

Information Technology Strategic Plan for Hospital using Ward and Peppard Model

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Abstract

Purpose: The objective of this research is to find IS/IT strategic plans, managerial activities, and operational activities in hospitals that can be used as proposals for IS/IT development in hospitals.

Methodology/approach: The approach used in this research is the strategic planning of Ward and Peppard who conduct an analysis of the internal environment and analysis of the external environment at the hospital using various analytical tools such as SWOT, CSF, PEST, Value Chain and McFarlan Strategic Grid.

Results/findings: The final result of this research is comprehensive strategic planning at the strategic, managerial, and operational levels which are expected to be in line with the business objectives of the hospital.

Limitations: The limitation of this research is the mapping of application proposals that are in accordance with the business objectives of the hospital.

Contribution: The final result of this research can be used as a basis for developing IT at the hospital which is expected to help in developing IT at the hospital in the future.

Keywords: *Strategic Planning, Information Systems, Ward and Peppard, Portfolio*

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1. Introduction

The hospital is an organization engaged in the health sector that provides health services to the community. In meeting the needs of each patient and providing services to patients, the use of information systems is one of the supporting facilities for hospitals in recording and reporting hospital activities. In its development, the implementation of IS/IT is carried out partially and ad-hoc where it is only to meet current needs, urgent activities, or the existence of laws that require them to be fulfilled. One of the effects is the unplanned growth of applications, hardware, and software. For example, until now there are 61 applications have been built and 50% of them are the same, the difference is the name, features, and developer. Likewise, hardware grows without taking into account costs with future planning, one of the reasons for this happening is that there is no IS/IT implementation plan that can guide policymakers in determining IS/IT investments to be made.

Based on the description above, an information system plan is needed with the aim of finding a proposed strategy that is expected to help achieve the development of an information system business strategy that fits the needs. The strategic planning used is the Ward and Peppard method with analytical techniques such as SWOT and CSF, with several process stages such as introduction, understanding current conditions, and opinion of future needs. Then this method discusses the strategic planning of information systems in terms of business and information technology in accordance with the business processes being carried out.

2. Literature Review

Previous research can be used for hypotheses and can be a temporary answer in this study, besides that previous research can be used as a source of comparison with the research that the author is working on. The following is a previous study that is close to the title of similar research and can be used as a reference in writing this research.

Table 1. Previous research

1	Research Title	Strategic Planning of Information Systems at South Tangerang Hospital
	Year	2019
	Results	Based on the analysis obtained, some problems often occur such as data duplication, human error, and incomplete data. From the results of IS/IT strategic planning, a proposed portfolio of applications that can support the needs of health applications in hospitals is obtained as well as an estimate of the budget to be issued.
2	Research Title	Strategic Planning of Information Systems at Palembang Hospital BARI
	Year	2016
	Results	Based on the analysis, it was found that the business strategy, IS/IT management strategy, and also the application portfolio that is in line with the business in the hospital as well as the proposed addition of divisions for IT management.
3	Research Title	Strategic Planning of Information Systems at RSUD Dr. H. Ibnu Sutowo Baturaja Using the EAP Method (Enterprise Architecture Planning)
	Year	2017
	Results	Based on the analysis carried out, we get a portfolio of applications for hospitals and also a schedule for application work based on a set plan.
4	Research Title	Strategic Planning of Information Systems in Hospitals with Price Waterhouse Approach
	Year	2017
	Results	Based on the analysis obtained from the hospital, the case study is an application portfolio that is in line with the hospital's vision and mission and is mapped into the McFarlan Strategic Grid then a roadmap for application development in the next few years is obtained based on the highest total project score.
5	Research Title	Information Systems Strategic Planning for Healthcare Organizations Using Ward and Peppard Model
	Year	2020

	Results	Based on the analysis results obtained, a portfolio of health applications has been mapped into four parts of the McFarlan Strategic Grid which is divided into Strategic, Key Operational, High Potential, and Support.
6	Research Title	Ward and Peppard Model for Strategic Planning of Hotel Business Information Systems
	Year	2021
	Results	Based on the analysis that has been done, an idea and business plan are obtained to support the organization's vision and mission that have been mapped into the future application portfolio of McFarlan Strategic Grid.
7	Research Title	Ward and Peppard Method Approach for Strategic Planning of Information Systems DISPERINAKER Salatiga City
	Year	2021
	Results	Based on the analysis obtained, a proposal is obtained which produces 18 proposed information systems that can improve the quality of organizational services in the application of IS/IT in supporting the achievement of the vision and mission of the Salatiga City DISPERINAKER which can be implemented within the next 4 years.
8	Research Title	IT Strategic Planning in IS Development Public Service (Case Study: Prosecutor's Office of South Sumatra)
	Year	2021
	Results	Based on the results of the analysis carried out, a solution is obtained that supports the business vision and mission at the South Sumatra High Court based on SWOT, CSF, and Value Chain analysis.
9	Research Title	Information System Strategic Planning at PT EP-TEC Solutions Indonesia
	Year	2019
	Results	Based on the analysis that has been mapped into the McFarlan Grid table, solutions and recommendations are obtained in the form of applications for learning and discussion forums, and CRM applications that support decisions to be made.
10	Research Title	Information Technology Strategic Plan at PT XYZ with Ward and Peppard Framework
	Year	2018
	Results	Based on the analysis of the internal environment and external analysis using tools such as SWOT, PEST and CSF, the proposed development of information systems to expand market reach such as the Customer Relationship Management System application is obtained.

3. Research Methodology

At this stage, will discuss theories related to research methods and some of the tools that will be used in conducting this research.

3.1. Research Methods

According to ([Ward & Peppard, 2002](#)) strategic planning is the process of identifying IS application portfolios that can support the organization in carrying out its business activities and goals.

IS/IT strategic planning also uses various tools and frameworks to align IS/IT strategically with businesses that are expected to seek new opportunities to implement innovative technologies.

The following is the Ward and Peppard version of the methodology approach where strategic planning is focused on the technology that will be used.

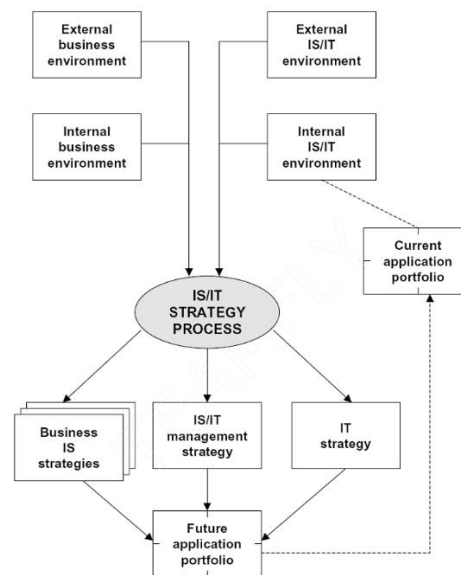


Figure 1. Ward dan Peppard Methodology

Source: Strategic Planning for Information Systems from Ward and Peppard (2002)

According [Shukla et al. \(2021\)](#) Strategic thinking is considered important because it directly affects the growth of the organization by considering market trends, strengths, and weaknesses compared to competitors. Strategic thinking also requires the ability to respond to changes in environmental conditions that occur because environmental changes can become new opportunities or threats to the organization ([Gerald et al., 2020](#)).

3.2. Research Stages

The stages of research used in this research are to do a qualitative approach. According to ([Ahyar et al., 2020](#)) a qualitative approach is to conduct interviews and direct observations to understand more deeply the ongoing business processes. Then an interview was conducted with the supervisor of the hospital's SIMRS section who discussed the existing technology infrastructure in the hospital at this time. The following is an overview of the stages of this research.

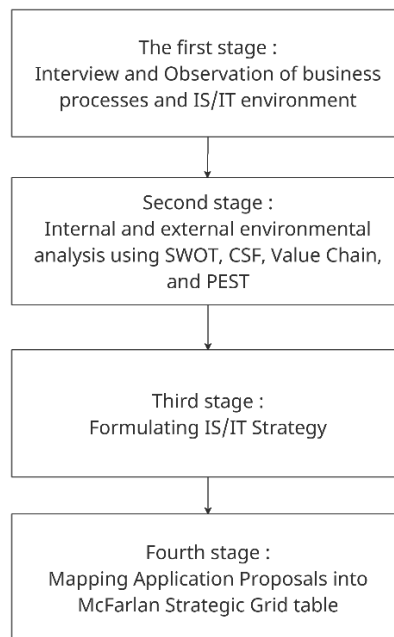


Figure 2. Research Stages

This research was carried out in several interrelated stages.

1. The first stage is to identify the problems that exist in the hospital by conducting interviews and observations with the IT team of the hospital.
2. The second stage is to analyze the existing business processes in the hospital such as strengths, weaknesses, threats, and opportunities that exist in the hospital, at this stage researchers will use SWOT, CSF, Value Chain, and PEST because this stage is the main step in knowing what are the problems in the organization so that they can provide suggestions that are expected to help business processes run well.
3. The third stage is to develop an IS/IT strategy based on the analysis obtained in the previous stage.
4. The fourth stage is to map out the proposed application to be implemented in the next 4 years.

3.3. Theories Related To Research Tools

At this stage, we will discuss the meaning of the analytical tools used in this study.

3.3.1. SWOT (Strength, Weakness, Opportunity, Threat)

SWOT analysis is used to identify internal factors consisting of strengths and weaknesses, then external factors, namely opportunities and threats from the resources owned by the hospital.

3.3.2. CSF (Critical Success Factor)

Critical Success Factor is an analytical tool by considering several critical things in the organization or company environment to define what factors are the keys to hospital success.

3.3.3. Value Chain

Value Chain is a value chain that includes activities such as obtaining raw materials, designing products, building production facilities, marketing products, and developing cooperation agreements and providing customer service.

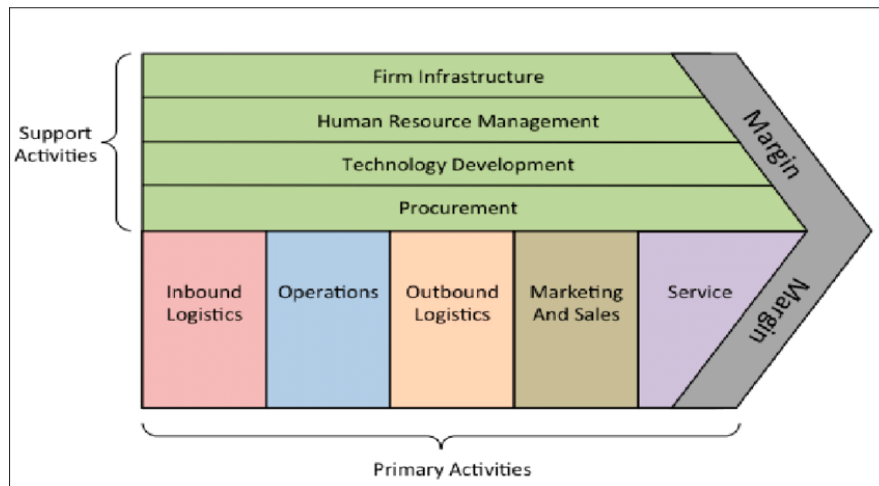


Figure 3. Value Chain Model

3.3.4. PESTEL

PESTEL is a tool used by industry to understand the macroeconomic and social context broadly, such as conducting an assessment of several organizational external influence factors that can guide strategic decision-making.

a. Political Factor

These factors include government policies, legal issues, and include formal and informal rules from the outside environment.

b. Economic Factor

Economic factors include all factors that affect the purchasing power of customers and affect the business climate.

c. Social Factor

Social factors include all factors that can affect the needs of customers and affect the size of the existing market share.

d. Technology Factor

Technological factors are the result of all that can help in dealing with business challenges and support the efficiency of hospital business processes.

e. Environment Factor

Environmental factors include all aspects of the ecology and the environment around the company.

f. Legal Factor

Legal factors are factors that cover all legal aspects related to business aspects.

3.3.5. McFarlan Strategic Grid

McFarlan Strategic Grid is a tool to map applications that need to be used by an organization by looking at their role for the organization. Mapping on the McFarlan Strategic Grid consists of 4 quadrants which include strategic, high potential, key operational, and support.

STRATEGIC	HIGH POTENTIAL
- Applications that are critical to sustaining future business strategy	- Applications that may be important in achieving future success
- Applications on which the organization currently depends for success	- Applications that are valuable but not critical to success
KEY OPERATIONAL	SUPPORT

Figure 4. McFarlan Strategic Grid

4. Results and Discussions

The following are the results of an analysis of the internal business environment and the external business environment, through observing and analyzing the results of interviews obtained from the hospital. It is hoped that this analysis will become a proposal that can be considered in the development of hospitals in the future.

4.1 SWOT Analysis

From the results of the internal and external analysis carried out, the strengths, weaknesses, opportunities, and threats that can affect the organization are obtained.

a. Strengths (S)

There is support from the government, a strategic location in the city center, a national referral hospital, and complete facilities.

b. Weakness (W)

There is no strategic plan for IT development, and data for each installation has not been integrated.

c. Opportunity (O)

The amount of government support to achieve goals in the field of health services. new medical personnel continues to increase.

d. Threats (T)

The emergence of new competitors in the health sector, and increasingly expensive medical devices.

Table 2. SWOT Analysis

Internal External	Strength	Weakness
	<ol style="list-style-type: none"> Government support. Strategic location in the city center. National referral hospital. Complete facilities. 	<ol style="list-style-type: none"> There is no strategic plan for IT development. The data for each installation has not been integrated.
Opportunity	Strategy SO	Strategy WO
<ol style="list-style-type: none"> The amount of government support to achieve goals in the field 	<ol style="list-style-type: none"> Utilize government assistance to improve the development of health 	<ol style="list-style-type: none"> Develop strategic planning of information systems for hospitals.

of health services. 2. The increasing number of new medical personnel.	support infrastructure in hospitals. 2. Provide training to medical personnel to improve the quality standard of health services in hospitals. 3. Develop information technology to support hospital services.	2. Development of a service system for the registration of patients for treatment to integrated drug payments.
Threat	Strategy ST	Strategy WT
1. The emergence of new competitors in the health sector. 2. Medical devices are getting more expensive.	1. Creating new innovations for health services. 2. Increase the budget for development in the field of procurement of medical equipment for hospitals.	1. Improving services more effectively and efficiently and minimizing errors. 2. Improving customer complaint service technology in order to re-evaluate the quality of service in hospitals.

4.2 CSF Analysis (Critical Success Factor)

CSF analysis is used to identify what factors determine organizational success with goals and benchmarks.

Table 3. CSF Analysis

Goals	Benchmark	CSF
To become an independent and trusted national referral hospital.	1. Provide complete hospital medical service facilities. 2. Provide comfort and friendliness to patients being treated.	1. Provide completeness of specialist and sub-specialist doctors. 2. Provide services in accordance with applicable operational standards.
<ul style="list-style-type: none"> - Provide a comfortable, clean, and friendly place to patients. - Improving medical personnel who are superior and have a work culture and are certified. - Improving and maintaining the quality of hospital services 	No complaints from patients.	<ul style="list-style-type: none"> 1. Improving the service of medical personnel 2. Provide training to medical personnel to improve their expertise in their respective fields

4.3 Value Chain Analysis

Value chain analysis is carried out to detail the workflows that are used to become strategic activities that are relevant to understanding business processes from start to finish.

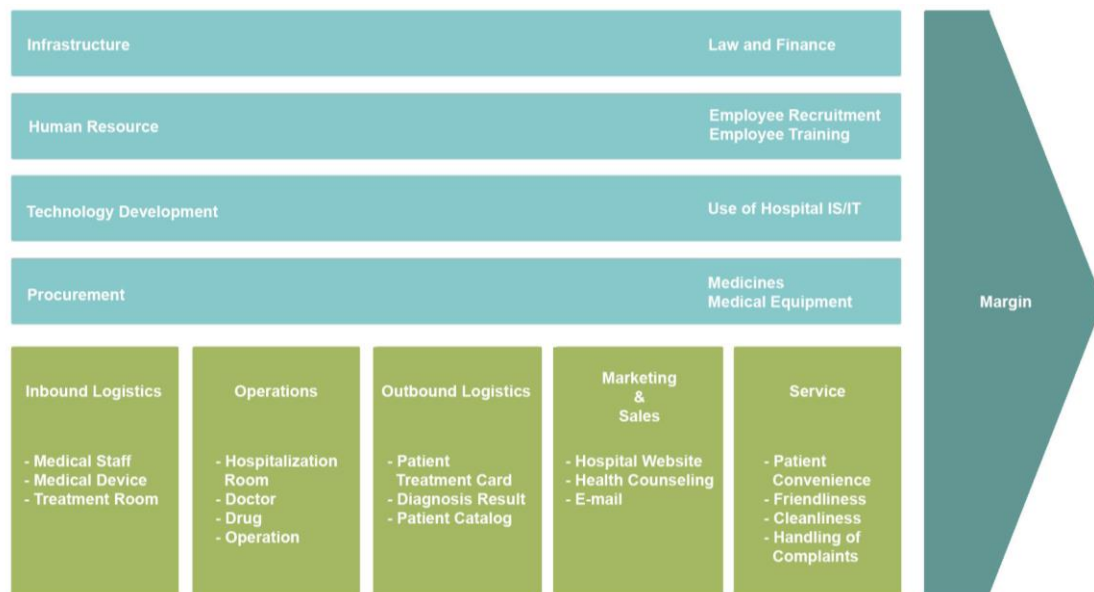


Figure 4. Analysis Value Chain

The following is an explanation of the activity classification above.

a. Primary Activity

Here are the main activities of the hospital:

1. Medical Personnel, Medical Equipment, Nurse Room
This activity consists of the main activity supporting units.
2. Nursing Room, Doctor, Medicine, Surgery
This activity is the main activity in operational activity at the hospital.
3. Patient treatment card, Diagnostic results, Patient catalog
This activity is the main output activity of the hospital.
4. Website, Health Socialization, Email
This activity is an activity to disseminate information and promotions that exist in hospitals, and e-mail is used for digital correspondence with hospital partners and hospital patients.
5. Patient comfort, Friendliness, Cleanliness, Complaint handling
This activity is a service activity where the hospital provides comfort, friendliness, cleanliness, and receives complaints from patients.

b. Support Activity

Here are the supporting activities of the hospital:

1. Law and Finance
This support activity is important so that the hospital can continue to develop in accordance with its vision and mission as well as the goals to be achieved so that it can continue to compete with other hospitals.
2. Employee recruitment, Employee training
Provide training for employees so that they can have competencies and abilities that are in accordance with the main tasks carried out. Recruiting competent employees is also carried out to increase the quality of hospital services.
3. Use of hospital IS/IT
Having IT and IS at the hospital can help simplify work such as employee attendance, online patient registration, recording reports at the hospital, and others. In addition, the presence of IT/IS in the hospital can maintain competitiveness with other hospitals.
4. Medicines, Medical Equipment
Cooperating with other vendors to supply medicines and medical equipment to make it easier for hospitals to carry out operational activities.

4.4 PESTEL Analysis

PESTEL analysis is used to analyze the environment from the social aspect of the hospital. It is hoped that this analysis can describe the environment that affects hospital growth.

a. Political Factor

The political foundation of the hospital's external factors that guide the organization's vision, mission, and goals is legislation no. 44 of 2009 which was approved by the DPR RI and the President of the Republic of Indonesia regarding hospitals. As stated in the law that the hospital is a health service institution for the community with its own characteristics that are influenced by the development of health science, technological advances, and the socio-economic life of the community which must continue to be able to improve services that are more qualified and affordable by the community in order to achieve this. the highest degree of health. This basis is also the application of service standards in hospitals. In addition, there are policies from the government through the Digital Transformation Office team, namely to digitize health data in Indonesia which is focused on improving the quality of health policies based on accurate and complete data and efficiency in providing health services at the public health center, clinic, and home levels. sick for society.

b. Economic Factor

From the economic side, financial assistance from the central government and local governments greatly affects business processes such as the maintenance and purchasing of medical equipment to support health services in hospitals.

c. Social Factor

The health education and counseling program carried out by XYZ Hospital has the aim of increasing public knowledge about health and also to increase awareness and always maintain environmental health.

d. Technology Factor

There is support from the government through a strategic plan for digital health transformation to increase health service innovation in supporting services with better technological innovations for hospital operational activities.

e. Environment Factor

The environment around the hospital is a metropolitan environment located in the center of the city where there are shopping centers, entertainment centers, offices, and others.

f. Legal Factor

In carrying out hospital operational activities, it is inseparable from legal aspects because the law plays a role in regulating hospital operational activities so that they can run properly and safely. So that the activities of handling public health services can run smoothly and do not harm the parties involved.

The following are laws and regulations related to hospital management in Indonesia:

1. Law no. 44 of 2009 concerning Hospitals.
2. Regulation of the Minister of Finance number 129 of 2020 concerning Guidelines for BLU Management.
3. Regulation of the Minister of Health number 21 of 2020 concerning the Strategic Plan of the Ministry of Health for 2020-2024.

The main purpose of using the PESTEL tool is to reach scenarios that are significant for decision-makers and shape different futures ([Vesali et al., 2022](#)). These factors are considered important because they are considered ideas for making a more comprehensive planning process.

4.5 Identification of IS Strategy

The information system strategy is used to propose information system requirements for hospitals, it is hoped that this proposal can improve reporting efficiency and simplify hospital operational activities.

Table 4. SI Strategy Identification

Name	Function	Status	Suggestion
Hospital Website	As a medium of notification, promotion, information, and news about the Hospital.	Available	-
IS Customer Satisfaction	As a measuring medium for the level of customer satisfaction.	Available	-
IS Staffing	As a media to store and manage data on Hospital employees.	Available	Upgrade
IS Employee Performance Monitoring	As a medium for employee performance assessment.	Available	Upgrade
IS Ambulance Tracking	As a media manager of hospital vehicles.	Not Available	New system
IS Business Planning	As a medium of business planning information.	Available	-
IS Procurement	As a media to manage the needs of the patient's household appliance.	Not Available	New system
Single Sign System On	A system that provides access to application resources using one account.	Not Available	New system
IS Logistics	As a storage media and manager of goods management in the warehouse.	Available	Upgrade
IS Pharmacy	As a medium for managing and storing drug data in hospitals.	Available	Upgrade
IS Laboratory	As a data storage medium from a study or examination.	Available	Upgrade
IS Radiology	As a medium for storing patient	Available	Upgrade

	radiological examination data.		
IS Registration	As a storage medium and management of patient data registered.	Available	-
IS Billing	As a medium for storing patient payment data.	Not Available	New system
IS Claim	As a medium for management of insurance data in hospitals.	Not Available	New system
IS Outpatient Patient	As a medium for managing outpatient data.	Available	Upgrade
IS Patient Inpatient	As a medium for managing inpatients.	Available	Upgrade
IS Blood Sample	As a medium for data management of patient blood tests.	Not Available	New system
IS Medical E-Record	As a medium for the management of patient data electronically and can be accessed by the patient.	Not Available	New system
IS Data & Terminology	As a medium for management of health science research data.	Not Available	New system
IS Budget	As a media manager of the Budget Plan in the Hospital.	Not Available	New system
IS Finance	As a financial management media in hospitals.	Available	Upgrade
IS Audit SI/IT	As a medium for management of hospital equipment examination data.	Not Available	New system

4.6 Application Proposal Development

Future application development proposals are mapped to the McFarlan Strategic Grid application portfolio table, these applications are expected to produce information needed by hospitals in the future.

Table 5. McFarlan Strategic Grid Portfolio

Strategic	High Potential
Hospital Website IS Customer Satisfaction IS Staffing IS Employee Performance Monitoring IS Audit IS/IT	IS Budget IS Finance IS Data and Terminology
Single Sign System On IS Procurement IS Logistics IS Pharmacy IS Laboratory IS Radiology IS Registration IS Billing IS Claim IS Outpatient Patient IS Patient Inpatient IS Medical E-Record IS Blood Sample	IS Ambulance Tracking IS Business Planning
Key Operational	Support

4.7 Strategic Development Roadmap

In the next stage, determine the proposed application development flow based on the McFarlan Strategic Grid.

Table 6. Strategic Development Roadmap

Application Development Roadmap			
2022	2023	2024	2025
Single Sign System On IS Procurement IS Logistics IS Pharmacy	Hospital Website IS Customer Satisfaction IS Staffing IS Employee Performance Monitoring	IS Budget IS Finance IS Data and Terminology	IS Ambulance Tracking IS Business Planning

IS Laboratory	IS Audit IS/IT		
IS Radiology			
IS Registration			
IS Billing			
IS Claim			
IS Outpatient Patient			
IS Patient Inpatient			
IS Medical E-Record			
IS Blood Sample			

4.8 Future Organization Proposal

According to [Rahman Khan \(2020\)](#) effective and productive human resources can make a strong contribution to organizational development, it is proposed to create a unit called the Computer Security Incident Response Team (CSIRT), which is tasked with preventing, managing, and responding to incidents that occur related to cyber security. It is hoped that this unit will be able to manage cybersecurity incidents and maintain personal data in hospitals. The skills required by the CSIRT unit are experience and understanding of computer security issues such as viruses and cyber attacks as well as an understanding of computer security software.

5. Conclusion

Based on the results of the research conducted, at this stage, it will be closed with conclusions and suggestions. It is hoped that this research will be useful for readers.

5.1. Conclusion

1. From the results of the strategic planning of the information system at the hospital, it is possible to formulate application requirements in the form of an application portfolio that has been divided into 4 parts, namely Key Operations, Strategic, High Potential, and Support.
2. The results of this portfolio analysis are expected to be used as a reference in the development of IS/IT in the future by various health parties and IS/IT strategic planning in hospitals. It is hoped that it can become a benchmark for the implementation of technology in health services for the community.

5.2. Suggestion

1. For the implementation of IS/IT strategic planning, it is recommended that it be announced to all parties involved in policymaking so that they can give each other input, especially on the matter of planned costs and budgets.
2. It is hoped that further research can conduct better research with other analytical methods.
3. Suggestions for further similar research are expected to understand the business processes that occur and the tasks of each part of the organization. And ask what is being done or what plans are being worked on because that can be a clue and help what the organization wants.

5.3 Limitations and Study Forward

This research can be used as an example of IT strategic planning for a hospital, but it takes a lot of time to implement the developed application so it is recommended to discuss its development again with the parties involved.

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