Project Management on Network and Security Development using the PMBOK Method

Aldy Mercyano Iqbal[1]*, Indra Tresna Setiadi[2], Samidi[3]
Department of Master Computer Science[1], [2], [3]
Budi Luhur University
Jakarta, Indonesia
2111601189@student.budiluhur.ac.id[1], 2111601130@student.budiluhur.ac.id[2], samidi@budiluhur.ac.id[3]

***Abstract*— HOSPITAL ABC is one of the companies that operates in the healthcare sector. In the construction of the hospitals, must be supported by the implementation of technology, especially network technology so that all operational devices in the hospital can be connected and communicate with each other, while still paying attention to the security factor on the network. Based on this, project management is needed in network and security development at the hospital to be built so that the development can be following the timeline and meet the expectations of all stakeholders. With the use of the PMBOK approach for network development and security in hospitals, every phase has very important activities and is related to other activities. Besides that, by using the PMBOK approach can also find out which parts are challenges in project implementation. In this project, the process of procuring/ordering devices, storing devices, and physically checking devices with BAST are critical parts and require more attention so that the project can run according to the specified time.**

Keywords*— *Hospital, Computer Network, Network Security, Project Management, Project Management Body of Knowledge

I. INTRODUCTION

Project management is the discipline of initiating, planning, executing, controlling, and closing team work to achieve specific goals and meet specific success criteria by a specified time. Project management can also be interpreted as a control system that is used to achieve the right results or results. Project management basically has objectives with certain added value as expected by stakeholders, including central and local governments, the private sector, and the community/public [1].

Project Management of Body Knowledge PMBOK is a framework that can be used by a project manager in the project management process. Beside that, PMBOK is a standard set by the American National Standard ANSI/PMI 99-001-2004 published by the Project Management Institute (PMI) which contains a collection of knowledge by professionals in project management [2]. The knowledge system developed over time and was introduced in the Project Management Body of Knowledge (PMBOK) Guide, the sixth edition of which was released in 2017. The advantage of using PMBOK is that it reduces the possibility of failure and increases the success rate of projects [3].

HOSPITAL ABC is one of the companies that operates in a variety of business sectors, where one business run by the company is the business in the health field, namely hospitals. Hospital ABC plans to expand its network of health facilities by building hospitals in other areas, in this case the construction of hospital facilities in the city of Surabaya. Project management is needed in this development, where it aims to achieve the target where the hospital can be opened and provide services within a certain timeperiod. In project management, identification will be carried out, especially related to work constraints, challenges and obstacles that must be minimized, communication strategies, costs, time needed to develop the network and security of this hospital can be completed well, so that it can meet the expectations of all stakeholders in the company.

Previous research on project management in the IT field which used the Project Management of Body Knowledge (PMBOK) approach is project management for Cloud Compute and Storage Deployment: B2B Model, where PMBOK approach is used in the project life cycle. From this research, it is known that by utilizing project management techniques as best as possible while considering the complexity of processes in this type of business, an optimal project management approach can be used to meet the hopes/expectations of users [4]. Moreover, there is another study regarding the application of the system life cycle development method and project management body of knowledge in information system development, where in this study it is known that SDLC and PMBOK best practices can overcome problems that lie at the core of the importance of communication in projects, careful planning, quality control which refers to predetermined standards, project planning, user and business needs, as well as the need for executive support [5].

Based on the background and successful implementation of project management in previous research, the Project Management Body of Knowledge (PMBOK) approach will be used in developing the network and security in the new hospital, whereby using this approach the network and security development of the hospital can be implemented by the timeline and stakeholder expectations and can minimize challenges and obstacles that will arise.

Besides that, a problem was formulated which is how to manage the timeline, stakeholder expectations and minimize the challenges in the development of networks and security for hospitals using the Project Management Body of Knowledge (PMBOK) approach.

The limitations of the problem in this study are as follows.

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024

1. *A case study was carried out on security and network development for the hospital to be built by HOSPITAL ABC.*
2. *Project management is based on the Project Management Body of Knowledge (PMBOK).*

This research aims to prepare a document that can be used as a guide in implementing security and network projects in hospitals based on the Project Management Body of Knowledge (PMBOK) which consists of several stages of the project including Initiating, Planning, Executing, Monitoring & Controlling, and Closing. Meanwhile, the benefit of this research is to develop the correct stages in a project and as a guideline for implementing IT equipment procurement projects so that the implementation of this project is by the specified time and minimizes risks that will arise when implementation is underway.

II. LITERATURE REVIEW

A. Project Management

Project management is the planning, monitoring, and control of all aspects of a project and the motivation of all those involved in it, to achieve the project objective within agreed criteria of time, cost, and performance [6]. In addition, project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirement [7]. PMBOK contains guidelines for carrying out project management. This standard was first published in 1983. PMBOK is not a methodology, but a foundation on which organizations build the methods, rules, procedures, regulations, tools, techniques, and life cycles necessary to implement project management. The PMBOK used is the 6th edition published by the Project Management Institute (PMI) in 2017.

PMBOK aims to provide knowledge with systems that can be applied to projects. The Project Management Institute (PMI) uses PMBOK as a basis and benchmark for obtaining Professional Project Management or PMP certification skills. This certification is quite important for a project manager to validate his expertise in the field of Project Management. There are five process groups to categorize the stages required in PMBOK, including:

1. *Initiate: In this phase, the process includes an initiation phase and a phase where the project owner delegates tasks to the team responsible for creating a project definition to be used as a reference for the project plan.*
2. *Planning: Currently covers ten areas of knowledge in project planning.*
3. *Executing: This phase consists of the processes carried out to complete the compliance work specified in the project management design.*
4. *Monitoring and Controlling: During this phase, project activities are reviewed to assess project progress and performance. Then identify where the plan needs to be changed. To initiate changes according to the project. Ensure that project objectives are achieved following the stated objectives.*
5. *Closing: This phase carries out the process to complete all activities from all phases in the Project Management process group. Project management development needs to ensure that the final project report is available.*

Furthermore, in PMBOK there are ten knowledge areas, including:

1. *Project Integration Management is an area that allows teams to work together more smoothly. Integrated management includes a set of processes, systems, and methods that form a coherent strategy for project management.*
2. *Project Scope Management refers to the total amount of work that must be done to create a product, service, or other project deliverable with specified functionality and characteristics. Without comprehensive project scope management, teams may end up doing out-of-scope work that they don't need.*
3. *Project Schedule Management refers to the analysis and creation of schedules and project completion schedules. Time management is a key area of knowledge because it has a direct impact on the quality, scope, and cost of a project. Proper time management ensures you have the schedule and budget to complete your project. It can also clarify which stakeholders should be involved, how much time is required, and at what point in the project their expertise is needed. Therefore, as part of the time management for this project, we provided an extensive framework for estimating the sequence of activities, activity durations, and required resources.*
4. *Project Cost Management is the process of planning, estimating, and managing costs and budgets to complete a project. Cost management helps you keep your project costs within the given budget.*
5. *Project Quality Management is carried out to measure the quality of all running activities. To manage the quality of your project, this quality control process allows taking corrective action if something doesn't go according to plan.*
6. *Project Resource Management is managing and allocating resources within the organization that are needed to work on projects. This includes budget, capacity, and team members. To manage project resources effectively, it is necessary to know the bandwidth available to your team and identify the strengths and weaknesses of each team member. This process helps the team establish a strategy for completing the project.*
7. *Project Communication Management, which explains the processes and procedures required to ensure that information and data collected during a project are collected, stored, and distributed correctly to the project team involved. This process is necessary because effective communication is the key to project success.*

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024

8. *Project Risk Management Risk is one thing that cannot be separated from the project management process. Therefore, project risk management becomes necessary. This project risk management reduces the potential negative impact of unexpected events related to project costs, schedules, or other project resources.*
9. *Project Procurement Management Refers to the process of managing and optimizing the project budget. A project budget is available for the goods, services, and resources needed to complete the project. The team members responsible for supply management are often led by a project manager. When managing a budget, project managers ensure that resources can be purchased, rented, or acquired.*
10. *Project Stakeholder Management, which is how to communicate project status, costs, and obstacles to stakeholders. This is done to increase visibility, manage changes in project direction, and manage expectations [8].*

B. Capacity Management Plannng

Capacity planning is a process for planning system capacity so that it can meet current needs and anticipate growth in needs in the future. Technically, capacity planning means planning the resources or resources needed by a system to operate [9]. In project management, capacity planning is very crucial, because it is closely related to critical project knowledge management in several areas, including:

- *Time Management*
- *Team Management*
- *Work Management*
- *Resource Management*

Production capacity, strategic planning, and project planning are closely related. Scheduling is how someone schedules team members' time so that work can be completed on time. Capacity management is not a rigid process. Every business is different, and demands may change. Thus, there are various capacity planning strategies that project managers can use to adapt to different scenarios.

1. Capacity Planning Strategies

There are three capacity planning strategies for assisting requests, meeting resource needs, and increasing productivity in project management teams.

- *Lag Strategy*

Lag Strategy Having sufficient resources to meet actual needs rather than projected needs. This capacity planning strategy is beneficial for small organizations with low-capacity requirements.

- *Lead Strategy*

How about having enough resources to meet demand forecast plans. This capacity planning strategy is useful when demand increases because excess capacity can meet the increased demand.

- *Match Strategy*

Match strategy is a combination of lead and lag capacity planning strategies. In this case, the project manager must monitor actual demand, estimate demand plans, understand market trends, and adjust capacity.

2. Capacity Planning Benefits

Capacity planning is an important strategic planning process for many reasons. The following are some of the main benefits of effective capacity planning including:

- *Reduce costs.*
- *Prevent stockouts.*
- *Reduce production lead time.*
- *Eliminate excess capacity.*
- *Helps supply chain management i.e. A clear understanding of your project capacity requirements ensures that you have the right number of resources to benefit your supply chain.*
- *Helping resource management provide adequate capacity to meet capacity needs is key to optimizing resource planning and resource allocation [10].*

C. Computer Network

A computer network is a connection between two or more devices that are connected physically or logically so that they can exchange information. A computer network can be said to be connected if the devices on the network can exchange data, information and share their resources. A computer network usually consists of two or more computers and carries out data sharing between computers. Apart from that, a computer network is a collection of interconnections of several computers. In popular language it can be explained that a computer network is a collection of several computers and other devices such as routers, switches and so on [11]. In computer networks, there are different types of networks, namely:

1. *Personal Area Network (PAN)*
2. *Local Area Network (LAN)*
3. *Metropolitan Area Network (MAN)*
4. *Wide Area Network (WAN)*
5. *WLAN (Wireless LAN) [12].*

The types of networks based on topology are as follows.:

1. *Bus topology*
2. *Ring topology*
3. *Star Topology*
4. *Mesh Topology [13].*

D. Network Security

Computer network security systems are a branch of technology known as information security that is applied to computers and networks. Computer security objectives include protecting information from unauthorized parties while still facilitating access and use by users. Computer system security is a collective mechanism and process by which sensitive and valuable information, and services are protected from publication, interference or destruction by unauthorized

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024

activities or unreliable individuals and unplanned events respectively. Network Security is the most important and vital component in information security because it is responsible for securing all information passing through networked computers [14]. Studies on network security have started since the birth of information networks. The exponential growth of network size and application, especially the random dynamic access relationship built on the static Internet physical connection network based on OSI model, makes the study of network security more complicated. Before the 1960s, the focus on the network security research is how to build an absolute security system and reduce design vulnerabilities to ensure the confidentiality, integrity, and availability of the system, which can be regarded as the first stage of network security research. However, people soon realized the impossibility in practical operation [15].

E. Hospitals

A hospital as a health service facility is a place used to carry out health activities and maintain and improve health status. Therefore, hospitals are expected to be able to provide effective and efficient services to the public who use health services. A hospital is a health service institution that provides inpatient, outpatient, and emergency services [16].

Based on ownership, hospitals in Indonesia are categorized into two types, namely state hospitals, and private hospitals. State hospitals are hospitals managed by the government (including local governments) and other non-profit legal entities. Meanwhile, private hospitals are hospitals managed by legal entities with profits in the form of limited liability companies or limited liability companies [17].

F. Related Work

Previously, there had been studies/research regarding project management, especially in the field of IT infrastructure, using the Project Management Body of Knowledge (PMBOK). The following are several previous studies regarding project management. Based on [4], it is known that by utilizing project management techniques as best as possible while considering the complexity of processes in this type of business, an optimal project management approach is used to meet the hopes/expectations of users. Apart from that, based on [5], it is known that SDLC and PMBOK best practices can overcome core problems, namely the importance of communication in projects, careful planning, quality control that refers to predetermined standards, project planning, user and business needs, and the need for executive support.

Based on a study conducted by , by combining the fifth edition of PMBOK, the third version of SWEBOK, and Presidential Regulation number 4 of 2015[18] concerning the Fourth Amendment to Presidential Regulation number 54 of 2010 concerning Government Procurement of Goods/Services, it is hoped that the work design will be able to reduce the failure rate software projects in government agencies caused by weak software project management itself. In addition, based on a study conducted by [19], it is known that six factors were found that caused failure in software projects, namely the absence of sympathetic leadership, ignorance of the cost impact, latent risks being ignored, schedule tolerance, psychology of failure, and poor communication. ineffective. A study conducted by [20], analyzing project management, obtained an accurate picture of creating a lecture scheduling system, analyzing costs, and an overview to get an alternative system that can be maintained.

Furthermore, based on [21], in determining priorities and risk mitigation steps, the steps contained in PMBOK are applied and the analysis is carried out with the help of the FMEA method and also the Pareto diagram, where the steps taken are determining the values of severity, occurrence, detection for obtain the RPN value which is then used to determine the risks that will be prioritized for mitigation.

The study conducted by [22] said that the stages of designing and building a project management information system using the Agile method with an Extreme Programming approach will produce output, one of which is the result of an analysis of adjusting the 5 knowledge areas of PMBOK, with five Knowledge Area focuses, namely Project Integration Management, Project Scope Management, Project Schedule Management, and Project Stakeholder Management.

The study conducted by [23] said that after implementing PMBOK, it was discovered that out of 40 national educational standard activities in school organizations, 49 PMBOK activities had been met, whereas in PMBOK there was a knowledge area that regulated risk management, so it was seen that implementing PMBOK in school organizations was very good.

The study conducted by [24] said that there are still many project managers who lack awareness about SRM and only have a partial understanding of risk and from the research conducted, a framework related to risk management was produced with a proposed three stages, namely the root cause stage, where risk identification from elements of the business environment becomes the basis for measuring risk management which is measured through identification, analysis and verification activities with the support of communication, documentation and evaluation. The measurement results are classified into three major dimensions, namely cost, time, and quality. The final stage of the framework is the remaining performance risks and risk mitigation action plans. And [25] concluded that each project stakeholder must discuss very carefully and thoroughly in preparing the Project Charter and be open to each other so that the problems formulated in the Project Charter have been properly considered.

G. Problem Solving Conceptual Framework

Based on problem identification and previous literature review, the following is a conceptual framework related to studies to determine the effectiveness of project management based on the Project Management Body of Knowledge (PMBOK) in the construction of network and security infrastructure for new hospitals.

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024

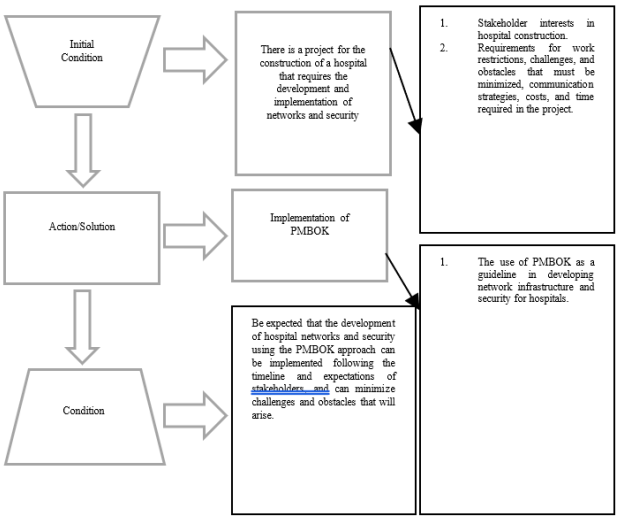


Fig 1.Research Framework

III. RESEARCH METHOD

The method used in this research is a literature study of various cases in journals and articles that discuss them. The problem of implementing network and security project management by the predetermined schedule and costs, resulting in descriptive analysis. After the problem was identified and using the methods previously explained, this research continued with a literature study related to project management, especially the PMBOK approach. And the final stage is project implementation based on the stages in PMBOK which are known from previous literature studies. In summary, the following is a flow diagram were presented below.

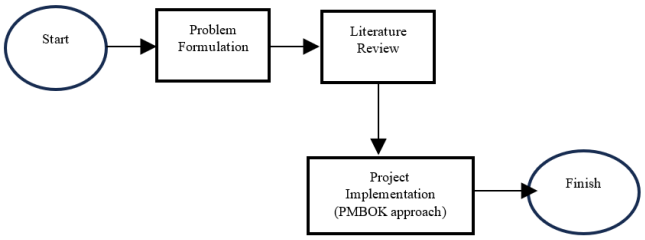


Fig 2. Research Stages

IV. RESULT AND DISCUSSION

Based on figure 2, after the problem was formulated, then carrying out the literature review regarding the project management method, especially the use of the Project Management Body of Knowledge (PMBOK) to implement to development of network and security in hospitals. With the PMBOK approach, the project divided and grouped the completion of this project into five stages, including the Project Initiation Phase, Project Planning, Project Execution Phase, Project Monitoring and Controlling Phase, and Project Closing.

A. Project Initiation Phase

At this stage, a project officially begins and is also the initial stage in the project management life cycle, therefore notes are needed containing information about the project, such as objectives, priorities, deadlines and so on which are then contained in the Project Charter. A Project Charter is a document that formally acknowledges the existence of a project/authorizes the project and gives project management the authority to apply organizational resources to project activities [26]. A Project Charter is useful as a reference in making decisions in a project. To initiate a project so that it runs smoothly and on time, it is necessary to identify a project charter with the structure described in TABLE 1.

TABLE 1. RELEVANT RESEARCH RESULTS

Schedule	Frequency	Participant	Method	Writer
Kick Off Meeting 1. Work planning and project estimation. 2. Introduction and responsibilities of project members. 3. Explanation of the project stages to be implemented. 4. Synchronize information and ask for ideas/input for projects to be started	Initial Meeting	Owner, Project Sponsor	Meetings, Presentations	PM
Project Planning 1. Project sustainability status 2. Constraints and problems in the field 3. Future work plans 4. Coordination with other teams	Daily	Project Sponsor	Meetings, Whatsapp Group	PM
Project Report 1. Weekly project report. 2. Project timeline update. 3. Scope and dependency status. 4. Suggestion and issues. 5. Next stage. 6. Project checklist.	Weekly	Project Team	Meetings, mail, whatsapp Group	PM
Proyek Akhir 1. Project Report 2. UAT Result 3. Minutes of Hand Over (BAST)	End of Project		Meetings, Presentations, final report	PM

In TABLE 1, it can be explained that in the project charter, several things need to be identified and what things need to be done in implementing the project. The kick-off meeting is the first thing that needs to be done before starting the project

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024

because, in the kick-off meeting, work planning, project time estimation, introduction and responsibilities of each project member, explanation of the project stages, synchronization of information and input regarding the project to be carried out will be carried out. Next is project planning, where in this case there will be monitoring of the project status, obstacles and problems that occur, work plans that will be carried out next, and the need for coordination with other teams.
Then proceed with creating a project report, where this report is divided into several reports, namely weekly project reports, updated information regarding the project timeline, scope and dependency status, input and problems that occur during the project, reports regarding the next stages that will be implemented, and checklists related to the project that has been done.

B. Project Planning Phase

Project planning is the process of detailing steps for accomplishing the project within a certain time frame by using the available resources [27]. In project planning in PMBOK, there are nine knowledge areas, one of which is scope management. The scope management in this project includes providing equipment procurement up to the handover stage of Network and Security Infrastructure work with details of data work can be seen in Figure 3.

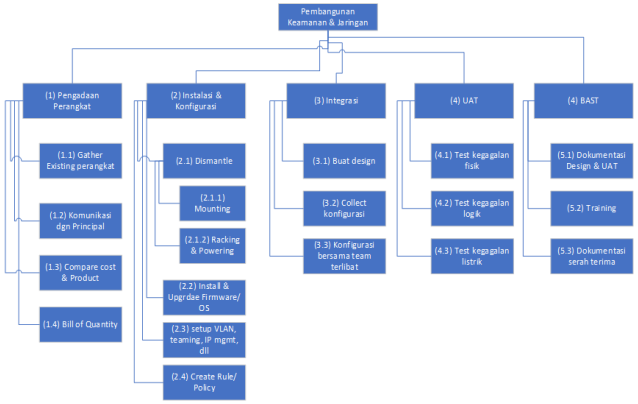
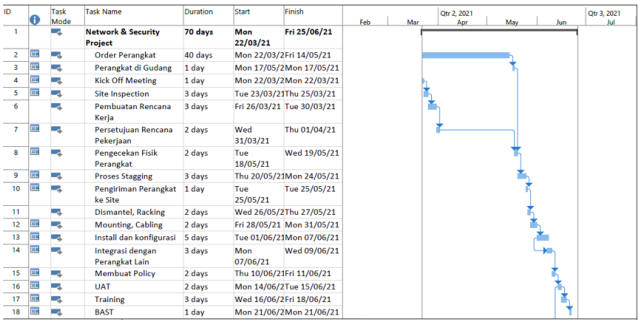


Fig 3. Work Breakdown Structure

Besides that, in the 9 knowledge areas in PMBOK, there is time management which is aimed at managing the work schedule for each task that will be carried out in the project. The following is a Gantt chart or timeline compiled for network and security development projects.



ID	Task Mode	Task Name	Duration	Start	Finish
1		**Network & Security Project**	**70 days**	**Mon 22/03/21**	**Fri 25/06/21**
2		Order Perangkat	40 days	Mon 22/03/21	Fri 14/05/21
3		Perangkat di Gudang	1 day	Mon 17/05/21	Mon 17/05/21
4		Kick Off Meeting	1 day	Mon 22/03/21	Mon 22/03/21
5		Site Inspection	3 days	Tue 23/03/21	Thu 25/03/21
6		Pembuatan Rencana Kerja	3 days	Fri 26/03/21	Tue 30/03/21
7		Persetujuan Rencana Pekerjaan	2 days	Wed 31/03/21	Thu 01/04/21
8		Pengecekan Fisik Perangkat	2 days	Tue 18/05/21	Wed 19/05/21
9		Proses Stagging	3 days	Thu 20/05/21	Mon 24/05/21
10		Pengiriman Perangkat ke Site	1 day	Tue 25/05/21	Tue 25/05/21
11		Dismantel, Racking	2 days	Wed 26/05/21	Thu 27/05/21
12		Mounting, Cabling	2 days	Fri 28/05/21	Mon 31/05/21
13		Install dan konfigurasi	5 days	Tue 01/06/21	Mon 07/06/21
14		Integrasi dengan Perangkat Lain	3 days	Mon 07/06/21	Wed 09/06/21
15		Membuat Policy	2 days	Thu 10/06/21	Fri 11/06/21
16		UAT	2 days	Mon 14/06/21	Tue 15/06/21
17		Training	3 days	Wed 16/06/21	Fri 18/06/21
18		BAST	1 day	Mon 21/06/21	Mon 21/06/21

Fig 4. Development of Project Timeline

From Figure 4, it is known that the time required for the network and security development project for hospitals is scheduled to be completed within a period of ± 70 days starting from March 22 to June 25, 2021, through several stages. In this schedule, the first thing to do is order the network equipment. The device is scheduled to be received within 40 days from the project start date/procurement of the device. Simultaneously with waiting for the equipment to be received, the project continues with a kick-off meeting (1 day), site checking (3 days), making a work plan (3 days), and approval of the work plan (3 days).

After the device is received, a physical check of the device is carried out which is scheduled to be carried out for 2 days, and continues with the stagging process for 3 days, sending the device to the location/hospital for 1 day, racking for 2 days, mounting for 2 days, installation and configuration of the device for 5 days, device integration for 3 days, policy creation, UAT implementation, training and ending with the handover minutes with the required schedule of 8 days.

Apart from that, it is important to know which processes will take a long time in a project. To find out this, one method that can be used is the critical path method (CPM). CPM is an integrated network consisting of a series of activities with one another intended to obtain maximum work efficiency. In determining the total time, the CPM project is simpler, it is obtained by summing the duration of each activity and taking the last / greatest finish time. The path where delays may not occur in each project activity is called the critical path [28]. The analysis using the CPM method in the hospital network and security development project is illustrated in Figure 5 below.

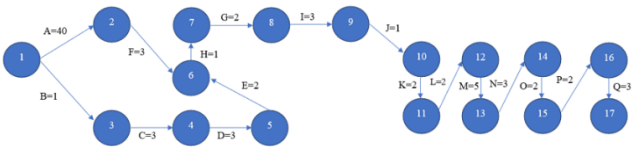


Fig 5. Critical Path Analysis

Based on Figure 5, each node/circle represents the process being carried out and the arrows represent the time required for each process to progress to the next process. The process for each node is 1. Kick-off meeting, 2. Order equipment, 3. Site inspection, 4. Creation of work plan, 5. Approval of work plan, 6. Devices are warehoused, 7. Physical checking of devices, 8. Staging process, 9. Delivery of devices to site, 10. Dismantling,

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024

racking, 11. Mounting, cabling, 12. Install and configure, 13. Integration with other devices, 14. Creating policies, 15. UAT, 16. Training, and 17. BAST. From this analysis, it is known that the longest path is via A-F-H-G-I-J-K-L-M-N-O-P-Q, which means that the process from the device procurement/order process, the device being warehoused, the physical checking of the device to the BAST process is the longest process which is the critical path in the network development and security project. hospital, so this process requires more attention so that the project can run according to the specified time.

C. Project Execution Phase

The execution phase of the project is most dangerous and the most drain on the resources during project life cycle, therefore, its need to monitor and control by specialists to exceeded obstructions and achieve the project goals [29]. In the hospital network and security development project, several stages need to be carried out, including the following:

1. *Preparation, Survey and Assessment*

This stage is the initial stage in implementing the project where this stage is to prepare everything that needs to be done in implementing the project, ensuring the location is ready for network implementation, testing, and evaluating the readiness of implementing the network.

2. *Procurement of equipment and installation materials*

This stage is an important stage where the network devices that will be implemented in the hospital are installed and then continued with the device installation process.

3. *Installation, Configuration, Interconnection and Distribution of Devices*

This stage is the final stage in the execution of the hospital network and security development project, where in this stage there is an installation and configuration process to support the network devices that have been provided so that they can run according to their function, ensuring connections between devices so that they can be connected in the network and distributing devices to the hospital that was built.

D. Project Monitoring and Controlling Phase

For the whole project can run well, it is necessary to create a method for monitoring and controlling, which is a design review meeting held at kick-off to ensure implementation is in accordance with the design and the design is per the requirements desired by stakeholders. Apart from that, project tracking is carried out while the implementation process is ongoing to ensure implementation is following the timeline agreed upon during the design review meeting, as well as project reporting which is always updated regularly regarding the status of the project.

E. Project Closing Phase

The project closing phase is the final stage of the project management life cycle. This stage also involves several processes that need to be carried out to close the project. The main goal of this stage is to complete and ensure that all tasks have been fulfilled and by the specified objectives. Several things that were carried out when the hospital network and security development was completed were as follows.

1. *Testing, Commissioning, Training (User Acceptance Test)*

Testing, commissioning, and training will be carried out by conducting performance testing, availability testing, specification review, and training.

2. *Final Project Report*

This report is created after completion of the installation, testing, and commissioning process, which contains the following information.

- *Summary of implementation process.*
- *Configuration and documentation of implementation results.*
- *Testing and commissioning results.*

This report is signed by both parties, indicating that the entire installation and integration process has been carried out by the hospital's requirements.

3. *Operational Phase Started*

In this phase daily operations will begin, device warranty and principal support.

Based on the use of the PMBOK approach for network development and security in hospitals which has been described previously, it can be concluded that each phase has very important activities and is related to other activities. Apart from that, by using the PMBOK approach can also find out which parts are challenges in project implementation. In this project, the process of procuring/ordering devices, storing devices, and physically checking devices with BAST are critical parts and require more attention so that the project can run according to the specified time.

V. CONCLUSION

Project management is an important thing that needs to be prepared as well as possible, where with project management it is hoped that the work in the project can be completed with the target or timeline that has been determined and following the expectations of stakeholders. In this study, project management was carried out where the case study taken was network development and hospital security and the project management method approach used was Project Management Body of Knowledge (PMBOK). This project management is divided into 5 stages, namely Project Initiation Phase, Project Planning, Project Execution Phase, Project Monitoring and Controlling Phase, and Project Closing.

Based on the application of the PMBOK approach for network and security development in hospitals, each phase contains extremely essential tasks that are tied to one another. In addition, the PMBOK approach can be used to identify the project implementation issues. To ensure that the project is completed within the allotted time, the processes of purchasing and acquiring devices, storing devices, and physically inspecting devices with BAST are crucial and demand extra attention.

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024

REFERENCES

[1] G. Padma Arianie and N. Budi Puspitasari, "PERENCANAAN MANAJEMEN PROYEK DALAM MENINGKATKAN EFISIENSI DAN EFEKTIFITAS SUMBER DAYA PERUSAHAAN (Studi Kasus : Qiscus Pte Ltd)," 2017.

[2] A. V. Suwandana and A. W. Utami, "Rancang Bangun Sistem Informasi Manajemen Proyek Berbasis Website Menggunakan Project Management Body Of Knowledge 6 (Studi Kasus PT. Tekno Mandala Kreatif)," JEISBI, vol. 03, p. 2022.

[3] P. H. Ardi, E. A. F. Elmuna, M. A. Zamroni, and M. A. Yaqin, "Implementasi Project Management Body of Knowledge (PMBOK) pada Organisasi Pondok Pesantren," ILKOMNIKA: Journal of Computer Science and Applied Informatics, vol. 2, no. 3, pp. 314–328, Dec. 2020, doi: 10.28926/ilkomnika.v2i3.166.

[4] J. Tanwar et al., "Project Management for Cloud Compute and Storage Deployment: B2B Model," Processes, vol. 11, no. 1, Jan. 2023, doi: 10.3390/pr11010007.

[5] N. Syamsiyah and M. F. Sesunan, "PENERAPAN METODE SYSTEM LIFE CYCLE DEVELOPMENT DAN PROJECT MANAGEMENT BODY OF KNOWLEDGE PADA PENGEMBANGAN SISTEM INFORMASI," 2018.

[6] A. Lester, Project Management, Planning and Control - Managing Engineering, Construction and Manufacturing Projects to PMI, APM and BSI Standards, 5th ed. Elsevier, 2007.

[7] Project Management Institute, A guide to the project management body of knowledge (PMBOK® guide)., 5th ed.

[8] Project Management Institute, A guide to the project management body of knowledge, 6th ed.

[9] A. M. Rani, "Meningkatkan Kapasitas Produksi dengan Capacity Planning (Studi pada PT XYZ)," Jurnal Manajemen dan Bisnis Performa, vol. 16, no. 1, pp. 39–49, Mar. 2019, doi: 10.29313/performa.v16i1.4571.

[10] J. Bridges, "Capacity Planning: Strategies, Benefits and Best Practices."

[11] T. Sudarianto and A. R. Mukti, "Perancangan Jaringan Komputer Menggunakan Metode Top Down Studi Kasus STKIP Nurul Huda," Jurnal JUPITER, vol. 15, no. 1, pp. 175–186, 2023.

[12] S. Wongkar, A. Sinsuw, and X. Najoan, "Analisa Implementasi Jaringan Internet Dengan Menggabungkan Jaringan LAN Dan WLAN Di Desa Kawangkoan Bawah Wilayah Amurang II," E-journal Teknik Elektro dan Komputer, vol. 4, pp. 62–67, 2015.

[13] R. Susanto, "Rancang Bangun Jaringan Vlan dengan Menggunakan Simulasi Cisco Packet Tracer," InfoTekJar : Jurnal Nasional Informatika dan Teknologi Jaringan, vol. 4, no. 2, 2020, doi: 10.30743/infotekjar.v4i2.2297.

[14] F. Dali, "Sistem Keamanan Jaringan Menggunakan Cisco AnyConnect Dengan Metode Network Access Manager," 2017.

[15] Y. Li, G. qiu Huang, C. zi Wang, and Y. chao Li, "Analysis framework of network security situational awareness and comparison of implementation methods," Eurasip Journal on Wireless Communications and Networking, vol. 2019, no. 1. Springer International Publishing, Dec. 01, 2019. doi: 10.1186/s13638-019-1506-1.

[16] A. K. Putri and D. Sonia, "EFEKTIVITAS PENGEMBALIAN BERKAS REKAM MEDIS RAWAT INAP DALAM MENUNJANG KUALITAS LAPORAN DI RUMAH SAKIT BHAYANGKARA SARTIKA ASIH BANDUNG," Jurnal Inovasi Penelitian, vol. 2, no. 3, pp. 909–916, 2021.

[17] A. Salim, "Analysis of State Hospital X Services Quality And Private Hospital Y Services Quality in City of Pekanbaru," Journal of STIKes Awal Bros Pekanbaru , pp. 38–47, 2020.

[18] M. A. Saputra, "KERJA MANAJEMEN PROYEK PERANGKAT LUNAK INSTANSI PEMERINTAH," 2016.

[19] W. Sardjono and A. Retnowardhani, "Analysis of Failure Factors in Information Systems Project for Software Implementation at The Organization," in 2019 International Conference on Information Management and Technology (ICIMTech), 2019, pp. 141–145.

[20] D. Mustari, "Analisis Manajemen Proyek untuk Sistem Informasi Penjadwalan Perkuliahan di Jurusan Teknik Informatika," 2016.

[21] H. Pertiwi, "Implementasi Manajemen Risiko Berdasarkan PMBOK Untuk Mencegah Keterlambatan Proyek Area Jawa Timur (Studi Kasus: PT. Telkom)," 2017.

[22] A. V. Suwandana and A. W. Utami, "Rancang Bangun Sistem Informasi Manajemen Proyek Berbasis Website Menggunakan Project Management Body Of Knowledge 6 (Studi Kasus PT. Tekno Mandala Kreatif)," JEISBI, vol. 03, 2022.

[23] M. A. Rajabiantoro, M. Yusril, T. Idrus, and M. A. Yaqin, "Implementasi Project Management Body Of Knowledge (PMBOK) pada Organisasi Sekolah," ILKOMNIKA: Journal of Computer Science and Applied Informatics, vol. 4, no. 1, pp. 104–115, Apr. 2022, doi: 10.28926/ilkomnika.v4i1.134.

[24] I. Hadi Al Ghozali, Samidi, and A. Rio Handoko, "Exploration of the Project Risk Management Framework for Information Technology Companies Eksplorasi Kerangka Manajemen Risiko Proyek Untuk Perusahaan Teknologi Informasi," Cogito Smart Journal |, vol. 9, no. 2, 2023.

[25] S. Moedjari et al., "Formulasi Piagam Proyek (Project Charter) pada PMBOK Edisi 6 dalam Peningkatan Keberhasilan Proyek Teknologi Informasi," 2019.

[26] Hosaini et al., MANAJEMEN PROYEK. Kabupaten Bandung: Widina Bhakti Persada Bandung, 2021.

[27] S. Gaur, "Understanding the Importance of Project Planning and Scheduling in Indian Construction Projects," Journal of Positive School Psychology, vol. 6, no. 3, pp. 3535–3544, 2022, [Online]. Available: http://journalppw.com

[28] S. Atin and R. Lubis, "Implementation of Critical Path Method in Project Planning and Scheduling," in IOP Conference Series: Materials Science and Engineering, Institute of Physics Publishing, Nov. 2019. doi: 10.1088/1757-899X/662/2/022031.

[29] H. K. Al-Agele and A. J. Ali, "Mismanagement Reasons of the Projects Execution Phase," Journal of Engineering, vol. 23, no. 10, pp. 15–29, 2017.

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.v13i2.2131, Copyright ©2024
Submitted : April 14, 2024, Revised : May 6, 2024, Accepted : May 13, 2024, Published : June 15, 2024