

Arab American University Faculty of Graduate Studies

Improving the Services at Beitunia Municipality Using Lean Six Sigma Methodology

By Ali Kamel Salhia

Supervisor Dr. Ashraf Al-Mimi

This thesis was submitted in partial fulfillment of the requirements for the master's degree in

Quality Management

Sep-2018

©Arab American University –2018. All rights reserved.

Improving the Services at Beitunia Municipality

Using Lean Six Sigma Methodology

By Ali Kamel Salhia

This thesis was defended successfully on ...2018-09-29....And approved by:

Committee members	Signature
1	
2	
3	

Declaration

I declare that I have developed and written this Master Thesis completely, and it has been generated by me as a result of my own original thesis, and has not been submitted elsewhere for any other degree or qualification. Moreover, I have not used sources or means without declaring them in the text, otherwise they are referenced.

Name: Ali Kamel Salhia

Signature:

Date:

Abstract:

This study contributes uniquely by elucidating the synergistic impact of implementing Lean Six Sigma Methodology in the public sector. It examined the use of the Lean Six Sigma methodology to help local governments become more efficient and simultaneously increase the quality of their services in order to increase citizen's satisfaction, eliminate waste, and reduce variation and cost.

The importance of this study lies in improving a core process at Beitunia Municipality, which includes some non-value-added steps that cause the process to take a long time to be completed. This results in receiving a large number of complaints from the locals. Moreover, no previous or similar studies have been identified in Palestine which confirms that there is a gap in both theory and practice.

The main objective is to improve the process of Issuing Building Permits at Beitunia Municipality. To achieve this objective, the improvement team has applied a well-known international improvement methodology named "DMAIC" which is a method that starts with identifying and defining the problems, then measures the current performance of the process, then analyses the data collected in the previous section, then implement the improvement and analyses the findings, and finally control and maintain the achieved improvements, In every phase of the DMAIC approach, a different set of tools can be used. In the Define phase, tools such as SIPOC and project charter Moreover, Pareto analysis, Process flow chart, eight wastes and Quick wins are just a few of the useful tools that can be used in the Measure Phase.

In the Analyze phase, useful tools that include cause and effect diagram, hypothesis testing, five whys, and pareto chart. In the Improve phase, PDSA is one of the improvements tools that has been used for testing different improvement theories along with the control, in the Control phase,

the flowchart for the new process is created and used as a standard that should to be followed along with a control chart which is used to monitor the new process in order to maintain the new performance.

In addition to the DMIAC improvement methodology, other research tools have been used such as conducting a survey, in which a questionnaire was prepared to obtain the opinions from the citizens who have applied for building permits from the municipality. Forty-eight questionnaires have been filled and collected, after that they were analyzed using SPSS software. Interviews were also held with municipal employees to obtain information about the current status of the process, define the current problem, and identify the project scope.

At the end of this improvement work, the conclusions reached are as follow: the improvements have resulted in shortening the time needed to issue building permits from 22.5 days to 10 days, and has eliminated the non-value added steps; and tracking the applications in the Building Permit Application system has become easier through breaking down some steps into sub-steps to highlight where exactly the application is waiting to be processed, and adoption of a new procedure that sets a time period for each step in the process.

The improvement team recommended the implementation of Lean Six Sigma methodology in order to improve all the services delivered to the locals in Beitunia City, and to train a selected group of employees at Beitunia Municipality on how to apply the Lean Six Sigma methodology to make improvements everywhere.

This study contributes to the introduction of a methodology that has never been applied in Palestine in the governmental sector. The use of this methodology and the application of its tools and principles lead to the development, improvement, and upgrading of the quality of services provided to citizens in the government sector.

Acknowledgment:

I would like to thank the faculty and the staff of the Department of Graduate Studies at the Arab American University for making my master study a memorable and valuable experience. I am grateful to my thesis supervisor Dr. Ashraf Almimi for his efforts, advice, and close corporation that helped me in achieving the objectives of this research.

Also, I would like to show my appreciation to all the staff of the Municipality of Beitunia for their cooperation and assistance in the improvements project, especially the Mayor of Beitunia Mr.Ribhi Dola and improvement team: Mr.Mohammad Majdoba, Ms.Fidaa Aazem, Mr.Ibrahim Shalby, Mr.Mothnna Nasar, and Ms.Bodor Badran, and I would like to thank Mr. Ehab Badr for his efforts with me in accomplishing this work.

This research is dedicated to my life partner Noor and my daughters Silen and Jood, who have provided continuous support and encouragement throughout my master's program. I also dedicate this research to my parents Kamel and Hanyea, who instilled in me the value of education and a lifelong love of learning.

Table of Contents:

1.	Chapt	er 1: Introduction	1
	1.1	Overview:	1
	1.2	Municipality of Beitunia Profile	3
	1.3	Problem statement:	4
	1.4	Importance of the Research	5
	1.5	Research Question	5
	1.6	Research Objectives	5
	1.7	Research Limitations	6
	1.8	Structure of the Thesis	6
	1.9	The Improvement Team:	7
2.	Chapt	er 2: Literature Review	8
	2.1	Introduction:	8
	2.2	Introduction to Six Sigma:	8
	2.3	Introduction to Lean:	9
	2.4	Introduction to Lean Six Sigma (Definition and Background)	9
	2.5	Lean Six Sigma Toolkits:	10
	2.6	Lean Six Sigma Methodology in the Literature:	12
	2.7	Lean Six Sigma in Public Sector:	13
	2.8	Lean Six Sigma in the Private Sector:	15
	2.9	Process Improvement:	18
	2.10	Building Permits Process:	21
3.	Chapt	er 3: Research Methodology	24
	3.1	Introduction:	24
	3.2	Research Strategy:	.24
	3.3	Research Focus – The Building Permit Process at Beitunia Municipality:	25
	3.4	The DMAIC Approach (Definition, Background, Objectives, and Tools):	25
	3.5	DMAIC Phases Objectives:	.27
	3.6	Uses of the DMAIC Approach	29
	3.7	Data Collection	30
	3.8	Data Analysis	31

	3.9	Framework Methodology	33
4.	Chapt	er 4: Define phase	34
	4.1	Select Strategic Issue:	34
	4.2	Definition of the Problem:	35
	4.3	PCD Technique:	36
	4.4	The Project Charter:	39
	4.5	SIPOC:	41
	4.6	Project Contract:	43
	4.7	Summary and Next Step	45
5.	Chapt	er 5: Measure Phase	46
	5.1	Introduction:	46
	5.2	Flowchart:	46
	5.3	Eight Wastes:	48
	5.4	Quick Wins:	52
	5.5	Value Stream Mapping (VSM):	55
	5.6	Control Chart:	58
	5.7	Voice of Customer (VOC):	60
	5.8	Data Collection:	60
	5.9	Data Analysis:	61
	5.10	Summary and Next Step	79
6.	Chapt	er 6: Analyze Phase	80
	6.1	Introduction:	80
	6.2	Cause and Effect Diagram:	80
	6.3	Five Whys:	82
	6.4	Summary and Next Step	88
7.	Chapt	er 7: Improve Phase	89
	7.1	Introduction:	89
	7.2	Define Possible Solutions:	89
	7.3	Improvement Propositions:	93
	7.4	Implement Improvements:	93
	7.5	Study Results and Measure the Impact of Improvements:	95
	7.6	Value Stream Mapping (VSM):	96

	7.7	Control Chart:	98
	7.8	Document Procedures and Train Employees on the Improved Procedures:	99
	7.9	Employee Training:	99
	7.10	Summary and Next Step:	99
8.	Chapt	er 8: Control Phase	. 100
	8.1	Introduction:	. 100
	8.2	Ensure the Process is Properly Managed and Monitored:	. 100
	8.3	Plan for Monitoring and Controlling the Process:	. 102
	8.4	Apply Improvements to Other Areas:	. 103
	8.5	Summary and Next Step:	. 104
9.	Chapt	er 9: Conclusions, Results, and Recommendations	. 105
	9.1	Conclusions	. 105
	9.2	Results:	. 105
	9.3	Recommendations:	. 107
	9.4	Result contributions:	. 109
	9.5	Future Research Work:	. 109
	9.6	List of References	. 110
A	ppendic	es	. 115
	9.7	Appendix A: Workflow of the old process	. 116
	9.8 improv	Appendix B: A detail report for time taken to complete the processes before the rements	.118
	9.9	Appendix C: Questionnaire about the process of issuing building permits in Municipality of	
	Beitun	ia	. 119
	9.10 needeo	Appendix D: Letter sent to the municipality's council and management which contain the d improvements	. 120
	9.11	Appendix E: Checklist	.121
	9.12	Appendix F: The new brochure which will be put in the stand in the OSS.	. 122
	9.13	Appendix G: The municipality's approval for the improvement	. 123
	9.14 improv	Appendix H: A detailed report for time taken to complete the processes after the rements were implemented	.124
	9.15	Appendix I: The new procedure for issuing the building permits	. 125
	9.16	Appendix J: A screenshot of the new software system.	. 128
	9.17	Appendix K: Announcement.	.130



List of Figures

Figure 3-1 : The DMAIC Cycle	28
Figure 3-2 : Research Framework	33
Figure 4-1 : PCD Technique for Building Permits Process	37
Figure 4-2 : SIPOC for the Issuing of Building Permits Process.	42
Figure 5-1 : Flowchart of Building Permit Process – Current process	47
Figure 5-2 : Eight Wastes Categories	49
Figure 5-3 : Value Stream Mapping for Issuing Building Permits Process.	57
Figure 5-4 : Control Chart for Issuing Building Permits Process.	59
Figure 5-5 : Distribution of Questionnaires' results by Age	62
Figure 5-6 : Distribution of Questionnaires' results by gender	62
Figure 5-7 : How does the employee treat citizens?	63
Figure 5-8 : Are the application requirements clear?	64
Figure 5-9 : Are the Guidelines and Brochures issued by the Municipality clear and give full informat	ion?
	65
Figure 5-10: Can you obtain all the information you want from the first visit?	66
Figure 5-11 : Was the municipality Accurate in processing the application?	67
Figure 5-12 : What is the speed of completing the application?	68
Figure 5-13 : What is the speed of verifying the engineering documents?	69
Figure 5-14 : Did the municipality commit to the deadlines?	70
Figure 5-15 : What do you think about the Building Permit fees?	71
Figure 5-16 : What do you think about Laws and policies governing a building permit issuing process	?.72
Figure 5-17 : Do you think policies and laws were applied on all citizens equally?	73
Figure 5-18 : What is the most important factor in the process of issuing building permit?	74
Figure 5-19 : What is the appropriate period for completing the process of issuing the building perm	it in
days	75
Figure 5-20 : Activation of the application through electronic services	76
Figure 6-1 : Cause and Effect Diagram (Fishbone Diagrams)	81
Figure 7-1 : Flowchart for the new process of issuing the permits	92
Figure 7-2 : VSM for the new process of issuing the permits.	97
Figure 7-3 : Control chart for the new process of issuing the permits.	98
Figure 8-1 : Control chart to monitor the new improved process	103

List of Tables:

Table 4-1 : The Project Charter for the Improving of the Building Permits Issuing Process	40
Table 4-2 : Project Contract for Improving the Building Permits Issuing Process	44
Table 5-1 : Type of wastes that exist in the Building Permit Process	50
Table 5-2 : Quick wins identified to address the eight wastes	54
Table 5-3 : Survey answers scale	60
Table 5-4 : Distribution of Questionnaires' results by Age	61
Table 5-5 : How does the employee treat citizens?	63
Table 5-6 : Are the application requirements clear?	64
Table 5-7 : Are the Guidelines and Brochures issued by the Municipality clear and give full informatio	n?
	65
Table 5-8 : Can you obtain all the information you want from the first visit?	66
Table 5-9 : Was the municipality Accurate in processing the application?	67
Table 5-10 : What is the speed of completing the application?	68
Table 5-11 : What is the speed of verifying the engineering documents?	69
Table 5-12 : Did the municipality commit to the deadlines?	70
Table 5-13 : What do you think about the Building Permit fees?	71
Table 5-14 : What do you think about Laws and policies governing a building permit issuing process?.	72
Table 5-15 : Do you think policies and laws were applied on all citizens equally?	73
Table 5-16 : What is the most important factor in the process of issuing building permit?	74
Table 5-17 : What is the appropriate period for completing the process of issuing the building permit	in
days	75
Table 5-18 : Activation of the application through electronic services	76
Table 5-19 : Summary of Statistical Analysis Results	78
Table 7-1 : Key performance indicators - time for each step in the Issuing Building Permits Process	91
Table 7-2 : Status reports of the improvements that were completed and any outstanding unresolved	ł
issues	94
Table 7-3: Report of Time taken to complete applications of issuing building permits after	
improvements	95
Table 8-1 : OCAP (Out of Control Action Plan) for Building Permits Process.	101

List of Abbreviations:

- DMAIC: Define, Measure, Analyze, Improve and Control.
- DPMO: Defects Per Million Opportunities.
- DPU: Defects per unit.
- LSS: Lean Six Sigma.
- NIS: New Sheqel.
- OCAP: Out of Control Action Plan.
- OSS: One Stop Shop.
- SIPOC: Supplier-Input-Process-Output-Customer.
- SITE Map: Service Improvement for Transaction based Entities.
- SPSS: Statistical Package for the Social Sciences.
- TQM: Total Quality Management.
- VOC: Voice of the Customer.
- VSM: Value Stream Mapping.

Chapter 1: Introduction

1.1 Overview:

The rapid development and emergence of many managerial techniques have prompted organizations to search for appropriate ways and means to achieve their objectives and promote their services and products using available resources (Abu Zaid, 2011).

When the service is provided many processes are involved, and each is affected by several factors in which some of them are difficult to control. These factors include: poor employee's attitudes, delay in delivering the services requested, poor tracing system, etc...., these factors result in customer dissatisfaction and bad performance. One of the best improvement methodologies that can help in addressing these factors is the Lean Six Sigma methodology.

The quality of services at all establishments is considered very important and necessary in a way that it can't be ignored or terminated. It is not enough to have good faith in providing distinguished quality service, but it is highly needed that the administration should pay attention to customers' complaints and their suggestions as well as their impressions regarding such service. Moreover, improving the quality of the service until it becomes really distinguished requires the implementation of a variety of methods and strategies and applying different techniques to provide a better service for beneficiary. There are some reasons and justifications which urge government sector's establishments to adopt the concept of the comprehensive quality management and measurement of performance which includes: the increasing demand of improving services and developing them in the government sector, and associating quality with productivity. Quality requires doing things appropriately from the first time. Experts believe in

this dimension that a lot of the expanses which are spent on services in the government sector are lost due to the lack of emphasis on the quality of services as well as increasing organizational effectiveness since comprehensive quality management can increase collaborative work, improve communication and enhancing the relationship between the administration and the employees which reduces the average of workers rotation (Salah Eldean & Bartamani, 2018).

Lean Six Sigma is used to be the methodology for quality improvement, and now it is a general-purpose methodology for reducing time, cost, and errors, maximizing value, and solving problems. Lean Six Sigma requires top management commitment and serious handling of problems in order to achieve better performance and happier customers (Summers, 2011).

Lean Six Sigma is an improvement methodology which is made up of two parts: Lean and Six Sigma. Lean focuses on eliminating waste, overproduction, extra transportation, waiting, inventory, and motion. On the other hand, Six Sigma seeks to improve the quality of process output by identifying and removing the causes of defects (errors) and minimizing variability (Furterer, 2004).

Synergistically, Lean aims to achieve continuous flow by tightening the linkages between process steps while Six Sigma focuses on reducing process variation (in all its forms) for the process steps thereby enabling a tightening of those linkages. In short, Lean exposes sources of process waste and Six Sigma aims to reduce the variation enabling a virtuous cycle of improvements towards the goal of continuous flow (Summers, 2011).

By analyzing processes and applying Lean Six Sigma quality management methods, public institutions such as municipalities can improve the services they provide to their citizens. This include reducing the time it takes to complete a process, e.g. the process to obtain a Building Permit, decreasing the municipality's expenses by eliminating unnecessary steps in processes, improving quality and reducing complexity and costs.

Our research statement is in general the application of the Lean Six Sigma methodology to improve a major service delivered to the residents and institutions of Beitunia, which is the Issuing of Building Permits service. This is done through the identification and elimination of waste and variation in the process of issuing building permits that is followed at Beitunia Municipality.

The expected outcomes of this research are to increase the efficiency, effectiveness, and flexibility of the process of Issuing Building Permit in Beitunia Municipality. Moreover, the implementation process that will be followed in the development of Building Permit Process can be extended to improve other processes within the municipality through using the knowledge and skills gained from achieving the objective of this research to achieve resident's satisfaction and happiness.

1.2 Municipality of Beitunia Profile

Beitunia is a Palestinian city located west of Ramallah. The city had a population of 40,000 in 2017 making it the third largest city in its governorate after Al-Bireh and Ramallah, and with a total area of 24 km² (Beitunia Municipality, 2018).

The Municipality of Beitunia was founded in1965 and its first Mayor was Fakhre Issa. Its council has thirteen members. The municipality has a 120-employee working in four

departments: services, engineering, public relation, and financial department. Its annual budget for 2017 was 15 million NIS.

During the past years the municipality had worked on developing the infrastructure such as roads, water pipe lines, garden and schools and on improving service delivery such as Issuing Building Permit, waste management, and regular checking of clean and health standards of different establishment such as restaurant and meat production facilities, and improving the living standards of the locals, and improving the image of Beitunia City.

According to Beitunia Municipality (2018), the municipality has many important tasks, such as:

- 1. Waste management service.
- 2. Issuing skilled worker permit for workshops and companies.
- 3. Building water pipe lines.
- 4. Paving and the maintenance of roads and sidewalks.
- 5. Supervising building activities.
- 6. Supervising the public health sector.
- 7. Building public schools and gardens.

1.3 Problem statement:

The Building Permit Issuing Process is one of the major services provided by the Beitunia Municipality; however, the process includes lots of non-value-added steps that caused citizens of Beitunia to be dissatisfied with the long time it takes to issue their permits.

1.4 Importance of the Research

The importance of this study lies in improving a core process at Beitunia Municipality, which includes some non-value-added steps that cause the process to take a long time to be completed. This results in receiving a large number of complaints from the locals. Moreover, no previous or similar studies have been identified in Palestine which confirms that there is a gap in both theory and practice.

The Lean Six Sigma framework and the validation of the framework through application of a case study in the engineering department in the municipality can be used by other cities to implement Lean Six Sigma.

Local Government Institutes benefit from Lean Six Sigma implementation in improving the services they provide to the citizens. Many countries, states, cities, and towns have used this proven approach to better utilize public resources, reduce expenditures, reallocate investments and improve the quality of life for citizens. This research focuses on the application of the Lean Six Sigma methodology to improve the Process of Issuing Building Permits and other services delivered to the residents and institutions of Beitunia.

1.5 Research Question

How can the implementation of Lean Six Sigma improve the process of Issuing Building Permits and service delivery to the residents and institutes of Beitunia?

1.6 Research Objectives

The objective of this study is to improve the Building Permits Issuing Process at Beitunia Municipality using Lean Six Sigma methodology.

5

1.7 Research Limitations

This study was carried out during December 2017 – August 2018.Hence conclusions made from study don't apply to other periods.

This study is limited to the Municipality of Beitunia as a governmental sector in Palestine. Therefore, the results cannot be universally generalized due to the extensive differences in perceptions, attitudes, and disciplines.

This study mainly examines the perception of Beitunia citizens and Beitunia Municipality employees.

1.8 Structure of the Thesis

The thesis is presented in nine chapters as follow:

In chapter one provides a general introduction and an overview of the study, chapter two provides a comprehensive literature review about Lean Six Sigma and other related quality and improvement methodologies, chapter three summarizes the research methodology that will be followed in this thesis, chapter four provides the work that was carried out to implement the steps in the Define Phase of the DMAIC cycle, chapter five provides the work that was carried out to implement the steps in the Measure Phase of the DMAIC cycle, chapter six provides the work that was carried out to implement the steps in the Analyze Phase of the DMAIC cycle, chapter seven provides the work that was carried out to implement the steps in the Improve Phase of the DMAIC cycle, chapter eight provides the work that was carried out to implement the steps in the control phase of the DMAIC cycle, and in chapter nine the final chapter summarizes the main conclusions and recommendations.

1.9 The Improvement Team:

The improvement team was formed in the define phase, which includes:

- Mohammad Majdoba: Municipality Management.
- Ali Salhia: Master's degree student
- Feda Azem: Engineering Department.
- Ibrahem Shalbi: One Stop Shop (OSS) Manager.
- Budor Badran: Engineering Department
- Muthna Nssar: Human Resource.

Chapter 2: Literature Review

2.1 Introduction:

This chapter summarizes some of the articles that have been published regarding the implementation of Lean Six Sigma, Service Quality, Process Improvement, and improving Building Permits Process, in order to gain enough knowledge to help improve the efficiency and effectiveness of the Building Permit process at Beitunia Municipality.

2.2 Introduction to Six Sigma:

The term Six Sigma was introduced for the first time at Motorola in 1986, and it was defined as a set of techniques and tools for process improvement (Webber, 2006). However, Maleyeff (2007) defined it as a statistical measure of variation that is achieved when each potential defect would have a very small chance of occurrence, usually expressed as 3.4 defects per million opportunities. While "Bevan et al. (2006)", defined Six Sigma as a process improvement methodology developed at Motorola in the 1980's to reduce defects in its processes. Its goal is to achieve a level of performance equal to a defect rate of 3.4 defects per million opportunities, this is a virtually defect free environment i.e. Six Sigma performance.

The Six Sigma metric focuses on defects per million opportunities (DPMO) defined as follows: DPMO = DPU X 1,000,000/opportunities for error.

Six Sigma represent a quality level of at most 3.4 defects per million opportunities; it is defined in the context of a manufacturing specification. The stretch goal of Six Sigma represents six standard deviations from the process mean to the specification limits, when the process is centered.

2.3 Introduction to Lean:

Lean principles have been enhanced and developed by Toyota to create the Toyota Production System. Lean means "using less to do more" by "determining the value of any given process by distinguishing value-added steps from non-value added and eliminating waste so that ultimately every step adds value to the process". (Miller, 2005)

Lean is a strategic approach to change and improvement. Focusing just on the tools at an operational level and reducing costs, will not result in gaining the full benefits. Womack and Jones (1997) described three fundamental business issues that should guide the entire organization on Lean transformation:

Purpose: What customer problems will be solved?

Process: How will value streams be assessed to make sure each step is valuable, capable, available, adequate, flexible and linked by flow, pull and leveling?

People: How can the organization ensure that value streams are continually evaluated in terms of purpose and Lean process and actively improved?

2.4 Introduction to Lean Six Sigma (Definition and Background)

The concept of combining Lean and Six Sigma principles began in the middle of 1990's and has quickly taken hold. Lean Six Sigma refers to a methodology that maximizes shareholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed, and invested Capital (Cuc & TRIPA, 2007). While Furtherer (2004) defined it as an approach focused on improving quality, reducing variation, and eliminating waste in an organization.

2.5 Lean Six Sigma Toolkits:

A large set of Lean Six Sigma tools are available; however, the focus of this section is on the most important tools that were used by the improvement team in this research:

Problem Context Diagram PCD: The Problem Context Diagram shows the system under consideration as a single high-level process and then shows the relationship that the system has with other external entities. (Adams, 2017)

SIPOC: it's a tool that summarizes the inputs and outputs of one or more processes in table form. The acronym SIPOC stands for suppliers, inputs, process, outputs, and customers which form the columns of the table. (Saxena &Kumar, 2007)

The SIPOC is often presented at the outset of process improvement efforts or during the "define" phase of the DMAIC process. It has three typical uses depending on the audience (Saxena & Kumar, 2007): to give people who are unfamiliar with a process a high-level overview, to reacquaint people whose familiarity with a process has faded or become out-of-date due to process changes, and to help people in defining a new process.

Project Charter: It is a statement of the scope, objectives, and participants in a project. It provides a preliminary delineation of roles and responsibilities, outlines the project objectives, identifies the main stakeholders, and defines the authority of the project manager. It serves as a reference of authority for the future of the project. The terms of reference are usually part of the project charter (Pyzdek, 2014).

Voice of the Customer (VOC): It is very essential for the team members to understand who the customers are and what they exactly want, before starting to improve a process. By listening to the VOC, the elements that are critical to quality for the customer can be easily understood.

There are several ways to listen to the Voice of the Customer. These include surveys, checklists, interviews, and questionnaires (Pyzdek, 2014).

Value Stream Mapping: it is a lean-management tool for analyzing the current state and designing a future state for the series of events that take a product or service from its beginning through to the customer with reduced lean wastes as compared to current map. Martin defined it as process of mapping the primary material and information flows in converting raw material to finished product or creating a service of value that a customer is willing to pay for (Martin, 2010). Another definition of Value Stream Mapping is the process of mapping the material and information flows of all components and sub-assemblies in a value stream that includes manufacturing, suppliers and distribution to the customer (Seth & Gupta, 2012).

A value stream focuses on areas of a firm that add value to a product or service, whereas a value chain refers to all of the activities within a company (Rother, 1999).

Flow Chart: a type of diagram that represents an algorithm, workflow, or process. The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. This diagrammatic representation illustrates a solution model to a given problem. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields. (Sevocab, 2008)

Control Chart: Also known as, Shewhart charts or process behavior charts are a statistical process control tool used to determine if a manufacturing or business process is in a state of control (Pyzdek, 2014).

Cause and Effect Diagram: According to Juran (1999), fishbone diagram is a tool for identifying the root causes of quality related problems. Furthermore, Juran explained, this has

been named to memorize Kaoru Ishikawa, who was a Japanese quality control statistician and the man who pioneered to use this chart in the 1960's. But according to Watson (2004), this is an analysis tool which provides an orderly way of looking at effects and the relevant causes that create or contribute for the effects. The Fishbone diagram is also named as a Cause and Effect diagram to reflect its function.

Five Whys: Sakichi Toyoda, one of the fathers of the Japanese industrial revolution, developed the technique in the 1930s. He was an industrialist, inventor and founder of Toyota Industries. His method became popular in the 1970s, and Toyota still uses it to solve problems today, it is an iterative technique used to explore the cause-and-effect relationships underlying a particular problem. The primary goal of the technique is to determine the root cause of a defect or problem by repeating the question "Why?" Each answer forms the basis of the next question. The "5" in the name derives from an anecdotal observation on the number of iterations needed to resolve the problem (Serrat, 2009).

As expressed by Serrat (2009) from his article 'the five whys techniques', "when confronted with a problem, have you ever stopped and asked "why" five times? If you do not ask the right question, you will not get the right answer. The Five Whys is a simple question asking technique that explores the cause and effect relationships underlying problems".

2.6 Lean Six Sigma Methodology in the Literature:

There are many applications of Lean Six Sigma, which reflect the recent interest in this field of study:

The concept of combining Lean manufacturing and Six Sigma principles started in the middle to late 1990's and has quickly taken hold. There are many examples of manufacturing

and public sector implementing a combined effort of Lean and Six Sigma, such as (Furterer, 2004), (Abu Zaid, 2011), (Maleyeff, 2007), (Zefaj, 2017), and (Maleyeff, 2014) in the public sector, while (Gijo & Scaria, 2014), and (Prashar, 2016) in the service sector.

2.7 Lean Six Sigma in Public Sector:

The researchers have implemented LSS methods on many fields: Furterer (2004) implemented LSS on the financial department in the local government; while Maleyeff (2007) focused on reducing cost in governmental agencies such as air force and navy and homeland security; Zefaj (2017) did a comparison between the level of quality of services delivered by Kosovo municipality and the quality dimensions in the world; Maleyeff (2014) also wrote on how to sustain public sector using LSS; Abu Zaid (2011) studied the impact of critical success factors in the application of Six Sigma Methodology on customer satisfaction in the Department of Civil Status and Passport Department in Amman; Gijo & Scaria (2014) discuss the successful implementation of Six Sigma DMAIC methodology along with Beta correction technique in an automotive part manufacturing company, Prashar, (2016) applied LSS to reduce waste in energy meter-reading for Narela district.

The researcher's aims from implementing LSS are to eliminate waste, reduce cost, improve the quality level of the delivered services, and identify the critical success factors for implementing LSS.

Furterer (2004) published a research about the framework roadmap for implementing Lean Six Sigma in local government entities, she has focused on seven framework components that create the infrastructure for the Service Improvement for Transaction based Entities Lean Six Sigma Framework Roadmap -SITE MAP- (Value Proposition, Customer Focus, Culture and Change Management, Human Resource Management, Infrastructure and Methodology, Quality and Lean tools, and Measurement). Moreover, she identified the following critical success factors to be used to ensure that the framework components are based on sound theory: Top Management commitment and visionary leadership, Human Resource management, Technical System, Information and Analysis System, Benchmarking, Continuous Improvement, Customer Focus, and Employee Satisfaction. These factors ensure local governmental entities can implement Lean Six Sigma to improve quality, reduce variation, and eliminate waste using the researchers' framework roadmap. She concluded that the application of Lean Six Sigma in local government using the SITE MAP is a powerful guide to successfully improving the processes, reduce variation, and eliminate waste.

Maleyeff (2007) studied the effect of implementing Lean Six Sigma on governmental agencies such as air force and navy and homeland security, and how it would improve their efficiency, reduce cost, and eliminate waste. The results of his paper are as follow:

- 1. Lean Six Sigma provides the means to improve the delivery of services using a disciplined project-based approach.
- 2. As methodologies, both Six Sigma and Lean have evolved from collections of techniques to comprehensive management systems.
- Many of the potential barriers could exist in any service organization (public or private) but appear to exist in greater frequency in government.

Zefaj (2017) compared the ideal municipal administrative services based on Lean Six Sigma with the current quality of administrative services provided by the municipality, from the perspective of civil servants. He concluded that the municipalities in the Republic of Kosovo do

not provide the ideal quality of services for their citizens as would be the case with the application of Lean Six Sigma standards

In another research, Maleyeff (2014) studied about Sustaining Public Sector Lean Six Sigma Perspectives from North America and concluded that the success factors that lead to a sustainable Process Improvement program in the public sector are: organizations deployment of a sound, consistent, and robust methodology, building of trust by removing fear, initiating longterm cultural change, and communicating the vision to all stakeholders.

Abu Zaid (2011) studied the impact of critical success factors in the application of Six Sigma Methodology on customer satisfaction in the Department of Civil Status and Passport Department in Amman. She found that the organization's strategy, support and commitment of senior management as well as the organizational culture are critical success factors.

2.8 Lean Six Sigma in the Private Sector:

Gijo & Scaria (2014) discuss the successful implementation of Six Sigma DMAIC methodology along with Beta correction technique (which is used for monitoring the process in the control phase) in an automotive part manufacturing company. The implementation of Six Sigma approach resulted in reduction of process capability-related problems and improved the first pass yield from 94.86 % to 99.48 %. After studying the baseline performance of the process, a brainstorming session was conducted with all stakeholders of the process for identifying the potential causes of the problem. This study contributes uniquely by elucidating the synergistic impact of Beta correction for greater effectiveness of Six Sigma programmers in the engineering industry.

Prashar (2016) presents a real-life illustration of a Six Sigma framework blended with innovative tools to identify defects and guide process improvements in energy meter reading in the context of public utilities. The remedial actions that followed the analysis resulted in a cost saving of INR 0.25 million per annum owing to reduction in the follow-ups for Narela District alone.

The researchers mentioned in the previous paragraphs have achieved several results such as reducing cost, improving the quality level of the delivered services, and identifying the critical success factors through implementing LSS.

Many researchers have carried out research to identify the critical success factors for implementing LSS in the establishments; some of the most important is Furterer (2004) who reached the conclusion that the critical success factors include top Management commitment and visionary leadership, Human Resource management, Technical System, Information and Analysis System, Benchmarking, Continuous Improvement, Customer Focus, and Employee Satisfaction. In addition, Abu Zaid (2011) pointed that organization's strategy, support and commitment of senior management as well as the organizational culture; are the most important factors. Maleyeff (2014) concluded that the critical success factors include organizations' deployment of a sound, consistent, and robust methodology, building of trust by removing fear, initiating long-term cultural change, and communicating the vision to all stakeholders. Manville (2012) pointed out that developing learning capability in the middle management team and the empowering of them are important critical success factors. This means that a greater role should be given to middle management in performance improvement and strategy formulation.

A lot of researchers have conducted research about improving the services' quality using DMAIC methodology which is an improvement methodology that consists of five phases (define, measure, analyze, improve, and control). Some of the most important researches are:

Nakhai (2009) published a paper titled "The Challenges of Six Sigma in Improving Service Quality", the purpose of his paper is to critically evaluate the contributions of six sigma methodology to the improvement of service quality and has reached the conclusion that the relentless drive toward adopting six sigma to services has led both to a limited field of applications and to unrealistic expectations as to what six sigma is truly capable of achieving, particularly in knowledge-based environments. While researchers Wang & Chen (2006) apply DMAIC methodology to improve quality service in the bank sector, the results of their research shows that the application of Lean Six Sigma methodology with TRIZ performs effectively in the improvement of banking services.

Tennakoon (2015) studied the application of DMAIC to improve delivery efficiency, the purpose was to provide on timely delivered products and services, which has become a competitive advantage and a need to ensure survival. He found that the product quality issues and Plant availability issues were the most problematic cause for delivery failures.

Application of Six Sigma DMAIC methodology in thermal power plants: A case study by Kaushika and Khanduja (2009), they aimed to apply Six Sigma methodology to a process industry taking a specific case of a thermal power plant. The implementation of the Six Sigma project recommendation and improvement action plans reduced the mean make-up of water from 0.90% to 0.54% of MCR (Maximum Continuous Rating), accruing with it a comprehensive energy saving of nearly Rs. 296.09 Lakhs per annum.

Hea, Zhanga, and Zhang (2014), used the DMAIC methodology to improve services quality. The purpose of their paper is to discuss how Six Sigma DMAIC (Define, Measure, Analyze, Improve, and Control) methodology was applied to reduce the voluntary turnover rate of dispatched employees in company M. After taking improvement actions, the weekly average turnover rate of dispatched employees declined from 2.5% to 1.4%, with concomitant savings of human resource costs and improvements in production quality and yield stability.

2.9 **Process Improvement:**

Process Improvement is the proactive task of identifying, analyzing, and improving upon existing business processes within an organization for optimization and to meet new quotas or standards of quality (Hamada, 2015).

Another definition of "Process Improvement" is the systematic approach to closing of processor system performance gaps through streamlining, cycle time reduction, and identification and elimination of causes of below specifications quality, process variation, and non-value-adding activities (Business Dictionary).

Rouse (2013) defines Business Process Improvement (BPI) as a strategic planning methodology aimed at identifying the operations or employee skills that could be improved to encourage smoother procedures, more efficient workflow and overall business growth.

From above, it can be concluded that Process Improvement is a method used by the organization to eliminate waste, reduce variation, and solve management and production problems that prevent the organizations from achieving their goals and exceed customer expectations.

Many studies have been carried out on this subject; the following paragraphs summarize the key points of these studies:

Nakhai and Neves (2009) stated in their research that the purpose of their paper is to critically evaluate the contributions of Six Sigma methodology to the improvement of service quality. Since its development in the late 1980s, Six Sigma has been extensively applied in manufacturing and quasi-manufacturing settings. The study aims to explore the challenges of Six Sigma in reaching a much wider field of applications. Their research focuses on highlighting gaps in Six Sigma when applied to services.

The most immediate practical implication of this study is the call for the redesign of the curricula of Six Sigma Black Belts training programs, and the importance of training in service quality for the successful application of Six Sigma in service operations. This study provides a fresh look into Six Sigma application to services by combining a thorough analysis of the service quality model with the in-depth understanding of Six Sigma statistical concepts The Business Process Bank (BPB) in Denmark did a study between 2006 and 2009 about the municipalities in Denmark; they struggled to create the organizational and managerial structures needed to administer the services. At the same time citizens complain if they find that one municipality administers services with less efficiency or effectiveness than others. The Local Governments of Denmark (LGDK) is a consortium of municipal governments working together and supports one another. The LGDK seeks, among other things, to help the municipal units to provide more consistent, effective services, while still respecting local traditions. They found that (Pedersen, 2009): By 2010, the LGDK joint Business Process Bank includes 250 core processes and 50 generic processes. At the same time, some 100 examples of good practices were associated with the different core and generic processes and everyone seems to believe that the process framework provides a better way to organize business practice information. All of the processes were documented in BPMN and stored in a repository that Municipal governments can access.

In effect, LGDK has put in place a nationwide system that will constantly work on maintaining the existing processes while simultaneously exploring new options and capturing improvements, which will then be stored in the repository to make them available to the other government units. At the same time, the government of Denmark will continue to create new laws and change existing requirements and the LGDK and municipal teams will continue to expand their processes to reflect the current work the municipalities are being asked to perform (Pedersen, 2009).

Engen (2011), the Mayor of Missoula City in the period around the year 2011, searched for the best approach to improve the efficacy of the city hall in 2011, and the recommendations of his paper included 17 important results such as:

- Consolidate all existing municipal planning and development review functions and staff in a single City department with one department head responsible for managing the entire municipal planning and development review process.
- 2. The City of Missoula should adopt a list of best management practices for streamlining the planning and development review process.
- 3. The City of Missoula should upgrade the automated permit information system to enable all reviewing agencies, applicants and their representatives to track and manage work activities via the Internet.

In a study conducted by Sbeha (2016) about the method of improving the services provided by the local government, he recommended that improving the efficiency of the municipality management needs an experienced and efficient staff that can use the technology to achieve good financial planning and other required goals.

Jouda (2013) did a study about improving process quality, he aimed at presenting a framework for implementing Six Sigma in the services sector in the Arab countries, his purpose was the need for decreasing defects in their processes and improving service quality. He concluded that it is very important to implement this framework on all service sectors. The study also shows that focusing only on the quality of inputs and outputs is not enough for presenting good quality services to the customers, which should also include the quality of processes as well. He made several recommendations such as the necessity of training the employees to adopt Six Sigma.

Aljbory (2008) stated in his research about Six Sigma methods the relation between it as a statistical reference and its managerial application using a descriptive analytical style and the possibility of combining it with continuous improvement. He also stated that Six Sigma integrates with process management through focusing on reducing cost and increasing system operation's effectiveness, he concluded several results such as; Six Sigma method is a natural extension for quality efforts; and the development is a result of realizing the importance of quality in reducing cost and improving customer satisfaction.

2.10 Building Permits Process:

Building permits are a type of authorization that must be granted by a government or other regulatory body before the construction of a new or existing building can legally occur.

There are many different methods and tools that have been used by researches to improve the process of issuing building permits, some used lean methodology (for example: O'Rourke, n.d),

others used traditional methods (for example: Abbas, 2014), others compared the process of issuing building permits between two countries (for example: Jovanovic, Aristovnik and Lugaric, 2017), while others followed theoretical methodology (for example: Borooah, 2013).

We will illustrate some of them here:

SeaTac City did a study on how to achieve rapid improvement in the Permit Department using lean methodology. They outlined some key observations such as permit technicians need to have complete knowledge of the process to perform their tasks effectively, they also managed to achieve few things such as cutting the process period from 9 days to 3 or 4 days and the eliminating of routing, and how to achieve continuous improvement by involving different departments in the process like the fire and police department (O'Rourke, n.d).

Borooah (2013), the Chief Building Official and Executive Director of Toronto Building, made a study about the time needed to obtain a Building Permit in Toronto in which she concluded that the goals of the department are being met however there is a need to fill the vacancies in the department to decrease the workload on the employees.

O'Brien (2017), in his Audit of Denver city permit department, made several recommendations such as, providing resources to train the employees to increase their efficacy and that staff should develop a strategy for determining how and when intake staff should focus their efforts on assisting customers in the Login Queue.

Jovanovic, Aristovnik and Lugaric (2017) made a comparative analysis study between Slovenia and Croatia Building Permit Issuing Process, they concluded the following:

The building regulatory field has not yet been a point of scholarly attention, also the comparison of Slovenia and Croatia revealed that the Building Permit Procedures do have very much in common and that the shortcomings and obstacles in the Issuing of Building Permits are alike, they recommended enabling the submission of the application electronically.

Abbas and his colleagues have done a study in February of 2014 that aims to simplify the process of obtaining Building Permit in Alsharqia district in Egypt. After they studied and analyzed the problems in the process, they concluded several solutions and recommendations such as: the need to improve the work environment, improve the employee skills to increase their efficiency, and to ensure there is no staff shortage.

After reviewing the studies that have been presented above, there were not any studies regarding the improvement of Building Permit Issuing Process that were applied in Palestine and is a clear evidence of the gab of knowledge that has not been covered yet. In this study, the improvement team aims to fill this gab by improving a major service at Beitunia Municipality.
Chapter 3: Research Methodology

3.1 Introduction:

The methodology is the rationale for the research approach, and the lens through which the analysis occurs. Howell (2013) stated that a methodology describes the "general research strategy that outlines the way in which research is to be undertaken" (Howell, 2013). Lean Six Sigma Methodology can be planned by municipality's management to identify processes to be streamlined to ultimately help improve citizens' satisfaction. As the previous chapter has shown, from a review of the literature, no evidence was found of any local governmental entity to have used Lean Six Sigma in Palestine, however, there are some examples of local governmental entities in other countries that have applied Lean Six Sigma methods and quality management programs. Some of the researches identified the elements that should be considered to successfully implement a quality program, but no detailed plan is available to help local governments to implement a successful Lean Six Sigma program.

This research aims to apply the Lean Six Sigma methodology to improve the Building Permits Process at Beitunia Municipality, so it runs more effectively and efficiently. Lean Six Sigma is a complete methodology and set of tools that can be used for improving any process at Beitunia Municipality, whether this process is considered core or a main priority.

3.2 Research Strategy:

The research type chosen for this study is considered an exploratory research. Mixed methods were used in this research to achieve the research objectives. This includes: the improvement methodology called DMAIC, questionnaire and interviews.

This diversity of research methods helps us to obtain full knowledge in identifying the problem and measuring the current performance accurately in order to reach the research goals, which is to reduce the time required for issuing the building permit in the Municipality of Beitunia.

3.3 Research Focus – The Building Permit Process at Beitunia Municipality:

Lean Six Sigma can improve the efficiency of processes, improve the quality of service delivery to citizens and reduce the time and costs of providing these services (Furterer, 2004). The Lean Six Sigma methodology was applied to improve the issuing Building Permit Process through reducing the time needed to complete the processes in Beitunia Municipality. It is important to note that Lean Six Sigma can be used to improve any other department's processes in Beitunia Municipality.

3.4 The DMAIC Approach (Definition, Background, Objectives, and Tools):

The improvement team have used the Lean Six Sigma problem solving approach, known as DMAIC (Define, Measure, Analyze, Improve, and Control), which is defined as similar in function to its predecessor methods, such as Plan- Do-Check-Act and the Seven Steps method of Juran and Gryna (Balakrishnan et al, 1995), along with a set of improvement tools to improve the Issuing Building Permit Processes. A successful implementation of the Lean Six Sigma problem solving approach is measured by the reduction of the time it takes to complete the process.

In every phase of the DMAIC approach, a different set of tools can be used as explained below:

In the Define Phase, tools such as PCD, SIPOC, Project Contract and Project Charter can be used to help identify the business problem and define what the customer requires (Henderson & Evans, 2000), select and define the process to focus on to either reduce variation or eliminate waste or both, define the objectives, goals, resources, scope and timeline for the project, and to define the opportunity for improvement from both business and citizen's perspective. The defining of the problem is the first and the most important step in the project because good understanding of the problem makes the job much easier later on.

In the Measure Phase, the Control Chart, Voice of Customer, Pareto analysis, Process flow chart, eight wastes and Quick wins are just a few of the useful tools that can be used in this phase, which aims to understand the process and its performance to establish a baseline for improvement.

In the Analyze phase, the data are analyzed, and the causes of the problems are discovered (Kapur & Feng, 2005). Some of the tools that are used in this phase include cause and effect diagram, hypothesis testing, five whys, and Pareto Chart.

In the Improve phase, the PDSA is one of the improvement tools that is used to develop potential improvement solutions and to test and implement these solutions. The gains from the improve phase are immediate and are corrective in nature. Other tools used in this phase are the control charts, implementation plan, communication matrix, etc.

Finally, in the Control phase, the process needs to be controlled to ensure that defects do not recur (Mathew et al, 2005). It is the final stage of Six Sigma implementation to keep hold of the gains obtained from the improve stage. Hence, in this stage, the new process considerations are documented and implemented into systems so that the gains are permanent. The control phase is preventive in nature. All possible causes of specific identified problems from the analyze phase are tackled in the control phase; the flowchart for the new process is created and used as a

standard that should be followed along with a control chart which is used to monitor the new process in order to maintain the new performance.

3.5 DMAIC Phases Objectives:

Koning and Mast (2006) have stated that the DMAIC objectives are as follow:

Define Phase:

- Problem selection.
- Benefit analysis to identify and map relevant processes.
- Identify stakeholders
- Determine and prioritize customer needs and requirements
- Make a business case for the project.

Measure Phase:

- Translation of the problem into a measurable form.
- Measurement of the current situation.
- Select one or more CTQs and determine operational definitions for CTQs and requirements.
- Validate measurement systems of the CTQs.
- Assess the current process capability.
- Define objectives.

Analyze Phase:

- Identification of influence factors.
- Identify the causes that determine the CTQs' behavior
- Select the vital few influence factors.

Improve Phase:

- Design and implement of adjustments to the process to improve the performance of the CTQs.
- Design actions to modify the process or settings of influence factors in such a way that the CTQs are optimized.
- Conduct pilot test of improvement actions.

Control Phase:

- Empirical verification of the project's results.
- Adjustment of the process management and control system in order that improvements are sustainable
- Determine the new process capability.
- Implement control plans.

Figure 3-1 illustrates the different phases of the DMAIC methodology:



Figure 3-1 : The DMAIC Cycle.

3.6 Uses of the DMAIC Approach

DMAIC is systematic method, which includes five steps, which aims to identify the problem, measure the current waste and variation, analyze the root causes, find appropriate solutions to reduce variability and remove waste, to establish procedures and controls, and to maintain and achieve improvements. (Mast & Lokkerbol, 2012)

The DMAIC approach is used to analyze the processes with a view to improve process steps, determining what process elements need improvement or removal, developing alternatives for improvement, then selecting and implementing them. It depends on many qualitative and quantitative techniques, focusing on the use of data and statistical analysis.

The research methodology followed in this thesis includes the following milestones:

- Interviewing key personnel involved in the Building Permits Process within the engineering department, the One Stop Shop (OSS) staff, and the inspectors to obtain complete information about the permit issuing process.
- Reviewing policies and procedures for the Building Permit Process.
- Assessing controls related to the permits issuing system (Service System)
- Evaluating the efficiency and effectiveness of the Issuing Building Permits Process.
- Creating a flow chart, identifying eight wastes, and Quick wins.
- Identifying root causes for the long time to process building permits.
- Research the best practices related to customer wait times, test theories, and implement new process with controls in place to maintain improvements.

3.7 Data Collection

The improvement team gathered both primary and secondary data that were used for this research for effective and efficient utilization of the method been adopted through questionnaire. Primary data was gathered through questionnaires and interviews in order to obtain citizen's opinions on the process of Issuing building permits at Beitunia Municipality. The questionnaire, which is comprised of 17 questions: 12 questions had options 5 - 1, four questions had multiple answers to choose from, and the last question was an open-ended question. The instrument used a five-point Likert scale reflecting a range of attitude from strongly satisfied to the strongly dissatisfied. The coding of the Likert scale was made as (5 = strongly satisfied, 4 = satisfy, 3 = neither agree nor disagree, 2 = dissatisfied, and 1 = strongly dissatisfied). Hence, 48 were used for the analysis, which comprises of 2 females and 46 males' respondents. Secondary data were also used in the form of published works such as internet, libraries, books and journals.

Interviews:

Four interviews were held in Jan-2018. The first interview was held with Mohammad Mjdobah the municipality director, Fida Aazm the head of engineering department, Shaher Remaoi the CFO, Ibrahim Shalby OSS manger. The objective is to obtain clear understanding of the problem and obstacles facing the municipality.

The following questions were asked to all of them:

- What is your most proud work accomplishment?
- What is your biggest thing that you failed in solving?
- If I would help you in improving your work, which process would you choose?

The second was held in Jan-2018 with Mohammad Mjdobah, Fida Aazm, Ibarahim Shalby, and Jasem Salem municipality council member, its objective was to know the workflow of the process of issuing building permits. The following questions were asked to all of them:

- What are the steps of issuing building permits?
- What is your role in the process of issuing the building process?

The third was held in Feb-2018 with Mohammad Mjdobah, Fida Aazm, Ibarahim Shalby, and Jasem Salem, its objective was to create the PCD tool at the define phase.

The following questions were asked to all of them:

- What do you think about the appropriate time to complete the issuing of building permit process?
- What is the most time and effort-consuming step in the process?

The fourth was held in Feb-2018 with Mohammad Mjdobah, Fida Aazm, Ibrahim Shalby, and Jasem Salem, its objective was to create the SIPOC tool at the define phase. The following questions were asked the all of them:

- What is your specific role in the process?
- What are the sources of variation and impact performance?
- What are the most regular complains from the locals?
- What are the obstacles facing the employees in completing their work?

3.8 Data Analysis

Software program used to analyze the gathered data from questionnaires, include SPSS and MINITAB. In the following chapters, the analysis of data is shown.

Before starting the improvement work, the improvement team agreed on the following ground rules:

- It is about the process only, not about the people.
- Operate in a blame free environment.
- Finger pointing has no place.
- Involve and collaborate with front line employees to explore and make process changes.
- We are students of the process, we are here to learn.

3.9 Framework Methodology

Figure 3.2 provides a summary of the framework methodology. It identifies the activities that are performed within the research, and the outputs and results of each activity.



Figure 3-2 : Research Framework

Chapter 4: Define phase

4.1 Select Strategic Issue:

In this research, the DMAIC approach was applied to improve the Building Permit Issuing Process at Beitunia Municipality. Currently this process includes many steps and each of these steps takes a certain period of time and effort and needs to be fully completed before moving to the next one, in step one, the applicant goes to the Public Service Center (OSS) to deliver the needed documents such as ownership and engineering documents. In step two, the application is registered in the system. In step three, the application is forwarded to check if the applicant has any unpaid water bills. In step four, the application is forwarded to check the property taxes. In step five, the application goes to the craft and health department. In step six, the application goes to the engineering department to check the submitted documents. If the application has all the required documents, it will be approved by head of the engineering department and it will be sent to the Building Committee in order to study it and make recommendations. On the other hand, if the application does not have all the required documents, then it's rejected and returned to the engineering office to make the needed changes. After that, the Building Committee meets on Saturday to discuss the application; if the committee approves it, then it goes to the municipality council which meets every Tuesday and discusses the application again; if it's approved it is sent to the Engineering Department to print it and calculate the fees. After that the application is routed in the system to the director of the municipality to approve it. Finally, the permit is handed over to the applicant. The above details of the process were gathered by doing interviews

with certain municipal employees. (See figure 5-1 page 35 and Appendix A: Workflow of the current process).

It's very clear that the application has too many steps which take a long time, effort, and cost to be completed, and this results in wasting resources and more citizens' dissatisfaction.

4.2 Definition of the Problem:

After holding many interviews with the director of the municipality and the head engineer, the improvement team was informed that the priority for improvement in the municipality is to improve the Process of Issuing Building Permits. Some of the problems they mentioned include: there is a large number of applications under processing, applicants keep calling the municipality and asking about their applications and complaining about the delay which is causing citizens' dissatisfaction, the Engineering Department takes a long time to approve engineering plans, and finally, the process has a lot of different steps that take a long time and waste funds.

The define phase is the first step of the Six Sigma DMAIC project. The objective of it is to define the project and its details including project title, purpose, scope, key players, barriers and risks, support estimates, expected benefits and schedule for the project in terms of the citizens' needs and the process of delivering these needs.

The improvement team was formed with the help of the municipality director as the team leader and four team members. The municipality director was named as the champion for this project. The team along with the champion had in depth discussions regarding this project and prepared the project charter which defines the elements of the project. The project charter was then created, which is considered an important step in the Define phase of the DMAIC methodology because it defines the project problem, the project's purpose, business case, scope, key players, enablers and barriers, and support estimates.

In addition to the project charter, other tools that were used in the Define phase are Problem Context Diagram (PCD), SIPOC, and project contract. These tools are explained in the following paragraphs.

4.3 PCD Technique:

The PCD which is shown in Figure 4-1 is a tool used to illustrate the problem taking place and the step of the process where the problem is first seen or felt and all the upstream and downstream processes. The improvement team did several interviews with key personals in the municipality and created the PCD:



Figure 4-1 : PCD Technique for Building Permits Process

Using this tool, the improvement team was able to discover that there are too many steps that contribute to the process of issuing of the permits, these include:

- Insert order.
- Check the debt of water bills.
- Check the property tax debt.
- Check if the applicant has any outstanding issues with the Department of Health and Crafts.

- Verification of the engineering documents.

Moreover, the PCD identified several steps, which are affected by the process of issuing permits, these include:

- Take a decision through the municipal council.
- Study the order by the building committee.
- Manage citizens' complaints.
- Calculate the fees for issuing of permits.
- Handover of the permit to the applicant.
- Archive the order.

Finally, the PCD helped in determining the team members who should form the improvement team. These include members from the following departments:

- 1) Engineering department.
- 2) Services department.
- 3) Human resources.
- 4) Municipality management.

After that the improvement team was formed, it includes:

- Mohammad Majdoba: Municipality Management.
- Ali Salhia.
- Feda Azem: Engineering Department.
- Ibrahem Shalbi: One Stop Shop (OSS) Manager.
- Budor Badran: Engineering Department
- Muthna Nssar: Human Resource.

4.4 The Project Charter:

Following the meeting held with Mr. Mohammad Magdoba the municipality director, the improvement team agreed on the project charter details, which is shown in Table 4-1, includes the following elements:

Project's Purpose: to reduce the time to issue building permits to the citizens of Beitunia city by approximately 50% (from an average of 22.5 days to approximately 10 days).

Project's scope: the scope of the new Building Permit Process in Beitunia Municipality which will be considered is from "insert the order into the system" to "issuing the permit".

The Business Case: the long time it takes to issue building permits causes citizens dissatisfaction, and bad reputation for the Municipality of Beitunia and the employees. Moreover, handling customer complaints and rework orders will cost the municipality time and money.

Team Leader	Ali Salhia								
Project Title:	Improving the Building Permits Issuing Process at the Municipality of Beitunia								
Purpose:									
To reduce the time to issue Building Permits to the citizens of Beitunia city by 50%.									
Business Case:									
The long time it takes to issue Building Permits causes citizens dissatisfaction, and bad reputation for the Municipality of Beitunia and the employees. Moreover, handling customer complaints and rework orders will cost the municipality time and money. Although the target is to issue the building permits within 10 days, it is now actually taking on average 22.5									
Key Players:		Scope:							
Sponsor: Mohammad	Majdoba	New building permit process in Beitunia Municipality							
Team Members: Ali S	Salhia.								
 Feda Azem. 									
 Ibrahem shalbi 									
 Budor Badran. 									
 Muthna Nssar. 									
Enablers/Risk Mitig	ation	Barriers/Risks							
 Commitment c 	f top management.	 Poor legislation and laws 							
- Budgeted project in implementing the		 Tight timeframe 							
improvement.		 Misunderstanding of the software feature by 							
 Time availabilit 	y for the team.	employee.							
 Project room for 	or conducting meetings	 The center employees have Lack knowledge of 							
regularly.		technical.							
– Data available	from the system	– Lack of staff							
 Employee trair 	ling								
Support Estimates									
Estimate of the people, equipment, expertise, capital required for the project.									
 Software devel 	opment.								
 Required budget (\$1,000) to print guide book that inform the applicants of all the documents needed to be filed with their application. 									

Table 4-1 : The Project Charter for the Improving of the Building Permits Issuing Process

4.5 SIPOC:

After agreeing on the project charter, the improvement team interviewed all the employees working on the permits issuing process. The improvement team managed to get a clear understanding of their tasks. After that, the improvement team created the SIPOC as shown in Figure4-2, in order to identify all the relevant steps in a project and important details about each of these steps.

The SIPOC is a very important tool that the improvement team needs to use to make sure that information about process steps' current and expected performance is obtained. The SIPOC identifies the suppliers, input, process, output and customer. It also analyzes the steps of the process individually, and identifies the process measure, present data, goal performance, voice of citizens, sources of variation and impact performance. SIPOC

Key Business Process Name: Issuing Building Permits										
Suppliers		Input		Process		Output		Customers		
Municipality Munic Municipality System Citizen Applic Citizen Requir		ipality permits processing staff 15 ation ed Documents		Process Purpose: to issue Building Permit with high quality as well as on time. Process Owner: Engineering Department team		Building Permit.		The citizens of Beitunia.		
Process Steps (High Level)	Insert application	Check status of applicant	Check requirement by Engineer Dep.	Approve by Building Committe	Approve by Town council	Approve b mmunicip ty director	y ai building permit	Results Measures Accuracy of submitted document s Time taken to complete the process		Customer Needs Issue building permit at shortest possible time with high accuracy.
Process Measures	Accuracy of checking document	Time taken to complete the task	Time taken to complete the task Accuracy of checking	Time taken to complete the task	Time taken to complete the task	Time tak to compl the tas	ken Time taken lete to complete ik the task			
Present Data	100% is accurate	Within 1 workday	Within 16 workday	Within 3 workday	Within 3 workday	Within workda	2 Within 2 ay workday			
Goal Performance	100% accurate checking	Within 1 work hours	Within 2 workday	Within 2 workday	Within 1 workday	Within workda	1 Within 1 ay workday	Results Concerns 40% orders late in Check Engineer requirement 20% orders late in Approve by Building Committee And Town council		Date
Sources of Variation & Waste	inaccurate checkingof availability	Delays taken to complete the task	Work pressure	Meet once a week only	Work pressure	Work	Work re pressure			Version
Impact on Performance	Accuracy of Insert the application	Delay of completing the work	Late for the next step	Delay of completing work	Delay of completing work	Delay o approve permit	of Delay in Prepare and t print the permit			

Figure 4-2 : SIPOC for the Issuing of Building Permits Process.

Among other things, the SIPOC has highlighted the following Results measures, Customer needs, and Results concerns:

Results Measures: Accuracy of submitted documents and time taken to complete the application process.

Customer Needs: Issue Building Permits at shortest possible time with high accuracy.

Results Concerns: 40% orders late in check Engineer requirements and 20% orders late in approve by Building Committee and town council.

It is very clear that there are many steps that waste time and resources. The SIPOC will be used to start the measuring phase to identify the steps that take the most time to be completed.

4.6 **Project Contract:**

The project contract was then created as shown in Table 4-2, it is considered a formal agreement between improvement team and project sponsor so that everyone is committed to achieving the project's milestones shown at the bottom part of the contract.

Author:	Ali Salhia							
Project Title:	roject Title: Improving the Building permit issuing process at the Municipality of Beitunia							
Purpose:								
To reduce the time to issue Building Permit to the citizens of Beitunia city by 50%.								
1. Business Cas	e:							
The long time it takes to issue Building Permits causes citizens dissatisfaction, and bad reputation for the Municipality of Beitunia and the employees. Moreover, handling customer complaints and rework orders will cost the municipality time and money. Although the target is to issue the building permit within 10 days, it now actually taking on average 22.5 days, and could take up to 60 days in some cases.								
Key Players:		Scope:						
Sponsor: Mohammad N	Vlajdoba	New building permit process in Beitunia Municipality from						
Team Members: Ali Sa	Ilhia.	insert the order in the system to issuing the permit.						
 Feda Azem. 								
 Ibraheem Shalbi 								
 Budor Badran. 								
 Muthna Nssar. 								
Enablers/Risk Mitiga	tion	Barriers/Risks						
Commitment of top r Budgeted project in i improvement. Time availability for t Project room for com Data available from t Employee training	management. mplementing the he team. ducting meetings regularly. he system	Poor legislation and laws Tight timeframe Misunderstanding of the software feature by employee. The center employees have Lack knowledge of technical. Lack of staff						
Support Estimates								
Estimate of the people,	. equipment, expertise, capital requ	ired for the project.						
Software development. Required budget (1,000 \$) to print guide book that inform the applicants of all the documents needed to be filed with their application. Application for Building Permits.								
Milestones		Deadline						
Define the problem		01- Feb -2018						
Measure the as is		01- Apr -2018						
Identify the root cause		01- May -2018						
Inst theories		01-June-2018						
Create standard for no	N process	01 Aug 2018						
Monitor new process		01-Αυσ-2010						
Close project		20- Aug -2018						
ciose project		20- Aug -2018						

Table 4-2 : Project Contract for Improving the Building Permits Issuing Process.

4.7 Summary and Next Step

In this chapter, the problem to be resolved is defined using the following tools: Problem Context Diagram, Project Charter, SIPOC, and Project Contract. In the following chapter, the current performance of the process will be studied, key measures will be identified, and the voice of the citizens will be captured.

Chapter 5: Measure Phase

5.1 Introduction:

The main objective of this phase of the DMAIC technique in Six Sigma problem solving process is to study, understand and document the current state of the process of Issuing Building Permits to be improved. This includes estimating the baseline performance of the process with respect to the critical to quality aspects identified during the define phase, and to identify the process problems that are causing inefficiencies and waste with their root causes. In this phase, we will collect data to identify where the waste or the defect or the problem occurs, in order to understand the as-is situation and uncover areas where improvements are needed. The following tools will be used during this phase: Flow Chart, VSM, Eight Wastes, Quick Wins, VOC and Control Chart.

5.2 Flowchart:

The improvement team created a flowchart (Figure 5-1 illustrates the flowchart for the current process) to present the steps and the relationships between steps involved in the process of Issuing Building Permits to identify bottlenecks, redundancy and unnecessary steps in the process, and to understand the steps of application transition between departments.



Figure 5-1 : Flowchart of Building Permit Process – Current process.

From the flowchart above we can find out that:

- We have many steps needed to complete the process.
- The application has many routes between departments.
- The process has about 11 human touches and each one takes a specified time to be done and sometimes takes additional time in waiting.
- There are many stages for checking.
- There are many stages for approvals.
- Non-value-added steps exist in the process.
- All the above cause time to be wasted and the probability of defect increases.

5.3 Eight Wastes:

Waste is defined as any action or step that doesn't add value. The process steps were analyzed by the improvement team one by one in order to determine the types of wastes that exist in each of them. These wastes were categorized into one or more of the eight wastes categories which illustrate in Figure 5-2 include: (Defects, Overproduction, Waiting, Non-Utilized Talents, Transportation, Inventory, Motion, and Excessive Processing). Determining these wastes helped the improvement team identify the improvement opportunities available.



Figure 5-2 : Eight Wastes Categories

Table 5-1 below shows which waste exists in each step of the process:

Workflow			DOWNTIME							
Step	Activities	Executed by	Defect	Over- production	Waiting	Non Utilized Talents	Transport	Inventory	Motion	Excessive Processing
1	Insert order	OSS				small task				
2	Check the debt of water bills	OSS								small task that doesn't require a dedicated stage
3	Check the property tax debt	OSS								small task that doesn't require a dedicated stage
4	Check Department of Health and Crafts	OSS								small task that doesn't require a dedicated stage
5	Verification of the required documents	Engineering Department	mistake or missing information in documents may occur while checking required it		may take long time			accumulation of applications		
6	Modification of engineering documents	Engineering Office			may take long time					
7	Study the order	Building Committee			The applications are under reviewing only on Saturday of each week.					
8	Take a decision	Municipal Council			The application waits for council meeting on Wednesday to be approved					
9	Approved application	director of the Municipality								Unnecessary stage - non value added
10	Calculate fee	Engineering Department	mistake may occur while calculating fees							
11	Handover the permit to the applicant	OSS						accumulation of documents		

Table 5-1 : Type of wastes that exist in the Building Permit Process.

From Table 5-1 and Figure 5-2, we can summarize the main eight wastes as follow:

Defect:

- Verification of the required documents: mistake or missing information in documents may occur while checking required documents.
- Calculate fees: mistakes may occur while calculating fees manually.

Waiting:

- Verification of the required documents: may take a long time.
- Modification of engineering documents: may take a long time.
- Study the order: the applications are under reviewing only on Saturday of each week.
- Take a decision: the application waits for council meeting on Tuesday to be approved.

Non-Utilized Talents:

- Insert order step: it's a small task that doesn't need a dedicated employee.

Inventory:

- Verification of the required documents: accumulation of applications.
- Modification of engineering documents: may take long time.

Excessive Processing:

- Check the debt of water bills: small task that doesn't require a dedicated employee.
- Check the property tax debt: small task that doesn't require a dedicated employee.
- Check Department of Health and Crafts: small task that doesn't require a dedicated employee.
- Approved application unnecessary stage non-value added.

As shown in the previous section, five types of wastes exist which cause the followings:

- Delays in completing the process.
- The possibility of errors and defect to occur.
- Many unnecessary tasks.
- The existence of huge waiting times.
- The accumulation of applications and non-utilized talents.

5.4 Quick Wins:

The Quick Wins criteria which include that it Takes less than one week, it costs less than 1000 NIS, is reversible (we can change our mind), and its Within Team's scope to authorize, are shown in Table (5-2) they have been used to identify the Quick wins that can or can't be implemented at this phase. The first set of Quick wins that can be implemented are:

- Documenting and Writing Procedure.
- Adopt a checklist while verifying the required documents.
- Eliminate assignment of tasks to wrong employees.
- Continuous updating of the application process stages on the system.
- Change names of the employees on the system to their positions.

On the other hand, the following solutions cannot be implemented as Quick Wins:

- Cut the number of applications handoffs from 11 to 7 to increase productivity.
- Integrate three steps of checking the applicant's status into one task with the insert application step (one person does all the steps).

- Providing a guidebook to citizens to explain the requirements needed for issuing building permits.
- Delegate the building committee in the municipality to handle the task of approving the building permit instead of the municipal council.
- Change the date for meeting the municipal council from Tuesday to Sunday.

#	Quality Concern / Eight wastes	Potential Solution (Quick Win)	Take less than one week	Costs less than 1000 Shekels	ls reversible	Within Team's scope to authorize
1	There is no documented procedure	Documenting and Writing Procedure	Yes	Yes	Yes	Yes
2	Mistake or missing issue may occur while checking required documents. /defects	Adopt a checklist while verifying the required documents	Yes	Yes	Yes	Yes
3	The need for application to goes through extra unneeded steps / Excessive Processing	Eliminate assignment of tasks to wrong employees	Yes	Yes	Yes	Yes
4	No close transaction of application in the system /waiting time.	Continuous updating of the application process stages on the system	Yes	Yes	Yes	Yes
5	Incorrect information in the system resulting from assigning tasks to employees' names instead of their positions. /defects	Change names of the employees on the system to their positions	Yes	Yes	Yes	Yes
6	The application goes through too many steps	Cut the number of applications handoffs from 11 to 5 to increase productivity	No	Yes	Yes	No
7	Small and similar tasks of checking applicant's status with respect to outstanding water bills, property tax, and if the applicant has any issue with Department of Health and Crafts, that don't require a dedicated stage. /Excessive Processing	Integrate three steps of checking the applicant's status into one task with the insert application step. (one person does all of the steps)	No	Yes	Yes	No
8	Illustrate the requirement from the citizen for a building permit needs/ defect	Providing a guidebook to citizens to explains the requirements needed for issuing building permits	No	No	Yes	Yes
9	Application waits for long time until approved (Wednesday) /waiting time.	Delegate the building committee in the municipality to handle the task of approving the building permit instead of the municipal council	No	Yes	Yes	No
10	Application waits for long time until study (Saturday) /waiting time.	Change the date for meeting the municipal council from Wednesday to Sunday	Yes	Yes	Yes	No
11	Poor system	Adoption a new software	No	No	Yes	Yes

Table 5-2 : Quick wins identified to address the eight wastes.

5.5 Value Stream Mapping (VSM):

After the Flowchart is done, the next step is to prepare VSM, which is a lean visualization tool for recording all the repeatable steps that are required to bring a product or services to market (Rouse, 2017), by obtaining a report from the system for 30 applications (See Appendix B: A detailed report showing the time needed for each step and the waiting time).

The improvement team has constructed the Value Stream Mapping (VSM) as described below in Figure 5-3, and has calculated the followings: average duration, down time, average cycle time and average delay time for each step. Finally, the improvement team calculated lead time and value-added percentage for the whole process.

The improvement team has concluded the followings:

- The total number of minutes daily is 480 minutes (six days weekly,8 hours daily = 480 minutes)
- The total number of applications considered is 30 applications (the completed applications in 2017).
- The average time needed to complete the process is 12,480 minutes.
- Few tasks were done on time without delay.
- The step that takes a long time to execute is "verification of the required documents"; it takes around 6,492 minutes on average.
- Steps that take a long-time waiting are: "take a decision by Municipal Council" average waiting time is 1,860 minutes, "study the order by Building Committee" average waiting

time is 936 minutes, "approve by general manager of the Municipality" average waiting time is 900 minutes.

- The percentage of value added is around 60.2% of the total time of the process, which has been calculated by dividing the total minutes of the process time over the total time of the process.
- Percentage of Added Value = total time of each step / the total time of the process.
- There was no documentation of some steps like the time taken to modify the engineering documents by engineering office, it's included within the total time taken to verification of the required documents, but it's not the municipality responsibility.
- Some data are not available such as inventory data, number of defects, rework applications and the time needed to modify the engineering documents by the engineering office.



- Time taken to modify the Engineering documents is not included within the total time taken to issue the permit, its not the municipality responsibility.

Figure 5-3 : Value Stream Mapping for Issuing Building Permits Process.

5.6 Control Chart:

Control chart is a statistical process control tool used to determine if the process is in a state of control or not. The data were plotted in time order in MINITAB software to create the control chart graph which is shown in Figure 5-4, for the period from January 2017 to December 2017. The objective is to identify the central line of the process (the average time required to complete the process), the upper control limit and the lower control limit and to show if the process is stable or not. After inserting the current data on a statistical program, we can draw the following conclusions:

- The central line of the process is 22.5 days. Which mean that the average time needed to complete the process is 22.5 days.
- The upper control limit is 47.97 days.
- The lower control limit is -2.86 days.

Only one data point is above the upper control limit. After investigating the reason for this assignable cause, it was found that this point represents the time it took to issue permit for a commercial center, the delay is due to the citizen's decision to license one floor at a time.

As it's shown above, a lot of variation exists in the process, which shows the importance to carry out this project in order to reduce the variation in the process.



Figure 5-4 : Control Chart for Issuing Building Permits Process.
5.7 Voice of Customer (VOC):

The voice of customer is a term used to determine the citizens' specific needs or requirements from the process of Issuing Building Permit. In order to capture the voice of the customer (citizen), the improvement team prepared a questionnaire to capture citizens' opinions from different dimensions of quality and to identify the critical to quality characteristics.

5.8 Data Collection:

Population: Citizens of Beitunia who submitted requests for building permits.

Number of samples: the improvement team collected 48 questionnaires filled out through the Public Services Center and through field visits.

Survey answers scale: Likert scale was employed which consists of the following five categories: Satisfy

1	2	3	4	5
Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied

Table 5-3 : Survey answers scale.

The questionnaire used is available in Appendix C.

The improvement team has analyzed the data collected through the questionnaire using Statistical Package for the Social Sciences (SPSS) software. The analyses are shown in the following section:

Table 5-4 and Figure 5-5 display the age and the age range of the people who responded and filled the questionnaires. As can be seen from Table 5-4, the age range is from 26 to 76 years and the average age of the participants is 43.7 years.

Age		Frequency	Percent	Valid Percent	Cumulative Percent
	26	2	4.2	4.2	4.2
	29	1	2.1	2.1	6.3
	30	2	4.2	4.2	10.4
	31	2	4.2	4.2	14.6
	32	4	8.3	8.3	22.9
	36	2	4.2	4.2	27.1
	38	4	8.3	8.3	35.4
Valid	39	5	10.4	10.4	45.8
	42	6	12.5	12.5	58.3
	45	3	6.3	6.3	64.6
	46	3	6.3	6.3	70.8
	47	3	6.3	6.3	77.1
	48	3	6.3	6.3	83.3
	53	1	2.1	2.1	85.4
	66	3	6.3	6.3	91.7
	68	2	4.2	4.2	95.8
	76	2	4.2	4.2	100.0
	Total	48	100.0	100.0	

Table 5-4 : Distribution of Questionnaires' results by Age.



Figure 5-5 : Distribution of Questionnaires' results by Age.

Figure 5-6 shows that the research sample includes 44 men who form around 91.7% of the participants, and 4 women who form around 8.3% of the participants.



Figure 5-6 : Distribution of Questionnaires' results by gender.

The descriptive statistical results of the questionnaire are presented in Table 5-5 and Figure 5-7. It shows that the feedback from the citizens were positive for most of the questions. Citizens have scored between Very satisfied and Very unsatisfied with the process of Issuing Building Permits at Beitunia Municipality.

_	How does the employee tre	at citizens? The	e average is 4.06,	which means	satisfied.
---	---------------------------	------------------	--------------------	-------------	------------

How does the employee treat citizens		Frequency	Percent	Valid Percent	Cumulative Percent
	Very unsatisfied	-	-	-	-
	Unsatisfied	6	12.5	12.5	12.5
Valid	Neutral	2	4.2	4.2	16.7
	Satisfied	23	47.9	47.9	64.6
	Very satisfied	17	35.4	35.4	100.0
	Total	48	100.0	100.0	

Table 5-5 : How does the employee treat citizens?



Figure 5-7 : How does the employee treat citizens?

As the table above show 12.5% were unsatisfied with the way they are treated by the employees, 4.2% were neutral and 35% were very satisfied.

- Are the application requirements clear? As shown in Table 5-6 and Figure 5-8, the average is

The application requirements are clear		Frequency	Percent	Valid Percent	Cumulative Percent		
	Very unsatisfied	-	-	-	-		
	Unsatisfied	2	4.2	4.2	4.2		
Valid	Neutral	16	33.3	33.3	37.5		
	Satisfied	12	25.0	25.0	62.5		
	Very satisfied	18	37.5	37.5	100.0		
	Total	48	100.0	100.0			

3.96 which mean very satisfied.

Table 5-6 : Are the application requirements clear?



Figure 5-8 : Are the application requirements clear?

As the table above show 4.2% were unsatisfied with the clarity of the application requirements, 33.3% were neutral, 25% were satisfied.

 Are the Guidelines and Brochures issued by the Municipality clear and give full information? As shown in Table 5-7 and Figure 5-9, the average is 3.06, which means people interviewed are neutral.

The Guidelines and brochure issued by the Municipality are clear and give full information						
		Frequency	Percent	Valid Percent	Cumulative Percent	
	Very unsatisfied	10	20.8	20.8	20.8	
	Unsatisfied	7	14.6	14.6	35.4	
Valid	Neutral	13	27.1	27.1	62.5	
	Satisfied	6	12.5	12.5	75.0	
	Very satisfied	12	25.0	25.0	100.0	
	Total	48	100.0	100.0		

Table 5-7 : Are the Guidelines and Brochures issued by the Municipality clear and give full information?



Figure 5-9 : Are the Guidelines and Brochures issued by the Municipality clear and give full information?

As the table above show 20.8% were very unsatisfied with the Guidelines and Brochures, 14.6% were unsatisfied , 12.5% were satsfide and 25% were very satsfide.

Can you obtain all the information you want from the first visit? As per Table 5-8 and Figure 5-10, the mean is 3.31, which means people are neutral.

Obtain all the information you want from the first visit						
		Frequency	Percent	Valid Percent	Cumulative Percent	
	Very unsatisfied	2	4.2	4.2	4.2	
	Unsatisfied	14	29.2	29.2	33.3	
Valid	Neutral	14	29.2	29.2	62.5	
	Satisfied	3	6.3	6.3	68.8	
	Very satisfied	15	31.3	31.3	100.0	
	Total	48	100.0	100.0		

-1 abic J^{-} 0. Call you obtain an the information you want norm the mat you



Figure 5-10: Can you obtain all the information you want from the first visit?

As the table above show 4.2% were very unsatisfied with obtaining all the information from the first visit, 29.2% were unsatisfied , 6.3% were satsfide and 31.3% were very satsfide.

Was the municipality accurate in processing the application? As per Table 5-9 and Figure 5 11, the average is 4.65, which means very satisfied.

Municipality Accuracy in processing the application						
		Frequency	Percent	Valid Percent	Cumulative Percent	
	Very unsatisfied	-	-	-	-	
	Unsatisfied	-	-	-	-	
Valid	Neutral	2	4.2	4.2	4.2	
	Satisfied	13	27.1	27.1	31.3	
	Very satisfied	33	68.8	68.8	100.0	
	Total	48	100.0	100.0		

Table 5-9 : Was the municipality Accurate in processing the application?



Figure 5-11 : Was the municipality Accurate in processing the application?

As the table above show 27.1% were satisfied with the municipality Accurate processing of the applications, 4.2% were neutral.

What is the speed of completing the application? As shown in Table 5-10 and Figure 5-12, the average is 3.1, which means people interviewed are neutral.

The speed in completing the application						
		Frequency	Percent	Valid Percent	Cumulative Percent	
	Very unsatisfied	-	-	-	-	
Valid	Unsatisfied	18	37.5	37.5	37.5	
	Neutral	13	27.1	27.1	64.6	
	Satisfied	11	22.9	22.9	87.5	
	Very satisfied	6	12.5	12.5	100.0	
	Total	48	100.0	100.0		

Table 5-10 : What is the s	eed of completing	the application?
----------------------------	-------------------	------------------



Figure 5-12 : What is the speed of completing the application?

As the table above show 37.5% were unsatisfied with the speed of completing the application, 22.9% were satsfide and 12.5% were very satsfide.

What is the speed of verifying the engineering documents? As per Table 5-11 and Figure 5-13, the average is 3.27, which means that people interviewed are neutral.

The speed of verifying engineering documents						
		Frequency	Percent	Valid Percent	Cumulative Percent	
	Very unsatisfied	-	-	-	-	
	Unsatisfied	19	39.6	39.6	39.6	
Valid	Neutral	5	10.4	10.4	50.0	
	Satisfied	16	33.3	33.3	83.3	
	Very satisfied	8	16.7	16.7	100.0	
	Total	48	100.0	100.0		

Table 5-11 : What is the speed of verifying the engineering documents?



Figure 5-13 : What is the speed of verifying the engineering documents?

As the table above shown 39.6% were unsatisfied with the speed of verifying the engineering documents, 33.3% were satsfide and 16.7% were very satsfide.

Did the municipality commit to the deadlines? As per Table 5-12 and Figure 5-14, the average is 4.15, which satisfied.

Committing the dead lines		Frequency	Percent	Valid Percent	Cumulative Percent
	Very unsatisfied				
Valid	Unsatisfied	3	6.3	6.3	6.3
	Neutral	6	12.5	12.5	18.8
	Satisfied	20	41.7	41.7	60.4
	Very satisfied	19	39.6	39.6	100.0
	Total	48	100.0	100.0	

Table 5-12 : Did the municipality commit to the deadlines?



Figure 5-14 : Did the municipality commit to the deadlines?

As the table above shown 6.3% were unsatisfied with the municipality commit to the deadlines, 12.5% neutral, 39.6% were very satsfide.

What do you think about the Building Permit fees? As shown in Table 5-13 and Figure 5-15, the average is 3.33, which means people are neutral with permit fees.

Building Permit fees		Frequency	Percent	Valid Percent	Cumulative Percent
	Very unsatisfied	5	10.4	10.4	10.4
Valid	Unsatisfied	2	4.2	4.2	14.6
	Neutral	21	43.8	43.8	58.3
	Satisfied	12	25.0	25.0	83.3
	Very satisfied	8	16.7	16.7	100.0
	Total	48	100.0	100.0	

Table 5-13 : What do you think about the Building Permit fees?



Figure 5-15 : What do you think about the Building Permit fees?

As the table above shown 10.4% were verey unsatisfied with the Building Permit fees, 4.2% were unsatisfied ,25% satsfide, 16.7% were very satsfide.

What do you think about Laws and policies governing a building permit issuing process? As per Table 5-14 and Figure 5-16, the average is 3.31, which means people interviewed are neutral.

Laws and Policies governing a building permit issuing process					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Very unsatisfied	6	12.5	12.5	12.5
Valid	Unsatisfied	6	12.5	12.5	25.0
	Neutral	9	18.8	18.8	43.8
	Satisfied	21	43.8	43.8	87.5
	Very satisfied	6	12.5	12.5	100.0
	Total	48	100.0	100.0	

Table 5-14 : What do you think about Laws and policies governing a building permit issuing process?



Figure 5-16 : What do you think about Laws and policies governing a building permit issuing process?

As the table above shown 12.5% were verey unsatisfied with Laws and policies governing a building permit issuing process, 12.5% were unsatisfied ,43.8% satsfide, 12.5% were very satsfide.

Do you think policies and laws were applied on all citizens equally? The average is 3.67, which means people are neutral.

Applying of the policies and laws on all citizens equally						
		Frequency	Percent	Valid Percent	Cumulative Percent	
Very unsatisfied		2	4.2	4.2	4.2	
Valid	Unsatisfied	5	10.4	10.4	14.6	
	Neutral	11	22.9	22.9	37.5	
	Satisfied	19	39.6	39.6	77.1	
	Very satisfied	11	22.9	22.9	100.0	
	Total	48	100.0	100.0		

Table 5-15 : Do you think policies and laws were applied on all citizens equally?



Figure 5-17 : Do you think policies and laws were applied on all citizens equally?

As the table above shown 4.2% were verey unsatisfied with policies and laws were applied on all citizens equally, 10.4% were unsatisfied ,39.6% satsfide, 22.9% were very satsfide.

 What is the most important factor in the process of issuing building permit? The majority of people chose the time taken to complete the process.

The most important factor in the process of issuing building permit					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Time	34	70.8	70.8	70.8
Valid	Price	11	22.9	22.9	93.8
	Accuracy	3	6.3	6.3	100.0
	Total	48	100.0	100.0	

Table 5-16 : What is the most important factor in the process of issuing building permit?



Figure 5-18 : What is the most important factor in the process of issuing building permit?

As the table above shown 22.9% were choose that the most important factor in the process of issuing building permit is price, 6.3% were choose Accuracy.

 What is the appropriate period for completing the process of issuing the building permit in days: about 79.2% of people interviewed mentioned 10 days is appropriate.

The appropriate period for completing the process of issuing the building permit					
		Frequency	Percent	Valid Percent	Cumulative Percent
	30	3	6.3	6.3	6.3
Valid	20	14	29.2	29.2	35.4
	10	21	43.8	43.8	79.2
	5	10	20.8	20.8	100.0
	Total	48	100.0	100.0	

Table 5-17 : What is the appropriate period for completing the process of issuing the building permit in days



Figure 5-19 : What is the appropriate period for completing the process of issuing the building permit in days

As the table above shown 6.3% were choose that the appropriate period for completing the process of issuing the building permit in days is 30, 29.2 % were choose 20 days, 20.8% were choose 5 days.

Activation of the application through electronic services: all the respondents agreed, they want application through electronic services.

Activation of the application through electronic services					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	48	100.0	100.0	100.0

Table 5-18 : Activation	n of the application	through electronic services
-------------------------	----------------------	-----------------------------



Figure 5-20 : Activation of the application through electronic services

From the analysis of the questionnaires' results, we can conclude the followings:

- The most important critical to quality factor is the time. In general, the citizens want the lead time from submitting requests to receiving permits to be lower than 10 days.
- With regards to the brochures distribution the respondents gave a grade of 3.6 which means brochures don't have clear information; hence an action is required by the municipality to improve their brochures.
- The citizens gave a grade of 3.1 with regards to the speed of processing the applications which is a negative result therefore work is needed to cut the time taken to process the applications.
- Another result is that the step of verifying the engineering documents takes a long time to finish; hence work is needed to cut time taken.

The municipality must take the following actions:

- Improve the guidelines and brochure issued by the municipality to help citizens obtain the information they need easily.
- Make improvements to speed up the process.
- Speed up the step of verifying the engineering documents.
- Review the policies and laws governing the building permit issuing process.

		Age	Gender	Position	Accuracy to complete the application	Accuracy of punctuality	How do employees deal with citizens	The application requirements are clear	Ease of transaction procedures	Apply policies and laws to all citizens in the same way
N	Valid	48	48	48	48	48	48	48	48	48
IN	Missing	0	0	0	0	0	0	0	0	0
	Mean	43.73	1.08		4.6458	4.1458	4.0625	3.9583	3.8542	3.6667
	Rank	-	-	-	Very high	High	High	High	High	High
S	td. Deviation	12.564	.279		.56454	.87494	.95441	.94437	.79866	1.07848
	Minimum	26	1		3.00	2.00	2.00	2.00	3.00	1.00
	Maximum	76	2		5.00	5.00	5.00	5.00	5.00	5.00
		Building Permit fees	Laws and policies governing a building permit	Get the information you want from the first time	The speed of verification engineering documents	The speed in completing the application	Guidelines and brochure issued by the Municipality	The most important factor in the process of issuing building permit	The appropriate period for the complete the process	Activation of the application through electronic services
N		48	48	48	48	48	48	48	48	48
IN		0	0	0	0	0	0	0	0	0
	Mean	3.3333	3.3125	3.3125	3.2708	3.1042	3.0625	1.3542	2.7917	1.00
	Rank	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	-	-	-
S	td. Deviation	1.13613	1.22312	1.30720	1.16216	1.05668	1.46456	.60105	.84949	0.000
	Minimum	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1
	Maximum	5.00	5.00	5.00	5.00	5.00	5.00	3.00	4.00	1

Table 5-19 : Summary of Statistical Analysis Results

5.10 Summary and Next Step

In this chapter, the current performance of the process was studied, key measures were identified, and the voice of the citizens was captured using the following tools: Flowchart, Eight Wastes, Quick Wins, Value Stream Mapping, Control Chart, and Voice of Customer. In the following chapter, the root causes of the problem are identified and verified.

Chapter 6: Analyze Phase

6.1 Introduction:

The main goals of this phase are to analyze the problems and process inefficiencies, identify the root causes for both the variation and waste, and to define the improvement opportunities. The first activity carried out was an in-depth study of the process through a brainstorming session with the process owner and operators to identify the potential causes.

In this chapter, the analysis tools used by the team will be demonstrated. They include: Cause and Effect Diagram and Five Whys.

6.2 Cause and Effect Diagram:

The improvement team used the Cause and Effect Diagram to identify many possible causes for problems in the process. It can be used to arrange the ideas in a brainstorming session and sort it into useful categories.

The improvement team created the following Cause and Effect Diagram as shown in Figure 6-1 to identify potential root causes related to the process (People, Methods, Material, Technology, and Environment).



Figure 6-1 : Cause and Effect Diagram (Fishbone Diagrams).

6.3 Five Whys:

Five Whys is a tool used to determine the cause and effect relationships underlying a particular problem. The main objective of this technique is to determine the root causes of the waste or the problem by repeating the question "Why?" Each answer forms the basis of the next question.

The benefits of this tool are that it is the simplest one, easy to use without statistical analysis, helps us to locate issues, and shows the relationship between different root causes of the problem.

The improvement team had detected five potential reasons for the delay in the process and prepared the Five-Whys? Question as shown in the next pages:

Define the Problem: There is no set work time for each step of the process

Why no set work time for each step of the process causes variation in the time it takes to finish the process of issuing the permit?



Define the Problem: Poor Services System

Why that there is a poor services system causes variation in the time it takes to finish the process of issuing the permit?



Why the need to fill too many papers causes variation in the time it takes to finish the process of issuing the permit?



 How do we stop this from
 Evaluate the current system and involve the staff in developing it.

 happening again?
 Evaluate the current system and involve the staff in developing it.

Define the Problem: Numerous Steps

Why numerous steps in the process cause variation in the time it takes to finish the process of issuing the permit?



Define the Problem: No documented procedure

Why no documented procedure causes variation in the time it takes to finish the process of issuing the permit?



How do we stop this from happening again?

Study the workload on each employee and redesign procedure.

6.4 Summary and Next Step

In this chapter, the root causes of the problem were identified and verified using the 5 Whys tool and the Cause and Effect Diagram. In the following chapter, the improvement theories will be tested, results of testing will be studied, and improvement theories that achieve the research objectives will be adopted and implemented.

Chapter 7: Improve Phase

7.1 Introduction:

The main goal of the improve phase is to define possible solutions, implement the improvements, study results, and document the new process.

In this phase the tools below were used:

- Flowchart.
- Control chart.
- VSM.

7.2 Define Possible Solutions:

Following the application of the tools in the analyze phase, the improvement team concluded that the waste that exists in the process is due to the following root cause by using five whys:

- The municipal services system is poor.
- There is no specific time period for each step in the process.
- Existing of numerous steps that delay the process completion.
- Long waiting time between steps.
- Non-value-added steps exist in the process.

The improvement team made four suggestions:

- The steps of checking the water bills debt and crafts and health to be merged into one step and they would be checked by the same OSS employee before inserting the application in the system.
- 2. The building committee would be delegated to approve the applications instead of the municipal council.
- 3. The steps of checking the water bills debt, crafts and health and the verification of engineering documents to be done in parallel to save time.
- 4. The municipal weekly meeting would be rescheduled from Tuesday to Sunday.

These suggestions were intensively studied and reviewed by all the stakeholders who participated in the process. The third and fourth suggestions were approved and implemented. On the other hand, the first suggestion was rejected due to fear of problems occurring with the workers association as some employees may become redundant as a result of the merging. Moreover, the second one was rejected because the municipality council refused to authorize the Building Committee to Issue Building Permit as the law states that only the municipality council has the authority to issue the permits.

The improvement team agreed to solve the issues by applying these improvements (suggestions 3, and 4).

A letter was prepared and sent to the municipality's council and management on June 1st, 2018 as shown in Appendix D, which included the following improvements suggestions:

 Determine the requirements for the new service system, which was approved to be purchased by the municipality's management. Key performance indicators with respect to time for each step in the issuing building permits
 process were determined as shown in Table 7-1:

Task	Period	Note
Insert order	immediately	
Check the debt of water bills	1 hour	
Check with department of Health and Crafts any pending issues.	1 hour	These steps are done in parallel
Verification of the required documents	3 days	
Study the order by Building Committee	3 day	
Take a decision by Municipal council	1 day	
Calculate fee	1 day	
Handover the permit to the applicant	-	When the applicant is ready

Table 7-1 : Key performance indicators - time for each step in the Issuing Building Permits Process.

- Remove all non-value-added steps such as the approval of the director of the municipality for issuing the permits.
- Perform the checking of water bills, craft and health and verifying the engineering documents steps simultaneously to save time.
- Change the meeting of the municipality council from Tuesday to Sunday.
- When the engineer verifies the engineering documents, he or she adopts a check list as it's shown in Appendix E.
- A new managerial employee was hired to help with the work in the engineering department.
- A new brochure stand was installed in the OSS, which contains leaflet to give information about the requirements for the building permits as its show in the Appendix F

On June 10, 2018, the mayor of Beitunia Municipality responded with the letter shown in Appendix G, in which, he approved the improvements we suggested to them.

A new flowchart has been created to clarify the new process of issuing the permits as shown in Figure7-3:

Flowchart of Building Permit Process – New process



Figure 7-1 : Flowchart for the new process of issuing the permits.

7.3 Improvement Propositions:

In this section, the following improvement theories will be explained, in order to check if any of them will shorten the time taken to Issue Building Permit:

- 1. Will the new software system shorten the time taken to issue building permits?
- 2. Will changing the date of the municipal meeting from Tuesday to Sunday shorten the time taken to issue the building permit?
- 3. Will adapting to a new procedure with a specific time for each task result in shortening the time taken to issue building permits?
- 4. Will the new leaflets and checklist shorten the time taken to issue building permits?

7.4 Implement Improvements:

The improvement team collected data from the new software system to confirm the feasibility of the process improvement theories presented in the previous section, and after analyzing the collected data, we can confirm that there is a relation between the improvements that were adopted and the shortening of the time taken to issue the permits, Table 7-3 shows the data collected between 1-7-2018 and 31-7-2018.

The project manager provided status reports to the team that included the tasks that were completed and any outstanding unresolved issues, as shown in Table7-2:

#	Quality Concern	Potential Solution	Status
1	Poor system	Adoption a new software	Done
2	There is no documented procedure	Documenting and Writing Procedure	Done
3	Mistake or missing issue may occur while checking required documents. /defects	Adopt a checklist while verifying the required documents	Done
4	The need for application to goes through extra unneeded steps / Excessive Processing	Eliminate assignment of tasks to wrong employees	Done
5	No close transaction of application in the system /waiting time.	Continuous updating of the application process stages on the system	Done
6	Incorrect information in the system resulting from assigning tasks to employees' names instead of their positions. /defects	Change names of the employees on the system to their positions	Done
7	The application goes through too many steps	Cut the number of applications handoffs from 11 to 5 to increase productivity	The number of steps has been decreased to 7
8	Small and similar tasks of checking applicant's status with respect to outstanding water bills, property tax, and if the applicant has any issue with Department of Health and Crafts, that don't require a dedicated stage. /Excessive Processing	Integrate three steps of checking the applicant's status into one task with the insert application step. (one person does all of the steps)	The process has been changed in which the three steps will be done in parallel
9	Illustrate the requirement from the citizen for a building permit needs/ defect	Providing a guidebook to citizens to explains the requirements needed for issuing building permits	Done
10	Application waits for long time until approved (Tuesday) /waiting time.	Delegate the building committee in the municipality to handle the task of approving the building permit instead of the municipal council	The suggestion was rejected, and a recommendation was made to change the weekly meeting from Tuesday to Sunday
11	Application waits for long time until study (Saturday) /waiting time.	Change the date for meeting the municipal council from Tuesday to Sunday	Done

Table 7-2 : Status reports of the improvements that were completed and any outstanding unresolved issues.

After the improvement team received the approvals required, the municipality implemented the process in the new services system of Issue Building Permits across a one-month period from 1 July to 31 July.

7.5 Study Results and Measure the Impact of Improvements:

The improvement team measured the impact of the improvements after the majority of the improvement opportunities were implemented for the process.

Table7-3 show the time taken to complete the process in days: (see Appendix H detail report for the time taken to complete the applications after improvements).

APP #	Time per Day
1	9
2	13
3	12
4	14
5	9
6	9
7	12
8	13
9	10
10	14
11	11

Table 7-3: Report of Time taken to complete applications of issuing building permits after improvements.

The reduction of the process time was a result of the elimination of non-value-added tasks, determining specific set time period for each step, reducing the number of steps, and adopting new software system.

By obtaining the findings from the testing phase, we can confirm that the new process has shortened the process time from 26 days to only 10 days. VSM and control chart were created, to ensure the validity of our findings.
7.6 Value Stream Mapping (VSM):

After the improvements are done, the improvement team prepares VSM by obtaining a report from the system for 11 applications. The improvement team has come up with the following findings:

- The total number of the applications considered is 11 applications.
- The average time needed to complete the process is 5280 minutes.
- The most steps were done on time without delay.
- The step that takes a long time to execute is verification of the required documents; it takes around 1,813 minutes on average.
- The step that takes a long time in waiting before it is done (study the order by building committee; it takes 1,527 minutes on average.
- The average of value added around 75.5% of the total time of the process.
- Some data are not available such as inventory data, number of defects, rework applications and the time needed to modify the engineering documents by the engineering office.

Figure 7-4 shows the VSM after the improvement team implemented the improvements:



20 M	60 M		175 M		1813		No data		480 M		480 M		480 M	480 M			Lead time : 5280 M
0 M		0 M		0 M		No data		1527 M		o M		o M		No data		0 M	%VADD= 75.5%

- Time taken to modify the Engineering documents is not included within the total time taken to issue the permit, its not the municipality responsibility.

Figure 7-2 : VSM for the new process of issuing the permits.

7.7 Control Chart:

The data were plotted in time order in MINITAB software to create the control chart, for the period from 1-July 2018 to 31-July 2018.

From the control chart created in Figure 7-5, the followings can be observed:

- The central line of the process is now 10.18 days instead of 22.55 days, which is more than 50% reduction in lead time. The process is now stable, faster, and has low variation.
- The upper control limit of the process is now 17.1 days instead of 47.97 days.
- The lower control limit of the process is now 3.27 days instead of -2.88 days.



Figure 7-3 : Control chart for the new process of issuing the permits.

7.8 Document Procedures and Train Employees on the Improved Procedures:

The improvement team documented the improved and standardized procedures, which included all detailed process steps and computer screen shots. The procedures were developed based on our detailed knowledge of the process of Issuing Building Permits. The procedures were so thorough, that on several occasions when any employee was not available, any other employee can step in and fill in for him or her even with limited advanced training. A sample procedure is included in Appendix I.

7.9 Employee Training:

A meeting was held with every employee working in the process, and they were told what the roles are he or she needs to fulfill and the notes that should be inserted into the system. Also, they were told all the new steps and the period that they need to complete them in. The departments' heads received a signed copy of the new improvements. All the new changes and improvements were explained to them and all their questions were answered. Also, the improvement team agreed with the employees to provide them with any suggestion that would improve the process.

7.10 Summary and Next Step:

In this chapter, the improvement theories were tested, results of testing these theories were studied, and improvement theories that achieved the research objectives were adopted and implemented using the following tools: Flowchart, Value Stream Mapping, and Control Chart. In the following chapter, tools to standardize the new process, and to monitor and sustain the performance of this process were identified.

Chapter 8: Control Phase

8.1 Introduction:

The last phase of Six Sigma's DMAIC model is the Control phase. The main goal of this phase is to monitor the improved standard and performance measures to control and sustain the new processes. Moreover, a plan for monitoring and controlling the process was established to ensure that the action item created in the improve phase is effectively implemented and gains are maintained.

8.2 Ensure the Process is Properly Managed and Monitored:

In order to maintain focus, the improvement team must narrow down the vital few measurements they need for continuous monitoring of the process performance. In addition, an OCAP (out of control action plan) was created as shown in Table 8-1, to represent a response plan which explains what to do in the case that the process performance starts to deviate from standard. This often leads to continued process refinement.

101	
101	

Deficiency Description	Process Step	Responsibility	Specification Limits Requirement	Response Plan / Actions to be taken	Resources
Missing documents	Insert order	OSS employee	100%	Call the applicant and ask for the missing documents	OSS employee / system
Employee made a mistake and gave a clearance for someone Who has unpaid water bills. Pending issue with department of health and craft.	Check water bills. Check the department of health and craft.	OSS employee	100%	Send the application back to the OSS employee and ask him/her to correct the mistake	OSS employee System Department of health and craft employee.
Delay in verifying of the engineering documents	Verifying of the engineering documents	Engineering department	It must be done in 2 days	The head of the engineering department monitor the process and remove any obstacles	The head of the engineering department
Rescheduling or cancelling any meetings	Study order in the building committee	Building committee	The meeting must be held every week	In case of cancelling a new date must be set as soon as possible	The head of the building committee
Rescheduling or cancelling any meetings	Approve the application	The municipality council	The meeting must be held every week	In case of cancelling a new date must be set as soon as possible	The mayor
Making a mistake in calculating the fees	Calculate the fees	Engineering department	100%	Call the applicant and ask for the missing fees	The head of the engineering department
Delay occur at any step in the process	All steps	OSS Manager	It must be done in 10 days	Follow up of applications through weekly report	OSS Manager/ system

Table 8-1 : OCAP (Out of Control Action Plan) for Building Permits Process.

8.3 Plan for Monitoring and Controlling the Process:

The plan for monitoring and controlling the new improved process shown in Table 8-1 includes the following:

- The newly purchased system for entering and processing applications has been modified in order to:
 - 1. Enable the implementation of the improvements resulted from this research.
 - 2. Show the applications in process, their status, and the date they were inserted into the system. (See Appendix J: new software system shot screen)
- An employee was appointed in every department to be responsible for following the pending applications in his or her department.
- The brochure shown in Appendix F which was created in the improve phase needs to be distributed in the municipality One Stop Shop and added to the municipality website.
- The checklist shown in Appendix E for checking that all the Engineering requirements have been done should be used on a daily basis by the Engineering officers.
- The OSS manager in charge will make and send the reports on Monday to all the coordinators, who will follow up the applications or provide reasons why the applications are pending.
- A monthly meeting between the coordinators will be held to study and correct any mistakes.
- If any of the employees has any suggestions, he or she needs to deliver them to the coordinator so that they could be discussed in the monthly meeting.
- The standard operating procedures shown in Appendix I which have adopted need to be followed all time.

The following control charts for the new improved process will be used to monitor the process in the future through collecting 1-2 data points on a weekly basis and plotting them on the control charts:



Figure 8-1 : Control chart to monitor the new improved process.

8.4 Apply Improvements to Other Areas:

The improvement team made a recommendation to the municipal council to form a team from all the departments and train them to be able to apply Lean Six Sigma improvement methodology to improve all process as was done to the Building Permit Process, in order to improve the services offered to Beitunia citizens, and to build a system for continuous improvement, to achieve the following goals:

- Create a culture to support continuous improvement in all departments.
- Shortening the time taken to deliver services.
- Improving the quality of services.
- Increasing effectiveness of services and efficiency of internal system.
- Cutting cost.

8.5 Summary and Next Step:

In this chapter, tools to standardize the new process, and to monitor and sustain the performance of this process were identified and these were: Flowchart, OCAP, and control chart.

Chapter 9: Conclusions, Results, and Recommendations

9.1 Conclusions

In conclusion, the application of Lean Six Sigma at Beitunia Municipality using the DMAIC approach is a powerful guide to successfully improve the quality of services or processes, reduce variation, and eliminate waste. This methodology, which contains powerful tools such as flowchart, value stream map, eight wastes, voice of customer, quick wins, cause and effect diagram, and control chart, is highly effective in not only achieving more effective processes but also in improving communication and participation within the Municipality to better achieve its goals and customers' satisfaction.

The propositions raised in the define phase of this research have been proven to be valid which means that the Municipality of Beitunia does not provide the required quality of services for the locals. The citizens of Beitunia Municipality who were interviewed agreed with the findings of this research regardless of their age, gender, place of work, or experience. The level of administrative services is unsatisfactory, as the citizens have rated the average speed for completing the building permit application 3.1 out of 5.

9.2 Results:

The results of implementing the improvements to the process of issuing building permits at Beitunia Municipality can be summarized as follow:

- The period required for issuing permits has been reduced from 26 to 10 days.
- Reducing the number of hours required for processing the applications in the Engineering
 Department from eight working hours to 4 hours.

- The number of resubmitted applications was reduced by more than 50%.
- The period needed for the citizens to stay in the OSS has been shortened.
- Improving the Building permit application processing system by making tracking the applications in the system easier through breaking down some steps into sub-steps to highlight where exactly the application is standing.
- Standard operating procedures were developed for the process of Issuing Building Permits.
- Checklist for auditing the Engineering documents' requirements has been developed.
- A new flowchart for the process of Issuing Building Permits has been created after removing some non-value-added steps, merging some steps, and making some steps run in parallel.
- A brochure to give information to citizens of Beitunia on the requirements of the Engineering department has been created, printed, and distributed to citizens.
- The weekly meeting for the Beitunia Municipality council's members has been changed from Tuesday to Sunday. This resulted in reducing the waiting time for collecting the building permits by 3 days.
- Internal hiring or transfer of an employee from the Archive department to the Engineering department and was tasked to insert notes in the system about the building permits applications, creating the minutes of meetings for the building permit committee, and prepare all the application ready for the council meetings.
- Sorting the applications on hold on the system by updating the status of many of them or requesting missing documents from citizens (see Appendix K for the announcement, which was made by the Municipality to citizens to ask them to complete their applications).

Moreover, the improvement team have concluded that the main success factors that are critical to the effective implementation of the Lean Six Sigma methodology in the Municipality of Beitunia are as follow: top management commitment, supporting organizational culture to improvement efforts, listening to voice of citizen/customer, and competent team who are skilled in using Lean Six Sigma methodology and tools.

9.3 Recommendations:

To improve community planning and development of operational efficiencies within the permitting process, we recommend the following corrective actions:

- The Municipality should establish quality department/roles in the Municipality structure, to be responsible for monitoring the quality of the services and processes in all departments.
- 2. The Municipality council should authorize other departments to make decisions and move towards decentralized authority system.
- 3. Applying the Lean Six Sigma methodology to improve other processes.
- 4. The municipality should compile a list of "best management practices" for streamlining the designing and development of processes.
- 5. Customer Survey Feedback and Trending: building a system to listen and communicate with the locals to know their issues and complaints (voice of customer).
- 6. The municipality should consider enhancing their current practices related to the tracking and monitoring of the applications in the process, to identify reasons why applications are resubmitted, and to provide customers with the information needed to help reduce the number of resubmitted applications.
- 7. The municipality should work with staff, applicants and applicant representatives to agree on, set and monitor timelines for all services.

- 8. Focusing on a plan for training the employees: The Municipality should develop and implement a training plan that addresses the skills lacked by the employees, especially on how to use and apply Lean Six Sigma tools.
- 9. It is important to change the reward and recognition system in order to motivate employees to make improvements and celebrate their achievements.
- 10. The municipality should reorganize the engineering department office and make engineering department offices adjacent.
- 11. The municipality should work with other developed municipalities to acquire best practices and learn from their experience.
- 12. The municipality should build an effective internal communication system, which could include an internal emailing system.
- 13. Improve current E-services system so that the locals can submit their applications through it.
- 14. The municipality should create easy public access to information, procedures and processes.
- 15. The municipality management needs to support all improvements efforts and applications of Lean Six Sigma, as commitment of top management is considered crucial.
- 16. The engineering department and other departments should continue to review and improve the Building Permit Process.
- 17. The municipality should evaluate the current systems and involve staff in both the evaluation process and developing these systems.
- 18. The municipality should study the workload and current staff work capacity.

9.4 **Result contributions:**

The research's main contributions to theory and practice can be summarized as follow: this is the first time that Lean Six Sigma Methodology has been applied to improve a public sector organization in Palestine and a thesis in the Lean Six Sigma field application has been added to the literature. Moreover, the study contributes to strengthening practices of Lean Six Sigma, documenting work procedures for services provided to citizens in the local governments, and creating control procedure for services provided to citizens in the local governments.

9.5 Future Research Work:

Lean Six Sigma can be implemented to improve all services in the municipality, such as waste management, craft permits, and debt collection. Moreover, Lean Six Sigma can be implemented in other municipalities or public sector institutions to improve their services.

Other future research work include identifying critical success factors for Six Sigma implementation in local government in Palestine; and implementing Hoshin Kanri or Strategy Deployment to ensure that the municipality's strategy is deployed in the municipality structure.

List of References

- Abbas ,O.(2014).Simplify the process of obtaining building permit in Alsharqia district in Egypt, Retrieved from: tanzemsharkia.rigala.net/t27-topic.
- Abu Zaid ,W.(2011).The impact of critical success factors in the application of Six Sigma Methodology on customer satisfaction in the Department of Civil Status and Passport Department in Amman. Retrieved from www.meu.edu.jo/libraryTheses/5860efe505dae_1.pdf.
- Adams, M. D., Celniker, S. E., Holt, R. A., Evans, C. A., Gocayne, J. D., Amanatides, P. G., ... & George,
 R. A. (2000). The genome sequence of Drosophila melanogaster. Science, 287(5461), 2185-2195.
- Adams, N D, What is a Context Diagram and what are the benefits of creating one? Retrieved from ttps://www.modernanalyst.com/Careers/InterviewQuestions/tabid/128/ID/1433/What-is-a-Context-Diagram-and-what-are-the-benefits-of-creating-one.aspx.
- Aljbory & (2009) Six Sigma method the relation between its statistical and its implementation using a descriptive analytical style .Journal of the development of Rafidain.143-125 ,(93)31 ,
- Behnam Nakhai, Joao S. Neves, (2009) "The challenges of six sigma in improving service quality", International Journal of Quality & Reliability Management, Vol. 26 Issue: 7, pp.663-684, https://doi.org/10.1108/02656710910975741
- Beitunia Municipality Website: https://www.facebook.com/pages/biz/community_organization/609779535718010/.
- Bevan, H. (2006). Lean Six Sigma: some basic concepts. NHS Institute for Innovation and Improvement.
- Borooah,A. (2013). Building Permit Review Times & Enforcement of the Sign By-law. Retrieved from https://www.toronto.ca/legdocs/mmis/2013/pg/bgrd/backgroundfile-61207.pdf.
- Cuc, S., & TRIPA, S. (2007). Lean Six Sigma and Innovation. Fascicle of Management and Technological Engineering, 6 (16), 2525-2530.
- De Mast, J., & Lokkerbol, J. (2012). An analysis of the Six Sigma DMAIC method from the perspective of problem solving. International Journal of Production Economics, 139(2), 604-614.
- De Mast, J., Does, R. J. M. M., & de Koning, H. (2006). Lean Six Sigma for service and healthcare.
 Alphen aan den RijnBeaumont Quality Publications90809277329789080927735.

- Dinesh Seth * & Vaibhav Gupta (2005) Application of value stream mapping for lean operations and cycle time reduction: an Indian case study, Production Planning & Control, 16:1, 44-59, DOI: 10.1080/09537280512331325281
- Eldean, N. S. S., & Bartamani, M. S. (2018). University Service Quality in the Community Service and Continuing Education Center at Sultan Qaboos University: An Empirical Study Using SERVQUAL Scale. Journal of Educational and Psychological Studies [JEPS], 12(1), 16-39.
- Engen, J. (2011). Working Together A best-practices approach to improving the City of Missoula's development review system . Retrieved from https://www.ci.missoula.mt.us/DocumentCenter/View/5476/WorkingTogetherPPT?bidId=.
- Furterer, Sandra L., "A Framework Roadmap for Implementing Lean Six Sigma In Local Governmental Entities" (2004). Electronic Theses and Dissertations. Paper 91.
- Gijo, E. V., & Scaria, J. (2014). Process improvement through Six Sigma with Beta correction: a case study of manufacturing company. The International Journal of Advanced Manufacturing Technology, 71(1-4), 717-730.
- Goswami, S., & Mathew, M. (2005). Definition of innovation revisited: An empirical study on Indian information technology industry. International Journal of Innovation Management, 9(03), 371-383.
- Graham Manville, Richard Greatbanks, Radica Krishnasamy, David W. Parker, (2012) "Critical success factors for Lean Six Sigma programmes: a view from middle management", International Journal of Quality & Reliability Management, Vol. 29 Issue: 1, pp.7-20, https://doi.org/10.1108/02656711211190846
- Hamada ,A.(2015).Process improvement organizational development. Retrieved from: (https://www.linkedin.com/pulse/what-process-improvement-organizational- developmentabdelaziz-hamada)
- He, Z., Zhang, X. T., & Zhang, M. (2014). Reducing the voluntary turnover rate of dispatched employees by the DMAIC process. Total Quality Management & Business Excellence, 25(7-8), 842-855.
- Howell, K. E. (2012). An introduction to the philosophy of methodology. Sage.
- Jovanović, T., Aristovnik, A., & Lugarić, T. R. (2016). A comparative analysis of building permits procedures in Slovenia and Croatia: development of a simplification model. Theoretical and Empirical Researches in Urban Management, 11(2), 5-23.
- Juda, mahfoth Ahmad.(2013). Improve process quality by implementing Six Sigma in the services sector .Remah Review for Research and Studies.21-1 ,(2086)21 ,

- Juran, J. M. (1999). Juran's Quality Handbook (5th Edition). McGraw-Hill
- Kapur, K. C., & Feng, Q. (2005). Integrated optimisation models and strategies for the improvement of the Six Sigma process. International Journal of Six Sigma and competitive advantage, 1(2), 210-228.
- Kaushik, P., & Khanduja, D. (2009). Application of Six Sigma DMAIC methodology in thermal power plants: A case study. Total Quality Management, 20(2), 197-207.
- Kothare, M. V., Balakrishnan, V., & Morari, M. (1996). Robust constrained model predictive control using linear matrix inequalities. Automatica, 32(10), 1361-1379.
- Maleyeff, J. (2014). Sustaining Public Sector Lean Six Sigma: Perspectives from North America.
 Management and Organizational Studies, 1(2), 92.
- Maleyeff, J., & Campus, H. (2007). Improving service delivery in government with lean six sigma (pp. 1-45). Washington, DC: IBM Center for the Business of Government.
- Martin,k.2010, Value stream mapping for non manufacturing environments Retrieved from: https://www.slideshare.net/KarenMartinGroup/value-stream-mapping-in-nonmanufacturingenvironments?qid=3edec0ea-f6d7-4080-a95b-765390a90fd1&v=&b=&from_search=2
- Miller (2005), Going Lean in Healthcare, IHI White Paper.
- Nakhai, B., & Neves, J. S. (2009). The challenges of six sigma in improving service quality.
 International Journal of Quality & Reliability Management, 26(7), 663-684.
- O'Brien, Timothy M. (2017). Audit Report Community Planning and Development Building Permits. Retrieved from : https://www.denvergov.org/content/dam/denvergov/Portals/741/documents/Audits_2017/CPDPe rmittingSystem_August2017.pdf
- O'Rourke ,T. City of SeaTac: Improving the Right-Of-Way Permit Process from 21 Days to 5 Days.
 Retrieved from: https://goleansixsigma.com/rapid-improvement-event-example-right-way-permit-process-city-sea-tac/.
- Pedersen. (2009) the Business Process Bank (BPB) in Denmark (2009). Retrieved from https://www.bptrends.com/publicationfiles/04-10-CS-Danish%20Municipalities%20Case%20Study-2.pdf
- Prashar, A. (2016). Six Sigma adoption in public utilities: a case study. Total Quality Management & Business Excellence, 27(5-6), 479-506.

- Process improvement. Business Dictionary. Retrieved from: http://www.businessdictionary.com/definition/process-improvement.html
- Rother, Mike; Shook, John (1999). Learning to See: value-stream mapping to create value and eliminate muda. Brookline, Massachusetts: Lean Enterprise Institute. ISBN 0-9667843-0-8.)
- Rouse ,M. business process improvement (BPI)-(1-2-2018). Retrieved from: https://searchcio.techtarget.com/definition/business-process-improvement-BPI
- Pyzdek, Thomas, Six Sigma Handbook, McGraw-Hill, 4th Edition, 2014
- Saxena, Kumar (June 2007). "SIPOC". Noida, India. Retrieved 2012-07-03
- Sbeha, M.(2016) .The method of improving the services provided by the local government, Retrieved from Journal of the New Economy, No. 14, Volume 2016-01..
- Serrat, "Five Whys Technique". adb.org. Asian Development Bank. February 2009. Retrieved 26 March 2012.)
- SEVOCAB: Software Systems Engineering Vocabulary. Term: Flow chart. Retrieved 31 July 2008
- Summers, Donna C.S (2011). Lean Six Sigma: Process Improvement Tools and Techniques. One Lake St, Upper Saddle River, New Jersey: Prentice Hall. ISBN 978-0-13-512510-6
- Silva, S. K. P. N. (2012). Applicability of value stream mapping (VSM) in the apparel industry in Sri Lanka. International journal of lean thinking, 3(1), 36-41.
- Tennakoon, B.M.M.M and Palawatta, T.M.B., A Case Study on Application of DMAIC to Improve Delivery Efficiency (December 22, 2015). 12th International Conference on Business Management (ICBM) 2015 - The Best Case Study Presentation Award. Available at SSRN: https://ssrn.com/abstract=2706992 or http://dx.doi.org/10.2139/ssrn.2706992
- Watson, G. (2004). The Legacy of Ishikawa. Quality Progress 37(4), 54-47.
- Webber, Larry; Wallace, Michael (15 December 2006). Quality Control for Dummies (https://books.google.com/books? id=9BWkxto2fcEC&pg=PA43). For Dummies. pp. 42–43. ISBN 978-0-470-06909-7. Retrieved 2012-05-16
- Womack, J. P., & Jones, D. T. (1997). Lean thinking—banish waste and create wealth in your corporation. Journal of the Operational Research Society, 48(11), 1148-1148.
- Zefaj, E. (2017). Lean Six Sigma Based Administration Municipal Services versus Current Ones: Measuring the Gap from Civil Servants Perspective. Mediterranean Journal of Social Sciences, 8(1), 359.

Zu, X., Robbins, T. L., & Fredendall, L. D. (2010). Mapping the critical links between organizational culture and TQM/Six Sigma practices. International Journal of Production Economics, 123(1), 86-106

Appendices

Appendix A: Workflow of the old process.

<u>\$</u>			-			_						
										، حِتَل بَعَلْيِمات بَاقَدْهُ	ليتعلام فطعة سيل	إجراء بحرير
							? 🚳 🛒 🖻	\$ I 🕨 🕨	• «	📆 📸 🗞 🎁	1 🔀 🗊	। 🍓 冷)
· · · · · · · · · · · · · · · · · · ·												
e	يد الغاء تعديل رجو	تغزين الغال جد					لب	د مسارات الط	تحديد			
	عرص رسم المسار						ناء جديد على ارض خالية	ب طلب رخصة با	الطلب			
		<u>الرد</u> اعة دقيقه الكيقية الاولوية	<u>فترة</u> قي يوم سا	المسمى الوظية	التوع	هيكلية البلدية	الموظف	ظف اسم	الموظ			
	اظهار على الانترنت 📃 يتطلب وثيقة	1 0 التوازي 🔽 🖌	0	رئيس شعبة	لتعبة	قسم الجباية والضرائب	ل عقل		6 📥			
	اظهار على الانترنت 📃 يتطلب وثيقة	0 0 (التوالى 🖵 1	1	مدير البلدية	دائرة	مدير اللبدية	ىد مجدوبة	54	10			
	اظهار على الانترنت 📃 يتطلب وثيقة	1 0 التوازي 🔻 1	0	موظف	ئىعبة	قسم الجباية والضرائب	ی ہریش	مله	11 🚲			
	اظهار على الانترنت 📃 يتطلب وثيقة	التوالي 🔻 5	0	رئيس قىم	لنعبة	قسم الابنية والتنظيم	، عازم	فداء	7 🖒			
	اظهار على الانترنت ايتطلب وثيقة	6 🗸 6	0	رئيس قىم	لنعبة	قسم الابنية والتنظيم	، عازم	فداء	7			
	اظهار على الانترنت] يتطلب وثيقة	1 0 التوالي 🔻 7	0	رئيس شعبة	، والم تسعية	قسم الرقابة الصحية والحرف	ر هريش	-14 <u>-</u>	3 —			
	اظهار على الانترنت] يتطلب وثيقة	0 0 التوالي 🔻 8 🗸	60	رئيس قىم	ئىمية	قسم الابنية والتنظيم	، عازم	قداء	7 👻			
								ملاحظات				
		ريمن	نمودج ال					بمودج القيول				
				_				الوئائق المطلوبة	N.			
	18	the direct densiti				مرتبط ب	الوثيقة	الكود ومنف				
					بلرى 🔻	مكلف أجبا	ة هوية	🔺 01 مىرر				
	مؤرشف المعاملة	المحطة التهانية صاحب الصلاحية العليا			بلري 🔻	معاملة اجب	د موقع جدید	29 مخطم				
	قبار موظفين المسار	مستلد الطلب تقد الرقض من			بلري 🔻	المهتدسيا معاملة اجب	خ مخططات البناء المقترح مصدفه من نقابه ا الاستراب المقترح مصدفة من نقابه ا	<u>31</u> ۽ نيب				
					بري ب	ت الفلكية معاملة الجب حداء أو معاملة الحد	حفيع الشركاء على مخطط الفساحة إذا كانت ماكم قالغراء قد إن مكالة ديرية إن سناد تب	43 توفيح 45 الالت				
			1		- (c)-	معاملة احدا	اسیار امراع نید او وقته دوریه او شد شد د اسامهٔ اصلاف این اسام ایر خمان ۶ نسخ	ubia 56				
	الغاء خروج	ادخال جديد تخزين			-		<u></u>					
					-							
									1			
L												

all copyrights reserved to AL-Ghassan Information Systems

سبل: ۸/۲

<u>4</u>		
		ک بافذہ
	? [166] 📈 🖬 [🕨	🕨 🖣 🌒 🛯 👘 🖗
	 ٢ ٢	
	بياتات العرقي الحرض الحرض البتايه البتايه	
	يوجد طلبات قادمه من الانترنت عدد ٣ الوثائق المطلوية تحويل الطلب طباعة بطاقة مراجعة	

all copyrights reserved to AL-Ghassan Information Systems



Appendix B: A detail report for time taken to complete the processes before the improvements.

مدة الطلب - فترة تتفيذ	خصة	تسليم الر	100	ة الهندسية	الدائر		ير البلدية	مد		لمس البلدي	المج	4 1011		يثاء والتتظيم	لجنة ال	4 1451	1.2	رة الهندسية	الدائر	11000	Â.	فحص فسم الصد		1 1221	Kukp	المياه وضريبة	فحص مديوتية	تقديم الطلب	
State of the state of the	المدة	10 - 10 m	المدة	النهاية	البدء	المدة	التهاية	اليدء	المدة	الشهاية	البدء		المدة	التهاية	اليدع		العدة	التهاية	اليدء	1,	المدة	النهاية	اليدء	, Jan	المدة	النهاية	البدء	اليدء	#
23	1		1	23/01/17	22/01/17	1	22/01/17	21/01/17	1	22/01/17	21/01/17	-1	1	22/01/17	21/01/17	0	18	21/01/17	03/01/17	0	1	03/01/17	02/01/17	0	0	02/01/17	02/01/17	02/01/17	1
22	1		1	23/01/17	22/01/17	1	22/01/17	21/01/17	1	22/01/17	21/01/17	-1	1	22/01/17	21/01/17	0	18	21/01/17	03/01/17	0	0	03/01/17	03/01/17	0	0	03/01/17	03/01/17	03/01/17	2
36	1	CONT. LO.	1	14/02/17	13/02/17	1	31/01/17	30/01/17	1	13/02/17	12/02/17	7	1	05/02/17	04/02/17	5	18	30/01/17	12/01/17	0	1	12/01/17	11/01/17	0	0	11/01/17	11/01/17	11/01/17	3
19	1	1000	1	04/02/17	03/02/17	1	27/01/17	26/01/17	1	03/02/17	02/02/17	4	1	29/01/17	28/01/17	2	7	26/01/17	19/01/17	0	1	19/01/17	18/01/17	0	0	18/01/17	18/01/17	18/01/17	4
29	1		1	14/02/17	13/02/17	1	02/02/17	01/02/17	1	13/02/17	12/02/17	7	1	05/02/17	04/02/17	3	13	01/02/17	19/01/17	0	1	19/01/17	18/01/17	0	0	18/01/17	18/01/17	18/01/17	5
19	1		1	14/02/17	13/02/17	1	05/02/17	04/02/17	1	13/02/17	12/02/17	7	1	05/02/17	04/02/17	0	6	04/02/17	29/01/17	0	1	29/01/17	28/01/17	0	0	28/01/17	28/01/17	28/01/17	6
19	1		1	01/03/17	28/02/17	1	23/02/17	22/02/17	1	28/02/17	27/02/17	1	1	26/02/17	25/02/17	3	10	22/02/17	12/02/17	0	0	12/02/17	12/02/17	0	0	12/02/17	12/02/17	12/02/17	7
16	1		1	01/03/17	28/02/17	1	23/02/17	22/02/17	1	28/02/17	27/02/17	1	1	26/02/17	25/02/17	3	7	22/02/17	15/02/17	0	0	15/02/17	15/02/17	0	0	15/02/17	15/02/17	15/02/17	8
22	1		1	17/03/17	16/03/17	1	09/03/17	08/03/17	1	16/03/17	15/03/17	3	1	12/03/17	11/03/17	3	10	08/03/17	26/02/17	0	1	26/02/17	25/02/17	0	0	25/02/17	25/02/17	25/02/17	9
23	1	Continent)	1	28/03/17	27/03/17	1	19/03/17	18/03/17	1	27/03/17	26/03/17	7	1	19/03/17	18/03/17	0	9	18/03/17	09/03/17	0	2	09/03/17	07/03/17	0	0	07/03/17	07/03/17	07/03/17	11
17	1	1000	1	28/03/17	27/03/17	1	19/03/17	18/03/17	1	27/03/17	26/03/17	7	1	19/03/17	18/03/17	0	5	18/03/17	13/03/17	0	0	13/03/17	13/03/17	0	0	13/03/17	13/03/17	13/03/17	12
16	1		1	28/03/17	27/03/17	1	19/03/17	18/03/17	1	27/03/17	26/03/17	7	1	19/03/17	18/03/17	0	4	18/03/17	14/03/17	0	0	14/03/17	14/03/17	0	0	14/03/17	14/03/17	14/03/17	13
12	1		1	28/03/17	27/03/17	1	26/03/17	25/03/17	1	27/03/17	26/03/17	0	1	26/03/17	25/03/17	0	7	25/03/17	18/03/17	0	0	18/03/17	18/03/17	0	0	18/03/17	18/03/17	18/03/17	15
131	1		1	04/08/17	03/08/17	1	30/07/17	29/07/17	1	03/08/17	02/08/17	3	1	30/07/17	29/07/17	0	123	29/07/17	28/03/17	0	0	28/03/17	28/03/17	0	0	28/03/17	28/03/17	28/03/17	16
22	1	1.1.1	1	21/04/17	20/04/17	1	13/04/17	12/04/17	1	20/04/17	19/04/17	3	1	16/04/17	15/04/17	3	11	12/04/17	01/04/17	0	0	01/04/17	01/04/17	0	0	01/04/17	01/04/17	01/04/17	17
12	1		1	21/04/17	20/04/17	1	16/04/17	15/04/17	1	20/04/17	19/04/17	3	1	16/04/17	15/04/17	0	3	15/04/17	12/04/17	0	1	12/04/17	11/04/17	0	0	11/04/17	11/04/17	11/04/17	18
19	1		1	28/04/17	27/04/17	1	23/04/17	22/04/17	1	27/04/17	26/04/17	3	1	23/04/17	22/04/17	0	10	22/04/17	12/04/17	0	1	12/04/17	11/04/17	0	0	11/04/17	11/04/17	11/04/17	19
11	1		1	21/04/17	20/04/17	1	16/04/17	15/04/17	1	20/04/17	19/04/17	3	1	16/04/17	15/04/17	0	2	15/04/17	13/04/17	0	1	13/04/17	12/04/17	0	0	12/04/17	12/04/17	12/04/17	20
39	1		1	22/06/17	21/06/17	1	16/06/17	15/06/17	1	21/06/17	20/06/17	2	1	18/06/17	17/06/17	2	29	15/06/17	17/05/17	0	1	17/05/17	16/05/17	0	0	16/05/17	16/05/17	16/05/17	22
25	1		1	15/06/17	14/06/17	1	05/06/17	04/06/17	1	14/06/17	13/06/17	6	1	07/06/17	06/06/17	2	12	04/06/17	23/05/17	0	0	23/05/17	23/05/17	0	0	23/05/17	23/05/17	23/05/17	23
13	1		1	15/06/17	14/06/17	1	07/06/17	06/06/17	1	14/06/17	13/06/17	6	1	07/06/17	06/06/17	0	2	06/06/17	04/06/17	0	0	04/06/17	04/06/17	0	0	04/06/17	04/06/17	04/06/17	24
14	1		1	22/06/17	21/06/17	1	18/06/17	17/06/17	1	21/06/17	20/06/17	2	1	18/06/17	17/06/17	0	5	17/06/17	12/06/17	0	2	12/06/17	10/06/17	0	0	10/06/17	10/06/17	10/06/17	25
32	1		1	14/07/17	13/07/17	1	07/07/17	06/07/17	1	13/07/17	12/07/17	3	1	09/07/17	08/07/17	2	19	06/07/17	17/06/17	0	3	17/06/17	14/06/17	0	0	14/06/17	14/06/17	14/06/17	26
29	1		1	14/07/17	13/07/17	1	06/07/17	05/07/17	1	13/07/17	12/07/17	3	1	09/07/17	08/07/17	3	16	05/07/17	19/06/17	0	2	19/06/17	17/06/17	0	0	17/06/17	17/06/17	17/06/17	27
17	1		1	14/07/17	13/07/17	1	09/07/17	08/07/17	1	13/07/17	12/07/17	3	1	09/07/17	08/07/17	0	6	08/07/17	02/07/17	0	3	02/07/17	29/06/17	0	0	29/06/17	29/06/17	29/06/17	29
25	1		1	24/08/17	23/08/17	1	02/08/17	01/08/17	1	23/08/17	22/08/17	2	1	20/08/17	19/08/17	0	18	19/08/17	01/08/17	0	0	01/08/17	01/08/17	0	0	01/08/17	01/08/17	01/08/17	31
56	1		1	26/09/17	25/09/17	1	06/08/17	05/08/17	1	25/09/17	24/09/17	5	1	19/09/17	18/09/17	0	44	18/09/17	05/08/17	0	2	05/08/17	03/08/17	0	0	03/08/17	03/08/17	03/08/17	32
26.59259259	1		1			1			1		1000	3.555555556	1	100		1.148148148	16			0	0.88888889			0	0				

طلبات الحصول على ترخيص بناء المكتملة من بلدية بيتونيا بالفترة من 1-1-2017 الى 31-12-2017



Appendix C: Questionnaire about the process of issuing building permits in Municipality of Beitunia.

<u>سِنَّ مِلَّةِ للتَّ</u>مَن<u>ِّزِللَّحِي</u>مِ استبيان للرأي حول عملية الحصول على رخصة بناء جديدة من بلدية بيتونيا

يهدف هذا الاستبيان الى تقييم عملية الحصول على رخصة بناء جديدة من بلدية بيتونيا, أرجو التكرم والإجابة على الأسئلة المطروحة وتزويدنا بآرائكم القيمة, مع العلم أن جميع الأسئلة المطروحة ضمن هذا الاستبيان لأغراض البحث العلمي وأن إجاباتكم ستكون محاطة بالسرية الكاملة والعناية العلمية الفائقة, شكرا على تعاونكم وحسن استجابتكم مسبقا

العمر : الجنس : 🗌 ذكر 🛛 أنثى المهنة.....

. 1	الاجابة											
البند	مرضية جدا	مرضية	محايد	غير مرضية	غير مرضية جدا							
أسلوب تعامل الموظفين مع المواطنين												
وضوح متطلبات المعاملة												
النشرات الارشادية الصادرة عن البلدية												
سهولة حصولي على المعلومات والوثائق التي احتاجها من أول مرة												
سهولة الاجراءات الخاصه بالمعاملة												
الدقة في انجاز المعاملة												
السرعة في انجاز المعاملة												
سرعة اعتماد المخططات الهندسية												
الدقة في المواعيد (مواعيد الكشف، مواعيد انجاز المعاملة)												
رسوم الحصول على رخصة البناء												
القوانين والاجراءات التي تحكم الحصول على رخصه بناء												
تطبيق السياسات والاجراءات على جميع المواطنين بنفس الطريقة												

الرجاء وضع إشارة x في المكان الذي تراه مناسبا:

العامل الاهم بالنسبة لي في عملية الحصول على رخصه بناء جديد	الوقت	السعر	الدقة	اخرى
حسب تقديرك الفترة المناسبة لإتمام عملية اصدار رخصة بناء بالايام	30	20	10	5
تفعيل تقديم الطلب من خلال الخدمات الالكترونية	مناس	ب	غير	مناسب
هل واجهتك اي عقبات او صعوبات في الحصول على رخصه بناء	نع	م		لا
اذا كانت الاجابة بنعم, ما هي:				

Appendix D: Letter sent to the municipality's council and management which contain the needed improvements.

2018-06-1

حضرة السيد رئيس بلدية بيتونيا المحترم حضرة السادة أعضاء المجلس البلدي المحترمين حضرة السيد مدير بلدية بيتونيا المحترم

تحية طيبة وبعد ...

الموضوع : تطوير الية اصدار رخص البناء في بلدية بيتونيا

لقد قمنا خلال فترة الثمانية شهور الماضية بالتنسيق والعمل مع مدير البلدية السيد محمد مجدوبة و المهندسة فداء عازم مديرة الدائرة الهندسية في البلدية والسادة ابراهيم الشلبي مدير مركز خدمات الجمهور والسيد مثنى نصار, بدراسة وتحليل الية عمل اصدار رخص البناء المعمول بها في بلدية بيتونيا, والتي توصلنا من خلالها الى مجموعه من الاشكاليات المتعلقه بمدة الاجراءات المطلوبة ووقتها وتسلسل مسارتها الادارية والتي يؤدي البعض منها الى اعاقه انجاز الخدمة المطلوبه (رخصه بناء) في الوقت المحدد.

وبناءا على ما توصلنا اليه مع فريق العمل في البلدية نضع بين ايديكم مجموعه من المقترحات التي من شأنها العمل على انجاز هذه الخدمة وفق معايير الجودة العالمية, وصولا الى تحقيق رضى المواطنين عن اداء البلدية في تقديم هذه الخدمة, آملا من حضرتكم ابداء الموافقه على تطبيق هذه المقترحات واعتمادها , لبدء العمل بها وهي:

ضرورة العمل على تغيير نظام الخدمات المعمول به في البلدية. تغيير موعد جلسة المجلس البلدي من يوم الاربعاء الى يوم الاحد من كل اسبوع (تقليص 4 ايام انتظار لكل طلب). دعمكم في تطبيق اجراء عمل جديد (مرفق) محدد بالوقت لكل خطوة يكون ملزم لجميع الدوائر. التوصية بتعيين بإداري اضافي في الدائرة الهندسية, تكون من مهامه اصدار تقارير يومية عن سير عمل الطلبات ومراسلة الجهات التي لديها طلبات العالقه. الموافقه على تصميم وطباعه مواد دعائية توضح الوثائق المطلوب من الموطنين توفيرها لإصدار رخص البناء, توزع في مركز خدمات الجمهور وعلى موقع البلدية الالكتروني. بناء على نتائج الاستبيان الذي قمنا بعمله على عينه من مسفيدي هذه الخدمة, وبعد تحليل البيانات , الشارت الرغبة في تقديم الطلب للحصول على هذه الخدمة بشكل الكتروني.

وتفضلوا بقبول فائق الاحترام.....

علي صالحيه كلية الدر اسات العليا - إدارة الجودة الجامعة العربية الأمريكية



التاريخ :

نموذج تدقيق الوثائق الهندسية لطلب رخصه بناء جديد

رقم المعاملة :

اسم مقدم الطلب :

ملاحظات	نعم / لا	البند
		هل الوثائق المطلوبة كاملة ؟
		هل وثائق الملكية مطابقة ؟
		هل تصنيف الارض المراد البناء عليها مطابق لنوع البناء ؟
		هل الرسومات الهندسية في الوثائق المقدمة واضوحة ومحدد عليها القراءات؟
		هل مخطط المساحة مناسب ؟
		هل النسب المئوية السطحية مناسبة ؟
		هل ارتدادات البناء مطابقة للقوانين ؟
		هل مناسيب البناء والشارع متوافقه ؟
		هل المخططات المرفقة (الكهربائية والميكانيكية) مناسبة ؟
		هل مواصفات بيت الدرج مطابقة للقوانين المعتمدة ؟
		هل أعداد بيت الدرج مطَّابقة للقوانين المعتمدة ؟
		هل وجهات البناء مُقبولة ؟
		هل ارتفاع البناء مقبول ؟
		هل يوجد بئر مياہ ؟
		هل يوجد مواقف للسيارات ؟
		هل العدد لمواقف السيار ات كافي ؟
		هل المساحات المطلوبة لمواقف السيار ات مقبولة ؟
		هل يجود حفرة صماء؟
		هل مواصفاتها معتمدة من دائرة الصحة ؟
		هل تم اعتماد متطلبات السلامة العامه في البناء من الدفاع المدني؟
		هل تم فحص رخصه البناء السابقة والتأكد من عدم وجود اية مخالفات على المواطن؟
		ملاحظات لمقدم الطلب <u>:</u>
		ية. من الحالية عن المحدودية ·
		لوصيات الدائرة الهندسية .

مدقق الطلب

مدير الدائرة الهندسية

Appendix F: The new brochure which will be put in the stand in the OSS.



المواطن الكريم

يتطلب حصولك على رخصة بناء جديدة من بلدية بتونيا توفر كافة المتطلبات الموضعة ادناه :

أولا : متطلبات يجب توفيرها قبل تقديم طلب الترخيص , ولن يتم استلام الطلب في مركز الجعهور حتى يتم توفيرها

وفي :--

- صورة هوية مالك الأرض.
- اثبات ملكية للارض المراد البناء عليها (وثيقة طابو).
- مغططات اهتدسية للموقع ، معتمد من نقابة المندسين حسب الاضول، مع نسخة من المغططات على قرص صلب .
 - عقد اشراف من مكتب المصعم مصدق من نقابة المهندسين.
 - 4 نمخ مخطط مساحة مصنف من مساح مرخص.
 - فحص لتربة موقع البناء.

ثانيا : متطلبات يجب توفيرها بعد تقديم طلب الترخيص وقبل استلام الرخصة من البلدية :-

- العصول على موافقة الدفاع للدني على المغططات المقدمة.
 - اعتماد الصبعة للعفرة الصماء المقدمة في المخططات.

وتتعهد لكم بإتمام الاجرائات المطوبة من طرفتاً خلال 10 ايام عمل كحد أقصى في حال عدم وجود اي امور عائقه

من طرف مقدم الطلب.

بلدية بيتونيا

نسعد بخدمتكم

Appendix G: The municipality's approval for the improvement.



التاريخ: 2018/6/10



No. : Date :

حضرة الأخ/ علي كامل صالحية المحترم

تحية القدس الشريف

الموضوع: تطوير الية إصدار رخص البناء في البلدية

بعد التحية والاحدرام، نثمن جهودكم في تحسين وتطوير آلية إصدار رخص البناء في بلدية بيتونيا من ناحية تقليل الوقت لإنجاز الطلب أو الرخصة وعليه فقد تمت الموافقة على تطبيق الاقتراحات الواردة في كتابكم بتاريخ 1/6/2018، والتي تتضمن:

- ♦ تغيير موعد جلسة المجلس البلدي من يوم الثلاثاء إلى يوم الأحد من كل أسبوع.
 - 🗸 الموافقه على تطبيق إجراء العمل الجديد المقترح من طرفكم.
 - ◄ الموافقه على نقل موظف إلى الدائرة الهندسية، لتخفيف اعباء العمل.
- الموافقة على تصميم وطباعة مواد دعائية توضح الوثائق المطلوب من المواطنين توفيرها لإصدار رخص البناء، توزع في مركز خدمات الجمهور وعلى موقع البلدية الإلكتروني.
 - 🗡 الموافقه على تفعيل تقديم الطلبات من خلال النظام الالكتروني.

وعليه سيتم تطبيق الاقتراحات من تاريخ 15/6/2018 وتطوير النظام الإداري في الدائرة الهندسية لتحقيق أفضل خدمة لمواطني المدينة.

مع فائق الاحترام والتقدير

Appendix H: A detailed report for time taken to complete the processes after the improvements were implemented.

حلبات الحصول على ترخيص بناه من بلدية بيتونيا بالفترة من 01-07-2018 الى 31-07-2018

تأخير من طرف المواطن	مدة الطلب - فت ة تنفيذ	سوم	ية - احتساب الر	الدائرة الهندسم		ولس البلدي	المح			يناء والتنظيم	لجنة ال	1 10 10 10	Constant Constant in	الدائرة الهندسية		الدائر	-	الصحة والحرة	فحص قسر	فحص مديوتية المياه		فحص ه	تقديم الطلب
0-9-9-0-9-		المدة	التهامة	البدع	المدة	التهاية	اليدع	التطار	المدة	التهاية	البدء	التطعان	مدة الاجراء للمجموعه الاولى	المدة	التهاية	البدء	المدة	التهاية	اليدم	المدة	النهاية	اليدء	# البدء
	9	2	11/07/18	09/07/18	1	09/07/18	08/07/18	0	1	08/07/18	07/07/18	0	5	5	07/07/18	02/07/18	0	02/07/18	02/07/18	0	02/07/18	02/07/18	02/07/18 1
	13	1	18/07/18	17/07/18	1	16/07/18	15/07/18	0	1	15/07/18	14/07/18	2	8	7	12/07/18	04/07/18	1	05/07/18	04/07/18	0	04/07/18	04/07/18	04/07/18 2
	12	1	18/07/18	17/07/18	1	16/07/18	15/07/18	0	1	15/07/18	14/07/18	2	7	7	12/07/18	05/07/18	0	05/07/18	05/07/18	0	05/07/18	05/07/18	05/07/18 3
	7	0	24/07/18	24/07/18	1	16/07/18	15/07/18	0	1	15/07/18	14/07/18	1	4	4	13/07/18	09/07/18	0	09/07/18	09/07/18	0	09/07/18	09/07/18	09/07/18 4
	9	1	25/07/18	24/07/18	1	23/07/18	22/07/18	0	1	22/07/18	21/07/18	4	2	2	17/07/18	15/07/18	0	15/07/18	15/07/18	0	15/07/18	15/07/18	15/07/18 5
	9	1	25/07/18	24/07/18	1	23/07/18	22/07/18	0	1	22/07/18	21/07/18	4	2	2	17/07/18	15/07/18	0	15/07/18	15/07/18	0	15/07/18	15/07/18	15/07/18 6
	12	0	30/07/18	30/07/18	1	30/07/18	29/07/18	0	1	29/07/18	28/07/18	6	4	4	22/07/18	18/07/18	0	18/07/18	18/07/18	0	18/07/18	18/07/18	18/07/18 7
	13	2	01/08/18	30/07/18	1	30/07/18	29/07/18	0	1	29/07/18	28/07/18	4	5	5	24/07/18	19/07/18	0	19/07/18	19/07/18	0	19/07/18	19/07/18	19/07/18 8
	10	2	01/08/18	30/07/18	1	30/07/18	29/07/18	0	1	29/07/18	28/07/18	5	1	1	23/07/18	22/07/18	0	22/07/18	22/07/18	0	22/07/18	22/07/18	22/07/18 10
	7	1	07/08/18	06/08/18	1	30/07/18	29/07/18	0	1	29/07/18	28/07/18	2	2	1	26/07/18	24/07/18	1	25/07/18	24/07/18	0	24/07/18	24/07/18	24/07/18 11
	11	0	06/08/18	06/08/18	1	06/08/18	05/08/18	0	1	05/08/18	04/08/18	5	4	4	30/07/18	26/07/18	0	26/07/18	26/07/18	0	26/07/18	26/07/18	26/07/18 12
	10.18181818											3.181818182											

Appendix I: The new procedure for issuing the building permits.



1	رقم آلية العمل: رقم الارشيف:	خالية	ں بناء جدید علی ارض	اجراء عمل طلب ترخيم
3	عددالصفحات:			تاريخ الإصدار:
			ā	الدائرة المسؤلة عن الاجراء : الدائرة الهندسي
				منسق آلية العمل: مدير الدائرة الهندسية
التاريخ		التوقيع	الأسم	اعتماد الجهات ذات العلاقة
				مدير الدائرة الهندسية
				مدير الدائرة المالية
				مدير البلدية
				رئيس البلدية
				يعتبر ساري المفعول من تاريخ
				ملاحظات :

نطاق وأهداف السياسة

تنظيم عملية اصدار رخصة بناء جديد للمواطنين في مدينة بيتونيا بالسرعه الممكنة وبشكل دقيق, بهدف:

تحديد المهمات والمسؤوليات لكافة الدوائر والاقسام ذات العلاقة.

تحديد سقف زمني لكل اجراء لضمان سرعه التنفيذ.

تحديد معايير لقياس الاداء.

اجراء عمليات تصويب ومراجعه اذا لزم الامر.

خطوات اجراءات العمل:

المهام	صاحب الاجراء	المسئول	استشارة	للعلم	النظام	السقف الزمني
يتم استقبال المواطن في مركز خدمات الجمهور لإستلام المعاملة.	موظف مركز الجمهور	مدير المركز	-	-	-	-
يتم تدقيق الوثائق المرفقة بالمعاملة والتأكد من انها كاملة.	موظف مركز خدمات الجمہور	مدير المركز	الدائرة الهندسية	-		فورا
في حال وجود نقص في الوثائق المقدمة يتم رد المعاملة للمواطن وتوضيح الوثائق المطلوبة ارفاقها في الطلب .	موظف مركز خدمات الجمهور	مدير المركز	الدائرة الهندسية	-		فورا
في حال استكمال المواطن جميع الوثائق المطلوبة يتم ادخال المعاملة على النظام ويتحويل الطلب من خلال النظام الى كل من : فحص الذمة المالية والدائرة الهندسة بالتوازي .	موظف مركز خدمات الجمهور	مدير المركز	الدائرة الهندسية	-	نظام الخدمات	فورا
يتم فحص حالة المواطن من حيث : مديونية المياه , رسوم نفايات , ضربية الاملاك , ضريبة المعارف, قسم الصحة , المهن والحرف, اي شكوى تخص المواطن من خلال الاستعلام عن رقم الهوبة.	موظف مركز خدمات الجمهور	مدير المركز	-	-	النظام المالي نظام الشكاوي	فورا
في حال وجود اي مدينوية يتم اضافة ملاحظة تفصيلية على الطلب توضح نوع المديونية والمبلغ المطلوب تسديده من طرف المواطن.	موظف مركز خدمات الجمهور	مدير المركز	موظف الجباية الصندوق	-	النظام المالي	فورا
في الدائرة الهندسية يتم تدقيق المعاملة مرفق بها الوثائق المقدمة من طرف المكتب الهندمي والتأكد من مطابقتها المتطلبات من حيث استوفائها للشروط المعتمدة	مهندس الابنية	مدير دائرة الهندسة	-		نظام الخدمات	يومان
في حال وجود اي نواقص او ملاحظات يتم التواصل مع المكتب الهندسي وتوضيح الملاحظات المطلوبة على المخططات المقدمة, ويطلب منه تعديلها وتزويدهم بنسخه معدلة ومختومة من نقابة المهندسين حسب الاصول <u>مع نسخة من</u> المخططات على قرص صلب.	مهندس الابنية	مدير دائرة الپندسة			نظام الخدمات	فورا
في حال استيفاء الوثائق كافة المتطلبات يتم اعتماد المعاملة من خلال مدير دائرة الهندسة على النظام وتجهيز المعاملة بشكل كامل لعرضها على لجنة البناء والتنظيم في البلدية.	مدير دائرة الہندسة	م <i>د</i> ير البلدية			نظام الخدمات	يوم

يتم دراسة المعاملة في لجنة التنظيم والبناء في البلدية كل يوم سبت ورفع توصياته للمجلس البلدي.	لجنة التنظيم والبناء	المجلس البلدي	الدائرة الهندسية			3 ايام
يتم رفع المعاملة مع توصيات لجنة التنظيم والبناء للمجلس البلدي لإتخاذ قرار بالمعاملة الذي يجتمع كل يوم أحد.	المجلس البلدي	رئيس البلدية	الدائرة الہندسية			يوم
في حال الموافقة المجلس البلدي على المعاملة يتم ابلاغ الدائرة الهندسية لإحتساب الرسوم.	مهندس الابنية	مدير دائرة الهندسة				يوم
في حال عدم الموافقة علي المعاملة ,يتم ابلاغ الدائرة الهندسية ليتم ارسال اشعار بذلك لمركز خدمات الجمهور لتبليغ مقدم الطلب.	مهندس الابنية	مدير دائرة الهندسة				يوم
بعد احتساب لرسوم يتم التواصل مع المواطن من خلال موظف مركز خدمات الجمهور لتسديد كامل الرسوم المستحقه نقدا, وتسديد اي مستقات ماليه أخرى على المواطن(فواتير مياه, ضرببة معارف).	موظف مركز خدمات الجمهور	مدير المركز				فورا
بالتوازي يتم ابلاغ مقدم الطلب بالحضور للتوقيع على التزام بالحصول على اذن صب من البلدية عند كل عملية صب وعلى تعهد بازالة اثار الجرف ووضع الشارات التحذيرية ان لزم الامر حسب الاصول.	موظف مركز خدمات الجمهور	مدير المركز	الدائرة الهندسية			-
يقوم مفتش الدائرة الهندسية بزيارة موقع البناء في الاوقات أدناه: عند بدأ أعمال الجرف وحفر الاساسات. عند بدأ اعمال البناء (بعد وضع اول مدماك للجدار) والتأكد من التزام المواطن بالمخططات المقدمة.	مفتش الدائرة الهندسية	مدير دائرة الهندسة				-
يتم تسليم الرخصة للمواطن بعد اتمام عملية البناء بشكل كامل وبعد تأكد ومفتش البلدية من التزام المواطن بالمخططات الهندسية المقدمة.	مفتش الدائرة الهندسية	مدير دائرة الهندسة				-
يتم عمل تقرير اسبوعي للطلبات على النظام ومراجعه الجهات المتأخرة في انجاز مهامها على النظام.	مدير مركز خدمات الجمهور	مدير دائرة الخدمات	مدير دائرة الهندسة	مدير البدية	نظام الخدمات	اسبوعيا

مؤشرات الأداء المعتمد									
المؤشر	الهدف	الدوائر ذات العلاقه	المقياس						
الالتزام بمدة تنفيذ طلبات المعامللات لإرضاء المواطنين	تنفيذ المعاملات خلال 10 يوم عمل من تاريخ ادخاله على النظام	مركز خدمات الجمهور , الدائرة الهندسية , مدير البلدية	مدة تنفيذ الطلبات						

الوثائق المساندة المطلوبة :-

صورة هوية. اثبات ملكية. مخططات هندسية موقع من نقابة المهندسين حسب الاصول, مع نسخة على قرص صلب . فحص لتربة موقع البناء. عقد اشراف من مكتب المصمم مصدق من نقابة المهندسين. 4 نسخ مخطط مساحة مصنف من مساح مرخص. Appendix J: A screenshot of the new software system.

<u>d</u>	الغدمات × الغدمات	Married Street Audio	at Company that Manual Real [
$\ \ \leftarrow \ \ \rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	① Not secure 120.121.122.215/Em/Service/_GetFields	sServices			©a ☆ 😝 :
			٩	يحك	الدينية
•				الخدمات » تقديم خدمة	ملقات وجداول 🗸
			w w Sile and he was discussed by	نوع الخدمة	هيكلية البلدية والمستخدمين 🧹
					إدارة المحتوى >
*	اختر	المهنة	اخكر	المواطن	حركات الموظقين ٧
			æ	معلومات مقدم الطلب	··· التَنفَيق والنتر
				e attati entra ta	··· طلبات التسجيل
				معتومات الطب	المنابعة
		اسّتراك المياه	کیپیر اثر سوم NIS O	رسوم الطلب	··· المتابعة كمفوض
Choose	No File 🕹	مصىادقة دائرة الإثار	Choose No File 🖄	اتبات ملكوة	··· الحدمات المعدمة من الإسريت ··· الخدمات المعدمة من الإسريت
	scan		scan		المحمد المحمالمحمد المحمد المحمم المحمد المحمم محمد المحمد المحمم محمد محمد محمد محمد محمد محمد محمد
	هي ا	ھى م	 حرض	حوض	شيم طلبات عامة
Choose	No Filo	di ha		á- 1-á	🗮 تتنيم خنمة
choose	scan				المراسلات مع المواطنين
Chause	N- FI- 2	5 m 1 5 m -	Church No. 51.	5.05.1 m	التقارير. ~
choose	No File Scan	مىرى، يورپ	choose No File Scan	بن . بد <i>ع</i> ب	الاحصاليات ٧
					»
Choose	No File 🗠	معقط مرقع جنيد	Choose No File 🗠	معققا مناعه مقتنق من منتاح مرعص 4 نتنج	
	Scort				
				ملاحظك	
_					
					00:20
🥶 🥲				AR	صر 19:99

Appendix K: Announcement.

ARAL B

No. : Date :

دوئية فلسطين State of Palestine

الرقم : التاريخ:2018/3/18

اعلان هام

تدعو بلدية بيتونيا كافة المواطنين الذين لديهم ملفات عالقة في ترخيص الأبنية للتواصل العاجل معها واحضار اثباتات الملكية و المخططات الهندسية اللازمة التي تمثل ابنيتهم القائمة وذلك في مدة اقصاها شهر من تاريخ هذا النيتهم القائمة وذلك لقيام بتسوية وانهاء وتنظيم وترخيص جميع الاعلان ، وذلك للقيام بتسوية وانهاء وتنظيم وترخيص جميع الابنية القائمة في المدينة، ولن ينظر في اي طلب بعد هذا التاريخ الا عبر القضاء والطرق القانونية . لذا تهيب بكافة المواطنين الاسراع في انهاء ملفاتهم العائقة قبل نفاذ المدة المتاحة في هذا الاعلان .



وإلى جانب منهجية تحسين DMIAC، أجريت مقابلات مع موظفي البلدية للحصول على معلومات حول الوضع الحالي للعملية، وتحديد المشكلة الحالية ونطاق المشروع، لعمل أدوات مثل PCD ، وآخر لأداة SIPOC.

كما تم تصميم استبيان للحصول على آراء المواطنين الذين تقدموا بطلبات للحصول على تصاريح البناء من البلدية. خلال هذا الاستبيان تم تعبئة وجمع 48 استمارة، ثم تحليلها باستخدام برنامج SPSS.

بعد أن قام الباحث بتطبيق هذه المنهجيات وأدواتها، توصل إلى أن منهجية Lean Six Sigma منهجية فعالة في بلدية بيتونيا، وساهم تنفيذها في زيادة كفاءة وجودة عملية إصدار تراخيص البناء في بلدية بيتونيا، فتم تقليل الوقت اللازم لإصدار تصاريح البناء من 22.5 يومًا إلى 10 أيام ، وإعادة ترتيب الخطوات التي تمر بها العملية بشكل يحفظ للعملية دقتها وسرعة تسلسها الإداري، كما أصبحت الطلبات تدخل بصورة مباشرة على برنامج الخدمات الخاص بإنشاء "طلب تصريح البناء" بالاعتماد على تفكيك بعض الخطوات التجميعية إلى خطوات منفصلة، وذلك لإعطاء معلومات عن الطلب الذي يتم معالجته بصورة أكثر دقة، رافق ذلك اعتماد إجراء عمل جديد يحدد الفترة الزمنية لكل خطوة في العملية.

إن هذه الدراسة تعتبر دراسة استكشافية تطبيقية، إذ لم يسبق أن قام أحد الباحثين بدراسة وتطبيق هذه المنهجية في القطاع العام في فلسطين، لذلك يوصي فريق التحسين باعتماد منهجية Lean Six Sigma في العمل، وتطبيق أدواتها ومبادئها، وتدريب مجموعة مختارة من الموظفين على كيفية تطبيق هذه المنهجية لتطوير وتحسين كفاءة وجودة الخدمات المقدمة للمواطنين في هذا القطاع.
ملخص الدراسة

تسعى هذه الدراسة إلى تبيان أثر تطبيق منهجية Lean Six Sigma في القطاع العام، بهدف المساعدة في القضاء على الهدر والحد من التباين الذي يؤدي إلى زيادة التكاليف، للوصول إلى تقديم خدمات أكثر كفاءة وجودة، مما يقلل من الوقت والمال اللازم لإنجاز العملية، ويوفر الراحة للمستفيدين من هذه الخدمات المقدمة.

تلقي الدراسة الضوء على عملية رئيسية، وهي عملية إصدار تراخيص البناء في بلدية بيتونيا. إن هذه العملية المنفذة في بلدية بيتونيا تعتبر من العمليات الرئيسية التي تحتوي على العديد من الخطوات الثانوية التي لا تقدم إضافة حقيقية، مما يؤثر في جودة وسرعة إنجاز العملية، الأمر الذي ترتب عليها إطالة فترة إنجاز العملية المطلوبة، مما يؤدي الى عدد كبير من الشكاوى من السكان المحليين.

إن فريق التحسين القائم على هذا العمل، قام في البداية بتطبيق منهجية التحسين المعروفة باسم "DMAIC" وهي منهجية تقوم بتحديد المشكلة وقياس الأداء الحالي للعملية، وتحليل البيانات التي تم جمعها، وذلك لتحليل النتائج وتنفيذ التحسينات، ثم المحافظة عليها بعد تحققها، وقد اعتمد فريق العمل في كل مرحلة (مرحلة النتائج وتنفيذ التحسينات، ثم المحافظة عليها بعد تحققها، وقد اعتمد فريق العمل في كل مرحلة (مرحلة التعرف على المشكلة، مرحلة القياس، مرحلة التحليل، مرحلة التحسين، مرحلة الرقابة) باستخدام مجموعة مختلفة من الأدوات. في مرحلة القياس، مرحلة التحليل، مرحلة التحسين، مرحلة الرقابة) باستخدام مجموعة مختلفة من الأدوات. في مرحلة موافظة عليها بعد تحققها، وقد اعتمد فريق العمل في كل مرحلة (مرحلة في مرحلة القياس فتم استخدام عدة أدوات مثل Project charter و مرحلة القياس فتم استخدام عدة أدوات مثل Voice of Customer أما ومرحلة التحليل فتم استخدام عدة أدوات مثل Value Steam Mapping وأداة Cause and Effect Diagram وأدا التحسين فتم استخدام أداة Value Steam Mapping وأداة Value Steam Mapping أما مرحلة التحسين فتم استخدام أداة Control Chart و اداة Value Steam Mapping وأداة Control Chart التحسين فتم استخدام أداة مرحلة الرقابة إذ تم عمل المعملية الجديدة واستخدامها كمعيار يجب إتباعه مع أداة Control Action Plan للعملية الجديدة واستخدامها كمعيار يجب إتباعه مع Chart.