can undoubtedly contribute to improving industrial performance (Thuda *et al.*, 2019). The amount of information that must be managed with human resources raises issues of high complexity (Sima *et al.*, 2020). Untidy data management, difficulty accessing employee data, difficulty finding pay slips, causing human resources to be unable to contribute appropriately. In addition to experiencing problems with data completeness, the freight service industry is experiencing problems with employee attendance needing to be fully recorded due to manual data collection to chaos in performance appraisal, which causes errors in giving bonuses. Problems that arise will take more work to solve with traditional processes. Conventional processes in companies today impact declining employee productivity, especially regarding human resource performance and performance. Therefore, the industry needs to improve HR competencies with information technology that produces the latest management solutions, namely the Human Resource Information System (HRIS).

However, before implementing HRIS, the freight service industry needs to develop in accordance with planning of human resource management strategy. Preparing a human resource strategy aims to collect the proper requirements for solving labor problems (Zeebaree *et al.*, 2019). Previous research by Göktaş stated that the development of a human resource strategy was divided into four steps using the Plan, Do, Control, Act (PDCA) method (Göktaş, 2017). The first step is to define the current human resource processes and issues. The second step is planning the creation of HRIS by defining the necessary resource management strategy. The third step is to realize HRIS by defining the cycles that go through based on the previous strategy design. The last step is to evaluate how HRIS impacts the industry, especially in the Society 5.0 era, used analysis Performance, Information, Economics, Control, Efficiency, Service (PIECES). Therefore, the changing role of human resources makes it necessary for the industry to redesign the current systems (Sony and Naik, 2020). HRIS enables human resources to blend with technology to increase global agility.

Problems previously mentioned in this research focused on developing a human resource strategy to

implement the Human Resource Information System (HRIS). (PDCA) Plan, Do, Control, Act is the research method. The use of the PDCA cycle in human resources can occur in several ways, namely by identifying which processes need improvement. The phase of research begins with collecting data from the literature systematic review, interviews and direct observations in freight forwarding service industry. Next, mapping business processes and problems experienced. The mapping results are used to map the resource management strategy to make HRIS. Then, the HRIS realization process is measured by defining the cycles that go through based on the previous strategy design using the PDCA method. The results of this study are in the form of proposed strategies for how HRIS will impact the industry, especially in the Society 5.0 era, using analysis Performance, Information, Economic, Control, Efficiency, Service (PIECES). This study aims to build the main strategy of human resource management used in the HRIS of the freight service industry using the help of the PDCA method. Thus, this strategy can be used to face the challenges of the Society 5.0 era.

### *Society 5.0*

Construct of community development that explores the potential of the relationship between individuals and technology (Fukuda, 2020). In the era of Society 5.0, it is centered on humans with technical guidance. The internet is not just for sharing information but is helpful for human resources in living life (Ahmed *et al.*, 2021). Dealing with increasingly massive technological developments requires contributing human resources with qualified abilities and skills. Human resources play an essential role in reducing the unemployment rate, given that Society 5.0 seeks to make people able to enjoy life comprehensively. Therefore, Indonesia needs to take advantage of the quality of its human resources in a competitive social transformation by prioritizing teamwork or collaboration in facing Society 5.0.

### *PDCA Method*

Plan, Do, Check, Act (PDCA) is a problem-solving method to improve a product/process (Manik *et al.*, 2020). The four phases of the PDCA cycle are interconnected and function as a cycle. The first stage is to identify problems and business processes in as much detail as possible (plan). The second stage is getting potential problem-solving (do). The third stage analyzes whether the results follow the expectations or targets set in the planning (check). The fourth stage is implementing a predefined solution (act). Each PDCA cycle allows for the improvement and refinement of well-organized business processes (Steffen *et al.*, 2023).

### Human Resource Information System (HRIS)

Using the Human Resource Information System (HRIS) can help companies manage employees efficiently (Hosain *et al.*, 2020). As is known, employees are the company's greatest asset. For this reason, companies need to manage employees using HRIS. HRIS usually includes several functions: Database, recruitment, training, human resources reporting and management (Memon *et al.*, 2022). HRIS manages several HR activities to mark employee presence in the shipping industry (Karunarathna *et al.*, 2020). HRIS monitors performance, fills in attendance data and reports employee work activities more easily. The utilization of HRIS has the characteristics of updated regularly, accurate, consistent, relevant, and complete data.

## Materials and Methods

### Data Collection

Data collection methods used are observation, interviews, and literature study (Alam, 2021). These three methods were chosen to help determine the right HRIS development strategy according to business needs. The data collection process aims to get an overview of the current business processes (Fatimah *et al.*, 2020). Interviews with the human resources department are only to discover the business processes running on conventional systems. The interview process was only conducted with one human resource manager. Finally, data collection through books, research journals and other sources as a reference for HRIS development. As a final step, an evaluation process for HRIS will be carried out by distributing questionnaires to 30 respondents containing 18 questions based on the PIECES Analysis.

### Research Stages

The stages of developing the HRIS strategy are shown in (Fig. 1).

Figure 1 shows the stages of developing an HRIS strategy with the following flow (Chen and Li, 2019; Stefanescu and Marin, 2020):

1. **Literature study:** Collect library information through books and research journals that have been made before. This study aims to collect materials and information relevant to developing an HRIS strategy
2. **Data collection (Madyatmadja *et al.*, 2021):** The data collection process uses qualitative techniques that aim to describe the data analysis narratively. Qualitative techniques used include observation, interviews, and literature study. These three methods were chosen to help determine the right HRIS development strategy according to business needs

3. **Planning process:** Describing current human resource problems uses a tree diagram. This stage focuses on problem identification using the help of tree diagrams
4. **Do HRIS strategy implementation:** Plan the creation of HRIS by defining the necessary resource management strategy. This human resource strategy characterizes all top management (managers) and all staff to excel in a competitive advantage industrial atmosphere
5. **Check HRIS cycles:** HRIS realization process by defining the cycles that go through. Cycle creation considers the environment, technological capabilities, and experience of human resources. The HRIS Lifecycle also describes each human resource's contribution to process management
6. **Act evaluation of HRIS:** Evaluate how HRIS impacts the industry, especially in the Society 5.0 era, using analysis Performance, Information, Economic, Control, Efficiency, Service (PIECES). The evaluation process is based on a usability test with a list of questions for each category of PIECES analysis. The number of questions on the questionnaire is 18 questions. Measuring the questionnaire using a Likert scale. The weight of the questionnaire used is a scale of 5 (strongly agree), scale 4 (agree), scale 3 (quite agree), scale 2 (disagree) and scale 1 (strongly disagree)

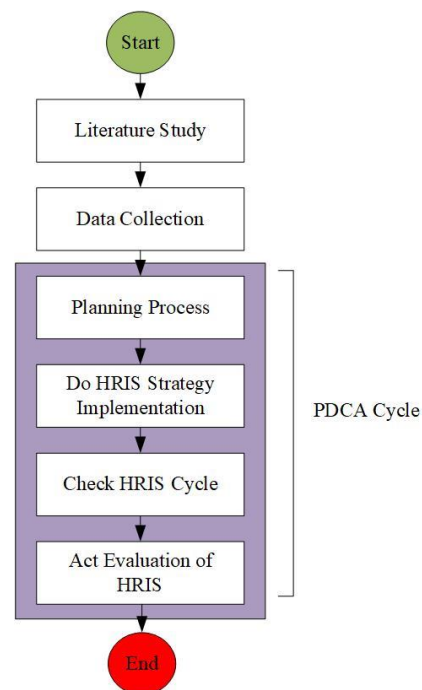


Fig. 1: Research stages (Aichouni *et al.*, 2021)

## Results

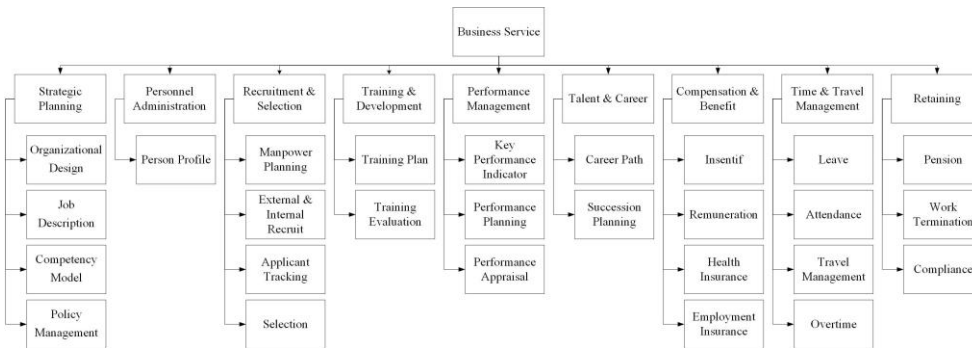
### Planning Process

Planning begins when one or more problems are identified that could jeopardize the success of the business process (Kabeyi, 2019). This stage focuses on problem identification using the tree diagrams. A tree diagram of the human resource process in Fig. 2.

Figure 2 shows the human resource governance process. The processes that are running in the freight forwarding service industry are currently related to the following:

- **Strategic planning:** Manage various information and results of human resource data analysis in the form of vision, mission, corporate values, organizational design, job descriptions, competency models and policy management
- **Administrative personnel:** Manage personal and employee data while being a company employee. Employee data includes personal data and employee records (training, certification, business trips, attendance)
- **Recruitment and selection:** Manage recruitment and selection activities in meeting workforce needs according to specifications

- **Training and development:** Develop individual employee training plans and handle training requests. Employees go through the process of planning and evaluating training
- **Performance management:** Manage employee appraisal processes, goals, and record targets. It aims to identify employees with the best performance and need further development
- **Talents and careers:** Manage planning career paths and talents. Planning based on the career path and succession planning
- **Compensation and benefits:** Manage methods, arrangements, and payroll calculations systematically. Compensation and Benefits include incentives, remuneration, health insurance and employment insurance
- **Time and travel management:** Manage allocations, submissions, monitoring and approval of absences for illness, permits, leave and assignments out of town/overseas
- **Retaining:** Manage planning career paths and talents until entering the retirement period. Planning based on the duties, responsibilities and competencies the possess



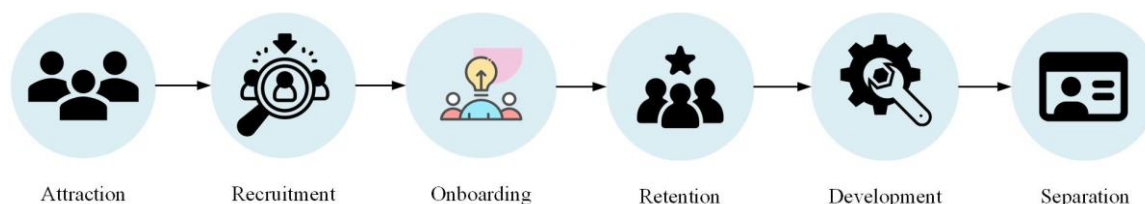
**Fig. 2:** Tree diagram business service



**Fig. 3:** Human resource management strategic

Attendance						
Employee List	Department List	Attendance List	Holiday	Incentive		
ID	Employee Name	Department	In Date	Out Date	Monthly/Daily	Active Period

**Fig. 4:** HRIS prototype



**Fig. 5:** HRIS lifecycle

**Table 1:** PIECES analysis for HRIS implementation

PIECES	Description	Score	Decision
Performance	Employee data can be inputted into the system	4	Agree
	Employee performance becomes faster, easier and more efficient	4,03	
	Data storage uses a database and has a data backup	4,2	
Information	There is information on active employees and resigned employees	4,07	
	There is information on employee work contract data	4,13	
	There is a guide for users	4,1	
Economic	Having a database makes the industry save on paper expenses	4,23	
	Search results are valid and accurate	4,2	
	The system has a user interaction menu	4	
Control	Not all employees have access to HRIS	4,13	
	Having a login menu prevents employees from accessing data indiscriminately	4,23	
	The system does not error when accessed	4,13	
Efficiency	Efficiency of reporting	4,07	
	All existing menus are separated into several modules and adapted to user access rights	4,1	
	Data withdrawal is faster than manual process	4,07	
Service	It takes a short time to record and search data	4,13	
	There is a menu for adding new user access	4,17	
	There is a data search feature	4,07	

### Do HRIS Strategy Implementation

At this stage of the PDCA cycle, start planning the creation of HRIS by defining the necessary resource management strategy (Jelenc *et al.*, 2020). Defining the strategy aims for the principles of Society 5.0 to succeed in creating a balance between business and technology. This human resource strategy is divided into ten principles that characterize human resources forwardness to the challenges faced of implementing HRIS in the Society 5.0 period. The planning of strategic model in Fig. 3.

Figure 3 shows the ten principles of human resource strategy as the basis for HRIS implementation:

1. **Strategic value choice:** HRIS can focus on human resource management processes. HRIS focuses on a very valuable point put on company goals. System implementation can include the use of artificial intelligence, big data, and the cloud in the era of Society 5.0 so that it can provide added value
2. **Strategic integration:** Human resource policies and procedures are linked to the business strategy of the freight forwarding service industry. Solve human-centered problems by utilizing HRIS
3. **Employee as asset:** HR is a critical point in achieving competitive advantage. Employees of the freight service industry in the era of Society 5.0 must have strong core competencies, including digital competence, globalization competence and future strategic competence
4. **Staff support:** Fostering a sense of belonging is necessary for every employee. The goal is to increase the work productivity of every employee in the freight forwarding service industry by producing goods
5. **Strength management:** Strengthen management and employee commitment. Commitment employees toward one another. With IT in the era of Society 5.0, the problem of reduced socialization between

communities will be reduced. Technology is not only a tool to advance personal and business life but must also be able to improve people's lives

6. **Effective communication:** When news is received and realized in the same way as the sender wants it, communication is so important in the organization, from the top to the bottom level or from the bottom to the top level, because with ineffective and maximal communication in a company it will result in obstacles. in achieving its goals
7. **Decentralization:** Management of HR strategy, it's more necessary to decentralize decision making at the lowest possible level in the industry hierarchy. That is, it allows decision-making on the source of the activity itself.
8. **Flexibility and adaptation:** An organization must respond to environmental changes and pressures. The industrial era 4.0 and Society 5.0 are the era of analog to digital technology transformation. Digital transformation has changed the way of life of society and industry, thus having a significant impact on planning of organizational strategic. Innovations in the HRIS program must be consistent with the current overall plan and program
9. **Obsession with quality:** Need oriented staff to produce goods with the best quality and service. Society is considered a customer. Industry produced goods must have quality goods. For this reason, the freight service industry must be obsessed with quality. Thus, business competition will be more stringent and require human resources to improve their abilities

### Check HRIS Cycle

This stage focuses on realizing HRIS by defining the cycles that go through. Check is carried out by auditing the execution and monitoring whether the plan follows the draft HRIS implementation strategy. The HRIS prototype is realized in (Fig. 4).

Figure 4 shows the realization of the HRIS design in prototype form. There are employee lists, department lists, attendance lists, holiday lists and incentive modules. The following process is to describe the human resource management cycle using HRIS. (Fig. 5) shows the cycle design that users go through when using HRIS.

Figure 5 shows the realization of the HRIS cycle, which is divided into:

1. **Attraction:** The first step is to identify talent needs and understand what competencies an employee must have. In addition, it is important to instill the right company culture. Prospective employees will choose companies for many reasons:
  - **Compensation:** Compensation in human resources refers to all the rewards the industry provides its employees for their work. These benefits can include base salary, bonuses, commissions, and allowances
  - **Time and leave:** HRIS arrangements include access services, vacation, sick, joint, and other leave programs offered to eligible employees
2. **Recruitment:** The process of selecting and adjusting new employees within the industry to matters relating to the industry. HRIS includes detailed data collection on new employee recruitment
3. **Onboarding:** Onboarding helps new hires blend into the company culture and become part of the team. One way to do this is to identify and communicate the company's core values, which are divided into:
  - **Set goals:** The process of setting goals and prioritizing performance to engage and motivate employees. When goals can be achieved, the industry can increase employee confidence.
  - **Performance:** Set clear and measurable goals for employee work. The industry wants its employees to reach their maximum potential, increase productivity and the success of business processes
4. **Retention:** A key stage of the employee life cycle. Employees have been with the company for a while and it's important to provide rewards and recognition as soon as possible. Then, from time to time, it's important to ensure employees know what to do to help achieve their goals and what human resources needs to do to keep accurate records of their ambitions, progress, and successes. Compensation and benefits plans attract high-performing candidates and help drive staff motivation, retention, and positive work experiences. This monetary value can include wages, salaries, commissions, and bonuses. Non-monetary benefits, additional facilities, or awards the industry provides for employees
5. **Development:** Once employees are satisfied and happy, it's also worth considering how strategic professional development can help companies get the best out of employees by:
  - Research and Development Keep employees up to date with new trends while broadening knowledge
  - Sponsor or Subsidize Courses. Companies can invest in employee training, education and learning
6. **Separation:** At this stage, reflection is very important. A good offboarding process helps

understand where there is room for improvement in employee experience. Increase employee efficiency within the industry, as well as reduce operational costs through the use of data. This process closes all activities carried out to empower human resources. The goal is to streamline processes between departments and employees to maximize results

### *Act Evaluation of HRIS*

At the act stage, it is necessary to evaluate how HRIS impacts the industry, especially in the Society 5.0 era. This process follows up on the results of HRIS implementation to make the necessary improvements. In addition, the act process also means reviewing all steps and modifying the process to improve it before the following implementation. The evaluation process using PIECES analysis on the current HRIS implementation is presented in Table 1.

Table 1 shows the results of the analysis using PIECES. The value of each HRIS service reaches four and has been successfully implemented in the freight service industry. Implementing HRIS in the freight forwarding service industry follows the previously planned strategy. The human resource strategy is the root of all program planning in facing the challenges of the 5.0 era. Strategic thinking is needed, which is directly related to the human resources in the industry. This human resource strategy must be applied to the improvement process of employee recruitment, training, and assessment to face the challenges of the Society 5.0 era.

### **Discussion**

Researchers were divided into four stages: Planning, implementing the HRIS strategy, checking system workflow and evaluating the system. Tree diagram mapping aims to help find business processes carried out in human resource management. Business services in the freight service industry clarify requirements gathering for defining HRIS strategies. These business services include managing human resource data, personal data, selection activities, training, performance, career, benefits, time management and retaining. Defining the requirements provides an overview of the essential features that will later be present in the HRIS. These basic features are master data management, organizational management, employee self-service, absence and leave management, recruiting and applicant tracking, compensation management, training tracking, analytics and more. If the gathering of requirements has been completed, then the next stage is defining the human resource strategy. Later, HRIS implementation must include ten principles related to strategic resource management, integration, employee

empowerment, support, commitment, communication, decentralization, flexibility, adaptation, and upholding quality. The ten principles of HR strategy focus on enhancing strategic capabilities, building better commitment between managers and employees, integrating labor and material resources and empowering employees. The strategy that has been made is then implemented into an HRIS cycle. The HRIS cycle, in general, includes the process of attraction (interest in the industry), recruitment (finding candidates), onboarding (understanding policies), development (skills development) and retention (increasing employee satisfaction). If the HRIS cycle has been implemented, evaluating the running process after using the system is necessary. The evaluation process uses PIECES based on performance, information, economic, control, efficiency and service criteria. Each criterion needs to be mapped so that HRIS implementation can run optimally. The human resource management strategy is designed to assist the industry in meeting employee needs. In addition, it is necessary to pay attention to managing employees to suit industry needs. Human resource strategies implemented in HRIS can change everything paradigm, helping to integrate modern ideas and models into modern practices. Therefore, this strategy benefits not only individual goals but also industrial and societal goals.

### **Conclusion**

Anticipation of the disruption turbulence from the industrial revolution 4.0, which can potentially reduce the role of humans, a new concept, "Society 5.0," has emerged. The concept of Society 5.0 is the development of the industrial revolution 4.0. It is built on harmony between humans living alongside technology to help with daily processes. This research identifies problems using tree diagrams. The business processes in human resource management are strategic planning, personnel administration, recruitment and selection, training and development, performance management, talent and career, compensation and benefits, time and travel management and retaining. After mapping business services, to the tree diagram results produce a human resource management strategy for planning HRIS development. The strategies used include strategic value choice, strategic integration, employee as asset, staff support, strength management. The process of realizing HRIS by defining the cycle that goes through into attraction, recruitment, onboarding, retention, development, and separation. Finally, it is necessary to evaluate how HRIS impacts the industry, especially in the society 5.0 era. Implementing HRIS in the freight forwarding service industry follows the previously planned strategy. On performance, HRIS can serve employee data input information analysis where HRIS has generated helpful information for report management.

From an economic standpoint, HRIS supports industrial and managerial processes and tackles wasted time/tools in the former process. Controls are installed to improve system performance so that HRIS can efficiently assist data management. In terms of service, it does not take a long time to record and search data. Therefore, the findings of this study are to produce an implementation strategy for HRIS and its usage lifecycle. This research has contributed to considering the right strategy in HRIS development. The implication of human resource strategic planning research is to help formulate a better and more systematic strategy for managing the HRIS system. HRIS can increase the security and flexibility of employee data, simplify performance control, save on operational costs, and simplify the recruitment process. The involvement of HR planning of strategic research is to help formulate a better and more systematic strategy for the system management process. Through the era of Society 5.0 in the use of HRIS, a balance will be created between the role of society and the use of available technology. This study has limitations in data collection using interview techniques, so it can only obtain data on business processes from one human resource manager. For future research, it is possible to develop a strategy using a different method and a wider sample questionnaire.

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## Author's Contributions

**Glisina Dwinoor Rembulan:** Defined the research concept, collected related literature, interpreted the results, and prepared the manuscript.

**Evaristus Didik Madyatmadja:** Developed user requirements, analysis, implementation and interpretation of results.

**Johanes Fernandes Andry:** Formulated problems, collected data and interpreted results.

**Lydia Liliana:** Development of HRIS applications, analysis, implementation, interpretation of results and preparation of manuscripts.

**Agustina Andriani:** Developed user requirements, data collection, analysis, implementation, interpretation of results and preparation of manuscripts.

## Ethics

This article is original and unpublished. Corresponding authors confirm that all other authors have read and agree that the manuscript not involved ethical issues.

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