QATAR UNIVERSITY

COLLEGE OF ENGINEERING

THE STUDY OF LEAN AND AGILE PROJECT MANAGEMENT APPROACHES IN THE INFORMATION TECHNOLOGY SERVICES DEPARTMENT AT QATAR UNIVERSITY

BY

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ABSTRACT

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Title: The Study of Lean and Agile Project Management Approaches in the Information Technology Services Department at Qatar University

Supervisor of Project: Tarek, El Mekkawy.

The goal of this project is to study the current process that is being carried out at Qatar University's Information Technology Services department when it comes to handling internal project development. This is done by looking at the subject through the lens of agile and lean project management principles. These principles organize the steps in the process such that there is minimal waste to get better efficiency. A tool that is often associated with lean thinking principles was relied on for this project. The tool is the Value Stream Mapping (VSM) tool. This tool helps in showcasing the relations between the steps, the required process time for each one of them, as well as the lead time for each step. From the VSM of the current process, some areas of improvement were determined. After that, the future VSM was created to foresee how the process will be if the adjustments were made. As a result of this study, the processing time was changed from 42,325 minutes to 29,795 minutes. The lead time was also reduced from 118 days to 81 days. The improvement rates were found to be 29.60% and 31.35% for the processing time and the lead time respectively. These rates were achieved by combining some steps of the process, modifying the nature of some steps, eliminating unnecessary steps, and finally some time reduction in some steps to avoid waste.

DEDICATION

I would like to dedicate this work to my beloved family and friends for their continuous support throughout my journey.

ACKNOWLEDGMENTS

I would like to recognize the support that I have received from my family and friends for this project. I would also like to acknowledge the support that I was provided with by Dr. Tarek Elmekkawy, my project supervisor, for his guidance throughout this project.

In addition, I would like to thank Qatar University's ITS department for giving me a chance to explore the areas that can be enhanced in the department all leading to the benefit of the university.

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LIST OF ABBREVIATIONS

QU	**Qatar University**
ITS	**Information Technology Services**
APM	**Agile Project Management**
LPM	**Lean Project Management**
PM	**Project Management**
PMI	**Project Management Institute**
PMBOK	**Project Management Body of knowledge**
VSM	**Value Stream Mapping**
PT	**Process Time**
LT	**Lead Time**

CHAPTER 1: INTRODUCTION

1.1 Background

The continuous exponential inclusion of digitization in various aspects and sectors of our lives has become a need rather than a mere desire or want. This growth has massively impacted how the markets operate. It led to the creation of newer business models and approaches that aim to ensure that products are delivered at the desired quality. Hence, the notion of project management was introduced and used even for digital projects to provide a systematic approach to delivering the project while taking into account all of its different requirements.

Qatar University (QU) is not different from its peers when it comes to looking for opportunities to embrace chances for improvements and tries to take a lead in integrating technology and the latest methods that are available as soon as they come out. This is due to the effort that the national university is putting to distinguish itself from other universities across the region in terms of its effectiveness in delivering an academic standard that lives up to the university's reputation.

One of the departments that provide major support for the university is the information technology services (ITS) department. The ITS department communicates with various departments in the university and works on projects alongside them to provide better effectiveness of the university procedures. It does not only provide services that serve the university students, but it is also addressing the needs of the administrative side of the university. Five sections fall under the ITS departments and they are: Enterprise management, infrastructure, cybersecurity, support, and the project management office. The department has recently adopted Agile project management approach and is looking to implement lean project management as well. All to provide better efficiency and delivery for its end users.

1.2 Problem Statement

The ITS department at Qatar University is continuously supporting other departments in embarking on projects. The projects that it takes on involve multiple stakeholders with different requirements, and it is looking for new methods that could help. The department has just recently started implemented agile project management (APM) and is looking forward to incubating other new approaches that will enhance it. One of the approaches that can be combined with agile project management is lean project management (LPM). This project will shed light on the parts of the department where lean project management and its processes can be implemented in order to make the department more effective and reduce the amount of waste that currently exists.

1.3 Objectives of the Study

Throughout the implementation of this project, the following are the goals of the project:

1. Explain lean project management and the various principles that it instills.
2. Study how the ITS department takes on projects and understand the workflow by contacting personnel from the department.
3. Apply lean project management processes to the department's workflow by determining areas of waste.
4. Show how effective lean project management is when it is incorporated within the ITS department.

1.4 Scope and Limitations

The ITS department at Qatar University has two types of processes to take on projects. The first is to carry out the whole project internally, while on the other hand, the second type involves contracting with vendors and third parties.

For this project, the scope will be limited to the processes that are involved in the projects which are carried out internally. This is due to the fact that the whole process will be under the control of one main entity (Qatar University) rather than having to deal with a complex web of multiple entities and their share of control over the projects. In addition, by making this choice, data collection will be better and more data will be available.

1.5 Report Overview

This report goes over 6 chapters including the introduction. It starts with the introduction of the topic and details the main concept behind the project and its goals. Then it moves onto the second chapter which is the literature review on related cases to the project. After that, the third chapter discusses the research methodology extensively. As for the fourth chapter, it will demonstrate the implementation of lean project management (LPM) principles in the ITS department at Qatar University. The results and the analysis of the implementation will be discussed in chapter five. And lastly, chapter six will be a conclusion for the project in addition to some recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 General Background

It is noteworthy to consider the criticality of time in this fast-paced world. Timing the release or enhancement of a product can determine whether it will succeed or fail. Current times are pushing firms more towards having better project delivery speeds. In older times, the main focus was on cost and quality. However, now the importance of client satisfaction has come on par with the previous parameters. Here comes into play the role of the firms' time management which has created a grave need for the firms to adapt to the changing market demands by becoming more flexible and agile. [1] Speed is not the only factor that is being called for. There has been an increase in the projects' complexity as well as the amount of interaction that is required to reach an agreeable result. [4]

The trend in the market is now moving towards performing early testing of the product, getting the results, and making changes to the product all within a short time frame. This means that the concept of classical project management as it is known needs to adapt to the new demands and incorporate some flexibility within it to include better delivery times. Throughout time, project management has had different orientations while upholding the same foundation principles. These are: classic, lean, and agile. [2]

The core difference between the classical and agile orientations of project management revolves around the amount of change and flexibility that one can accommodate. Agile project management embrace's the concept of lean management as well. Hence, the following discussion will focus on comparing the classical approach with the agile one. For instance, in the classical project management orientation, the main focus is on comprehensive planning to reduce the changing requirements of the

project. Meanwhile, the agile project management orientation embraces changes and is more tolerant towards them since this orientation focus is on the fact that change is inevitable and less on detailed planning. [3] This is albeit the fact that both the classical project management orientation and the agile project management orientation have the same aim that us to provide measurable results.[1] Below is a list of points that showcase the distinction between the two orientations:

- Classical project management focuses on planning whereas agile project management focuses on customer interaction and satisfaction.
- Classical project management has a late response to change or even prevents it. Meanwhile, agile project management deals with change through adaptive activities.
- Classical project management has a scope-based output while agile project management output is time-boxed.
- Classical project management is based on the contract while agile project management is based on the client.

According to Cesatotti, Gubinelli, and Introna in [4], classical project management provides steps to carry out the project. But with the use of newer techniques like agile project management, it is better understood how to carry out these steps and incorporate them within a project. The use of the newer techniques radically changes the implementation of project management making it more efficient and applicable. As quoted “Traditional tools fail when linear tasks do not easily accommodate dynamic processes and when schedules require frequent updating to reflect changing circumstances.” Today, the market requirements are very dynamic and a rigid system that does not adapt to mismatches in the available needs. Hence, there is a significant need for a change.

2.2 Traditional Project Management Framework [4]

Per the definition that is provided by PMI – Project Management Institute, project management can be defined as a technique that provides a guideline that helps in defining the management part of the project. As of the early times of this definition, the main goal of using this technique is to optimize each activity within the project with respect to its cost and time and ultimately achieve the project within the previously set time, budget, and scope. This approach is mainly suited to cater to projects that have clear requirements, require extensive documentation, or are of large scale.

According to PMBOK (Project Management Body of knowledge), the official guide published via PMI for project management. Traditional project management focuses on five process groups which are:

1- Initiating: defines the project and is mainly concerned with project charter creation.
2- Planning: set the project outcomes to the respective knowledge areas.
3- Executing: project implementation according to the planning process group.
4- Controlling and monitoring: ensure the alignment of the project execution with the plan and take corrective actions when necessary.
5- Closing: gaining the acceptance of the project outcome from the project stakeholders.

Traditional project management also relies on ten knowledge areas, like: integration, scope, scheduling, cost, quality, human resources, risk, stakeholders, and procurement. These knowledge areas are part of the core that traditional project management consists of.

2.3 Agile Project Management

Agile project management is a new concept that is being introduced for project development [15]. The introduction of the word “agile” into project management suggests that we are also incorporating flexibility, reactivity, flexibility, and adaptability to the original concept [4][5]. According to [12], agile project management is distinct from other approaches due to three attributes: A sense of ownership, smooth change of direction, and adaptability. The agile concept was introduced when more information technology-related projects started surfacing. It has long proved that it is a satisfactory approach for the IT industry [4][5][15].

The resulting satisfaction was due to the ability of the concept to deal with the continuous change in the customers’ needs and the reduction of the time at which the end product is received. This change took place because this approach highlights the importance of strong communication and the creation of a product that would be of utmost use to the receiving end rather than focusing on the documentation part of the project. [5]

Agile project management is a cumulation and combination of several methods. Rather than calling it a method, it is more of a mindset that needs to be followed [12]. For the IT industry, multiple methodologies were devised to develop an iterative style of programming and software development, like: Extreme programming, crystal methodologies, adaptive software development, and many more. The most known approach is SCRUM. [4]

The framework for agile projects is as follows: [4]

1- Guiding vision: to ensure a vision that acts as a guide for all involved members of the project.

2- Self-organized team of 7 to 9 people: a small and dynamic team that supports adapting to change. Consists of three groups: the product owner, the development team, and the scrum master.
3- Simple rules to define the project: make sure that rules do not affect the team's workflow or creativity.
4- Information flow: Free flow of information to enrich the whole group's knowledge.
5- Adaptive Leadership: having a leader that encourages adapting to change and enhances the team hand in hand with the adopted change.
6- Agile vigilance: constant change is to be expected and a manager must be assigned to create a balance and manage risks.

2.4 Lean Project Management

Lean principles were initially introduced in the manufacturing industry. Then, after the realization of the benefits and opportunities that it provides, it was adopted by other industries [14]. The main ideology of lean management is to focus on the reduction of waste in a system and maximizing its value. The concept is mainly applied to reduce the cost, lead time, and process time of production, which in turn reflects on the overall efficiency of a system [13][14]. This is done by nullifying tasks that are mundane to the process or by reducing the time they take to be completed if they are required [4][6][7][14]. Several tools can be used to apply lean. They are: Value Stream Mapping (VSM), The 5 whys, 5S, RACI chart, and Process mapping [7].

Value Stream mapping is a tool that lays out all of the activities in a process or system. This step makes waste identification easier and it provides a better

understanding of how the system or the process works [7][13]. As for the 5 whys, it is a tool that looks for the root cause of a known problem. This is done by asking the question “why” multiple times. Which with an increase in repetition helps in clarifying the real cause for an issue. Moving on to the 5S tool, it stands for: sort, set in order, straighten, shine, standardize, and sustain. The goal of this tool is to ensure the cleanliness and orderliness of the place and keep it maintained. Next is the RACI chart, which looks at one activity and scrutinizes it in terms of the responsibilities and accountabilities of individuals who are assigned to that task. Process mapping is a tool that relies on the VSM tool and then proceeds to capture the activities that do not add value to the process [7].

In comparison with traditional project management, Lean project management the main differences lie within the objectives, phases, and the relations between one phase and the other. It is driven to focus on relationships between steps and members, knowledge, and goals. With respect to projects, if the lean method is followed the project goes into 4 phases. The phases are: project definition, lean design, lean supply, and lean assembly [4].

1- Project definition: the project in this step is defined according to three parameters which are: location, cost, and time.
2- Lean design: this step acts as a connector between the project definition and the product or process design. As a result of this step, we might have to go back to the project definition step if an additional value-adding point is founded and should be taken in.
3- Lean supply: it proactively engineers the required supplies that need to be delivered or manufactured.

4- Lean assembly: involves the installation and the build-up required from the supplied materials and products for the process. It uses feedback loops to implement the required process.

2.5 Application of Lean and Agile on IT projects

Research has shown that project management schemes that are concerned with information technology services (ITS) are starting to adopt the concepts of agile and lean thinking. This is due to the fact that this specific field caters to the customers' demand, and desires, and addresses the flexibility of the approach as well as provide better customer satisfaction when it comes to delivery times [1][8][15].

As explored by Aseeri, Abdulaal, and Kabli on Saudi Airlines IT in [1], the current infrastructure of the ITS that is being used by Saudia is not living up to the need with respect to the costs and the time of delivery. The implementation of agile project management was taken into account for the operations and infrastructure department within the information technology department in Saudia. Throughout the process, it was made sure that the change was well accepted within the work environment and that all involved personnel are motivated to make this change take place. This point was focused on due to the fact that the acceptability of a change at this root level plays a critical role in making it a success. The proposed model was initially implemented on a group of 10 employees, and as a result of this implementation, it was determined how to proceed with the methodology for the rest of the IT department. According to the results, the airline benefited from the implementation of this type of PM approach and it was noted that there was an improvement in terms of delivery, cost, quality, communication, and bugs.

Based on another study carried out by Nabelsi, and Gagnon on two Canadian hospitals in [8], Hospitals' take on the subject of using the latest management option has had a late start. The state of ITS in hospitals can be further elevated to serve its need by integrating lean and agile project management (APM) techniques within it such that it becomes more patient-oriented, able to adapt and align the carried out procedures while being more efficient. These two concepts are important because many unforeseen challenges may arise when dealing with a complex environment that involves numerous factors that can be unrelated to each other. Another point is that efficiency must be maximized while making sure that the costs are being controlled and the quality level is being maintained. The result of this study has shown that even though there were challenges that were tackled, a massive transformation can take place if the ITS system incorporates both the lean and agile principles [8].

Another study on the same topic was carried out in Pakistan [15]. It was conducted on a total of 1800 Information Technology companies across 5 provinces which are: Khyber Pakhtunkhwa, Gilgit Baltistan, Punjab, Sindh, and Baluchistan. The sample was then reduced to get the desired targeted audience and the number of firms studied ended up being 176 firms. Through this study, a survey was circulated among the chosen sample of firms and the results of the survey were collected. The survey focused on getting responses of the firms on receiving feedback on the use of agile project management in project development. The results showcased a positive perception of the implementation of agile project management and its effectiveness in the IT industry in Pakistan.

CHAPTER 3: RESEARCH METHODOLOGY

For this project, two main methods were used. The first one was related to the analysis of available documents. Meanwhile, the second method was through the reliance on observation. As a result of the aforementioned methods, the value stream mapping tool is used to model the process which is being studied.

3.1 Document Analysis

By looking for credible evidence through tangible documents to extract information that is beneficial to the research. Some of the documents have been looked into and scrutinized as shown in the second chapter of this document. These documents mainly discussed the various types of project management that are being implemented nowadays such as agile project management (APM) and lean project management (LPM) and demonstrates the advantages of them being implemented in comparison to the classic project management concept. The information gathered from these documents will guide applying lean thinking principles in the ITS department at Qatar University.

3.2 Observations

Through observing the process that is being applied, data that is related to it can be noticed. Various insights can be gained through direct observations rather than relying on word of mouth or documentation of the process. Hence, this is an important technique to be used to support the goals of this project.

3.3 Value Stream Mapping Tool

To visualize the collected data from the two previous steps, one of the most useful tools in lean thinking or management practices are used. This tool is called Value Stream Mapping (VSM). By using this tool, all of the steps that are part of the process are highlighted while focusing on the value-adding ones for the end user [9][10]. The tool is used on the bottleneck of the system and tries to decrease the amount of time wasted there [13]. It uses symbols to provide a clear picture of the process from the client's request and reaching the desired end product [9]. The tool shows the details of each step of the process such as: lead time, process time, cost, and resources required. The goal of this tool is to be able to identify areas that can be adjusted to reduce waste. This is done by looking at steps that can be modified, enhanced, replaced, or removed to reach optimality. The value stream mapping then showcases the suggested flow of steps with the adjustments to be implemented. The figure below (figure 1) summarizes the tool and the steps it follows [9][10].

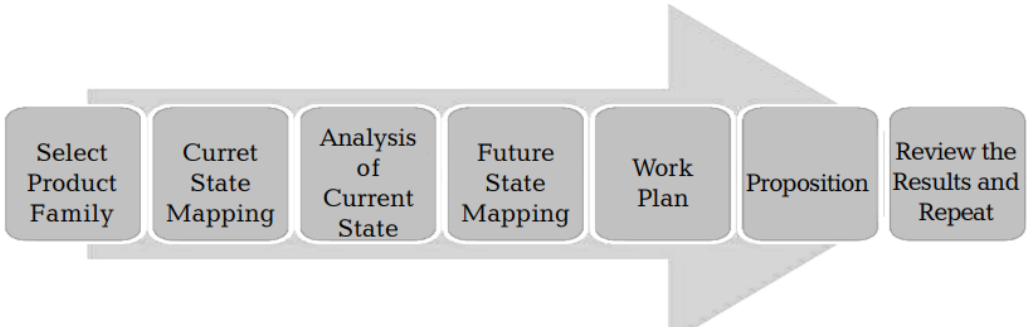

Figure 1: Value Stream Mapping Tool

The tool was recently enhanced given the latest advancements in technology. It is now capable of tracing the mapped process in real time through related data extraction applications. This enhancement adds to the current model by improving the rate of waste identification as well as loss of information flows [11].

CHAPTER 4: PROJECT IMPLEMENTATION

This chapter of the project extensively discusses how the current internal project development is handled by QU ITS. It consists of all the steps that are in place for the process in detail, including the responsible team for each step, along with the process and lead times. The process is also demonstrated by using the VSM tool. This chapter then proceeds to shed light on areas for improvement based on the current VSM, and modifications are done to reach the future VSM for the internal project development process at the university.

4.1 QU ITS Department: Current Project Development Process

Through several meetings that were conducted with personnel from the ITS department. The process that takes place in the department to carry on project developments was captured. To get the current VSM, the steps along with their respective lead and process times were given accordingly. Similarly, each step was handled by a specific team, the teams in these concerned steps are Business Team (BT), The Project Management Team (PMT), and lastly the Project Development Team (PDT). The steps required for the internal process of project development after the business case is submitted to the ITS department are elaborated as follows in the upcoming tables:

Table 1: Task 01 details

Task identifier	01	**Process time**	30 minutes
Responsible team	Project Manager Team	**Lead time**	0 days
Task description	Ensures organizational chart is created and that a PDT is assigned to the project.		

Table 2: Task 02 details

Task identifier	02	**Process time**	90 minutes
Responsible team	Project Development Team	**Lead time**	1 day
Task description	Gathers required data from the business case.		

Table 3: Task 03 details

Task identifier	03	**Process time**	45 minutes
Responsible team	Project Manager Team	**Lead time**	2 days
Task description	Conduct a meeting with BT for clarification based on PDT's feedback.		

Table 4: Task 04 details

Task identifier	04	**Process time**	45 minutes
Responsible team	Project Manager Team	**Lead time**	1 day
Task description	Conduct a meeting with PDT to provide them with clarification provided by BT.		

Table 5: Task 05 details

Task identifier	05	**Process time**	45 minutes
Responsible team	Project Manager Team	**Lead time**	3 days
Task description	Conduct a meeting with the client to finalize the scope and freeze it (First Sign-off).		

Table 6: Task 06 details

Task identifier	06	**Process time**	9600 minutes
Responsible team	Project Development Team	**Lead time**	21 days
Task description	Starts designing the project prototype.		

Table 7: Task 07 details

Task identifier	07	**Process time**	45 minutes
Responsible team	Project Manager Team	**Lead time**	1 day
Task description	Meet with BT to deliver a prototype for their concurrence to proceed with the project or if any adjustments are required.		

Table 8: Task 08 details

Task identifier	08	**Process time**	60 minutes
Responsible team	Business Team / Client	**Lead time**	3 days
Task description	Provide the PMT with feedback based on the prototype.		

Table 9: Task 09 details

Task identifier	09	**Process time**	60 minutes
Responsible team	Project Manager Team	**Lead time**	2 days
Task description	Meets with PDT to provide BT's feedback on the prototype.		

Table 10: Task 10 details

Task identifier	10	**Process time**	15 minutes
Responsible team	Project Manager Team	**Lead time**	3 days
Task description	Conducts a meeting with BT for a second sign-off based on the agreed prototype.		

Table 11: Task 11 details

Task identifier	11	**Process time**	30 minutes
Responsible team	Project Manager Team	**Lead time**	1 day
Task description	Conducts a meeting with PDT to inform them to proceed with the project development Conducts a meeting with BT for a second sign-off based on the agreed prototype.		

Table 12: Task 12 details

Task identifier	06	**Process time**	19200 minutes
Responsible team	Project Development Team	**Lead time**	45 days
Task description	Continue project development.		

Table 13: Task 13 details

Task identifier	13	**Process time**	2880 minutes
Responsible team	Project Development Team	**Lead time**	5 days
Task description	Internal Testing & Fix bugs.		

Table 14: Task 14 details

Task identifier	14	**Process time**	4320 minutes
Responsible team	Project Development Team	**Lead time**	5 days
Task description	Carry out final testing.		

Table 15: Task 15 details

Task identifier	15	**Process time**	45 minutes
Responsible team	Project Manager Team	**Lead time**	3 days
Task description	Delivers the project to the client for testing purposes and acceptance.		

Table 16: Task 16 details

Task identifier	16	**Process time**	2400 minutes
Responsible team	Business Team	**Lead time**	5 days
Task description	Carry out project testing and acceptance.		

Table 17: Task 17 details

Task identifier	17	**Process time**	45 minutes
Responsible team	Project Manager Team	**Lead time**	3 days
Task description	Conduct a meeting with the client for final sign-off for project acceptance.		

Table 18: Task 18 details

Task identifier	18	**Process time**	3360 minutes
Responsible team	Project Development Team	**Lead time**	14 days
Task description	keep close contact with the client for monitoring purposes in case of any bugs are found.		

Table 19: Task 19 details

Task identifier	19	**Process time**	10 minutes
Responsible team	Project Manager Team	**Lead time**	0 days
Task description	Submit a request for the completion form for the project.		

As it can be noted from the above tables, the current internal project development process in the ITS department consists of 19 steps. With the total amount of process time is 42,325 minutes and the total lead time is 118 days.

4.2 VSM for the Current Internal Project Development Process

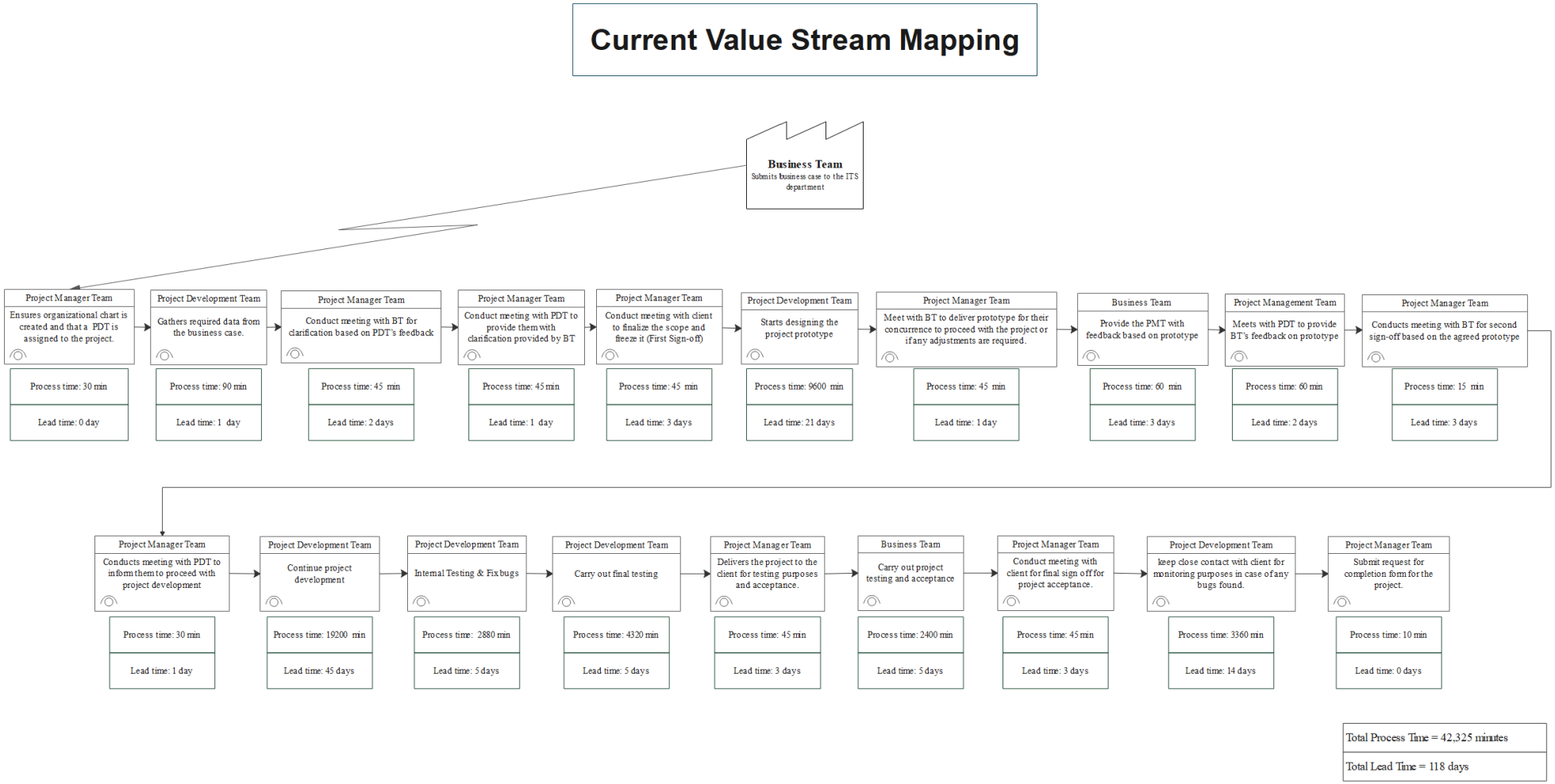

Figure 2: *Current VSM*

4.3 QU ITS Department: Future Project Development Process

After utilizing the VSM tool to represent the current state of the current internal project development process. Each step was observed, studied, and then adjustments were made accordingly. The adjustments were carried out to minimize wasted time by either removing a step, combining steps or shortening some of the time assigned to them. The activities in which some adjustments had taken place are highlighted by a Kaizen burst (A yellow electric symbol) in figure 3.

After implementing the changes as highlighted in figure 3, the future project development process is drawn by using the VSM tool in figure 4. The new total number of tasks is 16, the total process and lead times are 29,795 minutes and 81 days respectively.

4.4 Areas of Improvement in Current VSM

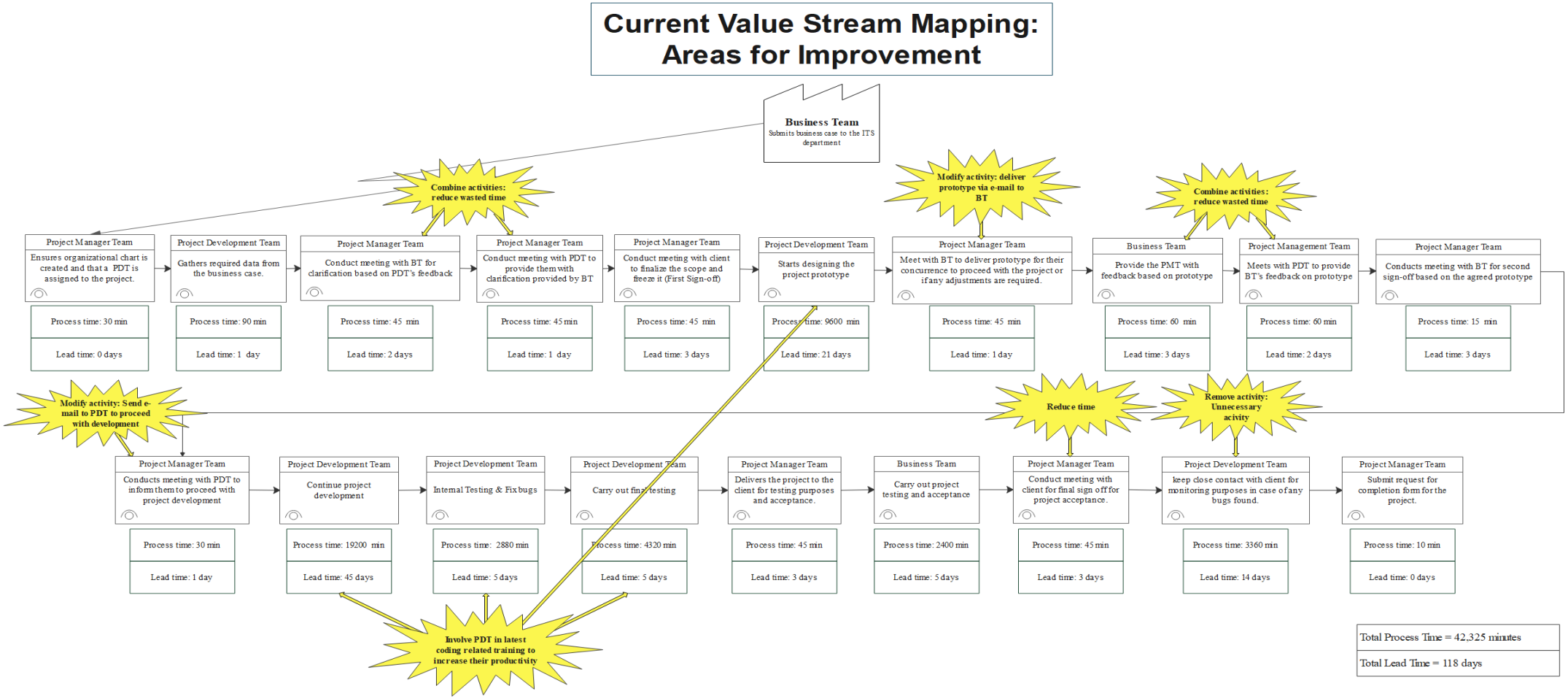

Figure 3: Areas for Improvement in Current VSM

4.5 VSM for the Future Internal Project Development Process

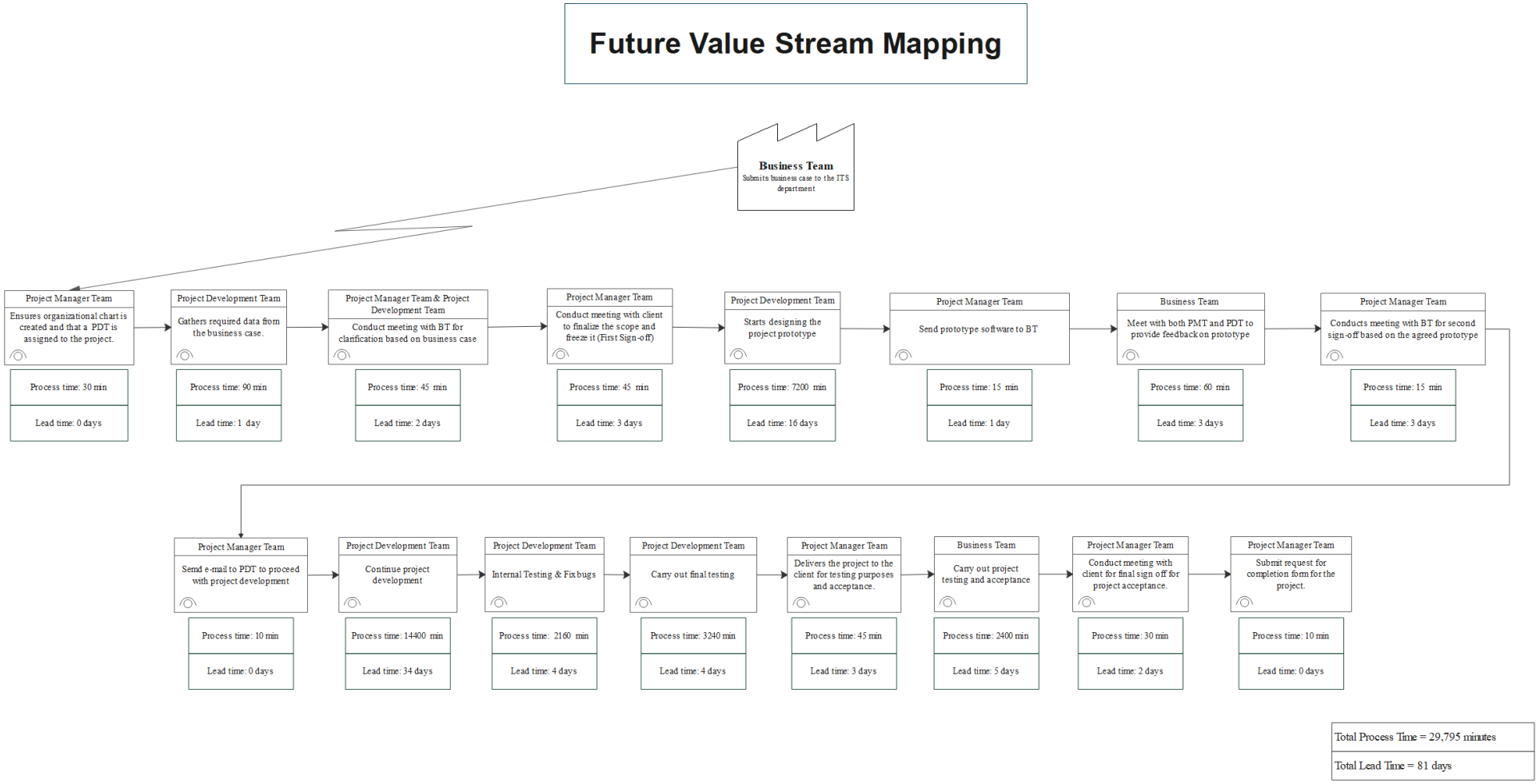

Figure 4: Future VSM

CHAPTER 5: RESULTS AND ANALYSIS

This chapter will discuss the aspects in which the current VSM was looked at, pick the steps used for the improvements and discuss them. It will also include the analysis part to compare the end result of the future VSM with the initial ones.

5.1 Areas for Improvement

The areas for improvement were determined by filtering out the wastes in terms of unnecessary tasks, tasks that require some modifications, and some time reduction. The suggested adjustments are highlighted in figure 3 by the Kaizen bursts. And the reason for picking each step is as follows:

The first Kaizen burst is driven by the fact that the two steps, Task 02 and Task 03 can be combined such that there is less time spent unnecessarily on the process. In addition, by combining these two tasks, with the coordination of the PMT the PDT will be able to get direct clarification from the BT. This does not only lead to the cancellation of one additional meeting, but it also helps the PDT to get a better understanding of the business case requirements. It also increases the familiarization and trust between the teams. By taking on this modification, 45 minutes are saved in terms of the process time, and 1 day was saved in terms of the lead time.

Moving on to the second Kaizen burst, instead of having the PMT conduct a meeting with the BT for the mere reason of providing the prototype. It would make the process much simpler to send the prototype via e-mail to the team. This will save both of the teams the effort of having to go out of their way and schedule a meeting only to get the prototype when other alternatives, that save time, are available. By

implementing this change, 30 mins of processing time are saved.

As for the third Kaizen burst. It is quite similar to the first one. Instead of having two separate meetings with the stakeholders, getting them all together in one room at the same time will nullify the requirement for an additional meeting. It will also reduce the chance of miscommunication between the teams. Hence, it was suggested that the BT conducts a meeting with both the PMT and PDT to let them know their feedback regarding the delivered prototype. By merging the two meetings, the saved process time is 60 minutes and the saved lead time is 2 days.

Next is the fourth Kaizen burst. It is concerned with changing the nature of the step. So instead of conducting a meeting between the PMT and the PDT to let them know to proceed with the project development, an e-mail to notify the PDT will suffice. This change saves 20 minutes of process time and 1 day of lead time.

Unlike the others, the fifth Kaizen burst does not alter the nature of the step. It only focuses on reducing the time. The step's process time was reduced by 15 minutes because the meeting would be only concerned with the last sign-off, there would not be anything else to be discussed other than the required formalities. Also, since both teams would be excited to sign off as soon as possible, the lead time was reduced by 1 day.

Following that is the sixth Kaizen burst. This burst is related to the removal of the step. This is because extensive testing was carried out by both the PDT and the BT prior to launching the project and accepting it. In addition, if anything was to come up with the project in the initial run, the ITS department accepts IT tickets to fix the issues that arise with all of the projects. Moreover, this will help in keeping the PDT ready to be assigned to their next project instead of being stuck with this one for a duration of 3360 minutes of process time and 14 days of lead time.

Lastly, the seventh Kaizen burst. It does not change the step at all. However, by

making sure that all of the PDT is up to date with the latest coding-related techniques by making them go through training will help in increasing their productivity and in consequence reduce the amount of time that is required for the project development. Assuming that by going through the essential training, their performance will increase by 25%, the process time and the lead times for the coding-related activities will improve significantly.

5.2 Improvements Analysis: A Comparison Between the Current and the Future VSMs

As the improvements mentioned in section 5.1 were implemented. The future VSM showed the improved process and lead times. The initial durations for the two parameters according to the current VSM are 42,325 minutes for the process time, and 118 days for the lead time. On the other hand, the future VSM yielded in 29,795 minutes for the process time and 81 days for the lead time. The below figures (figures 5 and 6) show a comparison between the two variables in both the current and the future VSMs.

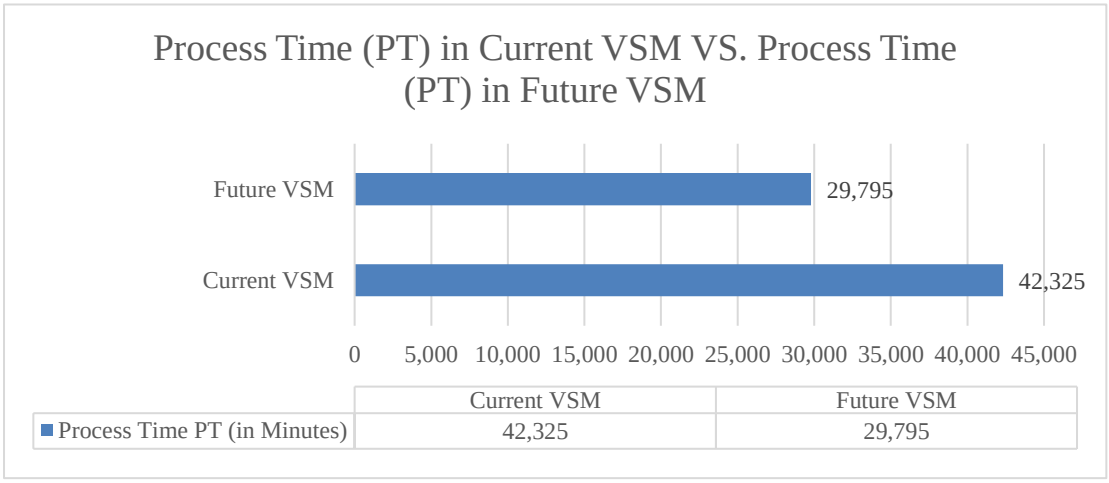

Figure 5: A Comparison between Process Time in Current VSM vs. Future VSM

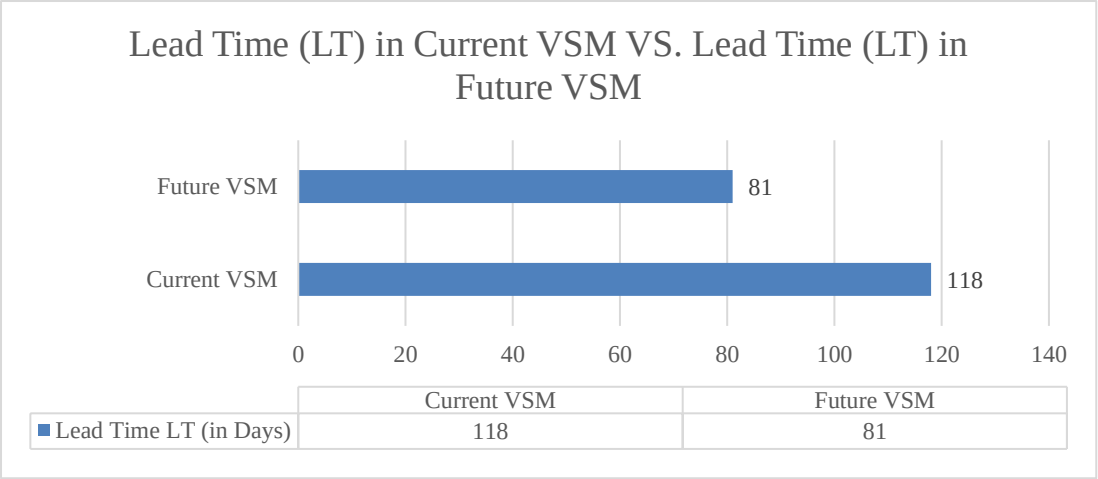

Figure 6: A Comparison of Lead Time in Current VSM vs. Future VSM

The rate of improvement in each variable can be calculated as follows:

$$Rate\ of\ Improvement\ in\ PT = \frac{PT\ Current\ State - PT\ Improved\ State}{PT\ Current\ State} = \frac{42{,}325 - 29{,}795}{42{,}325} =$$

0.2960

$$Rate\ of\ Improvement\ in\ LT = \frac{LT\ Current\ State - LT\ Improved\ State}{LT\ Current\ State} = \frac{118 - 99}{118} =$$

0.3135

The results can be tabulated for a better view of the data in table 20.

Table 20: Results Summary in terms of Improvements

Metric	Current State	Improved State	Improvement rate	Improvement percentage
Process Time (minutes)	42,325	29,795	0.2960	29.60%
Lead Time (days)	118	81	0.3135	31.35%

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

Qatar University has its own Information Technology Services department which carries out many types of project developments for the university. In this project, the internal project development process was studied. This project aimed to analyze the current process and make some enhancements to it to reduce the amount of waste. This was done through the lens of lean project management principles. These principles scrutinize a process and make sure that it is sorted in such a way that minimizes all kinds of waste. The main tool that was relied on was the Visual Stream Mapping (VSM) tool.

The project initially mapped the current process that the department follows. Then after some analysis, some areas for improvement were determined. After that, the improvements were mapped to achieve the future process. Two metrics were studied. They are the process and lead times. For the current VSM, the process time was 42,325 minutes and the lead time was 118 days. As for the Future VSM, it yielded 29,795 minutes for the process time and 81 days for the lead time.

The rate of improvement was calculated by subtracting the future value from the current value and then dividing it by the current value. The same equation was used for both the process time and the lead time. As a result, it was found that the process time was improved by 29.60% meanwhile the lead time was improved by 31.35%. These percentages are not to be taken lightly since the process is mainly focused on the process development part which has a huge weight on the total amounts of each metric respectively.

As for some recommendations, I would suggest that the number of meetings conducted is reduced. Some of the meetings can be combined together and more

information can be clearly gathered in that manner. Each respective stakeholder will have clarity on their concerns with little to no miscommunication. This would be ensured because there will be less word of mouth going from one meeting to another trying to convey what a stakeholder was trying to communicate to the next one through different meetings. Furthermore, some of the activities can be done virtually. This would also help in reducing the amount of time that is spent on waiting for all of the stakeholders to arrive and assemble in the meeting before the meeting's kick-off. A solution could be deduced from what had taken place during the pandemic Covid-19. And it would be to take these meetings virtually through various platforms. One last recommendation would be to utilize the given technology and rely on it for tasks in order to accelerate the process. For instance, instead of holding meetings for notifications to proceed with a plan, an e-mail would suffice instead. Another occasion would be to set templates for the required documents to be filled. An example would be by having an electronic form for the business case such that they can use. This will ensure that the whole procedure goes smoothly and not many clarifications would be required.

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