QATAR UNIVERSITY

COLLEGE OF ENGINEERING

APPLICATION OF LEAN THININKING IN THE STUDENT AFFAIRS SECTOR OF

QATAR UNIVERSITY

BY

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ABSTRACT

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Title: APPLICATION OF LEAN THININKING IN THE STUDENT AFFAIRS SECTOR OF QATAR UNIVERSITY

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Lean thinking is one of the well-known techniques that aims to create more value to customers with minimum used resources via minimizing or eliminating wastes. While the lean concepts is traditionally applied in manufacturing industry, it can be implemented in service industry such as educational institutions.

This report introduces the lean thinking using the value stream mapping tool on two processes of the student affairs sector at Qatar University (QU) in order to validate the approach of lean methods in service industry. The first process is the scholarship exemption request process under the admission department at QU. The other process is the external transfer which is under the registration department at QU. The first process shows a great percentage of improvement of the process after implementing the lean principle (almost 70% improvement). Furthermore, an action plan is suggested for the second process.

DEDICATION

This project work is dedicated to my supportive beloved parents, family, husband and my

son. In addition, I dedicate this report to my best friends and work colleagues.

ACKNOWLEDGMENTS

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LIST OF ABBREVIATIONS

QU	Qatar University
SA	Student affairs
AV	Academic advisor
ADSA	Assistant dean of student affairs
AD	Admission department
RS	Records section
SS	Scholarship section
SER	Scholarship exemption request
EXTR	External transfer
VSM	Value stream map
SIS	Student information system
PT	Process time
LT	Lead-time
TM	Total Material
SSP	Scholarship specialist

CHAPTER1: INTRODUCTION

1.1. Background

Lean thinking is a recognized improvement method that has been the focus in the manufacturing industry for a long time, and its implementations are taking place in all business fields. The main goal of lean thinking is to eliminate waste from a specific process to create more value for customers. Any use of resources that do not add value to customers sorted as wastes, and they should be eliminated or minimized. This management philosophy originates in Toyota Production System, and since then it has been applied in the manufacturing industry. However, lean also was extensively applied in service organizations such as healthcare; financial institutions and offices.

Today's marketplace is a very changing area where satisfying the customers became more challenge target to be fulfilled. In addition, service industry ambitions to reach better quality services and cost reduction. Despite information technology development and processes automation, unexpectedly, the level of service quality is declining year after year by significant amounts. Thus, many service industry institutions tried applying the lean thinking to reach a process with less waste, which in turn leads to a better quality service.

Qatar University is the national university at Qatar, and one of its key performance areas is to provide effective and efficient facilities to support academic missions and maintain a supportive environment for the university community. In 2016, the student affairs sector at Qatar University adopted a huge project that aims to satisfy students, staff and faculty by restudying and reviewing all processes under the student affairs sector and apply the lean thinking principles to these processes in order to reach valuable process with minimum waste.

1.2. Problem statement

Qatar University is a continuous developing institution, and nowadays it aims to enhance all services processes at the university. The Student affairs sector at Qatar University took this opportunity to introduce the lean thinking to reach its goals. This project will help in understanding the lean thinking and the value stream mapping method that leads to enhance processes by studying two services processes from student affairs sector at Qatar University. The study is expected to lay the foundation for further development on the different services at Qatar University by applying the lean thinking and value stream mapping method.

1.3. Objectives of the study

The project aims to:

1- Study the application of lean thinking in the service industry.

2- Provide an overview of lean thinking principles in higher education

3- Apply the lean thinking principles in the admission department at Qatar University.

4- Study a current service under the student affairs sector at Qatar University that needs to apply the lean thinking method.

5- Study the effectiveness of the future results.

1.4. Scope and limitations

The scope of this project is limited to services under the student affairs sector at Qatar University. Data were obtained with authority of the director of admission and enrollment division. In this project, two processes (case studies) will be the focus. The main case study is the process of requesting an exemption from conditions to maintain a scholarship from the corner of inspecting the effectiveness of applying lean thinking in services at Qatar University. A second case study from the registration

department will be discussed to emphasize the rule of lean thinking in education services.

1.5. Report overview

This report consists of six chapters including this chapter. This chapter gives an overview of the report topics, its background, and objectives. The second chapter is about literature review of topics related to this project. Research methodology used in this project will be illustrated in chapter three. Chapter four will discuss the implementation of lean principle in student affairs sector at Qatar university. Chapter five is about discussing the results and analyzing them. Chapter six provides the project conclusion, recommendation, and future research work.

CHAPTER 2: LITERATURE REVIEW

2.1. Lean philosophy

Lean philosophy is a transformational perspective in quality delivery with minimal cost that has found widespread application in the manufacturing sector. Lean philosophy demands development of a framework of action aimed at maximum waste elimination to meet the requirement in the market (Higor & Guilherme, 2015). One of the factors that affect the quality of products and services delivered by companies is waste that is a necessity in the process of service/goods production. The lean concept emerged as a result of adaptive resilience in Toyota's motor vehicle production process which had suffered a severe headache following the chaos created by the post-world-war II effects specifically in the economic perspective. According to (Higor & Guilherme, 2015) and (Shingo, 1996), Toyota, the famous motor vehicle industry, was faced with a massive shortage of resources which led to its low productivity hence making it difficult for the company to continue with the traditional model of mass production. Therefore, the company had to adjust to the post-world-war II economic situation and adopting the lean philosophy was one of the major adaptive mechanisms. Waste elimination due to shortage of resources and desperate financial constraints was necessary. At the same time, the company needed to produce high quality vehicles so as to command a larger percentage of the global market and remain competitive despite of the economic doldrums. (Caldera et all, 2017) studied various articles that shows the relationship between lean thinking and sustainable business practice. The study build sustainable business models accomplished by the implementation of lean methods that can reduce waste, minimize cost, and improve material efficiency in business processes.

(Dennis, 2008) identifies waste as any process or activity in the line of

production that does not add value to the final product. In the traditional model, waste identification was not given much priority as it was considered to be the normal part of production. Reduction of non-value adding activities is the most important aspect of lean thinking. However, (Womark et al, 1992) categorizes waste into two groups; waste that is within the capability of a company or organization to eliminate and waste that is outside the company's mandate to eliminate. Waste that the company can eliminate includes unnecessary transport or movement of items which consumes energy and time loss on the part of employees. Over-processing is also another common waste that can easily be eliminated through careful Value Stream Mapping techniques. It involves steps in the product development cycle that are not really necessary. Waiting and work in progress are other types of waste that can be minimized. Work in progress refers to all unfinished products while waiting refers to halts and delays in the production cycle introduced by such factors as waiting for co-ordination, waiting for materials, information, or people. Defects and flaws in the final product are other forms of waste. They cost a company significantly especially if the product is defective beyond customer's tolerance as the company will have to repeat the production cycle. Performing unnecessary processes is also a type of waste where activities performed but no longer needed. Finally, multiple methods or tools used to perform the same task is an obvious waste that, and it is called Variation.

Lean thinking is the adoption of ideas that result to a continuous production of services or products with limited flaws. The products or services should be delivered on demand with a customized yet universal aspect i.e. they satisfy the customer's specific interests at individual level as well as the interests of the larger pool of customers (Womack, & Jones, 2003). It involves achievement of more value, which should be a continuous process, with a few personnel.

2.2. Acceptance of new technologies and theories.

We live in an ever-changing world. Change is brought about by various factors, but most importantly, technological advances. New inventions and innovations keep popping up in a continuous manner, causing a gradual general change in how the world is perceived and changing the way human beings behave and interact. The invention of the wheel, for instance, greatly contributed to agricultural revolution particularly in Egypt. Another example of subsequent innovation that has changed the quality of life and face of earth include invention of the computer and its associated devices. This has completely transformed the technological sector and hence the industrial sector. Organizations are compelled to adopt to change in the technology accordingly risk elimination and extinction. Change management is necessary so as to assist organizations adopt to the continuous change the world is subjected to.

Lewin's model developed by Kurt Lewin in 1940's is still applicable in the modern century. According to this model, organizations should respond to change in three distinctive stages; unfreeze, change, and then refreeze. The unfreezing stage entails an organization generally developing a flexible mindset ready to embrace change. It is usually accompanied by a state of uncertainty in the stakeholders (Thomas & Christopher, 2014). Next, the change stage entails the stakeholders gradually compromising and resolving their uncertainty to adopt change. Lastly, the refreezing stage entails drafting of new rules, operational structure and organizational structure to instill order in the organization. Change management is an important concept that can be applied in lean philosophy implementation. Sometimes, continual improvement in the current century requires continual adoption of new technologies to better services and/or products.

2.3. Lean thinking in the service sector

Lean philosophy has been considered an ideally applicable in the manufacturing sector with little support to its applicability in the service sector. This can be attributed to its inception in the industrialization era. The manufacturing sector was a dominant industry during the industrialization era. With the gradual growth in technology, the service sector has gained much significance in the twenty-first century. Approximately 58% of the World's gross domestic product (GDP) can be attributed to the service sector (Higor & Guilherme, 2015). Also, a majority of professionals (79% in the United States) belong to the service sector. The fact that the service sector has become dominant in this era of advanced technology implies that application of lean concepts is necessary to improve service delivery.

The five principles of lean philosophy by (Womark & Jones, 2003) can as well find application in the service sector. First, a service organization must specify the value it needs to attain in order to satisfy its customers. Value Stream Mapping is then necessary so as to give the organization a broader picture of the processes, steps, operations, and costs that it will require in order to achieve the specified value. Flow optimization comes in hand as the service company needs to minimize waste. Waste in the service industry is mainly manifested through intellectual waste (lack of employee empowerment) (Higor & Guilherme, 2015), faults and flaws in the service delivered or the service delivery systems, and delays and halts in service delivery. In the service sector, the employee is the most important tool (as compared to materials in lean manufacturing). The employee is the source of intellectual property as well as a means of service creation and delivery. The service sector relies on Just-In-Time concept as the service is delivered according to customers' demand. This is as well applicable in the manufacturing sector where it assists a company to avoid

overproduction. Overproduction is not applicable in the service sector since services are delivered on customers' request unlike in the manufacturing sector where goods are manufactured and stored thus exposing the manufacturing firm to risks of overproduction. Lastly, the principle of perfection and continual improvement is applicable in the service sector. Improvement of the services offered as well as service delivery systems through which the company offers its services is necessary for value creation and excellent financial performance. In line with this, customer's feedback is important. However, there should be direct contact with the end customer to improve chances of obtaining reliable feedback. (Higor & Guilherme, 2015) suggest other additional principles in the lean service sector. First, a lean service organization must be customer focused. The organization must ensure to satisfy the customer's requirements completely, at the right time, and in the right context with minimal costs. Second, the service must be offered such that it exceeds customer's expectations. The customer's mood can influence their mood during consumption of the whole service and, hence, the urge to purchase the service again. (Bozena et al, 2016) illustrates in their article, the implementation of lean methods in healthcare that lean thinking demonstrates valuables results of time and efficiency to the process under the healthcare however, the impact of patient satisfaction is low. Thus, it was recommended patient's involvement while identifying the value and in the whole implementation process.

2.4. Services that used lean thinking philosophy

Even though most service industries have adopted lean philosophy in their service delivery, literature on lean implementation in the service sector including success case studies is still scarce (Piercing & Rich, 2008). This is because, lean philosophy is still a new approach to service delivery hence a minimal number of

reported success cases. However, a few success cases of lean implementation in the service industry are described below;

Food service sector: Taco bell fast foods company

Taco bell is a fast-food industry headquartered in the United States. Taco Bell was the first company within the service industry to implement lean philosophy in service delivery (Bowen & Youngdahl, 1998). The company has achieved trade-offs in efficiency, financial performance, flexibility, and low-cost service delivery. First, the company values its customers and employees. Second, it applies the Just-In-Time concept, offering services on request from its customers. Taco Bell has been flexible enough to establish operation centers in many places to reach out to a majority of customers. The company has achieved low-cost operation with high quality food service delivery at affordable costs to its customers.

Transport service sector: South-west airlines

South-west airlines has successfully implemented lean service delivery. It is a typical example of services in the transport sector that have created value through lean philosophy. In 2012, the company recorded the highest number of travelers (88 million) to at least 72 cities and towns in 37 countries around the world (Stanley & Reahm, 2012). First, the company recognized the kind of value people required. It therefore introduced the "Fly Bags Free" strategy to meet the value that customers required. Apart from not charging bags, the company responds to customers queries and complains in a timely manner and also manages timely flight departures and landings. The company also reduced wastes through reducing cases of employee turnover. The company rarely lays off employees as it considered this to be intellectual waste. It values customers and employees hence creating value at low costs with minimal wastage.

Healthcare sector: Lifecare hospital

Lifecare hospital implemented lean philosophy and practice which assisted it to deliver quality services to patients through elimination of infections and deaths caused by transfusion errors. Prior to implementation of lean philosophy, the hospital has recorded approximately 15 million victims of medication errors since its inception. Worse still, the mortality rate resulting from these errors was extraordinarily high. Approximately 40% of the victim's medication errors died. The hospital implemented lean philosophy by improvement of its medical test equipment (replacement where necessary), elimination of ambiguity through adoption of prescription technology such as Computerized Physician Order Entry (CPOE), and employee training. The results of lean implementation were impressive since the hospital reduced infection cases by approximately 87%. Other hospitals such as Park Nicollet Health Service, and Monongahela Valley Hospital have achieved better patient care through lean practice (Higor et al, 2015).

Banking and insurance: Jefferson pilot financial company

Jefferson pilot financial company is a life coverage and insurance company that has succeeded in lean implementation. First, this company commenced on lean practice through creation of a model-cell simulation set-up (Value Creation and VSM). This model acted as a guide to its fraternity on how to create value at low costs. Through guidance of the VSM, the company managed to reduce time spent on processing applications as well as error introduced during processing. Waiting waste was eliminated successfully. It achieved a 70% reduction of the time of processing a request and 40% of errors. The company also placed related processes close to each other to improve efficiency. Employee satisfaction was achieved through balancing of workload and pay. It results into 26% reduction of the cost of labor. Finally, the

company keeps track of its performance and practices continual improvement.

2.5. Lean thinking in higher education

Higher education and learning is a service sector whose services are mainly centered around delivery and reception of knowledge and information. Higher education is an essential service sector as it models professionals and students to offer their services to various industrial sectors. There is scarce literature on the application of lean philosophy in Higher Education settings. Lean applicability in higher education is somehow controversial since lean philosophy mainly goes hand in hand with profit creation and financial gains. However, lean finds applicability in higher education because it must practice efficiency in operations to offer value to its clients.

Due to the changing industrial requirements and expectations of graduates, Higher Education institutions are faced with the pressure to offer the best quality training and education which meets prevailing industrial standards. This compels most institutions to alter their financial position and budgets. The aim is to raise more finances necessary for effecting the required training of its clients (Bob, 2005). This higher cost is in turn passed on to students and parents. In order to solve such problems, lean thinking is necessary so as to reduce cost while at the same time offering training which meets industrial standards.

According to (Paral & Mishara, 2013), Higher Education is a service organization with supply of information and continuous demand for knowledge and information. Implementation of lean practice aligned to quality delivery can be achieved through such practices as regular review of course outlines to identify necessary and unnecessary contents, practices, and operations. It can also be achieved through creation and regular review of efficient financial management systems.

(Paral & Mishara, 2013) developed a lean philosophy approach that can be implemented in delivery of knowledge and information to students. The process should begin by identification of wastes processes and activities as well as key course elements in a course outline. Institutions should also review course processes, structure and outline, and operations with continual improvement and emphasis on value-adding elements. Just like the manufacturing sector values the customer, Higher Learning Institutions should value their students and create constant feedback channels for suggestions, complains, and opinions. A constant feedback channel should also be created with industries and parents as indirect clients. (Gopalakrishnan et al, 2017) indicate in their study the absence of literature regarding the implementation of lean in higher education. They studied the implementation of lean thinking in one of the educational institutes in south India and identified the metrics of performance and set of wastes were an educational institute should consider while implementing lean thinking.

2.6. Universities which implement lean

2.6.1. University of Central Oklahoma

The university of Central Oklahoma, after a thorough struggle with traditional models of service delivery, has managed to transform itself into a lean University. Prior to its transformation, the University experienced regular complains of students and other stakeholders' dissatisfaction with its services. The university also had insufficient funding, poor budget construction techniques, complains from employees, and low levels of productivity. (Moore, Nash & Henderson, 2007) outlined 4-steps lean implementation process that was applied in Central Oklahoma University. First, the management identified opportunities and weaknesses. Second, the management created a solution draft/design. Third, training of employees and implementation of

the solution design followed. Lastly, performance metrics and reviews of the solution design are regularly conducted for continual improvement. Numerous benefits results from implementing lean thinking in the university. A positive change concept that can happen to the university was the main impact. The concept that employees can create the improvement to support the financial position of the university increased their satisfaction, reduce their frustration, and increase their productivity. As an example, one process agent was able to minimize the average time to finish a work order by 70%.

2.6.2. University of Minnesota

The university of Minnesota has implemented a five-step lean approach. The first step involved identification of non-academic departments necessary for value creation. Second, the management availed lean training literature. This literature included examples of lean application in an education setting. The University management, through a central coordinating body, enforced continual improvement at departmental level. In step four, a lean facilitator (experienced guru in lean matters) was integrated into the lean implementation process in three separate periods of time scheduled 21 days apart. Lastly, the University of Minnesota spread the model to other universities after successfully completing the fourth step (Higor & Guilherme, 2015). It has an Office Service Continual Improvement which oversees overall continual improvement of the University services.

2.7. Value stream mapping

There are five principles of lean philosophy; value identification, value streaming, flow, pull, and perfection. Value refers to what the customer is exactly looking for. In order for the company to provide the customer with what they are looking for, a process of steps, practices, and operations is required. The series of

steps, practices, and operations required to give the customer what they need is called a value stream. Value stream mapping is then a visualization process which tends to assist the organization to create an overall picture of processes and operations required to deliver value to the customer at low cost. Whereas value steam mapping has found most applications in the manufacturing sector, it is as well applicable in the service sector.

Generally, VSM has four major steps; mapping current state, identification of opportunities and implementation challenges, mapping future state, and finally implementation of the future state. In the service sector, (Andrea et al, 2011) suggests that VSM should begin by choice of value the customer requires. In order to successfully identify a type of service a customer requires, an organization should perform Service Quantity (SQ) analysis and apply data mining techniques. After identifying the service categorized as the value that the customer requires, the expert should embark on mapping the current state of the organization's service delivery system. Mapping requires construction of a visible flow-chart of events and processes to be implemented towards achievement of the targeted service. Adopted from the manufacturing sector, Figure 1 shows the basic icons applicable in VSM. However, for them to find application in the service industry, (Andrea et al, 2011) suggests some additional adjustments since there are core differences between the manufacturing sector and the service sector.

(Andrea & Gionata, 2011) suggests addition of materials and data icons to specify the kind of material/data required for fulfillment of the service. Also, a lens should be included on the process box icon to indicate additional steps rather than a single step process since multiple services can be delivered in an instance by a single human being. After conducting a current state map, a future state map is conducted

followed by full implementation of the service.
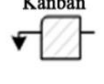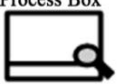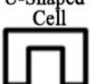
Material Supplier	Data Supplier	End Costomer	Service Issue	Customer Presence	Priority Queue
Documents	Electronic Data	Push flow	Pull flow	Load Levelling	Time Table
Kanban	Process Box	U-Shaped Cell	Worker/ Employee	Buffer	IT Station
Super Market	Items Inventory	Pool Resource	FIFO Lane	Queue	Web Page

Figure 1: Value stream mapping tools

The value stream map tool can be used at any scale wither mapping simple administrative process, or complicated manufacturing and sales process.
Figure 3 illustrates the timelines in VSM. The lead time is the time from starting the request to the delivery of the request. The black shaded areas represents the time that is adding value to the process. The light shaded area represents the necessary non-added value process time, however, the middle darkness shades shows the unnecessary non-added value process time, which is the waste that should be eliminated from the process. The white areas denote where the work is idle.
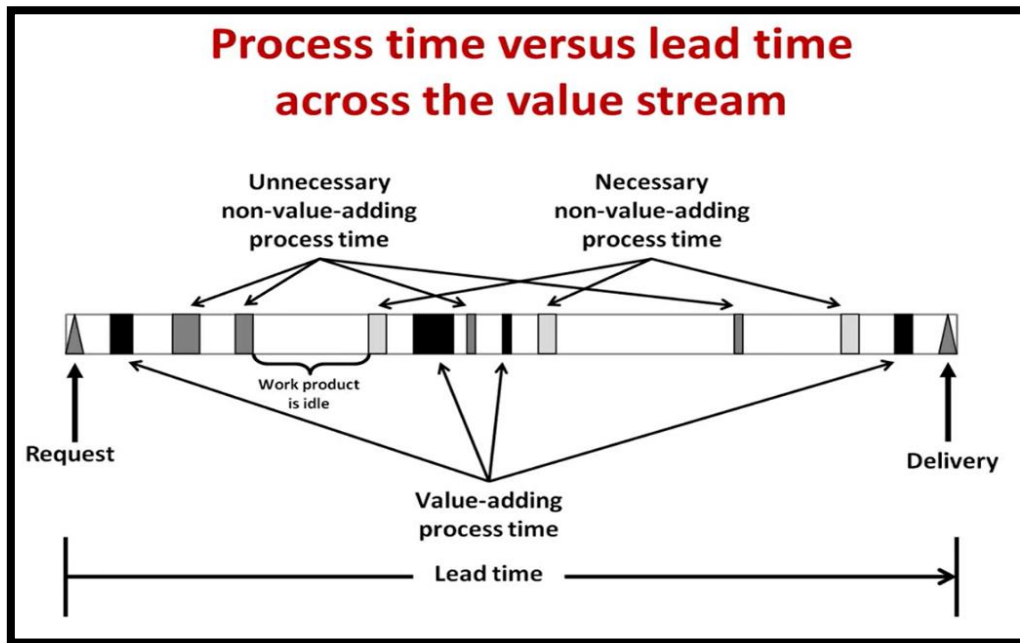
Figure 2: Timeline types in VSM

The value stream mapping is an effective tool to evaluate existing work processes or any business to companies of all extents, such as:

- Providing indication of the customer's perspective

- Providing a common language to observe and evaluate the value stream

- Providing holistic view of process needed to deliver or produce a product to a customer

- Detecting inefficiencies in the process

- Enrich the employees' understanding of work

- Powerful and simple tool to enhance manufacturing or service workflows

There are several helpful professionally designed value stream mapping templates created using the standard symbols available in the Creately value stream mapping tool library. Creately is a professional website for visual collaboration tools. There are eight available templets that can be used simply by click choosing the template and open it in the Creately editor. These templets are:

- Production Control Value Stream Map

  It can be used to visualize the flow of materials and information within a product's production path from supplier to the customer.

- Current State Value Stream Map

  The current state value stream map example which is the Toyota model production system. It is current state map used to identify inefficiencies and the bottlenecks of the current system. It is the foundation for the future state map.

- Software Development Process Value Stream Map

  In software development processes, the process must be contributed to the product's value by using the value stream map tool. This mapping model is beneficial in increasing the value from the specification requirements to the actual product or service used by the customer.

- Funnel Shaped Value Stream Model

  This type of mapping is useful when there are fast initial processing and large incoming amounts of material.

- Supply Chain Management Value Stream Map

  This type of templates can be used to visualize supply chain management process.

- Pyramid Shaped Value Stream Map

  The Pyramid shaped value stream maps template is useful when the outputs are large and the incoming material or orders is slow, so it's the opposite of funnel-shaped model.

- Data Management Value Stream Map

  This value stream map template useful for simplified data management system.

- Future State Value Stream Map

A future state map usually represents the ideal state of the system. It can be realized from the current state map were wasteful elements of existing system is identified and eliminated.

2.7.1. Implementation of VSM in higher education

Recently the number of universities are getter higher in all over the world and the research and teaching levels are not enough to attract the students. Thus, one of the Italian Universities decided to apply the VSM technique to improve the performance of its orientation centre, since it is the first place in the university visited by prospective students. (Andrea et al, 2011) illustrated the progress of implementation by starting with description of the enrolment process in details. The second step was forming a team for mapping the current state. Thus, a comprehensive team reflecting the needs of the management, of the employees and of the end customers, was recruited. The team then draw the current state including all details such as available time, time losses, cycle time, average queuing, maximal queuing time, and service utilization. Then team analyze waste in the current state and find out the reason causing the waste. After discussing these problems in an official meeting, to increase commitment and to motivate people, the team and the top management define challenging, but realistic objectives to be their target for improvement. The next step was proposing lean solution in order to reach the targeted objectives. The future state map obtained with the introduction of the proposed solutions. In addition, some calculations done to measure the percentage of improvement.

2.8. Root cause analysis

Root Cause Analysis is the application of inferential analysis techniques to determine the cause of a problem and then offer a probable solution. In organizations

implementing lean, RCA must be part of their continual improvement approach. There are a variety of RCA methods. (James et al, 2004) shows that a good RCA method should first clearly define the problem at hand as well as its effects. Future impacts if the problem persists should also be considered. The method should clearly establish a causal relationship of issues and factors that joined hands to cause the current situation. While identifying a causal relationship of factors, the method should offer evidence to support inclusion of particular factors. Lastly, a good RCA methods should offer the most probable solution to the problem at hand. A variety of methods and models for RCA exist.

Table 1: Root Cause Analysis Methods

Method	Brief procedure
Events and causal chart method	Finds out events related to the problem and arranges them to establish a causal relationship.
Change analysis	It initially defines a problem, then defines a situation without the problem to find differences.
Barrier analysis	Identifies whether a barrier that prevents occurrence of a certain problem was compromised with or failed.
Tree diagram	It is the establishment of causal relationships between factors then narrowing down to a single problem.
5 Whys	It is a series of five "Why' questions in which each question leads to an answer. The fifth question gives the most probable cause of a problem.

2.9. Qatar University

Qatar University is the first national university established in Qatar in 1973. According to Qatar University official website, the university started with one college, which is the college of education where the university admits only 57 male and 93 female students in its first year. Over the years, the country continuous development and growing needs of the labor market highlighted the need to establish different colleges to fulfil its needs. Today, the university contains nine colleges, which are Education, Health science, Medicine, Pharmacy, Engineering, Arts and Sciences; Business and Economics; Law; and Sharia and Islamic Studies.

Qatar University has continually seeks for highest international accreditations along with new and most recent technologies to smoothen its services since it serves currently over 14,000 students. The strategic plan of Qatar University focuses on several areas that supports the experience of students, performance in research, recognition of the university, and effectiveness and efficiency.

2.9.1. Admission department

The admission department in under the non-academic affairs of Qatar University. The department is responsible about receiving the application requests from applicants who want to continue their education at Qatar University wither undergraduate or graduate level, or studying non-degree certificate, visiting, or second bachelor degree. The department consists of five sections, which are Admission section, Scholarship section, International students section, Graduate section, Recruitment section.

2.9.2. Registration department

The registration department is responsible on enrolled student's services. The registration departments consists of three major sections, which are the registration section, the record section and the scheduling section. Each section have huge number of tasks. The department provides registration services and activities; manages student transcripts, records. In addition, it supervises schedules, and final examinations and class's management.

CHAPTER 3: RESEARCH METHODOLOGY

3.1.Definition and terminology

3.1.1. Student affairs:

Student affairs sector at Qatar University is a sector that takes care of all students services, life and activities. In other institutions, it may be called student support or student services. Its main concern is the student success and development to improve student growth in the state of Qatar and abroad.

3.1.2. Exemption system:

The exemption system is a system developed to help scholarship students apply for an exemption online if needed without the need to visit the scholarship offices.

3.1.3. Exemption process:

It is the list of steps in which scholarship specialist, academic advisor, students and all stakeholders must go through in order to perform one exemption request applied by a student.

3.1.4. Scholarship specialist:

Is an employee who works in the scholarship section at Qatar University and are specialized in all tasks that should be done by scholarship section.

3.1.5. Academic advisor:

Is advisor assigned to a student and know all data of admission and registration of the assigned students. The advisor is responsible about guiding and monitoring his/her assigned students actions and academic performance. Follow up the assigned student study plan and make sure that students are within the University rules and regulations.

3.1.6. Student information system

The Student Information System Office offers an access to several applications such as self-service banner, online course catalog, Online Class Schedules and E-payment applications to all students, faculty members and specialized staff. The student information system (SIS) team creates and support systems and modules required for the University.

3.1.7. Assistant dean of student affairs

There is an assistant dean for each college dean at Qatar University. Where the university have 9 colleges currently. In general, the assistant dean responsibility is to facilitate student support services, student leadership development, students advising procedures, and support college recruitment, orientation and retention efforts.

3.1.8. Competitive scholarship

Scholarships where students or applicants selected on competitive basis based on their Academic Performance and when receiving this type of scholarship they are committed to several restricted conditions to maintain the scholarship.

3.1.9. Scholarship exemption form

A hard copy form that scholarship students must fill in the existence of his/her academic advisor to apply for a scholarship exemption request. It consist of three sections, which are the student information section, academic advisor section, and the assistant dean of student affairs section. The form is in appendix A.

3.2. Research method:

Two techniques were used in this research project. The first technique was documentary analysis method and the second technique was observation method. The next step after completion of the first two techniques is to implement the value stream

mapping tool in the two selected process of this project which are SER and EXTR processes.

3.2.1. Documentary analysis method:

Facts and ideas are recorded in documents, which considered as tangible materials that can be used to extract useful data for the research. Several documents and articles were studied as illustrated in the literature review part that talks about lean thinking in higher education and universities, which implemented lean. The gathered knowledge from literature will be the guide to implement the lean thinking methods in Qatar University student Affairs.

3.2.2. Observation:

The most straightforward method to obtain data is by observing its process. Thus, the second method was observing the process of the services that are the aim of this research project.

3.3. Value stream mapping tool:

The next step after collecting all required information and data is to apply the VSM tool to the processes. In order to understand the map, there are three main segments of any value stream map introduced by (Karen, 2013):

- Production or work flow

As in a traditional process flow chart, the process flow from left to right. The parallel tasks or the subtasks flows also from left to right but beneath the main flow. This way is indicating a common language so that any user can understand the flow. This flow as shown in the middle portion of the map as shown in figure 2.

- Information or communication flow

At the top area of the map (see figure 2) all formal and informal communication that occurs within the process is shown. The communication flow can occur at any direction since there is no standardized communication flow.

- Timelines and travel distances

The bottom portion of the map shows the timelines of the process (see figure 2). It is a very important key of measuring improvement in services. The main time types measured in VSM are the process time, lead time, value added process time, non-value added process time. However, most maps uses the process time, or it can be called cycle time also, and the lead time. The other line that can be shown at the bottom of the map is the travel distance of the work, or people or the product through the process if any.
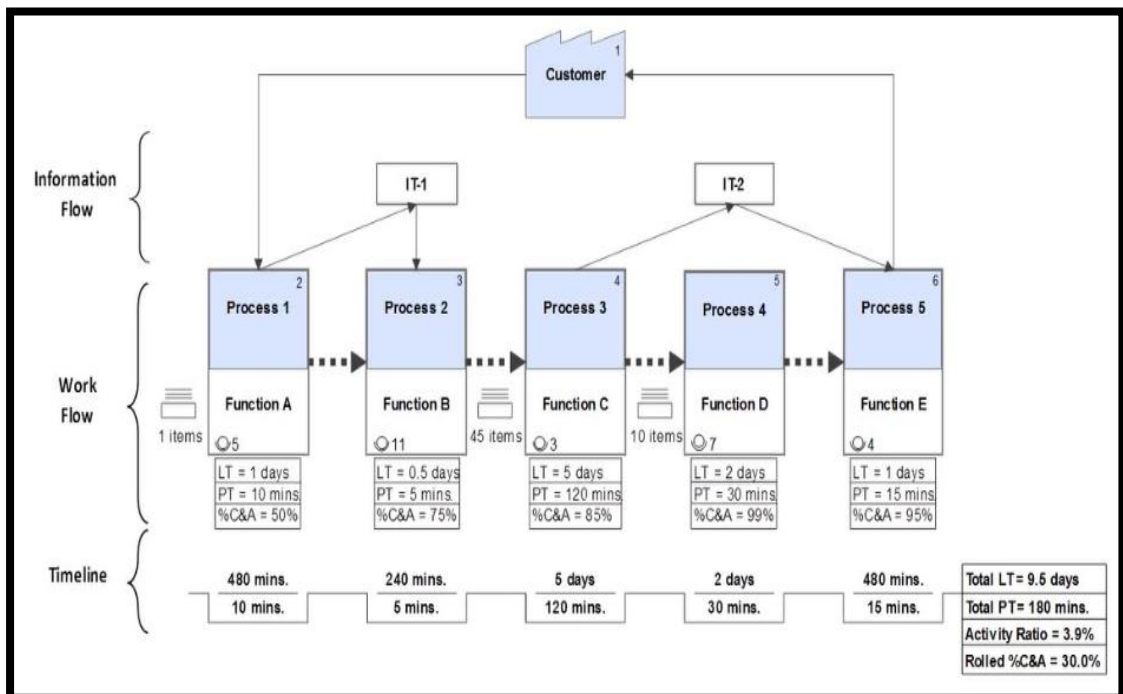
Figure 3: The three main segments of value stream mapping

CHAPTER 4: IMPLEMINTATION OF LEAN THINKING IN STUDENT AFFAIRS SECTOR

4.1. Student affairs sector:

The student affairs (SA) sector at Qatar University provides efficient services, quality programs and various opportunities to increase the students learning experience and their personal development in which it contributes to the educational mission of the University. The Sector targets to support the country by graduating qualified students who aim to serve the community in all fields. Referring to the office of student affairs at Qatar University, the SA structure shown in figure 4 consists of four main divisions, which are the student success department, admission and enrollment division, Student Development division, and Student Services and Activities division. The admission and enrollment division involves of five departments, which are admission department, registration department, student information system (SIS) section, enrollment services one-stop section, and graduate enrollment services. While the development division consists of five centers that are the academic advising center, student-learning support center, carrier service center, counseling center, inclusion and special need support center. Three departments are under the student activities and services division, which are the housing department, the student activities department, and student services department. The structure also consists of several sections under each department that are illustrated in appendix D.

Vise president of Student Affairs

Executive assistant

Administrative coordinator

Complaint system coordinator

Consultant

Planning Specialist

Student governance coordinator

Security Officer

Marketing and communicating units

Central Business Services

Finance unit

Administration unit

Student Success Department

Admission and Enrollment Division

Student Development Division

Student Services and Activities Division

Admission department

Registration department

Enrollment Service one-step section

Student information system section

Graduate Enrollment Services

Center of academic advising

Student Learning support center

Carrier Services Center

Student Counseling Center

Inclusion and special need support center

Student housing

Student activities department

Student Services Department

Figure 4: Student affairs sector structure of Qatar University

4.2. Value steam mapping of scholarship exemption request (SER) process:

The value stream mapping is the preferred way to plan and implement the necessary change that is required to achieve truly lean institution. Stream mapping technique, which is a tool of lean methods, inquires a complete preparation for the targeted process by agreeing on what process/service to study, how to map it, collecting necessary data, and choosing the team who will work on the selected process. The second step is to draw the current state of the targeted process including all steps, adding value and non-adding value steps, in the current state all data should be highlighted on the map. The future state is the next step; it should give a clear vision about where the process should be after minimizing or removing the waste or non-adding value steps of the process. The last step is planning for implementing the changes in order to achieve our future state vision. According to Locher (2016), the above four explained steps are a general steps that are used to insure achieving a good implementation of VSM. The chart below summaries the mentioned steps.
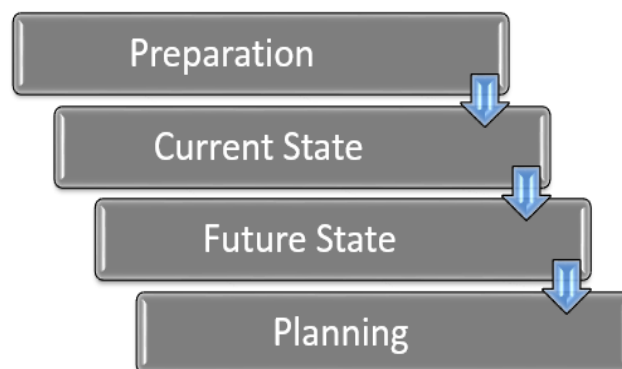
Figure 5: General steps of achieving good VSM

4.2.1. Step 1: Preparation of SER process

As explained above the first step of implementing VSM is to understand our targeted process. The concern process (SER) is under the scholarship section at Qatar

University.

4.2.1.1 Scholarship section

Scholarship section at Qatar University services the undergraduate level students. The section offer different type of scholarships distributed to freshmen high school graduate applicants and current QU students. The section's objective extracted from the university strategic plan for 2017 is to enhance customer services of Scholarships Section. Also, to achieve high level of efficiency within the Scholarships section. Scholarship section perfumes many tasks that need to be done effectively in order to achieve its goals. These tasks are:

- Distributing the scholarships to most entitled applicants

- Answering student's queries via phone, emails, and face-to-face visits.

- Communicating with internal parties such as academic advising center, call center, one-stop section, international student section, accommodation department, financial aid section, student information section, marketing & communication unit, information technology section, books section, External Relations Department, and admission section.

- Communicating with external parties such as number of embassies, the Amiri diwan, and different institutions that contact the scholarship section via official letters.

- Cancelations process: a process of stopping the scholarship from students who do not satisfy the conditions of maintaining the scholarship.

- Follow up with students who have a scholarship.

- Data cleaning process: check the validation of all data entered.

- Scholarship exemption request (SER) process.

The selected process to be an example of performing lean methods is the scholarship

exemption request (SER) process.

4.2.1.2. Process mapping (SER)

In order to understand the workflow of scholarship exemption process and where our targeted weak points is located throughout the process, this section gives a clear visual map of the exemption workflow process as shown below.

4.2.1.3. Process description (SER)

The process starts with the student. Students who have competitive scholarship must register and pass minimum15 credit hours each semester. If the student did not register 15 credit hours but he/she can register 15 credit hours then the student must register 15 credit hours otherwise he/she will get scholarship warning at the end of the semester and the process ends at this status. If student cannot register 15 credit hours for any reason, then student must arrange a meeting with academic advisor to discuss the reason. In the meeting the AV study student request and if the AV decided that student is not eligible for an exemption then his request rejected and the process ends. If the AV decide that the student reason is accepted then the student must fill the exemption form. The AV approves the request form and then send it to the ADSA office. The ADSA office approves the request form and then send it to the AD office. The AD manager approves the request and then send it to the scholarship section. The scholarship section the request form, enter the request into banner system, send approval email to student, and finally send approval or request completion email to the student's AV.
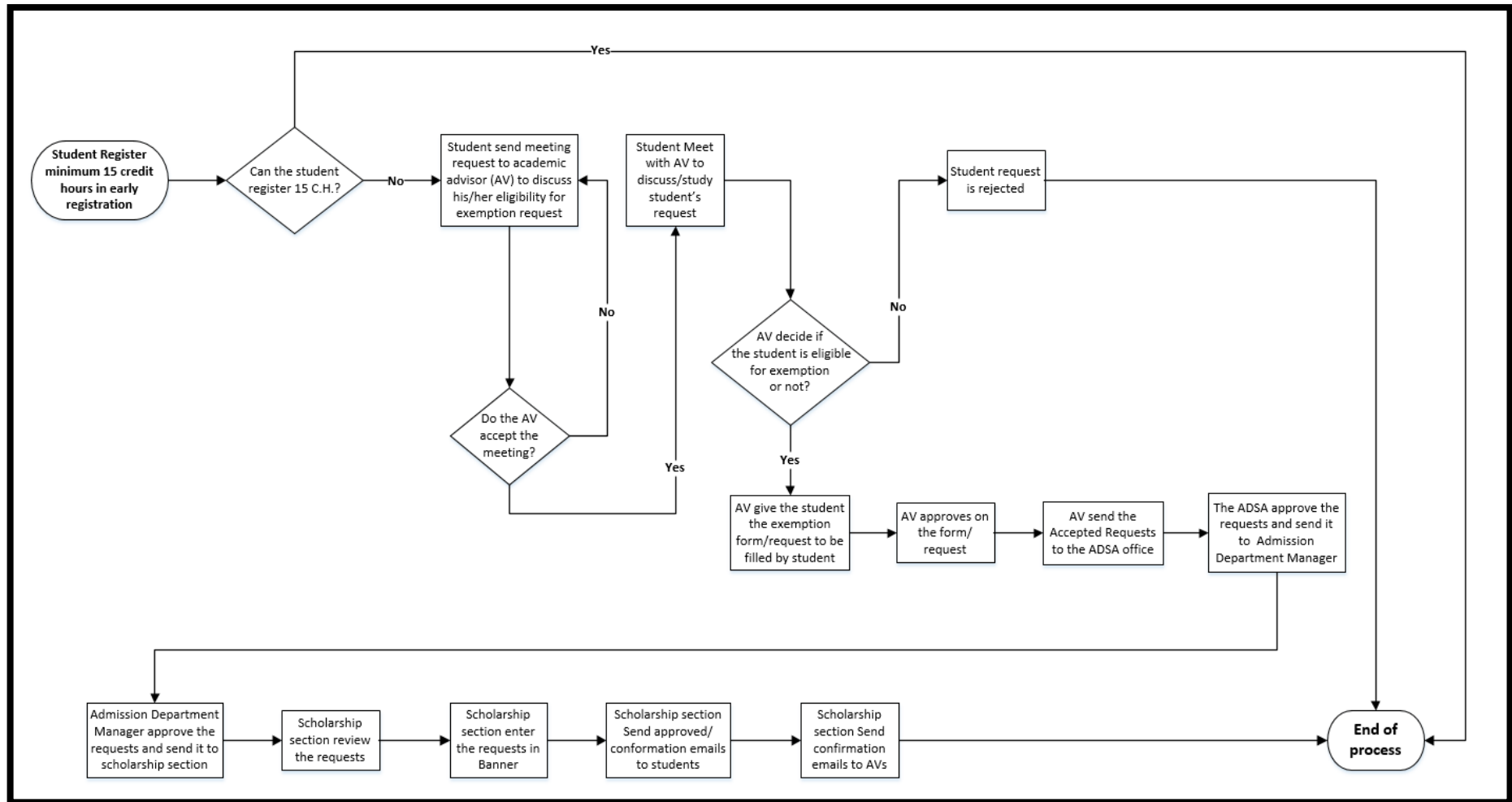
Figure 6: flow chart of the scholarship exemption request (SER)

<u>4.2.1.4. Data and resources (SER)</u>

Data of this project were gathered via observations of the existing exemption system in the scholarship section. In addition, setting meetings with scholarship teem and parties who are involved in the exemption system. Extracting reports from the current exemption system was the method used to have a detailed information regarding the number of students and requests entered per term.

- Observing the exemption system took three months of focus and following up the time and effort needed from different stockholders to implement one request demanded by one student. Requests differ in time and effort depending on the cause of the request and the employee availability and potentials. The method used was dedicating a scholarship specialist (SSP) from the scholarship section to track different types of exemption request and writing up the time and effort required to accomplish one request. In average, it took one month and three employee to perform one request.

- Several meetings were arranged with the different parties involved in the system and those are the academic advisor center, SIS team, the students that are our customer in this project, and the scholarship section (the owner). Each different stockholder was represented by a focal point. The overall number of meetings held is five meetings. The goal of these meeting was to gather all data and information from the different stockholders, and to identify current defaults and difficulties facing each stockholder

- The current exemption system do not allow its user to extract reports each semester. However, the scholarship section creates a report each semester to gather all requests in one file. The data were collected in excel sheets. The last three years data are as follows:

Table 2: Statistics of scholarship exemption requests of last three years

Year	Term	Number of requests	Total
Year 2014	Fall 2014	65	124
	Spring 2015	59	
Year 2015	Fall 2015	56	155
	Spring 2016	99	
Year 2016	Fall 2016	55	152
	Spring 2017	97	

4.2.2. Step 2: Current state VSM-SER

The current state includes all steps involved in the current process. The data gathered and used are the process time, lead-time, activity ratio, materials used, and number of employees.
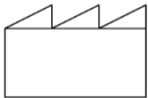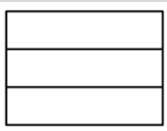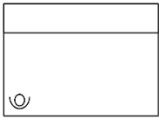
- Process time (PT): The process time is the time it takes to perform the work if the employee is able to work on it uninterrupted. It includes all tasks related to the completion of the task.

- Lead-Time (LT): the elapsed time from the time work of specific task is received from the previous step until it is done and passed to the next step. It includes all tasks wither its related to the completion of the task or not.

- Activity Ratio (Service Quality): Activity ratio is also called the service quality. Simply it's a measurements of the how quickly the work passes form step to step in the process. In ideal processes, the AR is 100%. One hundred minus the AR equals the time work is idle.

- Materials used (TM): the materials used in the project in the number of papers.

4.2.2.1.Symbols:

The table below illustrates the symbols used to draw VSM of the current state of SER process, and their meaning:

Table 3: Symbols used to draw VSM

Symbol	Meaning
	Indicates the customer or the supplier. In this project it's the customer
	Indicates data of a process
	Indicates a process. The upper space shows the process name and the lower space shows the function of the process
	Indicates the number of employees
	Indicates flow of electronic information
	Indicates emailing
	Indicates that information or material is transferred by office boy (walking) between two different buildings
	Indicates flow of data from a process to a process
	Indicates time segment of certain process. Upper space shows process time and the lower space shows lead time.
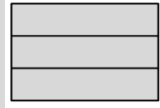
(icon: three-row box)	Indicates the summary metrics.
(icon: Kaizen burst star)	It's called Kaizen burst icon that is used to highlight the improvements that should be done at specific processes to achieve the future state map.
(icon: Internet Explorer)	Indicates internet such as apply online for a request.
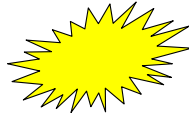
4.2.2.2.Assumptions:

- Number of employees is fixed.

- Employees work 7 hours in a day for 5 days in a week

- Only the longest path is studied.

- The process studied for Fall semester.

- The process assumes happy scenario. Which means it is assumed that the request is approved.

- The flow indicates the journey of only one request.

4.2.2.3.Current state:

Figure 7 shows the value stream mapping of the current state of scholarship exemption request (SER) process. The longest path was selected to be the focus of this study. The process contains 12 steps described below:

- Scheduling: The first step of the process starts by the student. The student contact the academic advisor (AV) in order to schedule a meeting. This step need two persons, which are the student and the AV. It takes 15 minutes as a process time and 1 day of lead-time. No material needed.

- Meeting: The student meet the academic advisor (AV). Two persons needed in

this step, the process time is 30 mins and the lead-time is one day. No material used.

- Request: The student fill the request form at the end of the meeting. This step needs only one person, which is the student. The PT is 10 mins but LT can be 20 mins. The material used is two papers.

- Approval 1: The first approval done by the academic advisor. The approving process time takes 2 mins but the lead time can be 30 mins. The number of papers is four papers since the AV usually save a copy.

- ADSA: The academic advisor send the approved requests with the office boy to the assistant dean of student affair (ADSA) of student's college. The sending process take 30 mins since the AV and the ADSA are in two different buildings. The lead-time may take 5 days. Only two papers transferred.

- Approval 2: The second approval is done by the ADSA. The approval take 2 mins and may take 5 days as lead time. Only two papers used.

- AD: The ADSA send the approved requests to AD. Again, the office boy takes the request from ADSA to the AD. The process time takes 30 mins and the lead-time is up to 1 day.

- Approval 3: The AD approves the request. The admission manager approves the request in 2 mins and it can take (lead time) 5 days. Only 2 papers used.

- SCS: The office of AD send the approved request to the scholarship section. The PT is 10 mins and LT can be 1 day. Number of papers is 2 papers.

- Review: The scholarship section reviews the request. Reviewing the request takes 15 mins and may take (lead-time) 5 days.

- Approval 4: The final approval is done by the scholarship section. The approval takes 2 mins and may take 1 day.

- Enter Request: The scholarship section enter the exemption request in the system. PT is 2 mins but the LT can be 1 day.

- After entering the request, an email is send to the student by the scholarship specialist to inform the students that his/her request is approved.
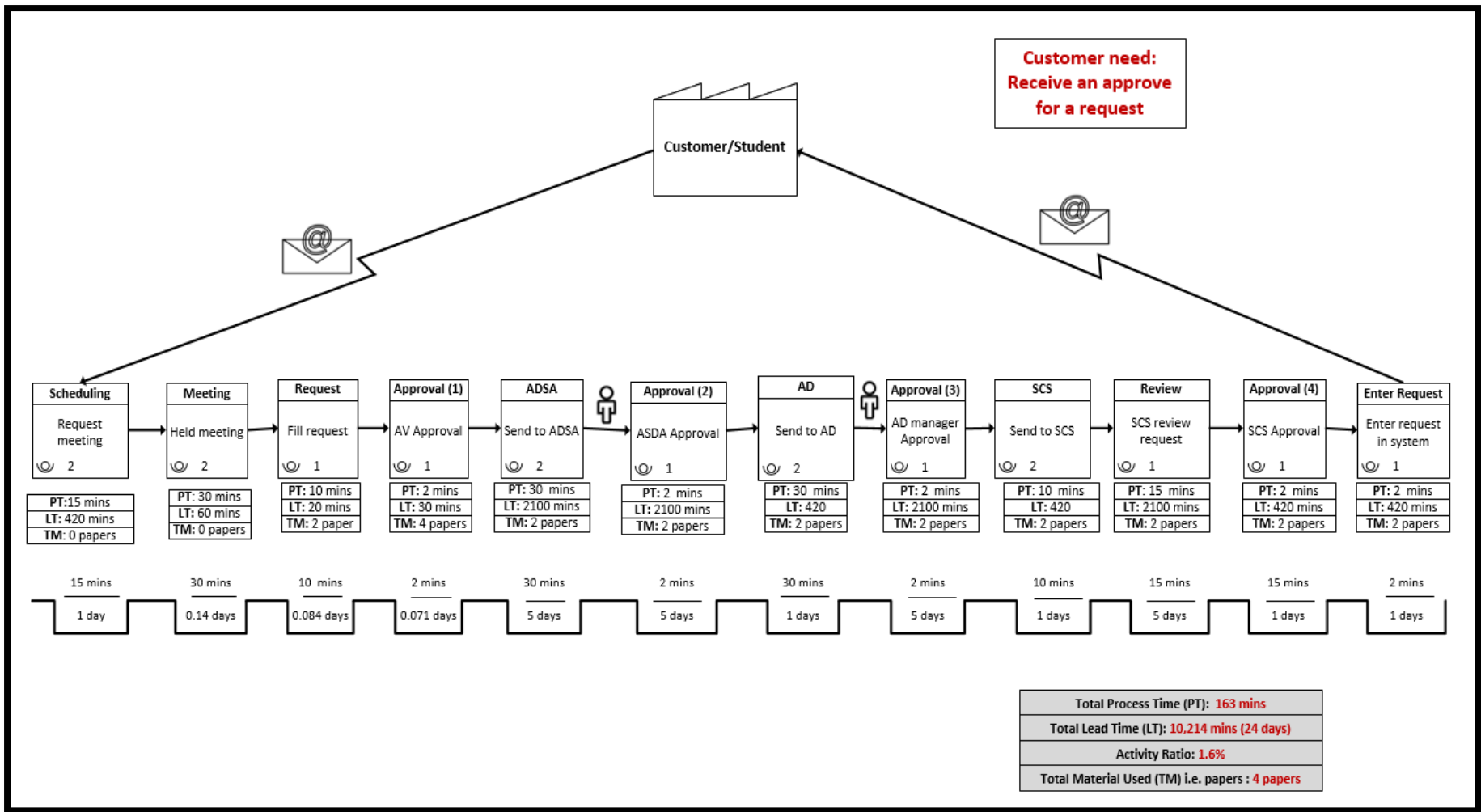
Figure 7: Current VSM of SER

4.2.3. Step 3: Future state VSM-SER

In order to draw a future vision of the current state, kaizen burst tool is the key for highlighting the defects or the waste occurrence in the current process. The first step is locating the kaizen events of our process. Figure 8 is the future state map with kaizen events.

Wastes in seven steps of the process should be eliminated. These steps are the scheduling, meeting, ADSA step, approval 2, AD, approval 3, and SCS step. The mentioned steps are non-value adding steps were the process work effectively without these steps.
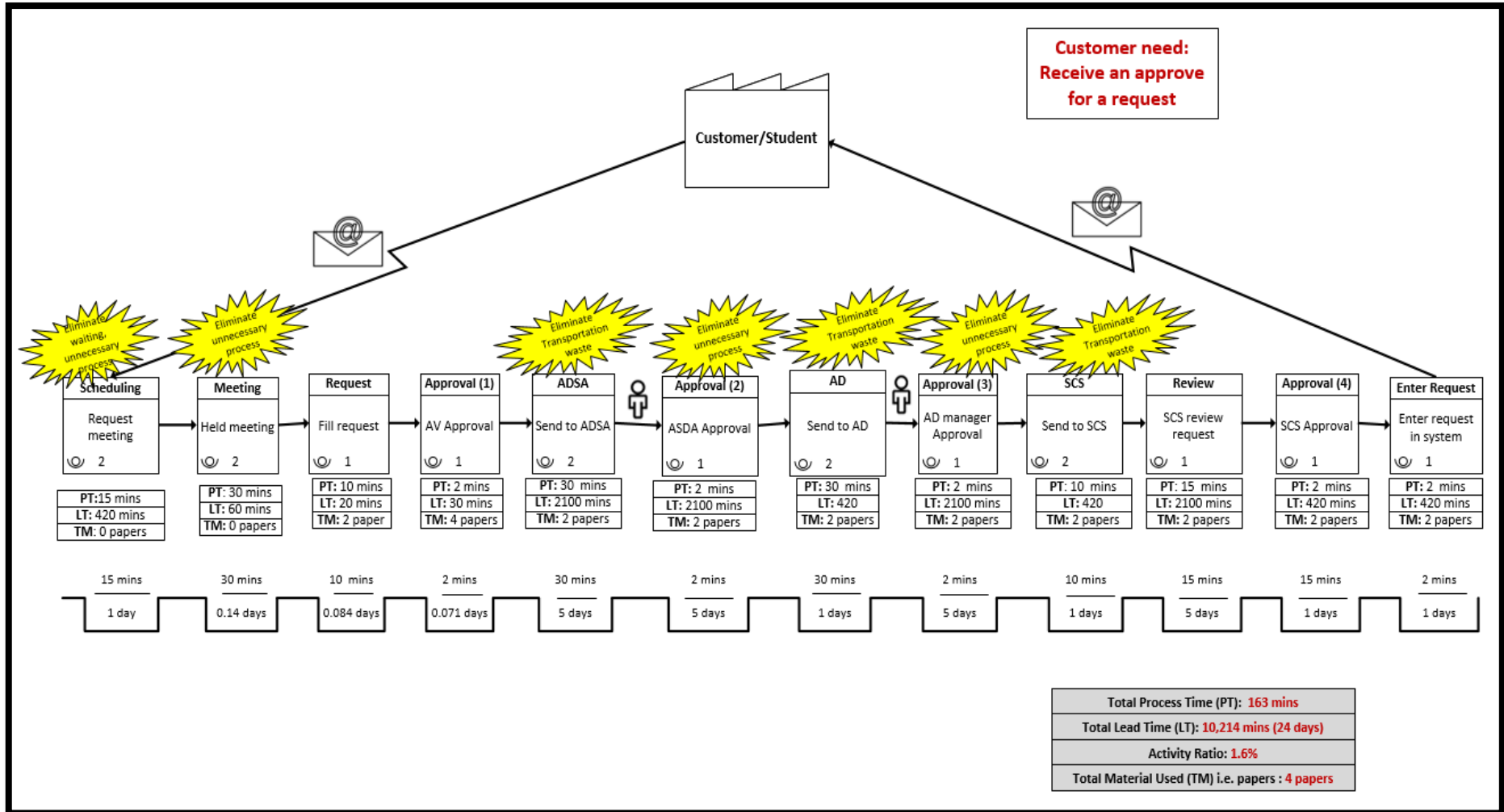
Figure 8: Future state VSM of SER with Kaizen events

4.2.4. Step 4: Planning SER

In this step, an action plan was managed in order to achieve the desired future state or the ideal state shown in the results chapter. The action plan for this case is as follows:

- The scholarship section searches for solution that can eliminate the waste highlighted by kaizen events.

- Set a meeting with SIS team to discuss the possibility of developing a new system to transfer the process to an online system. Since transferring the system to online system instead of paper work will accomplish the goal of eliminating wastes.

- Develop a system requirement document.

- Agree on a timeline for creating the new online system.

- The SIS team creates the new online system.

- The scholarship team test the new online system.

- If the system work as required. Launch the new system.

- Set a meeting with all academic advisors to learn about the new online system.

- Agree on a timeline to start and end the process.

- Announce to students about the new online system

- Check the operation of the new online system.

- Monitor the new online system by collecting comments, issues or defects that faced the users (AV, students, SS) while using the new system.

4.3.   Value steam mapping of external transfer (EXTR) process

The second process studied in this project is the external transfer process. Similar to the scholarship exemption request process, the EXTR process should go through the same steps which are preparation, currant state, future state and planning.

4.3.1. Step1: Preparation

In the preparation step for the EXTR will discuss only the process mapping and the process description since this process needs extensive study and more time for collecting data, which can be the door for further studies in future.

4.3.1.1. Process mapping:

The visual map of the EXTR is shown below in figure 9:
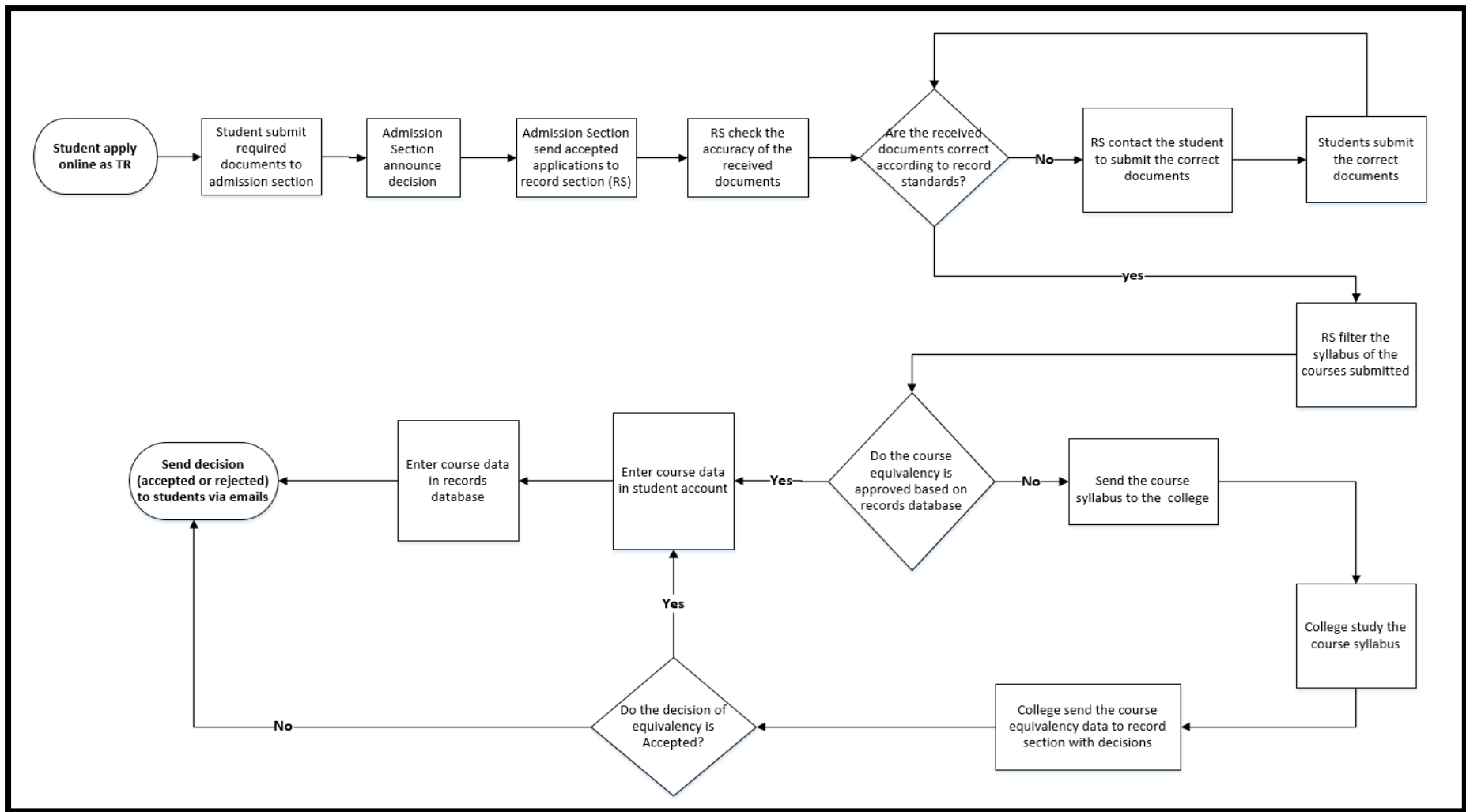
Figure 9: Process flowchart of EXTR process

The process starts by the student. The student apply online as a transfer student (TR) and then submit the requirement documents to the admission section. The required documents are mainly the transcript and the syllabus of the pervious university the student studied in. Next the admission section announce the admission decision wither the student is accepted as transfer student to QU or rejected. The admission section send the accepted application to the record section (RS) in order to evaluate the syllabus of the courses the student studied in the previous university and check if the courses is equivalent to courses taught at QU so that it will be transferred as completed credit hours. The record section (RS) check the accuracy of the received documents according to the record's standards. If the received documents are not as required, the RS contact the student to submit the required data. If the received documents contains all required data, the RS filter the courses syllabus and check if the course syllabus equivalency is from the approved historical database, if yes then the RS enter the course details in the student's account, and send email notification of the equivalency decision to the student. If no, the RS send the syllabus to the college (each course syllabus is send to the college that teach similar courses). The college study and evaluate the syllabus and then send decision of the study to the RS. If the equivalency decision was to accept the course to be equivalent to similar course taught in QU then the RS add the course data to the RS approved courses database, enter course data in the student account, and send email notification of the equivalency decision to the student. However, if the decision was to rejected, then RS send email to the student with the decision.

4.3.2. Step 2: Current state VSM-EXTR:

The process selected is the longest path of the EXTR process described above. The longest path occurs when the documents received are incorrect and when the course data are not recorded in the RS database.

4.3.2.1.Symbols:

The symbols is same as the one used in the SER process

4.3.2.2.Assumptions:

Assumptions are also the same as the SER process.

4.3.2.3.Current state:

Figure 10 show the value stream mapping of the current state of EXTR process. The process contains 12 steps illustrated below:

- Submit (1): The student should submit the required documents for transferred students. This step need two persons, which are the student and the employee who receives the document. It takes 15 minutes as a process time and 1 day of lead-time. Almost 15 papers in average.

- ADM decision: The admission section announce decisions to all TR students via emails and in the student account. The process time takes 10mins and the lead-time takes almost 1 day. It needs only one employee to execute the announcement. No material needed.

- Send (1): documents of the accepted students send from the ADM and to the record section (RS). 15mins needed as PT and 1 day as LT. only 1 employee needed and 15 papers in average used which is considered as materials used.

- RS check: the record section then check the documents received and compare it to their standards. The process takes 60 mins PT and 5 days LT. Number of papers is 15 and 3 employees.

- RS contact: the record section contacts the student via emails or by phone calls to re-submit the correct documents according to RS standards. 10 mins used as PT and 1 day as LT. No papers needed and 1 employees perform this task.

- Submit (2): the student re-submit the correct documents to RS. It takes 10mins PT and 1day LT. It requires two persons, the student and one employee. Number of material is 15 papers.

- Filter: the RS filter the documents (doc.) by college. I.e. each course syllabus sorted based on college that teach the course. Process takes 15mins PT and 1 day LT, 15 papers TM and 1 employees.

- Send (2): the office boy sends doc. to the concerned college from RS. PT is 15mins, LT is 1 day, number of TM 15, and 1 employees needed.

- Evaluate: the college study and evaluate the syllabus of courses and then decide if it equivalent to similar courses or not. Process takes 60mins PT and 5 days LT, 15 papers TM and 1 employees.

- Send (3): the office boy sends doc. to the RS again. PT is 15mins, LT is 1 day, number of TM 15, and 1 employees needed.

- Enter data (1): the RS enter the course data in the database of RS. Process needs 10mins PT, 1 day LT, no material used, ad 1 employees required.

- Enter data (2): the RS enter the course data in the student account. Process needs 10mins PT, 1 day LT, no material used, ad 1 employees required.

- Email: an email notification send to the students with decision.
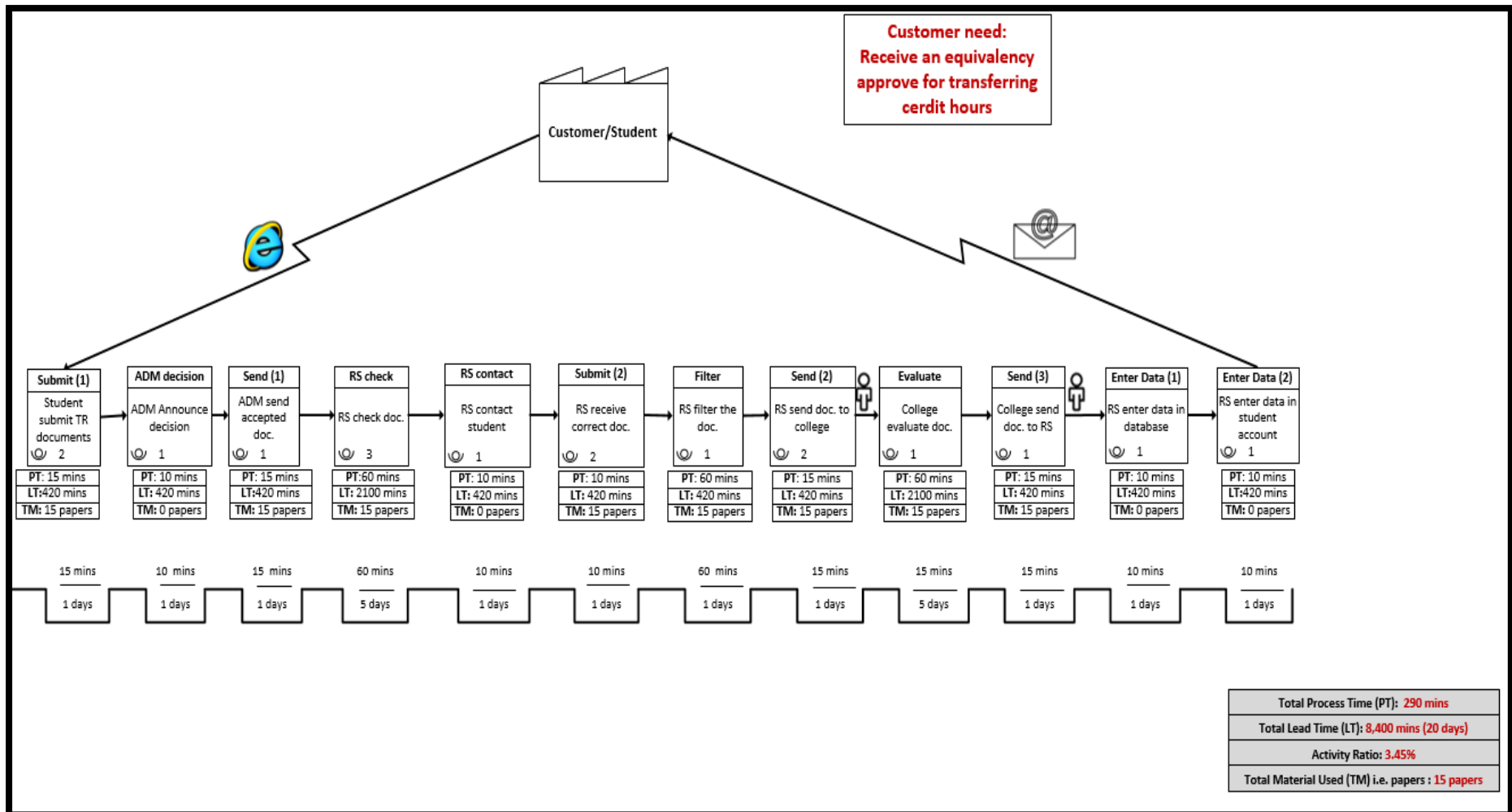
Figure 10: Current VSM of EXTR process

4.3.3. Step 3: Future state VSM-EXTR

Figure 11 shows the future state of the EXTR process represented by kaizen events, which highlights the wastes, need to be eliminated in order to have lean current map. Waste that need to be eliminated occurs in several steps, which are: RS check, RS contacts and submit 2, send 2, evaluate, and send 3.
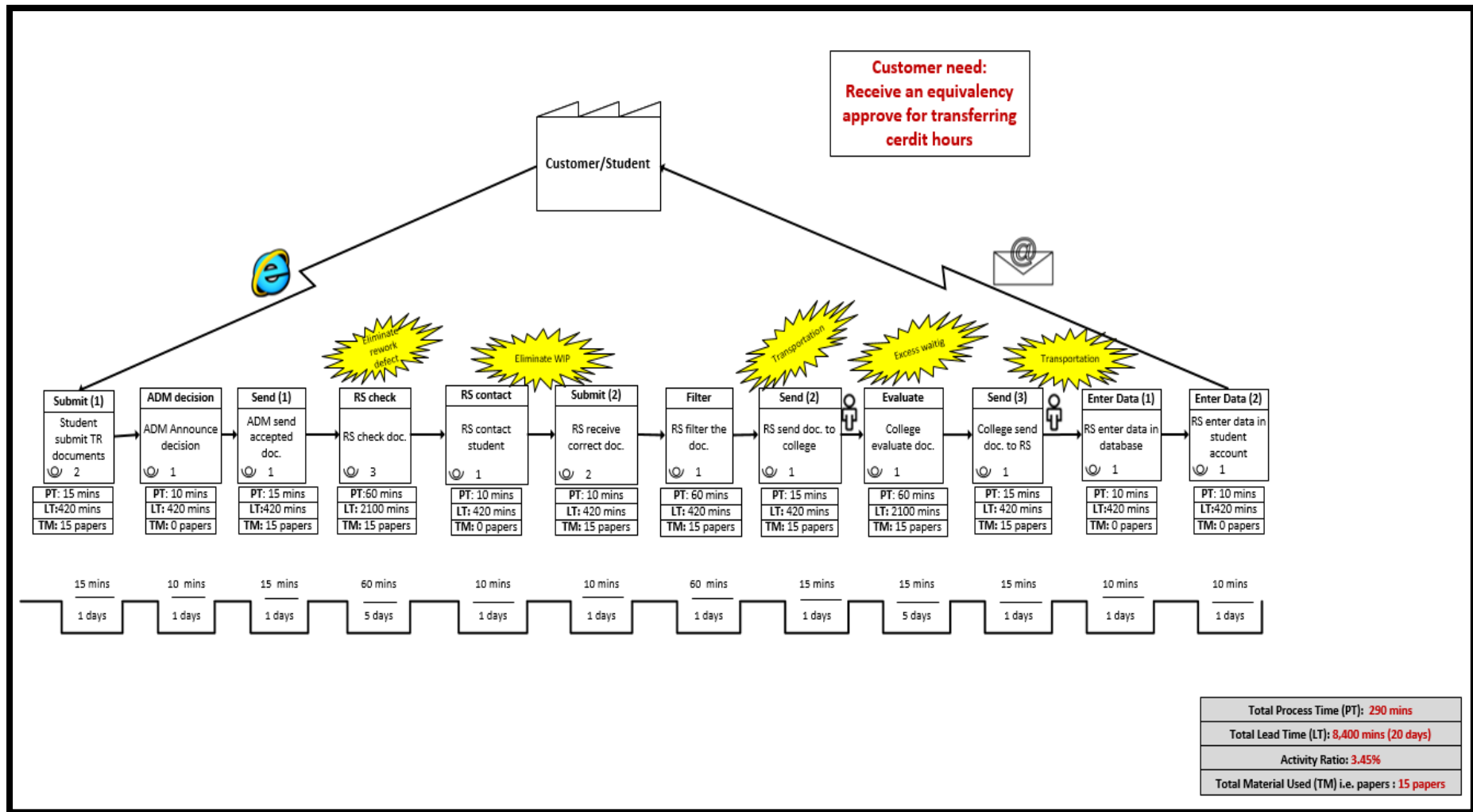
Figure 11: Future state of VSM of EXTR with Kaizen events

CHAPTER 5: RESULTS AND ANALYSIS

5.1. Results:

The processes of SER and EXTR shows that there is number of steps, which are non-added value, thus they are considered as waste in the process. The action plan steps listed in the chapter 4 for the SER process were implemented and a new online system was developed with all requirements needed to reach the objective of this project. The system details and the project requirements file are attached in the appendix B and C. However, for the EXTR process requires an action plan to reach the goal of eliminating wastes. In this project, the action plan step was not accomplished for the EXTR due to the time limitation and it is suggested to be future work. Consequently, there is no documented or tangible results for the EXTR process.

5.1.1. SER process

Wastes of the SER process are either unnecessary waiting, unnecessary transport, or unnecessary extra processing as highlighted in figure 8 by kaizen events.

- Unnecessary waiting:

There are excess waiting in scheduling step. The scheduling step requires time to check the availability time of the student and the academic advisor.

- Unnecessary extra processing:

The extra process are in the meeting, approval 2 and approval 3. The meeting steps takes time since the AV discuss the student request with the student, and explain the request form cells that must be filled by the student. In addition, approval 2 and 3 are considered extra steps since the ADSA and the AD are higher management level and usually do not study the cases.

- Unnecessary transport:

The transportation of papers from building to another building is considered waste that should be eliminated. This type of waste appears in the ADSA, AD, and SCS steps. In these steps, an office boy takes the approved requests from and to different buildings.

After implementing, the steps in the action plan shown in figure 12 represent the new VSM, which will be called the ideal VSM.
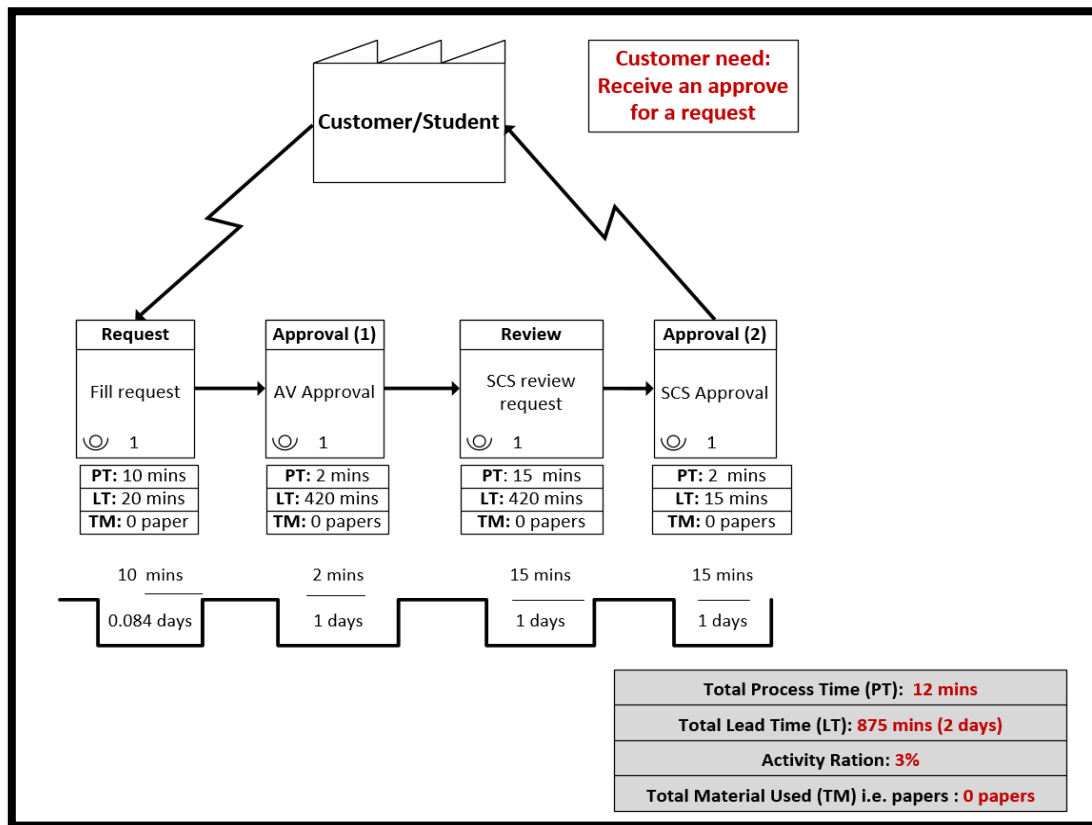
Figure 12: Future (Ideal) VSM-SER process

The table below shows the percentage of improvement when comparing the current state to the future state value stream maps:

Table 4: Percentage of improvement of SER process

Metric	Current State	Future State	% improvement
Process Time (mins)	163	37	**77%**
Lead Time (mins)	10,214	875	**91%**
Material Used (papers)	4	0	**100%**
Activity Ratio (Service Efficiency)	1.6%	4%	**2.4%**

The percentage of improvement calculated using the following formula for first three metrics:

% improvement= $\left| \frac{(current\ state)-(future\ state)}{(current\ state)} \right| * 100$

The percentage of improvement of the activity ratio increased by 2.4%

The calculation of activity ratio (service efficiency) done by the below equation:

Activity ratio (service efficiency) $= \frac{Total\ process\ time}{Total\ Lead\ time} * 100$

5.1.2. EXTR process:

Rework defects, work in process (WIP), transportation, and waiting are the most observed wastes shown in the EXTR process as illustrated in figure 11.

- Eliminate rework defects:

In the RS check step, the RS check the documents that were submitted to the admission section, which considered rework task since the ADM section already checked the documents.

- Eliminate WIP

The RS contacts and the submit 2 steps contains tasks that takes long time. Its

considered to be work in process waste since its an incomplete task that supposed to be finished in step 1 (submit1).

- Transportation:

Transportation occurs in send 2 and send3 steps. The transportation method is traditional way done be sending an office boy from one building to another which takes long time.

- Excess waiting:

The evaluation step take long time and effort and its considered the main cause of delay of the whole process.

5.2. Analysis:

The results analysis is for the SER process only since the future state of EXTR process not implemented yet. Results of SER process show significant improvement in the total process time and total lead-time when comparing the current state and the future state. This improvement calculated after implementing the action plan illustrated in the implementation chapter. The new online system eliminates all waste indicated by kaizen bursts in the future state VSM. The process time improvement shows that 77% is the percentage of improvement in the future VSM, in addition 91% improvement in the total lead-time. The percentage improvement is higher in the lead-time since processes that were eliminated were having big lead-time compared to their process time. The number of papers, which represents the materials used in the process, eliminated since in the new online system there is no need for papers anymore thus the percentage improved is 100%.

Although the process time and the lead-time is improved, the activity ratio (service efficiency) improvement did not increase a lot, which gives us an indication that the difference between the process time and lead time is high in both states

(current and future). The most important intangible result that was benefited from the new lean process is increasing the customer (student) satisfaction as it was noticed by the student's reaction regarding simplicity of the application method and the speed of response. After discussing these issues with the concerned parties, which are the students and the academic advisors, it occurs that most of the lead-time is due to huge workload, poor time management, and lack of communication.

- Workload:

The exemption process timeline usually ends in the add and drop period in Qatar university where academic advisors face huge amount of work in that period. The add and drop period is the period where students can register or drop courses in a term. Most of the fresh students and current QU students visit their academic advisors in the add and drop period. However, this period is important for the exemption process since after this period dropping any course will cause penalty in the student's account. Thus, the approval for the exemption process should be before or maximum in the add and drop period.

- Poor time management:

The time management skill is very important to prioritize tasks and complete them according to the timeline. Some of the academic advisors do not have this skill and that were noticed when receiving the exemption approvals. Some colleges perform the approvals within 2 mins and others can take one day.

- Luck of communication:

Setting the timeline for applying for an exemption is a task done by the scholarship section. Unfortunately, this decision have been managed by the section without communicating or agreement with the academic advisors to set timeline suitable for both sides (AV and SS).

CHAPTER 6: CONCLUSION AND FUTURE WORK

This project demonstrated that lean thinking principles have achieve high improvement of processes in service industry. Applying lean methods was challenging idea since it is used to be implemented only in the manufacturing industry; however, recently it became a common method to improve service industry too. It is concluded from literature that lean thinking in the service sector do not have specific tools or procedure, it is a mixture of tools and practices that can be applied referring to situation of the concerned process to be improved. Despite the fact that there is no specific tools, its best practices, extracted from manufacturing, when applied to services shows large financial results, improvement in the employee's behavior, and increase customer satisfaction. Thus, in this project the lean thinking principles was implemented in one of the scholarship section processes at Qatar University which is the scholarship exemption request process. The results show a great improvement in the percentage of process time, lead-time, material used and student satisfaction. It also shows a good improvement in the activity ratio of the process. Another benefit of lean thinking principles is that it is very simple method that can be taught to employees from different academic backgrounds. In addition, it can be applied in any process scale.

The lean method was implemented to another process under the SA sector, which is the external transfer process. However, results were not calculated since the proposed improved method (Future VSM) was not implemented date due time limitation. For further improvement of the process of SER it is recommended to gather a quality information such as the percentage of completed and accurate data. In addition, performing root cause analysis can improve the current process flow; also, it can straighten the brainstorming technique of searching for causes of problems and

their solutions. This research project can be the spark of starting a VSM analysis in the whole sector of SA. The future state of VSM-SER is now the current state since it is already implemented in the scholarship service. Thus, it is strongly recommended to continuously check the current VSM-SER for further improvement, and ensure that service outputs accomplish the section objectives.

The EXTR process have many waste time and activities that were identified via the kaizen events, unfortunately they were eliminated by implementing an action plan to reach an ideal VSM. Consequently, for future work, the following steps should be taken into consideration in order to reach similar improved results as the SER process:

- Study in deep the processes performed by the record section

- Check if there is similar processes performed in the RS and were improved by simple solution

- Target the longest path of the process of EXTR.

- Form a team to work extensively on the process

- Gather as much as possible of information regarding the process.

- Take necessary approvals from process owners to start plan for improvement

- Set a meeting with all stakeholders of the process.

- Agree with the team about an action plan to be implemented in order to achieve the target or eliminating all wastes highlighted by kaizen bursts.

- Schedule a timeline for planning and executing the improvement

- Test the results in test environment before transferring to the production environment.

- Document all actions taken to achieve the results

- Plan for continuous improvement

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Appendix (A): Manual SER exemption form

Figure 13: Section A of manual SER exemption form

Admission Department
Scholarship Section

Section B: Advisor Evaluation

Request is : ☐ Approved   ☐ Rejected

☐   Graduate Student (Last year)

☐   14 or 13 Credit hours with Embedded Labs

☐   Registration restriction

☐   Others:

Advisor Name: Advisor Signature:
                                       Date: dd/mm/yy

Section C: Assistant Dean of Student Affairs (ADSA) Evaluation

Request is : ☐ Approved   ☐ Rejected

Justification if any:

ADSA Name: ADSA Signature:
                                       Date: dd/mm/yy

Section A to be filled by the student
Section B to be filled by the student's academic advisor
Section C to be filled by the ADSA of the student's college

Figure 14: Section B, C of manual SER exemption form

Appendix (B): User Guide of the new developed SER process
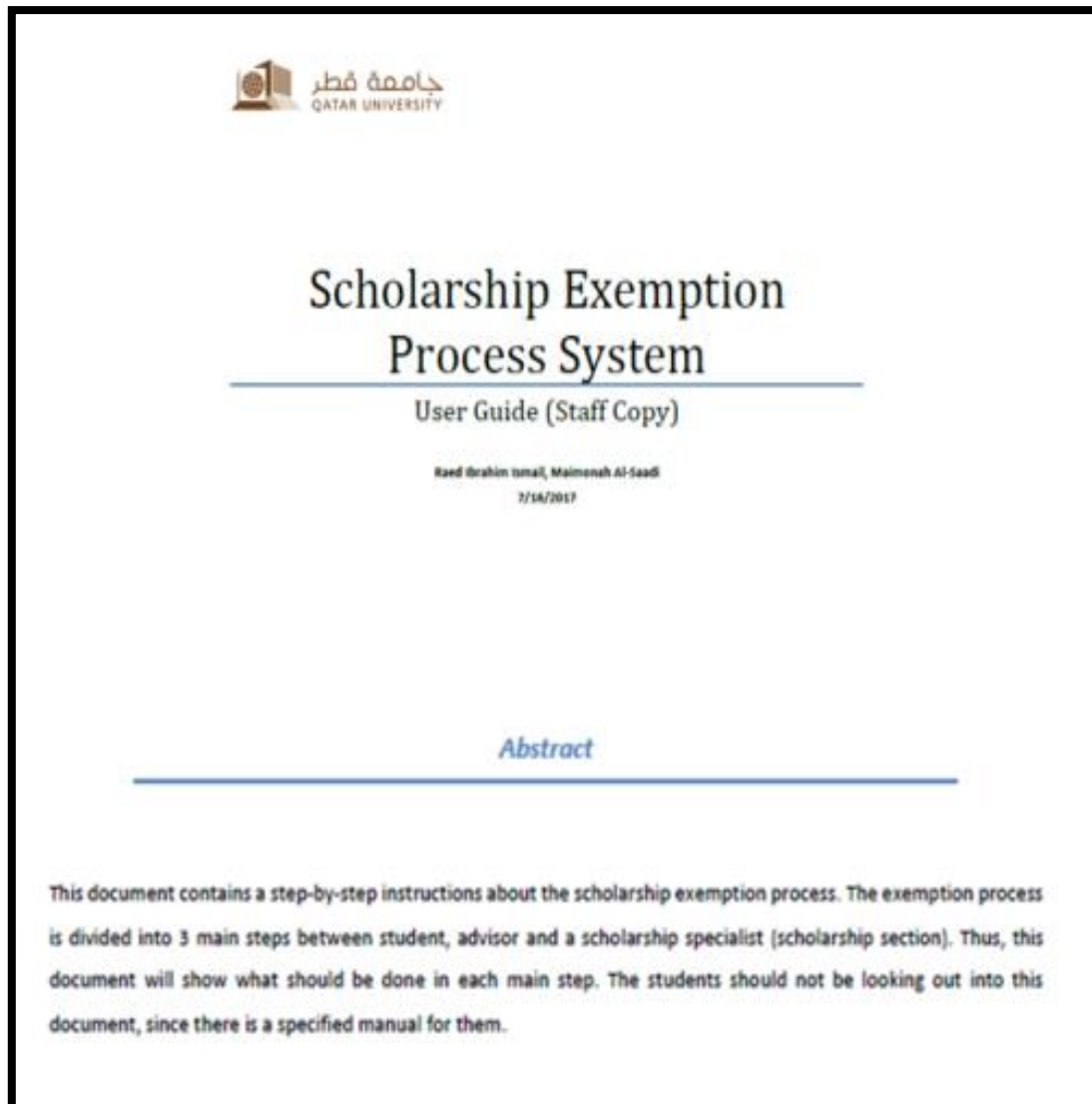
Figure 15:Cover page of user guide of new developed SER process

Figure 16: Scholarship section of user guide of new developed SER process(part 1)

The below table indicate two group of scholarships. Where Group A (competitive scholarships) shows scholarships which their students must follow the minimum Hours (15 hours /term) condition to maintain their scholarship. However, Group B (non-competitive scholarships) are not committed to this condition.

Group A	Group B
Islamic and other counties	Children of QU staff
All Embassies Except GCC	GCC embassies
H. H. Amiri excellence	Qatari Parent
Outstanding Performance	Qatari Husband
Honors Program	Amiri Diwan

1.3. After the students enter their requests and the assigned advisor added his/her action to their requests, the scholarship section can follow-up all application with their status and advisors actions and comments.

Note this form is big wide and can't show in one window, user must scroll to the right and left to see all data

1.3.1. Left Side: Student information and comments

1.3.2. Right side: Advisor & scholarship section comments and action

Figure 17: Scholarship section of user guide of new developed SER process(part 2)

1.4. Scholarship section can approve or reject the requests in form SWASCEX after it passes through the advisor step since the scholarship section can't add the final decision if the advisor didn't add his/her action. The decision that appears to student is only the scholarship section decision which is the final decision:

1.5. After the application approved by scholarship section, the application status also must be changed to approved so student and advisor know that, also the system will insert the exception into the form SWASEXP, so that the student will not get a warning in the specified term.

Figure 18: Scholarship section of user guide of new developed SER process (part 3)

Figure 19: Student section of user guide of new developed SER process (part 1)

Figure 20: Student section of user guide of new developed SER process (part 2)

2.4. Students can check their application status by returning to the scholarship submenus and choose the link:

Check Exception application Status

Personal Information	Student Registrations and Records

Search [   ] [Go]

Review Scholarship Status
Apply For Scholarship
Apply for Exception
Check Exception Application Status

They must choose the term that they applied for:

⬤ This term is not available for Registration process

Select a Term: Spring 2017
Fall 2016 (View only)
Spring 2016 (View only)
Fall 2015
Summer 2015 (View only)
Spring 2015
Fall 2014 (View only)
Summer 2014 (View only)
Spring 2014 (View only)
Fall 2012

[Submit]
RELEASE: 8.4

Any comment or request asked by the scholarship section will be shown in the student page under the administrator notes cell as shown below.

200665291 Maimonah A. Alsadi
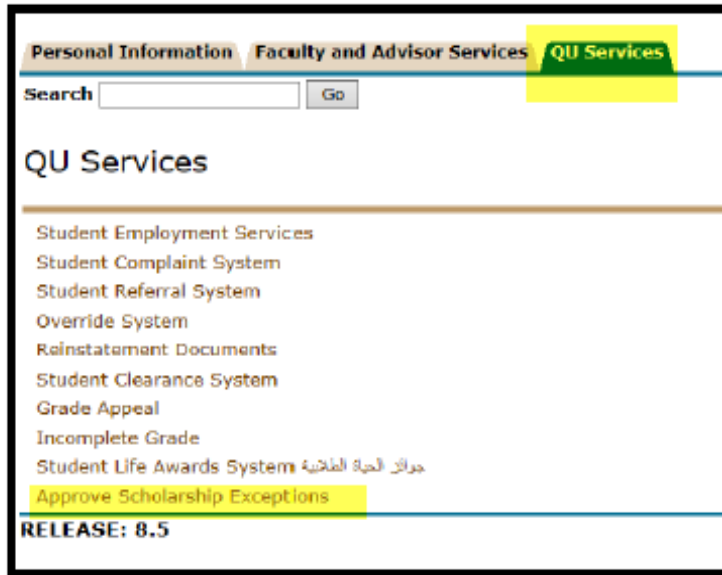Oct 13, 2017 02:29 pm

Previous Request's for student in term: Fall 2017

Request Reason	Request Decision	Request date	Student Notes	Administrator Notes	
Expect to Graduate: (last Year) ممنوع التخرج ، أخر سنة	New	09-OCT-17		Please Bring the Required Documents يجب احضار ما يثبت	

7

Figure 21: Student section of user guide of new developed SER process(part 3)

3. Advisor

3.1. Advisors can access new SSB page to approve scholarship exception from Menu QU services and then click on

Approve Scholarship Exception

Personal Information   **Faculty and Advisor Services**   **QU Services**

Search [ ] Go

QU Services

Student Employment Services
Student Complaint System
Student Referral System
Override System
Reinstatement Documents
Student Clearance System
Grade Appeal
Incomplete Grade
جوائز الحياة الطلابية Student Life Awards System
Approve Scholarship Exceptions

RELEASE: 8.5

Advisor must study the student request and record and then add his/her comment and action. The advisor action is either Processed or Not-applied or Transfer.

- Processed: means the advisor studied the request and it is approved
- Not Applied: means the advisor studied the request and it is not approved.
- Transferred: means the request reason is not academic and it is forwarded to the scholarship section to study their request and give their final decision accordingly.

Figure 22: Advisor section of user guide of new developed SER process (part 1)

Appendix (C): Hanover plan of the new developed SER process

Admission Department/Scholarship Section

ITS PMO Handover Plan to Operations & Sign-off for

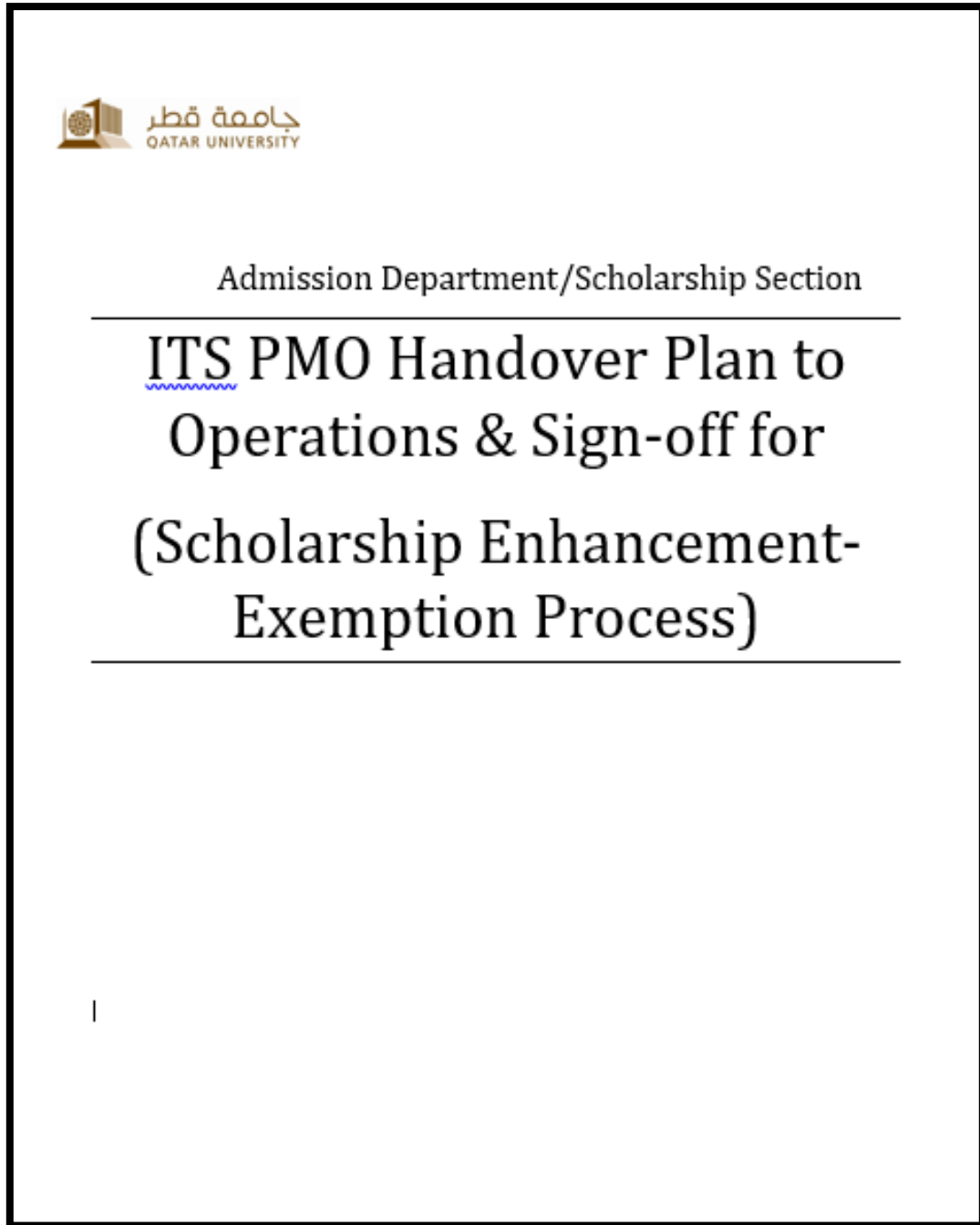# (Scholarship Enhancement-Exemption Process)

Figure 23: Cover page of handover plan of the new developed SER process

1. Introduction & Background:

Developed scholarship screens which are SCHE Validation Forms, Scholarship exemption term control (SWASCXT), Applied for scholarship exemption (SWASCEX) SCHE Management form. Approve scholarship exemption for advisors in SSB. For students. Develop two forms, which are apply for scholarship exemption and check the exemption status. UPDATE SCHE Self Service Pages, Accessing the Self Service Page for Students.

2. Roles & Responsibilities

Identify the roles and responsibilities associated with implementing the handover plan as well as the skill set needed to perform those functions.

Roles	Name	Responsibilities
Business Owner	Ms. Maimonah Al-Saadi	Control the project and ensure reliability of results.
Operations Technical Lead	**Scholarship Specialists** 1-Mr Mohamad Abdullah 2- Ms. Norah Al-Thani 3- Ms. Amani Nuweiser **Center of academic advising** 4- Mrs. Chithira Johnson 5- Mr. Rizwan Gitay	Operate the project, update and report any inconvenient results

3. Training

Type of training provided: Testing the system since it is already the same system that used to be worked on.

Figure 24: Page 2 of the handover plan of the new developed SER process

4. Documentation

Confirm all required project technical documentations related to the system operation are available? i.e. Architecture document, Technical Training manuals, etc

List of documentation available on EPM related to the system
1. Training session (on Banner Test Environment)
2. Word User guide manual
3.

Project Handover to Operations Checklist

Checklist By the Project Manager and Operations Team Technical Lead	
Item	**Comments**
☐ Did the project manager walk through the Handover Plan with clients/end-users and technical support Staff before executing it?	
☐ Did key stakeholders sign off on the Handover Plan?	
☐ Have stakeholders been notified well in advance of the handover date?	
☐ Have business and technical support staff been identified, assigned and adequately trained to maintain the new system/product?	
☐ Have arrangements been made for knowledge transfer from the vendor to in-house staff?	
☐ Are all product documentations completed?	
☐ Does EPM have all the development materials/documentation available to the maintenance team?	
☐ Have you introduced key members of the maintenance/operational team to key stakeholders in Advance of the Handover?	
☐ Have you purchased a maintenance agreement with outside vendors if in-house support is not available or capable of maintaining the product?	

Figure 25: Page 3 of the handover plan of the new developed SER process

3. Handover Acceptance

(Please attach the Project Handover to Operations Checklist.)

Project Name	Scholarship Enhancement Project
Department / Section Name	Admission Department\Scholarship Section
Operations Team	Scholarship Section Team Mrs Maimonah Al-Saadi Mr Mohammad Abdullah Mrs Nourah Al-Thani Ms Amani Nuweiser Acadmic advisors
Technical Lead	Mr. Raed Ibrahim Ismail (System Analyst-Student Affairs)
Type of Implementation	Direct conversion

Approved By	Name	Signature	Date
Project Manager :	Maimonah Al-Saadi		
Department Manager:	████████		
Operations Team Technical Lead			
ITS CIO:			
ITS PMO Manager:			

Figure 26: Page 4 of the handover plan of the new developed SER process

Appendix (D): Section level structure of the SA sector
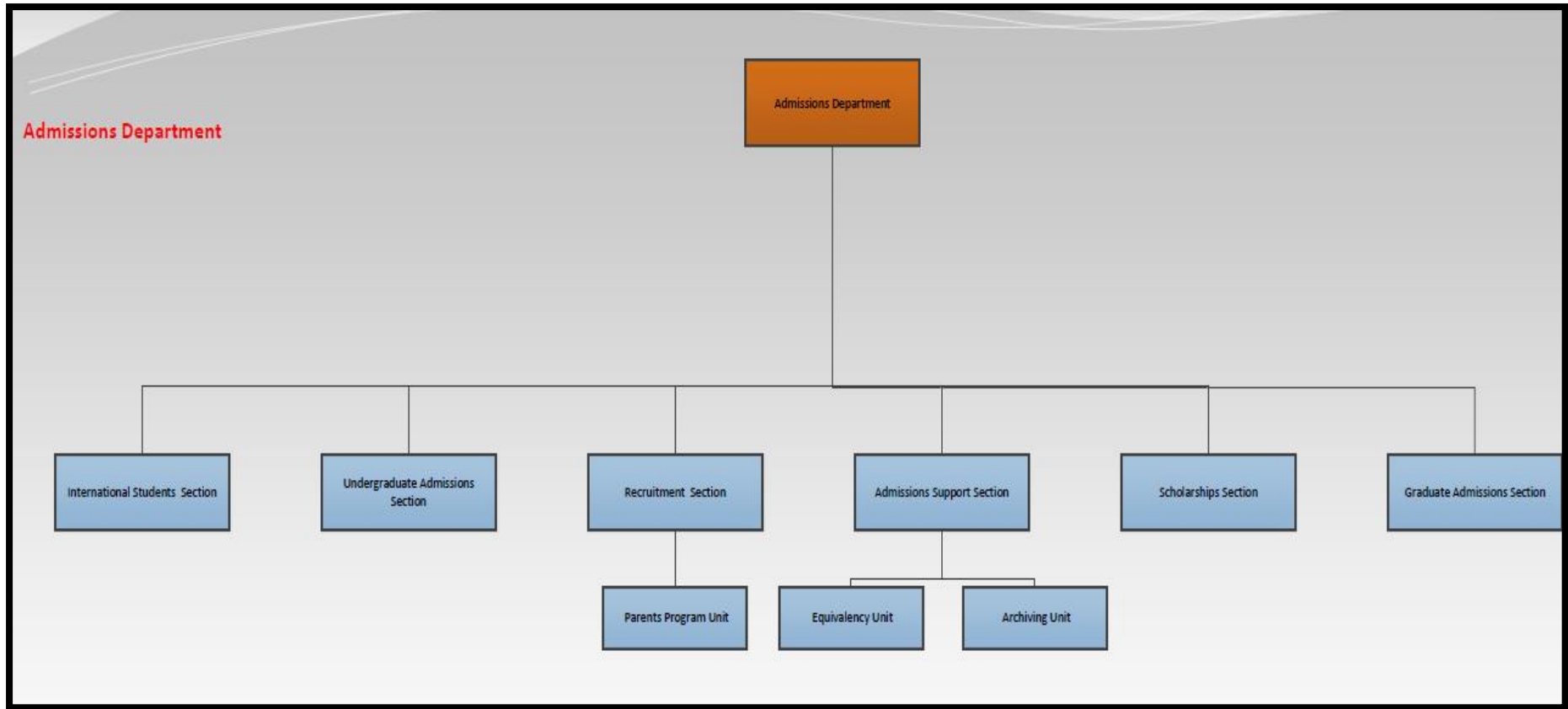
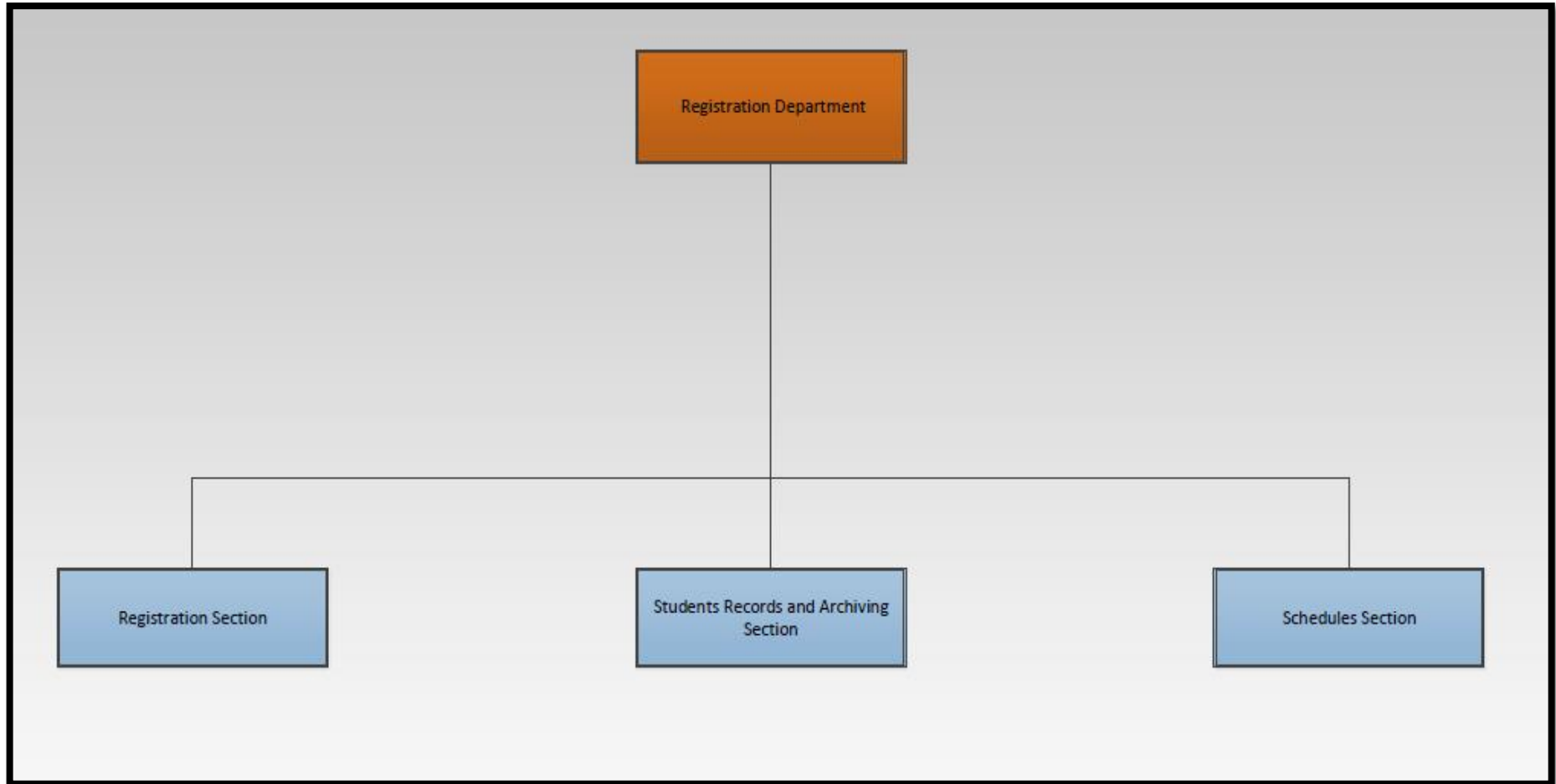*Figure 27: Admission department structure*
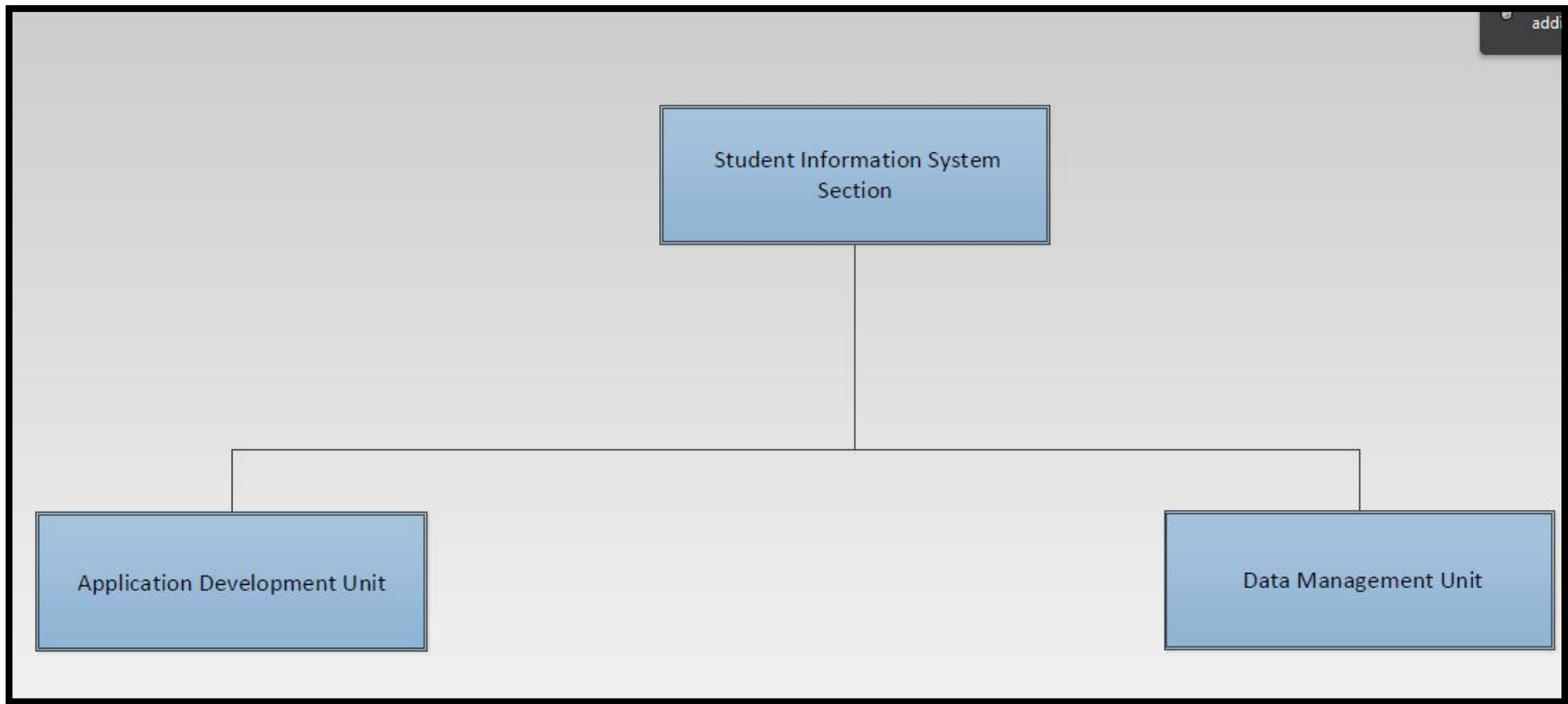
Figure 28: Registration department structure

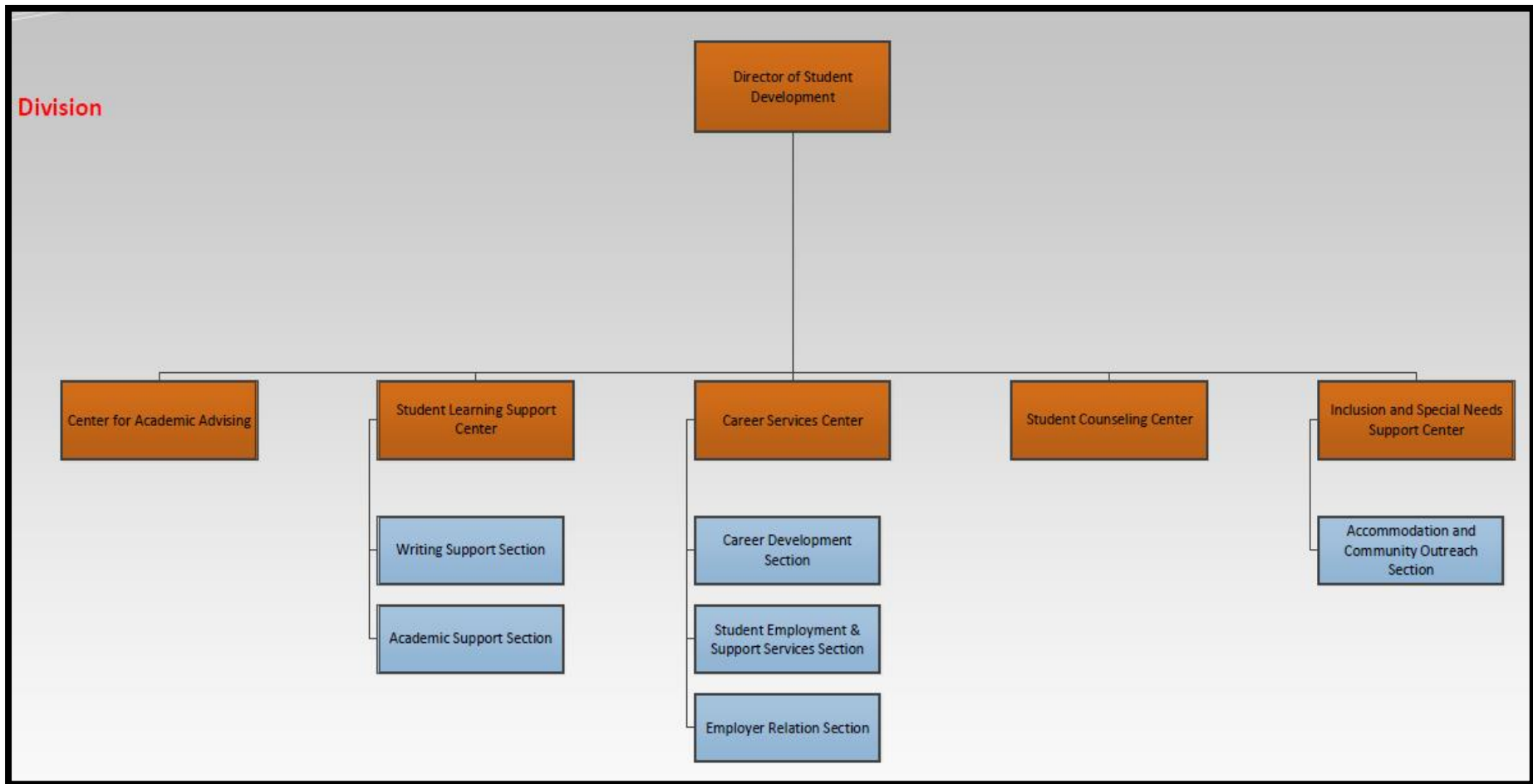*Figure 29: Information system section structure*

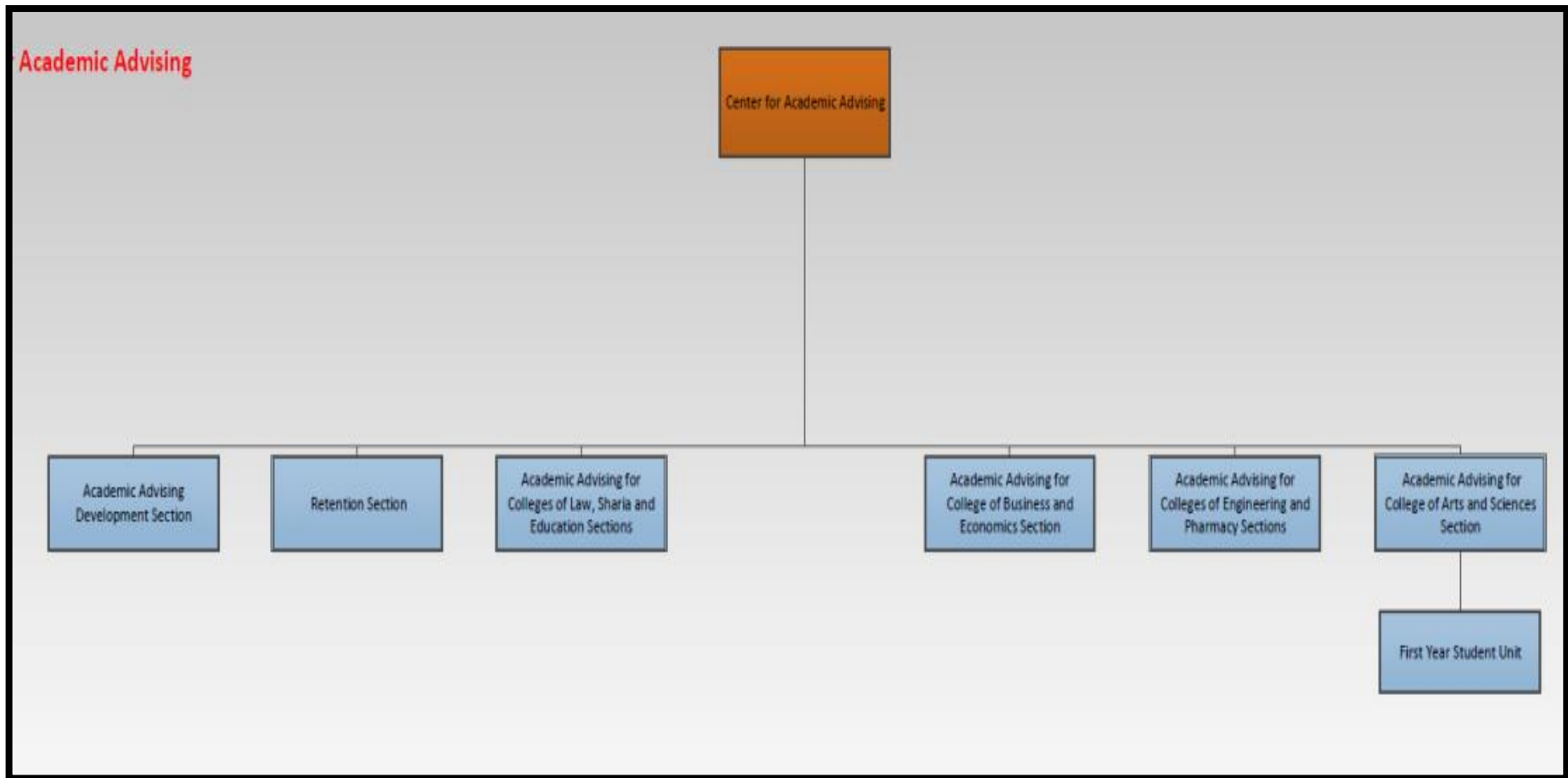*Figure 30: Student development department structure*

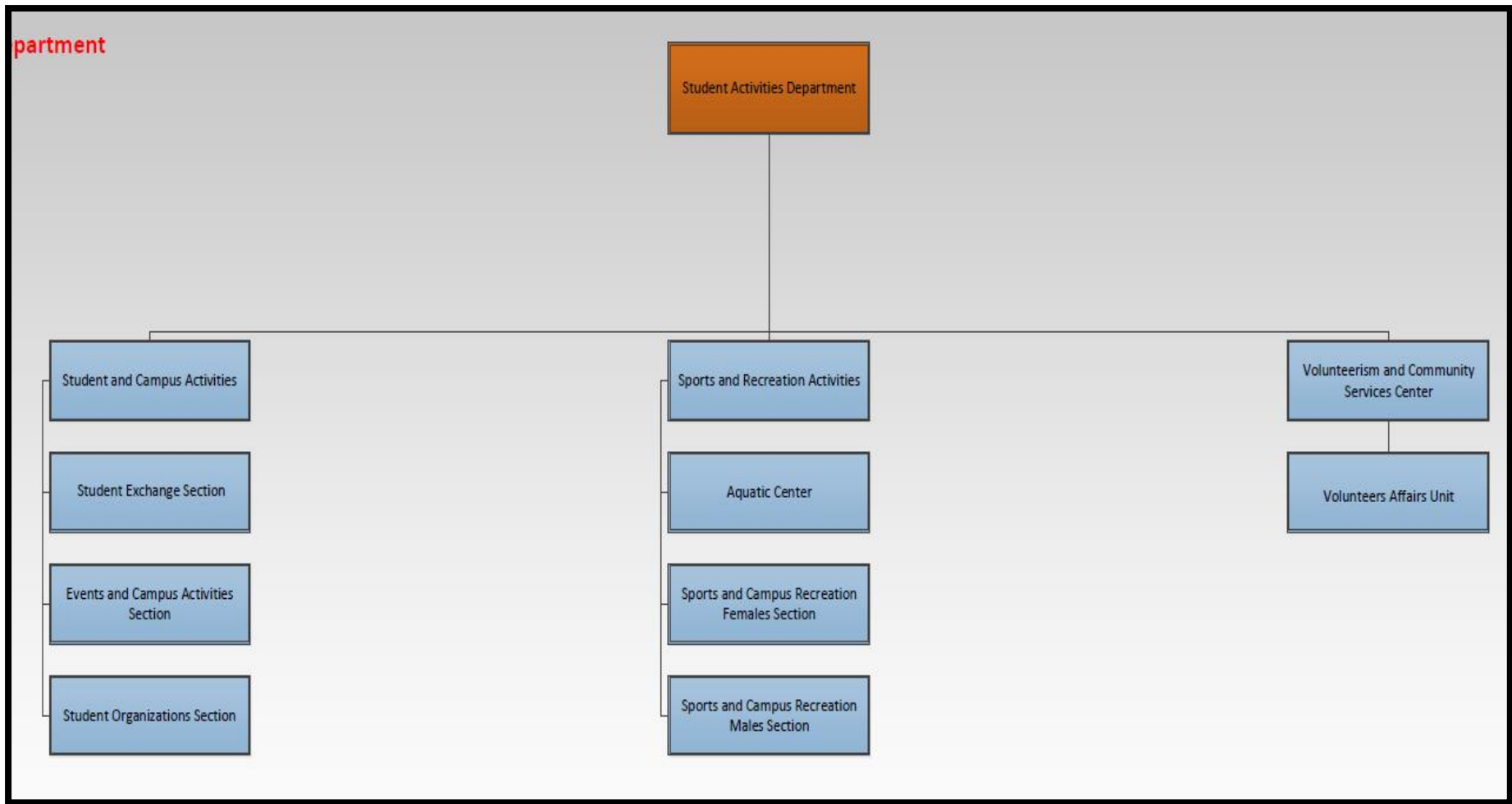*Figure 31: Academic advising center structure*
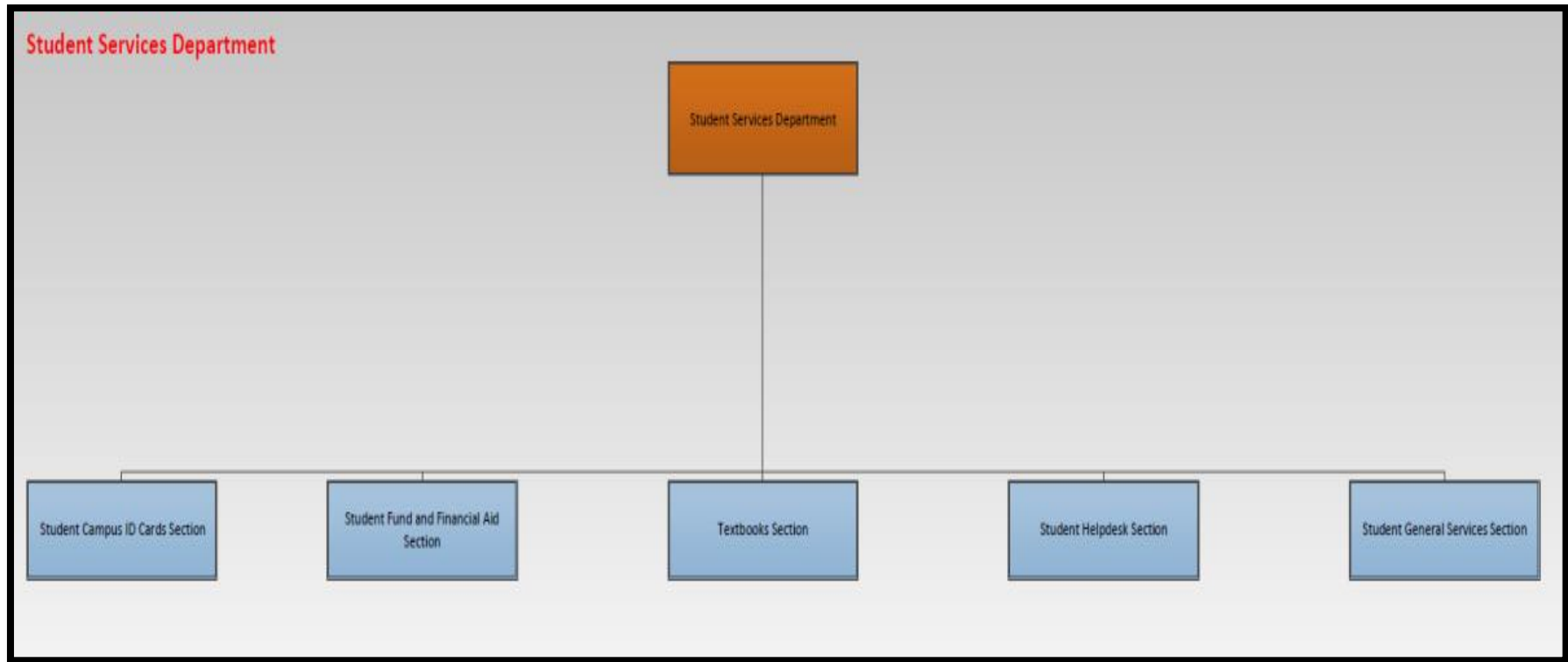
Figure 32: student activities department structure

Figure 33: Student services department structure