Research Article

Project Management Knowledge Analysis – A Case of Symptom Checker Development Project

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ABSTRACT

Over the past years, emerging technologies have always been crucial for organizations from various industries. Several organizations have implemented new technologies to serve customers' needs better and be more competitive in the market. Healthcare services are also one of the industries that need to stay up to date with recent technologies. Therefore, they can apply these technologies to their information systems projects. This paper aims to discuss a case of symptom checker development project carried out in a hospital in Thailand. Project management knowledge areas applied in the project are also identified from the activities performed in the project. Moreover, the main problems that occurred during the project were addressed along with the recommendations for solving the problems. The findings suggest that organizations apply only some project management knowledge areas from the framework. Those are project scope management, project procurement management, project integration management, project schedule management, project quality management, and project communication management.

Keywords: Healthcare services, Knowledge management, Project management, Symptom checker

Introduction

According to the rapid development of technology, organizations from various industries have initiated several information systems projects to respond to customers' requirements and adapt to market changes. Healthcare services are also one of the industries which need to keep up with the recent technology to support business operations in all aspects. One of the systems that is important to initially screen the patients and identify the disease, is the symptom checker systems. Many hospitals started to develop their symptom checker system.

This research discussed a case of symptom checker development project carried out in a

hospital in Thailand. The hospital was established from the collaboration of several healthcare professionals and a public company limited. Almost 30 years of combined healthcare sector expertise is represented on the hospital's executive and medical teams, with the mission to be a preeminent medical destination for Thailand and Southeast Asia and the vision of helping people maximize their health span with excellent patient care and promoting professional education and research to stay at the forefront of medical advances. The main problems that occurred from the project were addressed. Then, the research attempted to propose recommendations to solve the problems. The result of this research will benefit any healthcare service companies or healthcare IT service providers when doing symptom checker development projects. Also, the lessons learned from this project can be applied to similar related information systems projects in healthcare sectors.

The structure of this paper is that the first section discusses the software development concept, knowledge management, knowledge areas used in project management, and the symptom checker development project along with the research methodology. The second section discusses many activities performed in the project and attempts to identify which project management knowledge areas applied in the project. Also, the main problems that occurred during the project are discussed and recommendations are proposed to solve the problems. The last section is the conclusion and recommendations for future research.

Methods

The application of knowledge, skills, tools, and techniques to project activities to meet project requirements is defined as project management (Clemente & Domingues, 2023). Project management focuses on project performance to achieve project goals safely, within the agreed schedule, budget, and performance criteria (Radujković & Sjekavica, 2017). For the project success, organizations need to be able to plan, organize, monitor, and control all aspects of projects under the criteria of time, cost, and quality. Project management can apply

several methodologies in practice. Some companies used one methodology while others used a combination of more than one methodology. Different approaches such as predictive, hybrid, or adaptive methodologies can be used by project teams to achieve the desired results for the project (Clemente & Domingues, 2023). To describe the phases of developing information systems, a systems development life cycle (SDLC) framework is used (Schwalbe, 2019). A predictive approach such as the waterfall model, the spiral model, the prototyping model, and the Rapid Application Development (RAD) model is used for a product with a low degree of change in requirements and low frequency of delivery. An adaptive approach such as Agile works best when there is a high degree of change and a high frequency of delivery. Software development using the agile approach was initially introduced to address problems such as running over budget, being behind schedule, and producing output of poor quality (Amritesh & Misra, 2014). A hybrid approach is the use of a combination of approaches which is based on the nature of the work (Schwalbe, 2019).

Software development enables knowledge in various forms to circulate through every stage of the process and all across the project team so it is accepted as a knowledge-intensive process (Amritesh & Misra, 2014). For Information Technology projects, knowledge management plays an important role in project success since developing and implementing systems requires intensive knowledge activities (Clemente & Domingues, 2023). Knowledge management helps organizations deal with possible difficulties, increase productivity, and pave the way for development and innovation (Clemente & Domingues, 2023). Also, according to Radujković & Sjekavica (2017), the application of project management knowledge and skills from the project manager and the project team is one of the project management success factors. To achieve the project objectives and contribute to organizational learning, existing knowledge is used to create new knowledge (Clemente & Domingues, 2023). Therefore, organizational knowledge from this process can help improve project results, support

organizational operations, and facilitate future projects. Moreover, organizations need to provide a technical and systematic infrastructure to ensure that knowledge is available to others to minimize project failure (Gal & Hadas, 2015).

The Project Management Institute (PMI) condensed the expansive area of project management into ten manageable parts, which it refers to as the ten project management knowledge areas (Project Management Institute, 2017). Project initiation, project planning, project execution, monitoring and controlling, and project closing are the process groups that correspond to the knowledge areas of project management. Every project goes through these chronological phases. Any of these process groups includes the knowledge areas. However, the fundamental technical topics essential to effective project management are the knowledge areas. The ten knowledge areas for project management consist of Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resource Management, Project Communications Management, Project Risk Management, Project Procurement Management, and Project Stakeholder Management. The interrelationship of the key components in projects is shown in Figure 1.
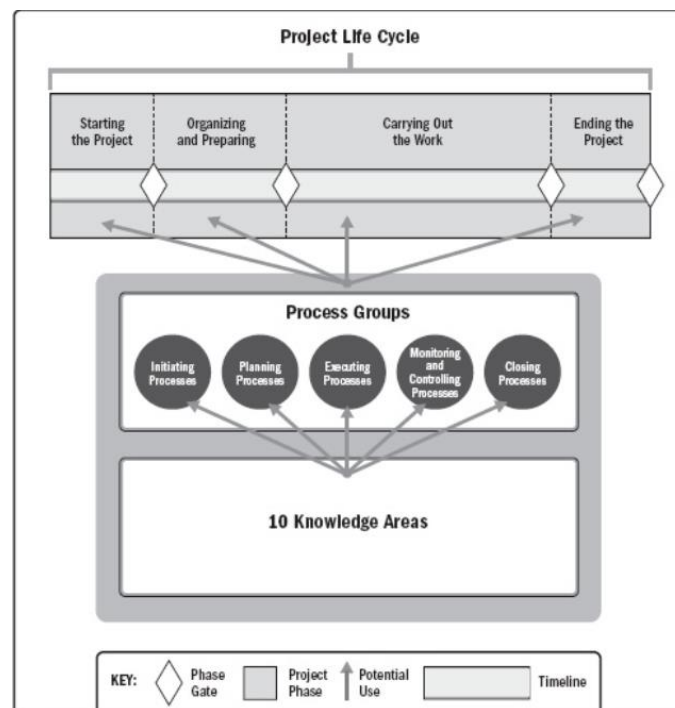

Figure 1. Interrelationship of key components in projects (Project Management Institute, 2017)

These knowledge areas were analyzed whether any has been applied to the symptom checker development project in a health services company in Thailand. To improve healthcare quality management outcomes, project management should be adopted (Sassykova, 2023). The symptom checker development project is based on the idea of developing a program that allows users to enter symptoms alongside additional demographic and medical information to generate a list of potential medical conditions (Benoit et al., 2023). A doctor's diagnosis can be requested after using a symptom checker as a preliminary step. A patient can enter these typical symptoms, such as a sore throat, an itch, a terrible case of sneezing, stomach discomfort, or fatigue, to examine their probable causes. However, the symptom checker is not a substitute for professional medical advice. The symptom checker has been created for many years.

It is nothing new but making the program accurate and stable is always a challenge. It requires a lot of time dedicated to reading medical textbooks and researching the symptoms. After all, it is crucial to categorize all

information into useful functions as a database. Examples of popular and reliable symptom checkers are Isabel, Mayo Clinic, MediFind, and WebMD (Isabel Healthcare, 2024; Mayo Clinic, 2024; MediFind, 2024; WebMD, 2024).

Research questions were addressed as follows;
• Research question 1: What are the knowledge areas applied to this project?
• Research question 2: What are the main problems that occurred from this project and recommendations for improvement?

This research used the case study method (Rashid et al., 2019) to collect the data from the project team members of this project in a health services company in Thailand. Semistructured interviews, meeting observations, and document collection were used to identify the problems that occurred from this project. A group of project team members with strong background knowledge and experiences in IS/IT projects were interviewed and observed. The collected data were analyzed and discussed by three researchers; two researchers had working experience in the IT field while another researcher earned a degree in Information Systems. This methodology followed the content analysis with investigator triangulation (Archibald, 2016) to reduce the bias from researchers.

Result and Discussion

Normally, the organization conducts the meeting to acknowledge all projects in the queue, identify difficulty levels, and agree on the direction of projects. In this case, the symptom checker development project is discussed in terms of project management knowledge areas. First, many factors were planned from the beginning stage to ensure proper work and keep up with the project's progress. Before starting the project, the project team agreed on the direction of the project and the scope and definitions of the project have been set up since the first day of the meeting to avoid miscommunication. This practice indicates that the project scope management knowledge area has been applied to the project. Second, this project used an outsourcing company, so the project team

needed to collaborate with the outsourcing company to ensure that they complied with the procurement contract. This practice implies that the project procurement management knowledge area has been applied to the project. Third, this project is a substantial undertaking with several departments involved and several moving elements that must ultimately line up. Without correct balancing of these components, the project may sluggishly progress, be less productive, or even grind to a halt. Careful steps were taken for the project to proceed forward. To avoid mistakes, the project charter document was created, and deliverables were identified to coordinate all project parts. This practice indicates that the project integration management knowledge area has been applied to this project.

Fourth, Microsoft Planner (Microsoft, 2024) has been used to work together and set up deadlines for each activity. Project members can define and organize the project tasks with this planning and scheduling application. The assigned tasks can be managed in either a task list or a calendar, which enhances efficiency and transparency for all project members. This enables the project manager and director to have a bird's-eye perspective of the project's status and any bottleneck before it becomes a significant issue. This practice indicates that the project schedule management knowledge area has been applied to this project. Fifth, objectives and key results (OKRs) have been set up since it is in line with current business conditions that force organizations to be flexible and agile to market conditions. This practice indicates that the project quality management knowledge area has been applied to this project. Lastly, weekly meetings were conducted to update the progress of the project and discuss the status of project tasks. This practice indicates that the project communication management knowledge area has been applied to this project. The rest of the project management knowledge areas have not been applied to this project since no related activity has been performed in this project. Project activities and project management knowledge areas used are illustrated in Figure 2.
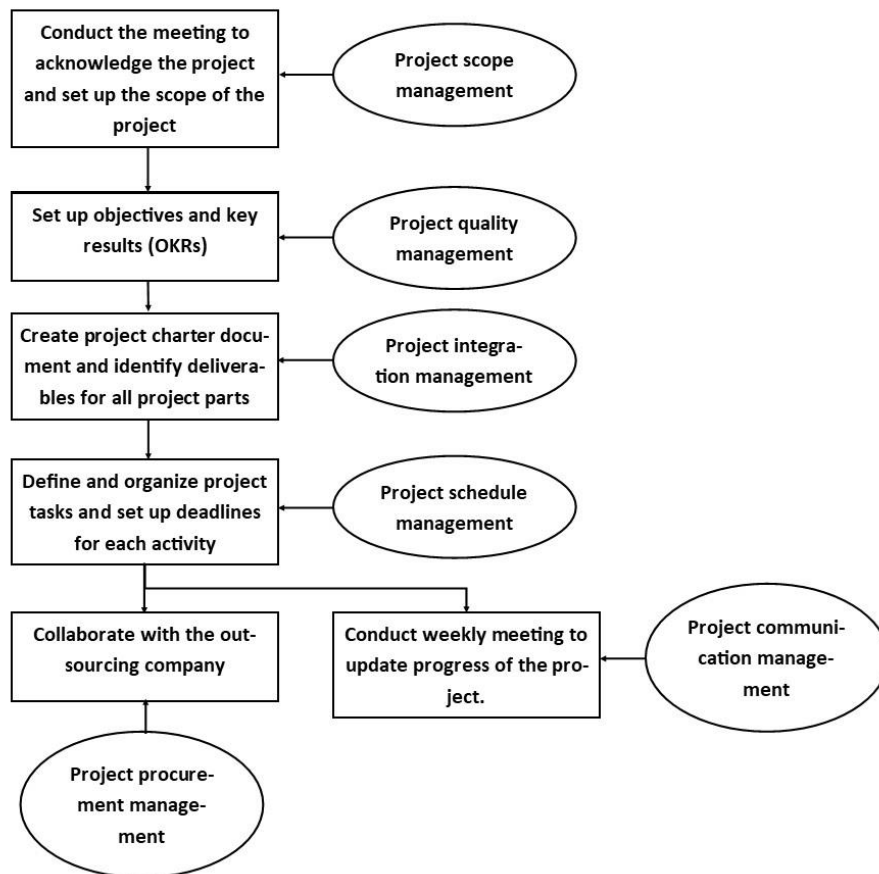
Figure 2 Project Activities and Project Management Knowledge Areas used

During the symptom checker development project timeframe, the main problems that occurred from this project are as follows.

- Work overload – There are fewer people in some functions. This causes work overload on one person in complementing and coordinating the project. For example, only two persons worked separately between website products and application products in the service design function. This problem leads to the project delay.
- Unorganized workflow – This problem is recognized at the beginning of the project since Google Calendar (Google, 2024) has been used to set up deadlines and meetings. Its functions were ineffective in terms of managing the project and tracking the progress of the project. This problem causes difficulty in managing the project and tracking the project milestone. Microsoft Planner was used later in the project which is more effective.

- Miscommunication – The nature of this project is a mix of IT and medical knowledge. It is also a sensitive application that can make patients pleased or stressed about the symptoms. This system requires careful communication. For example, IT persons did not understand some medical terminologies, so they did not truly understand the user requirements. Therefore, it is difficult for them to design and develop the systems. Therefore, miscommunication often occurs. This problem leads to misunderstandings of user requirements and a mismatch between user requirements and system functionalities.
- Lack of creativity - Creativity and accountability are important for this project. Initially, the project focused on what the hospital desires to provide to the patient. So, it causes a delay in designing the symptom checker tool. Later, the focus was changed to thinking about what the patient needs from the hospital. This problem leads to the project delay.

According to the main problems identified above, the following recommendations are proposed to solve the problems. First, the work overload problem could be solved by hiring or outsourcing more people to ensure that enough people are allocated to all required work. It is important to apply the Project Human Resource Management knowledge area to this project (Project Management Institute, 2017). Second, the unorganized workflow problem was detected at the beginning of the project and was solved by replacing Google Calendar with Microsoft Planner. Moreover, in the market, several project management systems/software have the functions as Microsoft Planner or even more functions. The project team could do some research on system functionalities and capabilities and select the suitable one for better efficiency and effectiveness. Third, the miscommunication problem could be solved by educating responsible people with both IT and medical terminology. Communication needs to be conducted with patience. It should ensure that the other party truly understands. Communication and collaboration tools like groupware tools can effectively help facilitate communication and collaboration among project members so they do not miss any important information related to the project. Lastly, the problem regarding lack of creativity could be solved by overlooking traditional ways of work, thinking out of the box, and finding new possible techniques and ideas to implement in the project.

Conclusion

The research result addresses project management knowledge areas used in the symptom checker development project by analyzing activities performed in the project. It also addresses the main problems that occurred from the project and recommendations to solve the problems. The knowledge areas that are used in the project are project scope management, project procurement management, project integration management, project schedule management, project quality management, and project communication management. The main problems are work overload, unorganized workflow, miscommunication, and lack of creativity. Recommendations proposed to solve the problems are applying the project human resource management knowledge area to this project, educating responsible people with both IT and medical terminology, using communication and collaboration tools, and thinking out of the box to find new possible techniques and ideas to be used in the project. Moreover, before starting the project, the organization needs to realize the importance of project management and several aspects of knowledge areas necessary for the success of the project. Then, the organization would gain the benefits from the successful project. This research could be expanded further to any information system project in healthcare services to see whether there is any similarity among the project management knowledge areas used and the main problems found. This would allow the organization to thoroughly understand the main problems that occurred from their projects and can improve the quality of the projects.

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