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Innovation in Public Sector Service Provision: The Case of BENAYAT Portal in The Kingdom of Bahrain

A thesis submitted in partial fulfillment of the requirements for the
degree of Master of Science in Engineering Management

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The student is awarded a grade A in the thesis subject.

- ☐ Without making any changes to the thesis.
- ☒ After making the modifications attached with this decision.

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Abstract

The Bahrain public service sector has changed a lot in the past decade due to the use of modern technology. The government aims to deliver high-quality services quickly and efficiently and has made innovation a part of its national development plans. Building permits play a crucial role in a country's development, and their timely approval is essential to keep the progress going. To speed up the process, the government introduced the BENAYAT Portal in 2018, an electronic system that simplifies the issuance of building permits.

This research aims to identify the opportunities and challenges that affect the issuance of permits to achieve more effective use of the BENAYAT Portal. The methodology employed in this research involved a multi-method approach that aimed to collect, analyze, and combine both qualitative and quantitative data to better understand the factors that influence the issuance of building permits. The research findings were obtained through semi-structured interviews with 5 experts in the field, and through a research questionnaire directed to the main users of BENAYAT and got 31 respondents. The analysis focused on non-numerical qualitative data, while the quantitative data was used to supplement and enhance the qualitative data's findings. This approach enabled a comprehensive understanding of the complex issues surrounding the issuance of building permits.

The research findings highlighted the limitations of the BENAYAT system and identified areas that require improvement to enhance the system's effectiveness. The first drawback that causes delay in the current system is the process sequences, second is the action of resubmitting the complete application for any change, third is the time needed for pre-approval, and finally the engineers' availability to receive queries. The research proposed recommendations to address these issues and others, and the first recommendation is to create easy channels of communication, second is including all related governmental authorities in the system, third is making it easy to change some inputs, and finally canceling the audit by municipalities after getting the building permit.

Finally, a revised model incorporating the proposed recommendations to enhance the issuance of building permits was developed. The recommendations and the revised model are expected to streamline the application process, minimize potential delays, and open the door to adding the missing services to the BENAYAT Portal. The goal is to improve the BENAYAT Portal and make it a more efficient and user-friendly system for applicants.

Dedication

My heart is filled with gratitude as I dedicate this dissertation to the pillars of my life, my parents, who have always been there for me, believing in me and providing me with constant encouragement.

I would also like to express my deepest appreciation to my wife, Dr. Zahraa Albarni, and my son, Hassan, whose unwavering love and patience have been an anchor throughout my master's program journey.

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List of Abbreviations

EO	Engineering Offices
BP	Building Permit
BPS	Building Permit System (old system)
GCC	Gulf Cooperation Council
EDB	Economic Development Board
SDGs	The Sustainable Development Goals 2030
UN	United Nations
CRPEP	Council for Regulating the Practice of Engineering Professions
UPDA	Urban Planning Development Affairs
BACA	Bahrain Authority of Culture and Antiquities
SEPPD	Sanitary Engineering Planning and Projects Directorate
WDD	Water Distribution Directorate
EDD	Electricity Distribution Directorate
iGA	The Information & eGovernment Authority
COVID-19	Coronavirus disease
AH	Anno Hegirae
AD	Anno Domini
BPR	Business Process Re-engineering
BIM	Building Information Modeling
AI	Artificial Intelligence

Chapter One: Introduction

The introduction chapter is divided into the following sections:

1.1 Introduction

1.2 Statement of the Problem

1.3 Research Justification & Importance

1.4 Research Questions

1.5 Research Aim and Objectives

1.6 Research Limitations

1.7 Research Structure

1.1 Introduction

The public service sector in Bahrain has undergone a significant transformation in the past decade, thanks to the adoption of modern technology. The governments of the Gulf Cooperation Council (GCC) have realized the importance of keeping up with the constantly growing economy and public expectations.

Due to the challenges of providing quality government services promptly and adopting modern management techniques, Bahrain has made innovation an essential part of its national development plans.

In the past, getting building permits was often a difficult task for various stakeholders. The manual permit process led to lengthy application processing times, resulting in a waste of time and money. To simplify the process and expedite approvals, the Kingdom of Bahrain introduced the BENAYAT Building Permit Portal in 2018 as an innovative solution.

1.2 Research Background

The number of applications for building permits has been increasing steadily over the years. In 2020, 1,451,579 building permits were issued in the USA, which is 22.7% more than the number of permits issued in 2015, 1,182,582 (USA Census Bureau, 2021). In Germany, there was a 3% increase in building permits issued from 2015 to 2020, with 147,304 building permits issued in 2015 and 151,612 building permits issued in 2020 (German Federal Statistical Office, 2021).

In Bahrain, building permits in 2016 granted for residential, investment, industrial and commercial projects expanded by 40% (BBK, 2016). Also, the year 2021 witnessed an increase in building permits in Bahrain by 20% (MENAFN, 2022). And recently in 2023, there was an

increase of 43.2% in the total area of building permits issued in Bahrain. (ALAYAM, 2023).

The processes involved in obtaining building permits in the United States are often characterized by bureaucratic inefficiencies and low productivity. However, regulatory authorities have increasingly recognized the need for more streamlined and efficient approaches to permit approval (Messaoudi & Nawari, 2021). Similarly, Bahrain has also experienced challenges related to the issuance of building permits. In response, authorities in the country have been exploring ways to improve the efficiency of the permit approval process.

This research is taking the BENAYAT Portal as a case study aiming to identify the opportunities and challenges that affect issuing Permits to achieve more effective use of the BENAYAT Portal.

Also, this research aims to identify and analyze main users' perceptions of the service provided to understand factors affecting issuing the of Building Permits positively or negatively and suggest recommendations for optimizing the processing time.

1.3 Research Justification and Importance

The research focuses on the BENAYAT model, recently adopted in Bahrain for issuing Building Permits. Our primary objective is to identify the challenges and opportunities that impact the Permit issuance process. Through this research, we aim to better understand the underlying causes of drawbacks that affect the permit issuance process.

By analyzing and evaluating these factors, we can provide recommendations that will help enhance the overall process. This, in turn,

will lead to significant savings in time, cost, and effort for all stakeholders involved in the Building Permit stage.

Furthermore, this research will contribute to improving process efficiency, which will positively impact the development of the building industry in Bahrain.

1.4 Research Questions

The main questions of the research are:

1. Why was the BENAYAT Portal introduced?
2. What is the history of building permits in Bahrain?
3. What are the challenges that the BENAYAT model has?
4. How to make the BENAYAT Portal better?

1.5 Research aim and Objectives

The main aim of the research is to improve the effectiveness of the BENAYAT Portal, the objectives of this research are as follows:

1. Identify the role of the BENAYAT Portal and its relation to Bahrain Economic Vision 2030.
2. Analyze the current model of issuing Building Permits through the newly adopted system (BENAYAT Portal), to understand the innovation in the public service provision and how this could be replicated in other public service provisions.

3. Indicate the opportunities and challenges that affect issuing the Permits to achieve optimal/more effective use of the BENAYAT Portal.

1.6 Research Limitations

The BENAYAT Portal is a crucial platform for the construction industry that provides a range of services related to building permits to enhance the functionality of the portal, it is essential to obtain feedback from Government engineers who use the platform. However, obtaining their feedback can be challenging due to several research limitations. These limitations include time constraints and the unavailability of engineers due to their busy schedules. Additionally, some engineers may be hesitant to provide feedback due to concerns about the security and confidentiality of their data. Despite these challenges, it is crucial to obtain feedback from Government engineers to ensure that the BENAYAT Portal continues to meet the needs of its users and remains a reliable and efficient platform for the construction industry.

1.7 Research Structure

The research project is comprised of four main chapters. The first chapter is an introductory section that aims to provide an overview of the research project. It will outline the primary goals of the study and discuss the rationale behind conducting the research. The chapter will also articulate the study's objectives and the research questions that will guide the investigation.

The second chapter will revolve around the literature review. It will first examine the innovation in Bahrain's public sector and then delve into

the historical background of building permits in Bahrain, including the regulations and policies that govern the building permit process. This chapter will also review the challenges and opportunities related to building permits in Bahrain. Furthermore, it will provide an overview of the BENAYAT Portal, outline the primary stakeholders, and review the current process of obtaining a Building Permit.

The third chapter will delve into the methodology used in the research project. The chapter will describe the research framework employed in the study and explain the combination of qualitative and quantitative methods used to collect and analyze data. The chapter will also describe the semi-structured expert interviews and questionnaires used in the research, including the participants and the data analysis techniques employed.

Finally, the last chapter will present and analyze the research findings. The chapter will discuss the results of the data analysis, including the emerging themes and patterns. It will also provide recommendations based on the findings and propose a revised model for building permits in Bahrain. The chapter will conclude with a discussion of the implications of the research and future directions for further investigation.

Chapter Two: Theoretical Framework and Literature Review

The literature review chapter is divided into the following sections:

2.1 Innovation in Bahrain's public sector

2.1.1 Sustainability

2.1.2 Fairness

2.1.3 Competitiveness

2.1.4 How Bahrain implement innovation?

2.2 Historical background of building permit in Bahrain

2.2.1 Overview of the History of the Municipality in Bahrain

2.2.2 The beginning of the Building Permit system in Bahrain

2.2.3 The beginning of the BENAYAT Portal (2018)

2.3 The BENAYAT Portal

2.3.2 BENAYAT Stakeholders

2.3.3 How does the BENAYAT Portal work to obtain a Building Permit?

2.4 The research focus and rational

2.1 Innovation in Bahrain's public sector

The government of Bahrain is dedicated to serving its citizens and residents in an effective and efficient manner through its policies, while keeping up with the world's changing needs. Bahrain Economic Vision 2030, which was launched by His Majesty King Hamad bin Isa Al Khalifa in October 2008, is a comprehensive economic plan for the country that provides a clear direction for its continuing development. At its core, the plan aims to build a better life for every Bahraini. The launch of the vision followed four years of extensive discussions with a range of opinion leaders in the public and private sectors, including governmental institutions and organizations, as well as international consultancies and bodies. The Economic Vision 2030 focuses on shaping the vision of the government, society, and the economy, based on three guiding principles: sustainability, fairness, and competitiveness. These are discussed briefly next with reference to the published 2030 vision (Kingdom of Bahrain's National portal [KBNP], 2021).

2.1.1 Sustainability

Bahrain's economic growth in the past 20 years was majorly driven by the public sector. However, with the global economy becoming more competitive and the government finances becoming tighter, this approach is no longer sustainable. The goal now is for Bahrain's private sector to drive the country's economic growth independently by the year 2030. The Bahraini Government's funding will focus on sustainability and maintaining a stable and future-oriented framework. The Kingdom of Bahrain will prioritize investing in education and training to develop human capital, particularly in applied sciences.

Given the ever-evolving world and the emergence of new technologies and global competitors, entrepreneurship and innovation can

play a crucial role in ensuring the long-term prosperity of Bahrain's private sector. At the same time, economic growth must never come at the cost of environmental health and the future wealth of Bahrain's people. Therefore, every effort will be made to protect the environment and preserve Bahrain's cultural heritage (KBNP, 2021).

2.1.2 Fairness

The goal of Bahrain's Vision is to create a broad base of prosperity and make sure that the country's economic progress has a greater impact on society. The economic prosperity of Bahrain is expected to have a positive influence on society, leading to an extensive period of well-being. Every person has the potential to positively contribute to society, provided they have the necessary resources and are given the opportunity. To create and maintain a level playing field between the public and private sectors, it is important to ensure that all activities are conducted transparently. This can help foster integrity and fairness. All participants should compete on a level playing field, with both private and public activities conducted out in the open, be it in terms of job hunting, bidding for land, or awarding tenders.

The role of Bahrain is to provide a sound legal and regulatory environment that safeguards the rights of consumers and equal treatment for business owners, both local and foreign investors alike. It is essential to eliminate corruption and ensure that laws are rigorously adhered to. When striving for fairness in society, everyone should be treated equitably regarding the law while also adhering to universal human rights. Moreover, all individuals should have access to basic services such as education, healthcare, and those in need must also be provided with job training and a well-developed social support system (KBNP, 2021).

2.1.3 Competitiveness

Bahrain can compete effectively in the worldwide economy. The ability to compete in such an environment can result in enhanced productivity, which in turn can lead to better economic growth, profitability, and wages. To increase their employees' wages, businesses must have high and consistently improving productivity. Achieving higher productivity necessitates having the appropriate skillsets for each job position.

To stay competitive, Bahrain has been actively striving to educate its citizens, retain qualified personnel and attract foreign professionals with expertise that is not available in the country. The key is to make Bahrain a great place to do business for both local and foreign companies. Attracting investors in high-value-added industries requires various components such as a reliable public service, a sophisticated infrastructure, and an attractive living environment.

The Economic Development Board (EDB) launched a program of economic and institutional reform after the introduction of the Economic Vision 2030. In collaboration with ministries, the EDB compiled the first National Economic Strategy as a roadmap to achieve the Vision. Additionally, the Sustainable Development Goals 2030 (SDGs) are addressed by Vision 2030 (KBNP, 2021).

The 2030 Agenda for Sustainable Development outlines a 15-year plan to achieve the Sustainable Development Goals (SDGs). These goals are a universal call to action aimed at ending poverty, protecting the planet, and improving the lives and prospects of all individuals, regardless of their location. In 2015, all UN Member States adopted the 17 Goals as part of the initiative to achieve the SDGs. (United Nations, n.d.).

The Sustainable Development Goals are listed in the below table:

Table 1 - The Sustainable Development Goals. (Source: Adapted from SDGs website)

GOAL 1	No Poverty
GOAL 2	Zero Hunger
GOAL 3	Good Health and Well-being
GOAL 4	Quality Education
GOAL 5	Gender Equality
GOAL 6	Clean Water and Sanitation
GOAL 7	Affordable and Clean Energy
GOAL 8	Decent Work and Economic Growth
GOAL 9	Industry, Innovation and Infrastructure
GOAL 10	Reduced Inequality
GOAL 11	Sustainable Cities and Communities
GOAL 12	Responsible Consumption and Production
GOAL 13	Climate Action
GOAL 14	Life Below Water
GOAL 15	Life on Land
GOAL 16	Peace and Justice Strong Institutions
GOAL 17	Partnerships to achieve the Goal

The figure below depicts the previously mentioned goals using icons:



Figure 1 - The Sustainable Development Goals. (Source: SDGs website)

The three main principles of the Economic Vision 2030 are sustainability, competitiveness, and fairness, which align with the Sustainable Development Goals 2030 (SDGs) and share the same objectives. Furthermore, under the sustainability section, it is mentioned in the Bahrain Portal that *"In a world where modern technology and new competitors from across the globe are continually shortening product lifetimes, entrepreneurship, and innovation will ensure the sustainability of a vibrant private sector"* (KBNP, 2021).

The Kingdom of Bahrain is well-known for its unwavering commitment towards creating strong institutions and fostering partnerships that are essential for achieving sustainable community goals. An excellent example of this is the establishment of Tamkeen, a labor fund in 2006. Tamkeen was created to promote investment in innovation and act as an engine to strengthen the Bahraini economy by supporting and nurturing the private sector. By forging partnerships with the private sector, non-profit organizations, and community-based organizations, Bahrain is not only fostering innovation but also generating innovative solutions that help the nation thrive. (Alves, 2013).

Moreover, innovation is an extremely important concept in the modern world. It involves the development, acceptance, and implementation of new ideas, processes, products, or services to improve existing systems or create entirely new ones (Baregheh, Rowley, Sambrook, 2009). Companies that embrace innovation are often successful because they can keep up with a constantly changing market and develop better solutions for their customers.

Furthermore, Governments worldwide are eager to integrate policy discussions into their endeavors, emphasizing the need for innovation and

inventive approaches in creating public services to address economic and social issues.

2.1.4 How Bahrain implement innovation?

There are multiple methods for achieving innovative transformational policy through operational procedures. These methods include privatization, outsourcing, or altering policies that affect certain public sectors and services.

A. Privatization:

The privatization of public services has been gaining traction in recent years, with many governments turning to private companies to provide public services. Privatization of public services has the potential to increase efficiency and reduce costs, although it is also associated with a range of risks that need to be carefully managed. These include possible conflicts of interest, decreased accountability and transparency, and the risk that private companies may take advantage of government resources for their own gain. For example, Bahrain began privatizing the electricity and water sector after selling Al-Dur station - currently the Hidd power station - for \$738 million (ALAYAM, 2011).

B. Outsourcing:

Outsourcing of public sector services is becoming increasingly popular as a cost-effective way to streamline the delivery of public services. By outsourcing certain services, the public sector can benefit from the expertise and scalability that external providers can offer while also achieving greater efficiency and cost savings. In addition, outsourcing enables public sector organizations to focus on core activities and better serve their constituents. For example, Bahrain has several telecom and

internet providers, including Batelco, STC, Zain Bahrain, Mena telecom, and Kalam Telecom (EDB Bahrain, n.d.).

C. Changing the policies:

With the ever-changing environment, governments are continuously exploring new ways to improve public services and sectors. Policy changes have become more frequent and complex, impacting various aspects of our lives. From healthcare to education, governments are now utilizing policy changes to shape the future of public services and sectors.

Furthermore, by following any of these models, the government's role will change from an operator (service provider) to a regulator and a partner. And this is exactly what is mentioned in Bahrain's Government Action Plan (2019-2022), point number 8: *“Redefine the role of the public sector from the main driver to a regulator and partner, developing and facilitating the government procedures”* (KBNP, 2021). In 2002, Bahrain's administration made significant strides in transforming its function from being a service provider to becoming a regulator of specific services in response to worldwide advancements in public service delivery.

Now in 2023, it is obvious that the government of Bahrain achieved this point (point 8 of the Government Action Plan), as a number of government services are now provided to the citizen by either semi-private or totally private firms, and government become a regulator to those services: such as renewing car registration, issuing new baby-born certifications, electricity power generation, infrastructure development, providing Housing Projects, and so on.

The following are some related and more detailed examples:

- **BeAware Bahrain:** The Information & eGovernment Authority (iGA) and the National Taskforce for Combating the Coronavirus

have come together to introduce an innovative mobile application called 'BeAware Bahrain'. This app, launched in early 2020, helps the government to effectively monitor and track individuals who are under home quarantine due to the COVID-19 pandemic. The app is designed to alert citizens and residents when they come near confirmed or suspected cases and is mandatory for individuals who are under quarantine. The app is connected to GPS-equipped irremovable electronic bracelets, which are worn by the quarantined individuals, and it enables healthcare teams to track them. Apart from this, the BeAware Bahrain app also allows users to register for the government-approved COVID-19 vaccines. Developed in-house by the iGA, the app serves as a valuable tool in the government's efforts to contain the spread of the virus and promote the overall health and safety of its citizens and residents.

- **eGovernment Services:** The national portal serves as a convenient platform for all government transactions, offering more than 500 eServices across all government channels.
- **Supporting business:** The labor fund Tamkeen was established by the Kingdom to foster investment in innovation and bolster the Bahraini economy by nurturing the private sector. Tamkeen offers financial assistance to individuals for training programs and professional certification, as well as wage support. It also provides financial support to businesses of any scale, promoting innovation and entrepreneurship.

The Economic Development Board (EDB) plays a critical role in promoting innovation by attracting foreign investment and providing support to the private sector. Through the allowance of 100% foreign ownership in most business sectors, global businesses are facilitated in

their efforts to establish a presence in the Kingdom and bring along their advanced technologies.

Moreover, the BENAYAT Portal has revolutionized the way building permit applications are reviewed and approved in Bahrain by introducing an automated workflow that streamlines the entire process. Additionally, the platform has partnered with the private sector to ensure that the process is efficient and effective. The use of such new practical and modern legal framework has contributed to Bahrain's improved performance in various areas. Also, BENAYAT Portal is linked to Goal number 11 of the Sustainable Development Goals 2030 (SDGs) which is: Make cities and human settlements inclusive, safe, resilient, and sustainable. As such, BENAYAT Portal is addressed under the eServices and systems that the government of Bahrain developed to support this goal. The BENAYAT Portal will be the case study of this research.

By the end of this section, the researcher has answered research question number 1 (Why was the BENAYAT Portal introduced?).

2.2 Historical background of building permit in Bahrain

In April 2023, the researcher began collecting historical background data related to the Building Permit in Bahrain. The researcher collected this data by visiting the media section of the Ministry of Municipality Affairs and Agriculture. The Ministry staff were very welcoming, and during the second visit, the researcher had the opportunity to meet the Head of Media. During the meeting, the Head of Media shared valuable information about the historical background of public sector services in Bahrain, including their establishment and progress. After that, the researcher delved into the

government database and conducted extensive research on governmental orders related to the Construction industry. As such he was able to identify and document the main milestones of these services (in the next sections of this research). The information collected by the researcher provides a comprehensive view of the development of the Construction Sector in Bahrain and sheds light on the innovative initiatives undertaken by the government in this field.

2.2.1 Overview of the History of the Municipality in Bahrain

(Ministry of Municipalities Affairs and Agriculture portal, 2023)

Before the formation of the municipality in 1919, there was no existence of a similar entity in the Kingdom of Bahrain that could perform the services that the current municipality provides.

During the month of Dhul-Qa'dah in the year 1337 AH, which corresponds to July 1919 AD, the government recognized the pressing need for a device that could safeguard the health and well-being of citizens, streamline their daily routines, and effectively manage their affairs. It was then that the municipality was established.

The Manama Municipality is among the earliest municipalities founded in the Arab world, and it is also one of the first official departments established in the Kingdom of Bahrain when the country's administration began to be restructured based on modern foundations.

The first legal system for municipalities in Bahrain was established on January 20, 1920, with the issuance of a law to establish a municipality in the city of Manama, which is the capital of Bahrain. The law's objective was to *"preserve the health, welfare, and well-being of the population,"*

and a municipal council consisting of eight members appointed by the government was entrusted with its management at that time.

The establishment of an important facility was necessary to carry out tasks, responsibilities, and achieve valuable goals. This facility is crucial for the future and safety of the people of this country. It supervises the health, preventive, and organizational aspects of citizens' lives through its services. At the start, the management included all types of government services that covered all duties and responsibilities during that period.

Upon its creation, the municipality undertook the task of assigning numbers to the residential and commercial properties and levying estimated charges on them. The next step involved the removal of the hills, formed from the buildup of garbage in Manama, which was referred to as "Al Samaid". The municipality's activities were restricted to merely sweeping and clearing the garbage from the city.

As time passed, its jurisdiction grew, and its duties expanded. In 1929, it commenced various construction projects, such as the widening of streets, leveling of roads using rudimentary methods, regulating public markets, overseeing altars, standardizing weights and measures, building public laundries, and creating rainwater drainage schedules.

Municipal councils continued to carry out their work until the period that preceded the administrative organization before the declaration of independence, as a result of this, the issuance of the first decree on January 19, 1970, from the late His Highness Sheikh Isa bin Salman Al Khalifa, stipulating the establishment of a State Council entrusted with the executive authority, as was issued Decree No. (2) of 1970 establishing departments that later became state ministries, including municipalities and agriculture departments, consisting of the following departments:

1) Municipalities Department. 2) Department of Agriculture. 3) The Rural Affairs Department.

On August 14th, 1971, Bahrain declared its independence, and the Emir of the country at that time issued a decree that named the Council of Ministers to the State Council, and the Department of Municipalities and Agriculture was created. (Ministry of Municipalities and Agriculture), then Decree No. (16) of 1973 was issued dated August 22, 1973, establishing a central municipal authority that exercises all the powers of the dissolved municipal councils for a transitional period of two years. Ten members representing the ministries of the state related to public services provided to citizens, and the Minister of Municipalities and Agriculture shall preside over the central municipal authority.

During the tenure of His Excellency Sheikh Abdullah bin Khalid Al Khalifa, the Ministry of Municipalities and Agriculture, the municipality entered a firm phase of comprehensive organization at various levels. In terms of services, all areas of municipal services were developed, which included public hygiene, environmental protection, beautification and afforestation of cities, villages, streets, and squares, and the establishment of public parks. City planning and organization of buildings and construction affairs. In that period, the administrative and functional apparatus was also developed based on the work needed at that time for administrative functional competence.

The municipality was also associated in that period with the outside world through its accession to the Arab Cities Organization and its influence on that contact, which was reflected in many aspects. In 1970, the municipality hosted the second conference of the Arab Cities Organization, which came out with many positive decisions that benefited the Arab cities that are members of the organization.

2.2.2 The beginning of the Building Permit system in Bahrain

A. 1973 - Establishing a temporary central municipal authority to manage municipal affairs (Appendix A1)

A central municipal body was established to exercise all the powers of the dissolved municipal councils for a transitional period of two years. This body was consisting of twenty-eight members appointed by a decision of the Prime Minister in the following manner:

1- Fourteen citizens from different municipal regions.

2- Fourteen members representing the relevant state ministries.

The government has given the central municipal authority special jurisdiction over the following matters:

First: Monitoring the implementation of health and organization laws and regulations that fall within the jurisdiction of municipalities and within their responsibilities, cleaning cities and villages, their streets and public squares, zoning lands, public shops, and other laws related to public utilities, in cooperation and coordination with the relevant ministries and agencies. The Central Municipal Authority, within the limits of its competence, and with the approval of the Minister of Municipalities and Agriculture, was able to issue the necessary complementary provisions to these laws and regulations.

Second: Report the following municipal projects in cooperation and coordination with the relevant government agencies:

A- Urban projects, and projects aiming at beautifying cities and villages, establishing public parks, roads, streets, and squares, expanding them, landscaping them, leveling them, cleaning them, and lighting them.

B- Establishing markets and slaughterhouses, setting up their systems, and supervising and inspecting their implementation.

C- Demolishing dangerous buildings, supervising new buildings, and restoring old buildings according to the required specifications.

d- Naming areas, neighborhoods, and streets, and monitoring weights, measures, and measures.

E - Expropriation projects in accordance with the law of expropriation for the public benefit.

Third: Considering proposals submitted by ministries or a member of the Commission and issuing decisions or recommendations in this regard.

Fourth: Discussing and preparing the draft budget for the local municipalities for the new fiscal year and their final accounts for the ending fiscal year.

Fifth: Any minister may, after the approval of the Council of Ministers, entrust the Central Municipal Authority with an order of matters within the competence of his ministry, provided that the ministry bears the corresponding financial burdens.

B. 1977 May - All started here. For the first time in Bahrain, you need to get a Municipality Building Permit before constructing buildings (Appendix A2)

(Determine what is to be submitted and from whom, such as plans, elevations, and so on).

The Building Regulation Law issued this year (1977) contains a lot of articles, the most important of which are related to the research are the following articles:

Article - 1 – states that, in accordance with the regulations of Law No. (3) of 1975 regarding public health, any construction, addition, demolition, modification, expansion, heightening, or support of a building or its internal arrangement, whether in its external form or in its work, is prohibited without obtaining permission from the municipality. Additionally, any alteration to the features of any land, such as digging or filling, requires a permit from the municipality.

Article - 2 - If any construction or project falls under the purview of a license as per this law, and it is undertaken without a license or in violation of the terms of the license, the concerned municipality may order its immediate cessation. Furthermore, the municipality may impose a fine or require the removal of any work carried out in violation of this law. The responsible party shall have a maximum of three months from the date of the verdict to take corrective action at their expense. If the party does not comply within this time frame, the municipality shall carry out the removal at the expense of the responsible party.

Article - 3- The license application shall be submitted to the Municipality's Technical and Engineering Affairs Department on the prescribed form accompanied by the drawings, data, and documents specified by the executive regulations of this law. The municipality shall give the license applicant a receipt dated with receipt of the application and its attachments.

Article - 4 - The license may not be granted except after verification of:

1- The relationship of the license applicant with the real estate.

2- The submitted drawings are prepared and approved by two architectural and structural engineers recognized by an official authority.

3- An acknowledgment from the engineer supervising the implementation, approved by the municipality, that includes his willingness to bear the responsibility in the event of the occurrence of what requires it.

The executive regulations of this law show the cases in which the license applicant is exempted from the provisions of the second and third clauses, provided that the reason for the exemption is the small area of the land on which the building is to be built, the low value of the building, the low costs of excavating or backfilling the land, or for other reasons determined by the executive regulations and related to the special circumstances of each request.

Article - 5 - The license may not be granted except after submitting the following drawings:

1- A drawing of the public site showing the adjacent properties within a radius of at least 100 meters, except for the small buildings specified by the implementing regulations.

2- A drawing indicating the construction site in relation to the land, as well as the existing facilities at the time of submitting the application.

3- Architectural drawings for the building and the construction account memorandum.

4- Structural drawings for foundations and all floors.

5- That the license applicant submits evidence indicating his capacity or relationship to the construction or work site.

C. 1977 October - Formulation of a committee to review the Building Permit applications, the committee consists of 8 governmental stakeholders (Appendix A3)

(Manual Submission)

The building permit review committee was composed of representatives of the relevant official authorities, the composition of the committee was as follows:

1- The Temporary Central Municipal Authority: It was represented by two engineers, Yahya Abdel-Ghani and Najdi Habib Hanna.

2 - Public Health Department: represented by Ali Jaafar Anjawi

3 - Fire Department: represented by Brian Turner

4 - Electricity Department: represented by Youssef Mohamed Mansour

5 - Works Department: represented by Saad Abdullah Al-Shorouki - for the sewage department, and Abdul Amir Ahmed Al-Asfoor - for the roads department.

6 - Water Liquefaction Department: represented by Muhammad Salih Juma and Saad Jabr Al-Dosari.

7 - Natural Planning Department at the Ministry of Housing: represented by Eng. Habib Muhammad Ali

8- Bahrain Telephone Management: represented by Ramzi Thomas Hudson.

The Municipality's Technical and Engineering Affairs Department is responsible for issuing building permits.

D. 1979 April - Determine regulation requirements for construction in Bahrain (Appendix A4)

(The first creation of the Building Regulation law in Bahrain).

The regulation requirements for construction were determined in the different regions of the country, and they were divided into seven sections as follows:

First: Regulatory requirements for construction in areas of multi-use buildings with a commercial façade.

Second: The regulatory requirements for reconstruction in the old areas, which are divided into:

A - Buildings overlooking commercial streets

b- Buildings overlooking residential streets.

Third: The regulatory requirements for construction in the new areas, which are divided into four sections, as follows:

1- Investment housing areas (A)

2- Investment housing areas (B)

3- Private housing areas (A)

4- Private housing areas (B)

Fourth: the regulatory requirements for construction in the areas designated for the construction of private and investment housing buildings in the local style.

Fifth: Regulatory requirements for construction in rural areas.

Sixth: Regulatory requirements for construction in industrial areas.

Seventh: the regulatory requirements for construction on the borders of the main roads outside the cities.

1980 to 2006 - The regulation requirements were simple at first and straightforward, but they evolved over time. This evolution led to some changes in the requirements needed for issuing building permits (such as documents, drawings, etc.), however, it was mainly dependent on **Manual Submission** and then reviewed or followed-up with the relevant authorities to obtain their approvals. At the end of each application, the municipality's approval was required before the building permit was issued.

E. 2007 - The beginning of an online application to get a Building Permit through the Online Municipality System

A paperless and total solution for the engineering offices to submit their application and drawings electronically via the Internet, through the online Building Permit system. In the system, they can track the applications for the authorities' comments/approvals, apply for amendments, apply for addition to existing buildings, apply for demolition, etc.

F. Establishment of Bahrain Municipal Geo explorer website:

This unique service was provided by the Ministry of Municipalities Affairs and Agriculture, it provides an interactive map that can facilitate displaying spatial details of the lands in Bahrain, such as administrative boundaries, commercial roads, zoning regulations, ex-pats investment zones, satellite images as well as landmarks, and so forth. This service was

very useful for the stakeholders, as they can access and review the needed information related to their projects from their office's comfort.

By the end of this section, the researcher has answered research question number 2 (What is the history of building permits in Bahrain?).

2.2.3 The beginning of the BENAYAT Portal (2018)

His Royal Highness Prince Salman bin Hamad Al Khalifa, the Crown Prince, Deputy Supreme Commander, and First Deputy Prime Minister, announced the launch of the BENAYAT Portal system, a new, more efficient procedure for issuing building permits in the Kingdom of Bahrain. This occurred at the 2018 Government Forum, which took place on Sunday, October 28.

On October 30, 2018, the Government Executive Committee—presided over by HRH the Crown Prince—discussed the BENAYAT Portal's development after the Government Forum. The previous Minister of Works, Municipalities Affairs, and Urban Planning, noted in a statement that BENAYAT marks a new milestone in expediting procedures related to issuing building permits.

Furthermore, His Excellency highlighted BENAYAT's role in promoting investments and opening opportunities in the real estate sector during the Government Executive Committee, adding that this new efficiency-focused system is one of several initiatives led by the Executive Committee to meet important goals within Bahrain's Economic Vision 2030 and continue to spur innovation within government services. His Excellency emphasized BENAYAT as a demonstration of the government's solid commitment to turning the private sector into the

primary engine of growth, providing opportunities for citizens, and driving sustainable development as he concluded the Committee.

The cabinet accorded high priority to the building permit service and aimed to revamp it in line with point number 8 of the government action plan. This was done because the service is deemed crucial in boosting prosperity and has a direct impact on Bahrain's international rankings and reputation as an investment destination. To achieve this goal, the Bahraini government utilized the BENAYAT system.

The official portal for building permits in the kingdom was created to handle and issue permits for various types of building projects, such as investment, residential, commercial, and industrial, while being supervised by the Ministry of Municipalities Affairs & Agriculture. The system is designed to manage building permits and can be considered as the go-to platform for this purpose.

By the end of this section, the researcher has achieved research objective number 1 (Identify the role of the BENAYAT Portal and its relation to Bahrain Economic Vision 2030).

2.3 The BENAYAT Portal

2.3.1 What is BENAYAT?

BENAYAT Building Permit Portal is the new official system utilized by the Kingdom of Bahrain to grant building permits for all types of building projects, including investment, residential, industrial, commercial, etc.

BENAYAT is an internet-based system that enables Engineering Offices registered in the Kingdom of Bahrain to submit building permit

requests, check the status of those requests, get advice from relevant government agencies about building permits, pay fees associated with those requests, and submit requests for other building related services.

BENAYAT enables applicants to access all necessary information to generate drawings and paperwork required to apply for a building permit by using an interactive map that offers important information for land parcels and by consolidating all relevant regulations and requirements under one system (BENAYAT Portal, n.d.).



Figure 2 - BENAYAT Portal Logo. (Source: BENAYAT Portal)

2.3.2 BENAYAT Stakeholders

The system encompassed all parties engaged in the issue of building permits, including governmental organizations, private entities, and property owners. As a result, BENAYAT is accessible to and usable by all stakeholders.

1- Property owners:

They could be a single owner, a group of owners, or even an organization. They own land in the Kingdom of Bahrain, and they are willing to construct a project on that land to serve their needs. Although

Property owners should appoint an Engineering Office to apply for a Building Permit, they still can interact with the BENAYAT Portal to check the status of their application and pay the government's fees related to their project.

2- Government organizations:

BENAYAT Portal is a platform that is integrated nationally and serves as a means for submitting applications for building permits. It incorporates processes from over 12 different public entities. Such as Urban Planning Development Affairs (UPDA), Roads Planning & Design Directorate, Supreme Council for Environment, Tatweer Petroleum, Civil Aviation Authority, Bahrain Authority of Culture and Antiquities (BACA), Sanitary Engineering Planning and Projects Directorate (SEPPD), Water Distribution Directorate (WDD), Electricity Distribution Directorate (EDD), and so on.

3- Licensed Engineering Offices:

The Council of Regulating the Practice of Engineering Professions has granted these highly skilled offices legal status to engage in engineering-related activities, including creating the drawings and paperwork required to apply for a building permit. The classification given to engineering offices varies depending on the number, area of specialization, and level of experience of the engineers employed by that office.

Depending on their function during the application procedure for a building permit, engineering offices for the BENAYAT application can be categorized as either Creators or Auditors. These two roles are described below:

- **EO Creators:**

An Engineering Office that has been hired by the property owners to provide the required drawings and paperwork for a building permit application. To acquire a building permit, they are the ones who create the BENAYAT application. If they designed the project, they may refer to this Engineering Office as the Designer.

- **EO Reviewers:**

Another Engineering Office (Same category as Creator or higher) is being hired to review Creators' works and ensure compliance with regulatory requirements and standards. This Engineering Office is sometimes referred to as a Reviewer since they review all the inputs in the Building Permit application.

2.3.3 How does BENAYAT Portal work to obtain a Building Permit?

Property owners must hire an Engineering Office certified by the Kingdom of Bahrain's "Council for Regulating the Practice of Engineering Professions" to create the essential drawings and documents for a building permit application. The Engineering Office is responsible for completing all duties required to secure a building permit on behalf of the property owners.

The BENAYAT workflow transformed the government's role from being a service provider to a regulator by automating processes. This helped to increase the involvement of the private sector in the examination and approval of building permit applications. The workflow also ensured compliance with an up-to-date legal framework.

The process of issuing building permit through BENAYAT Portal that the Engineering Office will perform is divided into the following stages:

- **Stage 1:** Initiate Request
- **Stage 2:** Pre-Approval
- **Stage 3:** Engineering Data
- **Stage 4:** Engineering office Review
- **Stage 5:** Service Connectivity
- **Stage 6:** Payment

Once the stages are finalized, an electronic Building Permit will be immediately issued by the system. This permit can be downloaded from the Creator Engineering Office's side from the BENAYAT Portal.

The figure below shows the BENAYAT Portal home page:

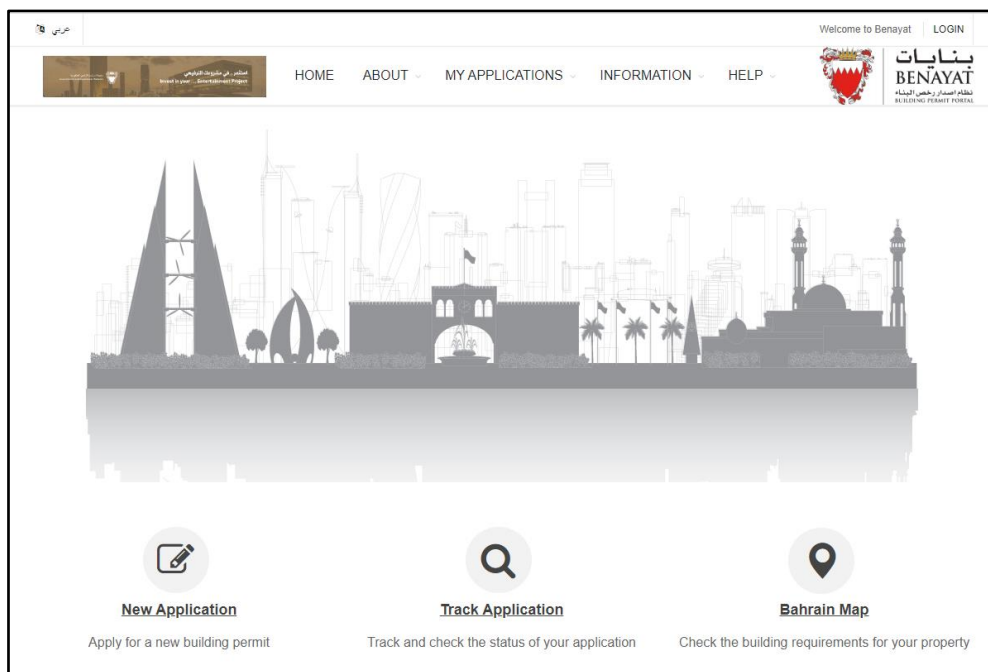


Figure 3 - BENAYAT Portal home page (Source: BENAYAT Portal)

Figure (4) below shows how the application looks in the BENAYAT system:

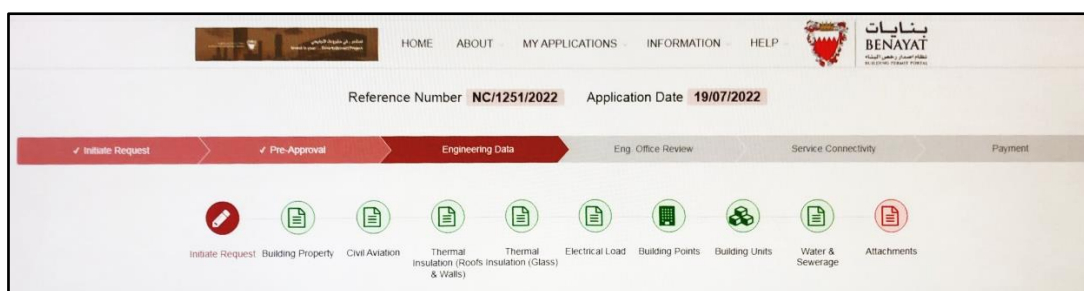


Figure 4 - Building Permit application in the BENAYAT Portal (Source: BENAYAT Portal)

Table (2) below elaborates on the process of issuing building permits through the BENAYAT Portal in sequence, showing each process description and general related information:

Table 2 - The process of issuing building permits through the BENAYAT Portal (Source: Original)

Process name	Process description	Done by	Requirements
1- Initiate Request	Property owners engage a licensed Engineering office to apply for a building permit.	Creator	-Documents -Drawings -Input data in the system.
2- Pre-Approval	In some cases, applicants must first obtain pre-approval before starting the process of applying for a building permit.	Government organizations	Upon request
3- Engineering Data	The creator continues to work on the application in the BENAYAT system; at this point, new data and drawings must be submitted. A stamped architectural drawing from the Auditor's side is included with the drawings. (Creators submit the drawings to Reviewers directly, not in the system).	Creator	-Drawings -Input data in the system.
4- Engineering office Review	The Creator submits all required drawings and documents to the Auditor, to review and ensure compliance with regulatory requirements and standards.	Reviewer	-
5- Service Connectivity	After Auditor approval, the system will automatically route the application to the	Government organizations	-

	concerned government entities.		
6- Payment	When all relevant permissions are received, the application will automatically proceed to the payment step. The payment must be made online.	Property owner	Building Permit Fees and insurance Deposit
7- Issue Building Permit	Once the building permit payments are received, the system will issue an electronic building permit immediately. The building permit is valid for one year after it is issued.	Government organizations (through BENAYAT Portal).	-

Figure (5) below shows the BENAYAT model for issuing Building Permits:

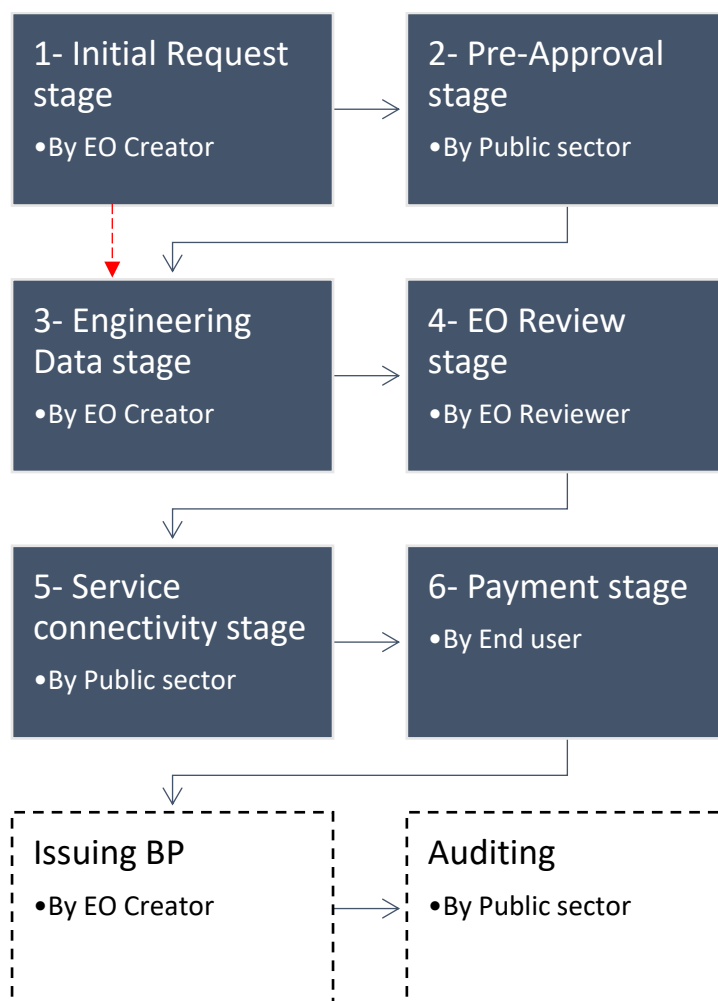


Figure 5 - BENAYAT model for issuing BPs. (Source: Adapted from BENAYAT Portal)

2.4 The research focus and rational

Without a doubt, every system crafted and executed by humans is open to enhancements. No system is perfect and there is always some scope for enhancement, whether it is in terms of efficiency, accuracy, functionality, or user-friendliness. Therefore, it is crucial to continuously evaluate and refine the systems to ensure they are meeting the desired objectives and delivering optimal results.

As the researcher is a registered and licensed Architect in Bahrain, throughout this research, he aims to improve the effectiveness of the BENAYAT Portal by exploring the opportunities and challenges associated with the system used for issuing building permits.

Fauth & Soibelman (2022) suggest that the best way to gather detailed feedback for such research is through qualitative expert interviews. Therefore, expert interviews will be conducted to collect data and feedback about the current model.

In addition, a quantitative questionnaire will be administered to the primary users of the BENAYAT Portal. The purpose of this questionnaire is to focus on the collected data and feedback, address any gaps in the current model, and propose enhancements to the system.

Furthermore, this research will compare the current model with the old municipality model for issuing building permits. The aim is to identify any gaps that may have occurred with the new model (to achieve objective number 3).

The Minister of Municipalities Affairs and Agriculture declared that the electronic system (BENAYAT) issued 1,565 building permits in 2022. Al-Mubarak explained that residential houses had the largest share in terms

of the number of permits (“The issuance of 1,565 building permits”, 2023), saying:

"The percentage of residential houses was 84.4%, which is the highest in terms of real estate classification, followed by projects of a special nature by 8.3%, then investment buildings by 4.5%, then other classifications."

Since building permits for residential projects have the largest share of the total issued building permits back in 2022, it will be the focus of this research.

Chapter Three: Methods and Procedures

This chapter is divided into the following sections:

3.1 Methodology Approach

3.1.1 Research Framework

3.1.2 Research Case Study

3.2 Research tools

3.2.1 Semi-Structured Interviews

3.2.2 Questionnaire

3.2.3 Fishbone Diagram

3.2.4 Process Re-Engineering

3.3 Research period

3.4 Research population

3.5 Data Collection and Procedure

In this chapter, we will outline the methodology used in this research. We will describe the research approach in detail, including how the data was collected and any limitations that were encountered. Additionally, we will discuss the research tools that were utilized, the period during which the research was conducted, and the population that was studied.

3.1 Methodology Approach

3.1.1 Research Framework

According to Figure (6), the study framework comprises the following research phases:

- The research problem aims, and questions are included in the research introduction.
- A theoretical framework and literature review for Bahrain's building permit system.
- The approach includes qualitative and quantitative methodologies via expert interviews and questionnaires.
- Data collection through the experts' interviews and responses to the questionnaire from the Engineering office.
- Data analysis and findings were obtained through expert interviews as well as questionnaire feedback.
- The last phase comprises the research's results, which are established through the research's conclusion and suggestions for future investigations.

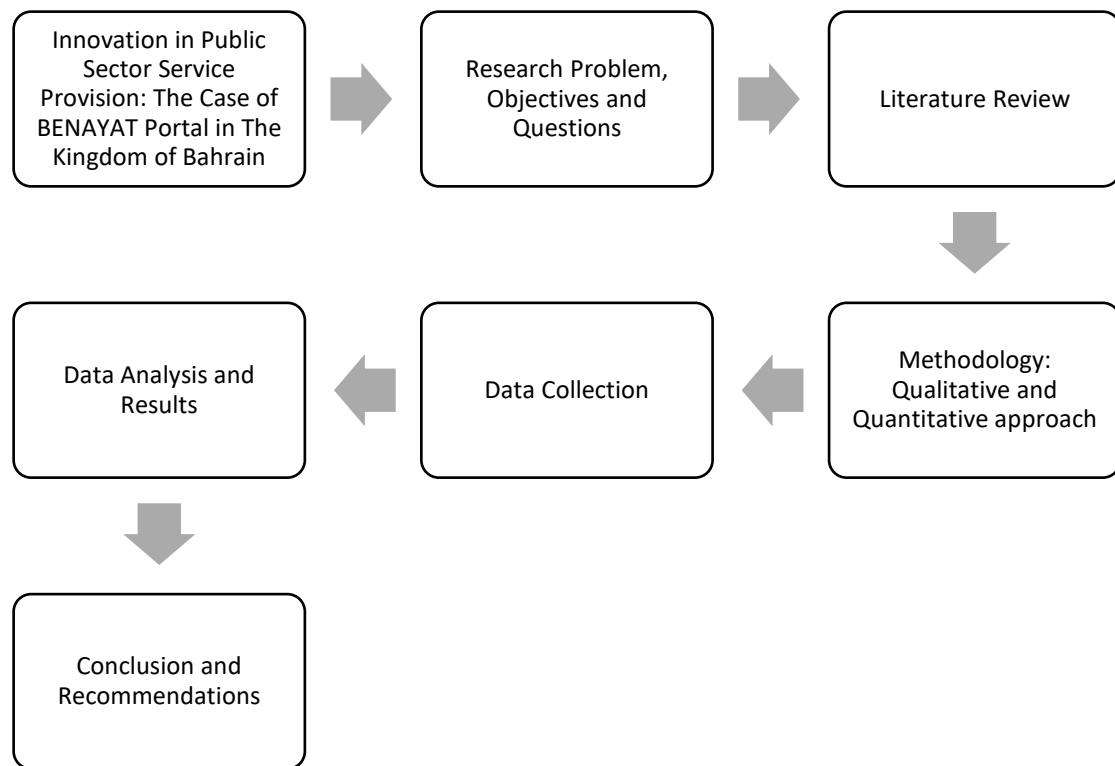


Figure 6 - Research Framework. (Source: Original)

3.1.2 Research Case Study

The research was conducted with utmost diligence and involved expert interviews and surveys with professionals who are actively involved in the BENAYAT Portal system. The objective was to focus on the newly adopted system for issuing building permits for residential projects in Bahrain, including villas, villa compounds, and apartment buildings. It is worth noting that the study was exclusively limited to the municipality and the engineering offices, which include architects and engineers. These professionals are the primary users of the BENAYAT Portal for issuing building permits, making them more interested in the portal and its development.

3.2 Research tools

There are various methods that can be employed when conducting research, but the three most used are quantitative, qualitative, and mixed methods.

The qualitative research method is mainly used to understand social aspects and relies on generating words rather than numbers. Although this method may appear imprecise, it seeks to comprehend attitudes and experiences by answering questions such as what, how, or why (McCusker & Gunaydin, 2014).

The quantitative method, on the other hand, involves using numbers to assess data, which is measurable and identifiable. The findings obtained through this method provide strong evidence for data collection and facilitate decision-making (Goertzen, 2017).

However, mixed methods research combines both quantitative and qualitative approaches to provide a more comprehensive understanding of a research question or problem. This study's methodology is based on the use of mixed methods that are quantitative and qualitative.

The qualitative method is conducted through in-depth semi-structured interviews with experienced Architects and Engineers from the listed CRPEP private Engineering offices in Bahrain. The researcher carefully selected the experts based on specific criteria. These criteria included working directly with the BINAYAT portal, having full experience with issuing building permits through the system from start to finish, having experience with issuing permits through the old municipality system, and having in-depth knowledge of building laws and regulations. All the experts were carefully vetted before being chosen.

The quantitative method is conducted through a questionnaire that is distributed to both Municipality and Engineering offices Architects and Engineers; the distribution targets the main users of the BENAYAT Portal. The questionnaire was an online form, using Microsoft Forms.

3.2.1 Semi-Structured Interviews

A semi-structured interview is an organized and methodical approach that involves asking the same predetermined questions in a specific order to all candidates. The primary goal of these interviews is to gather the perceptions of experienced Architects and Engineers on the services provided. The interviews aim to understand the factors affecting the issuance of Building Permits, positively or negatively. Furthermore, the interviews provide a platform for experts to express their thoughts on the BENAYAT Portal and their experience with the system. Experts can also elaborate more on their comments or suggestions regarding the BENAYAT Portal during the interviews.

3.2.2 Questionnaire

The questionnaire design was informed by the output of qualitative research that involved expert interviews. Descriptive statistics were used to analyze the data collected from the questionnaire. This analysis helps to summarize and comprehend the characteristics of the data set, including measures of the data, and gives short summaries about the sample. The questionnaire results strongly support the research questions and focus on the most relevant data that meet the research objectives.

The questionnaire, which can be found in Appendix B, is divided into four main sections as follows:

- **Section 01:** This section aims to collect general information about the respondent.
- **Section 02:** This section consists of general questions about the BENAYAT Portal and Building Permit. It aims to gather the main users' inputs and thoughts on the BENAYAT Portal.
- **Section 03:** This section relates to the causes of problems with the current BENAYAT model for Residential Projects and it is in the format of a question. The questions have ready choices of answers, as 5 Likert scale was used to answer this question as follows: (Never, Rarely, Sometimes, Often, Always).
- **Section 04:** This section gathers the respondent's thoughts about the effects of the proposed changes/enhancements to the current model of the BENAYAT Portal for Residential Projects. The questions are also in a question format, and 5 Likert scale was used to answer this question as follows: (No Effects, Slight Effect, Moderate Effect, Great Effect, Very Great Effect).

3.2.3 Fishbone Diagram

Effective project management is crucial for the success of any project, as it facilitates the planning and execution of tasks in the most efficient way possible. Quality is a vital aspect of project management, and to ensure it, seven fundamental tools are widely employed in organizations. These include the histogram, cause-and-effect diagram, Pareto diagram, correlation diagram, control chart, data stratification, and brainstorming.

The cause-and-effect diagram, also known as the "fishbone" or "Ishikawa" diagram, was developed by Kaoru Ishikawa in the 1960s due to its distinctive shape. It is a simple graphical tool that helps to understand the causes of quality defects and to identify the relationship between the problem and its potential causes (Liliana, 2016). The structure of this research will be created based on the causes of delay in issuing Building Permits for residential projects through the BENAYAT Portal and their main effects. The causes will be established based on the data gathered through expert interviews and a brainstorming session after going through the current BENAYAT model.

3.2.4 Process Re-Engineering

Business process re-engineering (BPR), also known as process re-engineering, is a method of redesigning and restructuring business processes within an organization to achieve significant improvements in performance, efficiency, and effectiveness. It involves analyzing existing processes to identify opportunities for radical improvements in areas such as cost reduction, cycle time reduction, quality enhancement, and customer satisfaction (Grover & Malhotra, 1997). The primary objective of process re-engineering is to break away from traditional and inefficient methods and adopt new approaches that can significantly transform the organization. BPR advocates for a complete overhaul of the processes, often starting from a blank slate, rather than making incremental changes to existing processes. Process re-engineering involves the following Figure:

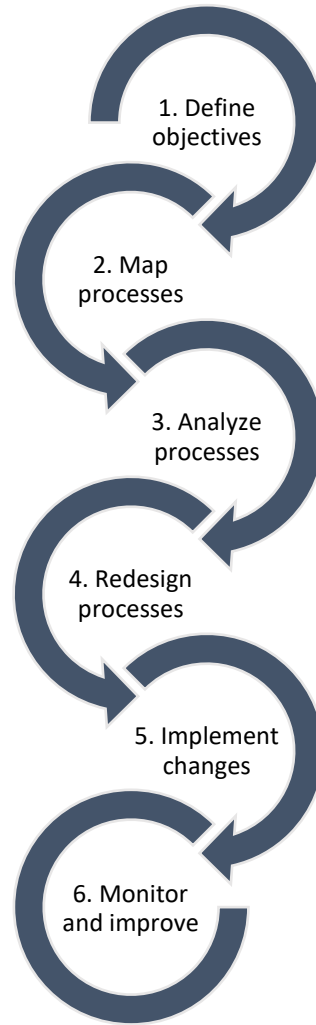


Figure 7 - Process re-engineering steps. (Source: Original)

Successful process re-engineering can result in improved productivity, reduced costs, and increased competitiveness. However, it is a complex undertaking that requires strong leadership and careful change management. BPR concept will be used to develop a revised model for issuing building permits through the BENAYAT Portal at the end of this research.

3.3 Research period

The research idea and proposal were submitted in December 2022. After all the necessary changes, the proposal was approved in March 2023.

The literature review was completed in July 2023, and the methodology, which included interviews and a questionnaire, was conducted from mid-August 2023 to mid-November 2023. After the data was collected, the analysis was done, leading to the conclusion and recommendations. Finally, the research was submitted in December 2023.

3.4 Research population

The population of interest for this study was sourced from the BENAYAT website and the CRPEP list of Engineering offices in Bahrain, which includes specialized personnel in the field of research.

The interviews were conducted with expert Senior Architects from Engineering Offices who are directly involved in the BENAYAT Portal in their work and have significant experience with the building permit stage of Residential Projects in Bahrain. The questionnaire was distributed to the Architects and Engineers who are using the BENAYAT Portal to issue Building Permits in both the government and private sectors from October to November 2023.

However, it was challenging to reach all the target respondents due to the busy nature of the industry and some limitations on access to personnel in the governmental sector.

3.5 Data Collection and Procedure

Collecting data for this research was challenging due to its relation to both government authorities and the private sector, as well as the fast-paced nature of the field. The data collection process can be broken down into the

following stages illustrated below in Figure (8) followed by the procedure of each stage.

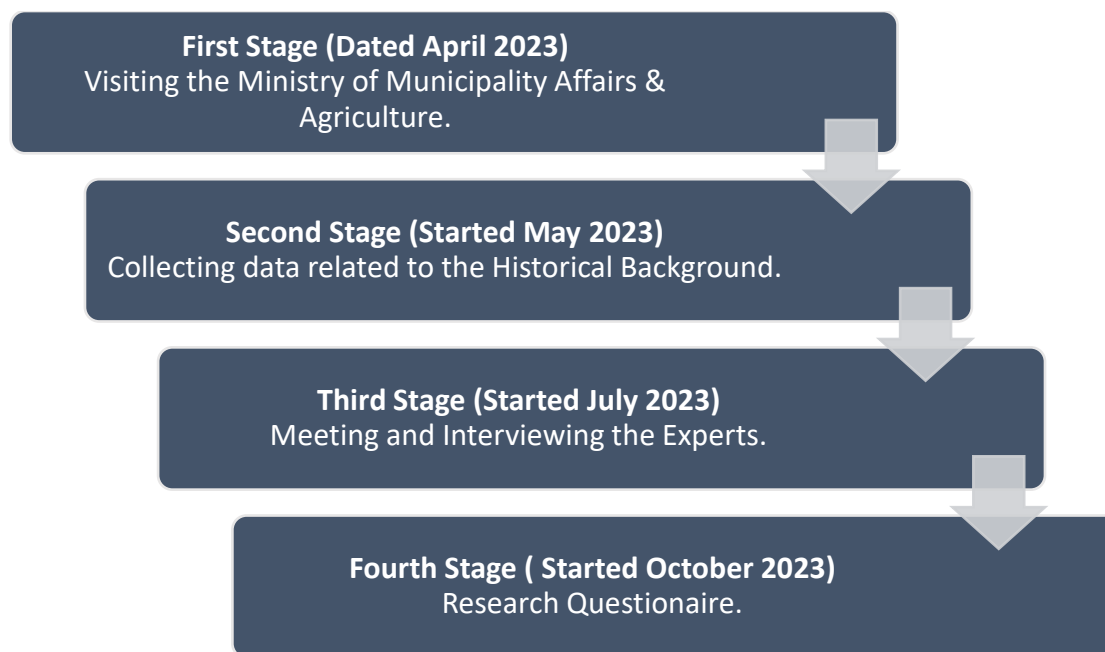


Figure 8 - Data Collection Stages (Source: Original)

1. Visiting the Ministry of Municipality Affairs & Agriculture

In April 2023, the researcher began collecting data by visiting the media section of the Ministry of Municipality Affairs and Agriculture. The staff at the Ministry were very welcoming and during the second visit, the researcher had the opportunity to meet the Head of Media. During the meeting, the Head of Media shared the historical background of public sector services in Bahrain, including when and how they were established. This was important information as it helped the researcher to understand the progress of public sector services and the innovation pursued by the Bahraini government to provide the best environment for citizens. The Manama municipality was founded in July 1919 (considered one of the first municipalities to be established in the entire Arab world) and acted as

the gateway between the government and the citizens. Its first purpose was to maintain the health and safety of citizens, organize their daily affairs, and manage their normal affairs.

2. Collecting data related to the Historical Background

After conducting a thorough investigation into the historical background of public sector services in Bahrain, the researcher discovered a significant void in the documentation of services provided for the Construction Sector. As one of the most crucial sectors in the country, the Construction Sector bears the responsibility of building the nation by establishing construction regulations, zoning lands for development, and maintaining records of vital information. The lack of comprehensive information on the services provided in this sector makes it challenging to understand the government's innovative efforts in this area.

To address this gap, the researcher delved into the government database and conducted extensive research on governmental orders related to the Construction industry. Through the research, the researcher was able to identify and document the main milestones of these services in the Literature Review section of this research. The information collected by the researcher provides a comprehensive view of the development of the Construction Sector in Bahrain and sheds light on the innovative initiatives undertaken by the government in this field.

3. Meeting and Interviewing the Experts

After conducting extensive research on the construction industry in Bahrain, the researcher arranged to meet with experts in the field to gather

insights on the recently adopted BENAYAT Portal for issuing building permits in the country. However, due to the demanding nature of the construction industry, scheduling meetings with these experts was challenging.

Despite the obstacles, the researcher was able to meet and discuss the BENAYAT Portal with five top experts working in different Category-A Engineering offices in Bahrain. During the informal discussion, these experts shared their thoughts on the portal and provided valuable insights that helped to prepare a draft of semi-structured interview questions.

After that, the researcher managed to perform a semi-structured interview with another five experts who have hands-on experience with the BENAYAT Portal and are experts in applying for and managing the building permit stage for projects in their respective companies.

It is worth mentioning that in similar research done by Fauth, Pasetti Monizza, & Malacarne (2023), four experts' interviews were performed only.

The below table shows the experts demographic details:

Table 3 - Experts demographic details (Source: Original)

Name	Gender	Age	Occupation	Experience in Bahrain
Expert-1	Male	50	Building Permits Manager	18 years
Expert-2	Male	37	Senior Architect	13 years
Expert-3	Male	35	Senior Architect	12 years
Expert-4	Male	33	Architect	9 years
Expert-5	Male	31	Building Permits Engineer	8 years

These experts provided the researcher with detailed information on the practical applications of the portal and shared their perceptions of the service provided and the factors that affect issuing the Building Permits positively and negatively.

Through these interviews, the researcher was able to gain a thorough understanding of the BENAYAT Portal and gather data about its impact on the construction industry in Bahrain. The insights and data gathered from these experts were invaluable and helped the researcher to approach the answers to the research questions.

4. Research Questionnaire

The research questionnaire was aimed at the main users of the BENAYAT Portal from both the governmental and private sectors. The data collected from the questionnaire provided focuses on identifying problems within the system and on the proposed enhancements to the portal. This information helps in identifying opportunities and challenges that affect the issuance of permits, intending to achieve more effective use of the BENAYAT Portal. The collection of the questionnaire was undertaken through October and November 2023, the study sample consisted of (31) personnel involved in the questionnaire.

Chapter Four: Results, Discussion, and Recommendations

This chapter is divided into the following sections:

4.1 Semi-structured Interview Analysis

4.1.1 Introduction

4.1.2 Expert feedback about the BENAYAT Portal

4.1.3 Shortcomings of the BP Model

4.1.4 Strategies to reduce the shortcomings

4.2 Questionnaire Analysis

4.2.1 General information about the respondent

4.2.2 Main users' inputs and thoughts on the BENAYAT Portal

4.2.3 Identifying the causes of problems with the current BENAYAT model

4.2.4 Effects of the proposed enhancements to the system

4.3 Implementation of Fishbone Diagram

4.4 Discussion of Results

4.4.1 Research Summary and Main Results

4.4.2 Research Conclusion

4.5 Research Recommendations

4.5.1 Recommendations Related to BENAYAT Portal

4.5.2 Future Recommendations

4.1 Semi-structured Interview Analysis

4.1.1 Introduction

As part of the research, we conducted detailed semi-structured interviews with five experienced experts (architects and engineers) from various EO companies in the private sector. Out of these experts, four had more than 8 years of experience in the construction industry, and one had more than 18 years of experience in the field.

Based on their feedback, we found that the BENAYAT Portal model has inherent negative factors that affect the issuance of building permits. These factors were related to the applied model itself. However, the experts also identified some positive factors associated with the BENAYAT Portal that help address the gaps in the previous system, which was the municipality building permit system.

The experts also shared their insights on how the BENAYAT Portal can be improved further. They suggested that the BENAYAT Portal should simplify the process for the applicants and improve the communication between the different stakeholders involved in the building permit issuance process.

Overall, the feedback from the experts provided valuable insights into the BENAYAT Portal and how it can be improved to make the building permit issuance process more efficient, transparent, and user-friendly.

4.1.2 Expert feedback about the BENAYAT Portal

All experts agreed that the BENAYAT Portal addresses some key problems with the old system. One of its most significant advantages is that the new Portal consolidates all public services relating to construction in a single gateway. In contrast, the old system was divided into several

different websites, making it challenging to navigate. For example, the EO can now access all information related to any parcel (land) in Bahrain through the Portal, whereas previously, the same information would have been spread across two or three different websites.

Additionally, the Portal provides clear updates about building permit applications. Both the EO and the end-users (owner or client) can view the application and review its status, all related comments, and other relevant information.

However, the BENAYAT Portal still has some shortcomings when it comes to building permit application services. Even after four years, it only covers the new building permit applications, leaving other services such as Adding to existing building applications, Renovation applications, and Demolition applications to the old system. The below table shows the building permits services provided by the two systems.

Table 4 - Comparing BP services provided by the BENAYAT Portal and the Old Municipality system. (Source: Original)

BENAYAT Portal BP services	Online Municipality Building Permit System (BPS) services
1- New building.	1- New Building. 2- Adding to existing building. 3- Demolition permit. 4- Renovation permit. 5- Applying for pre-approval.

Furthermore, the new building application model has some issues that did not exist in the old system. These negative factors will be discussed in the next section.

4.1.3 Shortcomings of the BP Model

Through the interviews and while also discussing the questionnaire questions, the experts agreed on the following as causes of problems with the current BENAYAT model for issuing building permits, which could be classified from major to minor as follows:

A. The process sequence of the BENAYAT model is not well studied, and the system does not benefit from the positives of the previous system.

Expert-1 states that: *“The AL Shamil Municipality system (old system) is better than the BENAYAT system as a stand-alone system. BENAYAT should benefit from the old system.”*

B. Process the Auditing of the application after issuing the Final Building Permit.

Expert-5 states that: *“Auditing the Building Permit after it is issued is a big problem! You have a BP, you give it to the Contractor, the Contractor starts the works, and after a while, someone will send you a letter saying you have a violation and you must stop the work, and you no longer have a valid BP! How does this work? When you have a BP, it means you can start your work. For big projects, this is not working at all. It may affect investors' decisions to invest in Bahrain, as bank loans are related to the project timeline, and having this issue with the auditing is a risk for the investors.”*

C. Engineers' availability to receive queries and follow-up is limited, especially government engineers.

Expert-4 states that: *“email and WhatsApp follow up are not working!”*

For a small thing like reset the BENAYAT account password, I need to send email and wait for their reply! However, after they responded to me by sending a special link to reset the password, it was not working, and the reset password failed!”

Expert-5 states that: *“There should be a call support center, email is not working at all.”*

D. Unsatisfactory user experience with the BENAYAT Portal, especially with address generation by the system.

Expert-1: *“All Building Permits Application is facing re-submission, mainly for two reasons: 1- Problems with the address application. 2- The need for additional documentation, especially in big projects.”*

E. The EO review scope is not defined, and too much liability is kept on them. As such, the reviewing process leads to delaying the approval and issuing of the Building Permits.

Expert-2 states that: *“The EO reviewer comments are not limited by a defined scope/guideline; it may cover regulations, drafting, design, and so on. This normally leads to delay in the reviewing process.”*

Expert-5 states that: *“There are no proper guidelines for the EO reviewer, that you need to review those points. It is left for them to review everything, and this is not helping.”*

F. The required data in the BENAYAT application from the Creator (Inputs, Documents, and Drawings) are a lot and confusing, and most of the time it leads to resubmitting the application.

Expert-1 states that: *“The same inputs are asked two times in different ways, leading to problems later.”*

Experts who were interviewed criticized the inclusion of additional documents, such as the Green Building Code, Soil Investigation Report, Thermal manual calculation, and other documents, as part of the BENAYAT Building Permit application requirements. They expressed concern that preparing these documents takes time and delays the BP stage.

G. The BENAYAT building permit model is still providing only one service, new building permit applications.

Experts have highlighted the fact that the BENAYAT Portal does not offer other Building Permit services apart from the application for new buildings. This means that services such as adding to an existing building, renovation, or demolition applications can only be accessed through the Municipality's old system.

4.1.4 Suggestions to reduce the shortcomings

Throughout the series of interviews conducted, all experts expressed concerns about the BENAYAT building permit model's negative impact on the construction industry. The experts who suggested improvements in the current model emphasized the need for a more streamlined and efficient process that can help reduce processing time and eliminate bureaucratic hurdles.

On the other hand, some experts recommended a complete re-engineering of the system and expressed dissatisfaction with the current model, citing examples of its detrimental impact on construction projects. They suggested a systemic overhaul to make the permit process more transparent, predictable, and responsive to the needs of the industry.

Overall, the interviews highlighted the need for a change to achieve an effective and efficient building permit system that can support the growth and development of the construction industry.

Based on their experience, they prioritized those strategies that could have an impact on reducing negative factors within the BENAYAT model for issuing building permits as the following:

- Easy channels of communication between Engineers to answer queries and follow up.
- Cancel the Audit by municipalities after getting the building permit.
- Include all related governmental authorities in the BENAYAT Portal.
- Eliminate the sources of resubmitting the building permit application.
- Make it easy to change some inputs by the Creator, without resubmitting the full application.
- Define the scope of the Reviewer.
- Increase the Building Permit validity time to 2 years.
- Reduce the input data needed in the Building Permit application.
- Improve the quality of Building Permit as a legal document (content, information, duration, etc).
- Improve the BENAYAT Portal interface to real smart and engineering rather than IT-driven modules, and the used vocabulary to be more direct.

4.2 Questionnaire Analysis

4.2.1 General information about the respondents

This section provides an overview of the respondents mentioned in Chapter 3, who total of 31 individuals. They are all Architects and Engineers working at Engineering Offices in Bahrain and are the primary users of the BENAYAT Portal for applying for Building Permits.

It is worth noting that although the questionnaire was distributed to Architects and Engineers in the government sector, none participated in the survey.

1- Respondents age:

The results in Figure (9) show that (16) respondents are within the (31 to 35) category, which is the highest percentage of the sample (52%). The results also show that (4) of the sample are within the (under 30) category, (3) of the sample are within the (36-40) category, (4) of the sample are within the (41-45) category, (2) of the sample are within the (46-50) category, and (2) of the sample are within the (Above 51) category.

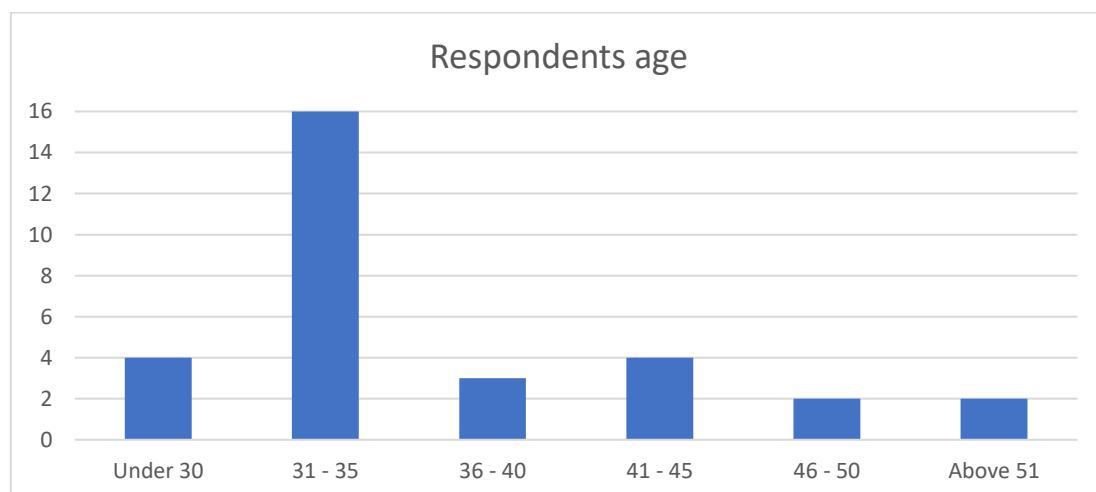


Figure 9 - Respondents' age (Source: Original)

2- Number of years of experience in the Residential Projects in Bahrain:

The results in Figure (10) show that (12) respondents have (6 to 10) years of experience, which is the highest category with (39%) percentage of the sample. The results also show that (5) of the sample are within the (under 5 years) category, (8) of the sample are within the (11-15) years category, (6) of the sample have more than 16 years of experience.

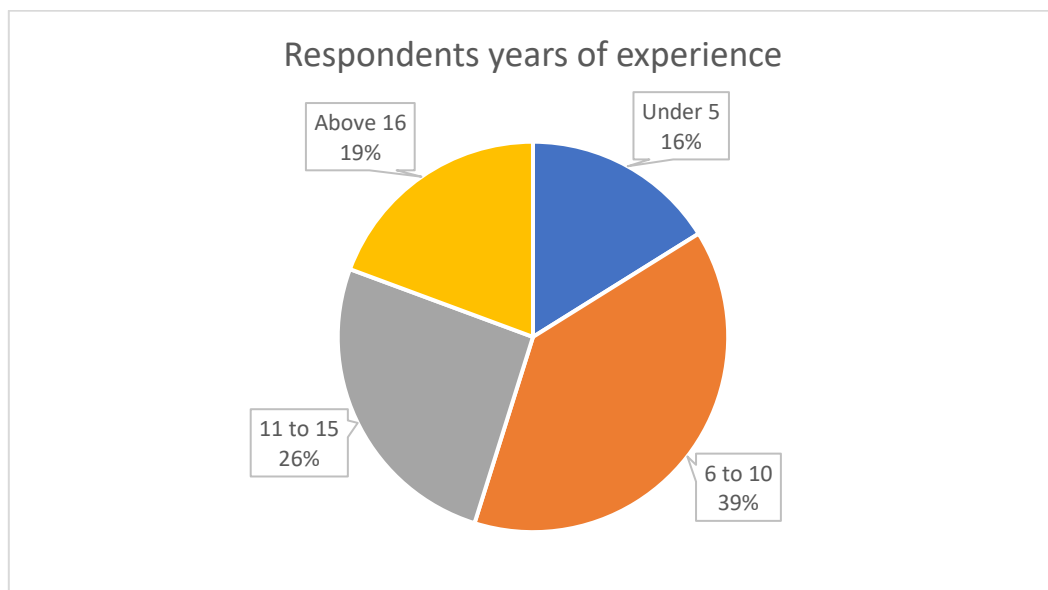


Figure 10 - Respondents years of experience (Source: Original)

3- Type of involvement:

The results in the below Table 5 show that (15) respondents are within the (Engineering Office Creator) category, which is the highest of the sample. The results also show that (13) of the sample are within the (EO Creator + Reviewer) category, (3) of the sample are within the (EO Reviewer) category.

Table 5 - Respondents type of involvement (Source: Original)

Type of involvement	EO Creator & Reviewer	EO Creator only	EO Reviewer only
Respondents No.	13	15	3

4- Respondents interacting with the BENAYAT Portal

The results in Figure (11) show that (15) respondents are within the Daily category, which is the highest percentage of the sample (48%). The results also show that (6) of the sample are within the (Weekly) category, (2) of the sample are within the (Bi-weekly) category, and (8) of the sample are within the (Monthly) category.

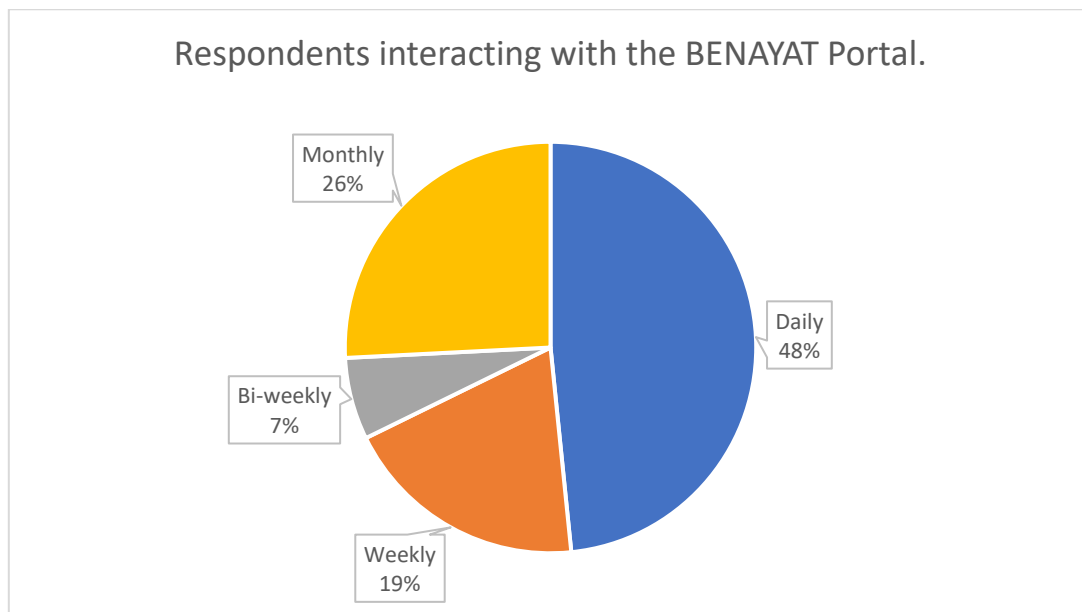


Figure 11 - Respondents interacting with the BENAYAT Portal. (Source: Original)

4.2.2 Main users' inputs and thoughts on the BENAYAT Portal

In this section of the questionnaire, the respondents were asked to provide feedback by answering several Yes or No questions. Also, they were asked to provide their feedback and opinions regarding some questions. These questions were created based on the data and input gathered from expert meetings and a brainstorming session conducted after the literature review of this research. The following is the respondent's feedback for each question:

1- Does BENAYAT improve the process of getting Building Permits for Residential projects?

Out of all the respondents, (58%) answered Yes, while (42%) answered No to the question. This indicates that most of the respondents believe that the BENAYAT system enhances the process of getting the BP done. However, the significant percentage of negative responses also suggests that there are some issues with the current system that need to be addressed.

2- Do you think we should improve the current BENAYAT model? If yes, explain why in the other box.

(94%) of the respondents answered Yes, while only (6%) answered No. This indicates the majority believe the current BENAYAT model needs improvement. Below is some feedback received for this question:

- Anonymous-1: *"Yes, rethinking about the process."*
- Anonymous-2: *"Yes, they should add for additional and amendment application too"*
- Anonymous-3: *"Yes, the system has a few advantages over the old system, but the regulations and processes have changed so much while Benayat portal was not developed to cover all aspects"*
- Anonymous-4: *"Yes, a lot of problems in the system "*
- Anonymous-8: *"Yes, the speed of inspectors response should be improved "*
- Anonymous-9: *"Yes, editing any point of building permit process without the resubmission from the preapproval "*

- Anonymous-10: *"Yes, because we can't have the government audit the building permit after it get issued any modifications or mistakes should be modified before issuing the permit "*
- Anonymous-14: *"Yes, see the reviews from the client perspective "*
- Anonymous-15: *"Yes, the Benayat System is very rigid when it comes to editing minor subjects, It treats the architecture like it's something that can be translated down into numerical fixed data, and forgets that architecture is the science of arts and it is actually a sculpture that will be experienced and inhabited by people. I think the benayat system should be more flexible and fluid when it comes to submitting architectural drawings. One of the major issues of the system is editing after data is saved and submitted , there is no margin and space for error. Simple changes to the architecture drawings cannot be done easily , it requires us to resubmit the whole application which causes conflict between the client and the engineering office alongside time wasted over simple things such as changing the location of a window. Also, Benayat Portal requires us to put down the electrical load and thermal data in the system in a very unrealistic process"*
- Anonymous-18: *"Yes, need more improvement! The engineers who handle the review after process of BP are not responding! They dont know how to resolve the technical issues on benayat! It will take time to response! Everytime made an update in the system it will more complicated "*
- Anonymous-20: *"Yes, the current system is restrictive in choices and has a rigid structure, an entire project will face resubmitting if a*

small detail has been missed which could delay a project over a week"

- Anonymous-21: *"Yes, faster method than the old system "*
- Anonymous-22: *"Yes, Benayat as Municipality system still complicated, need to be more easy for the engineers "*
- Anonymous-24: *"Yes, so far so good. However, There's always a room for improvement and it will be beneficial for both stakeholders."*
- Anonymous-25: *"Yes, it has to be improved to suite larg mixuse projects"*
- Anonymous-26: *"Yes, includes all departments in the system "*
- Anonymous-27: *"Yes, the system needs to be comprehensive and connects to all authorities by which approvals are issued "*
- Anonymous-28: *"Yes, cancel the Auto-approval boption. Let the auditing process happen in the governmental sector instead of other offices."*
- Anonymous-31: *"Yes, add Civil Defense."*

3- Are you facing issues that lead to re-submitting the full Building Permit application in the BENAYAT Portal? If yes, explain it in the other box.

Out of all the respondents, (70%) answered Yes, while (30%) answered No to the question. This indicates that most of the respondents are facing issues that lead to re-submitting the full Building Permit application in the BENAYAT Portal. Below is some feedback received for this question:

- Anonymous-1: *"Yes, for any small change"*
- Anonymous-5: *"Yes, if electricity reject we should resubmit, cancelling addresses problem"*
- Anonymous-6: *"Yes, mainly because of Audit comments, for addresses and for EDD"*
- Anonymous-7: *"Yes, for very tiny issues like addresses and electrical load"*
- Anonymous-10: *"Yes, issues with the address usually require the office to re-submit the application."*
- Anonymous-13: *"Yes, some changes required by other departments"*
- Anonymous-14: *"Yes, un clear rules and regulations "*
- Anonymous-15: *"Yes, every minor issue such as changing the title of a letter or the size of a maids room . We have to resubmit the whole process and then the client receives a message thinking it's something major. As I stated before, there is not space for error in the system and treats architecture like it is a small box with no creativity ."*
- Anonymous-18: *"Yes, all the time were facing an issues! You have to go back again and again from the start from pre approval to approval again and it will cost more time! Also about the buding entrances part its more difficult to submit! "*
- Anonymous-20: *"Yes, any details in the initial submission cannot be edited later on, forcing offices to delay the project"*
- Anonymous-21: *"Yes, mainly : Basic info, EDD comments or the services , address "*

- Anonymous-22: *"Yes, we need to send email for one stop shop to open the system again ,take time"*
- Anonymous-25: *"Yes, missing documents"*
- Anonymous-26: *"Yes, wrong inputs in engineering Data and addresses"*

4- Do you think each BENAYAT user's scope of work is clearly defined/understood?

Figure (12) below shows the respondents answer for this question:

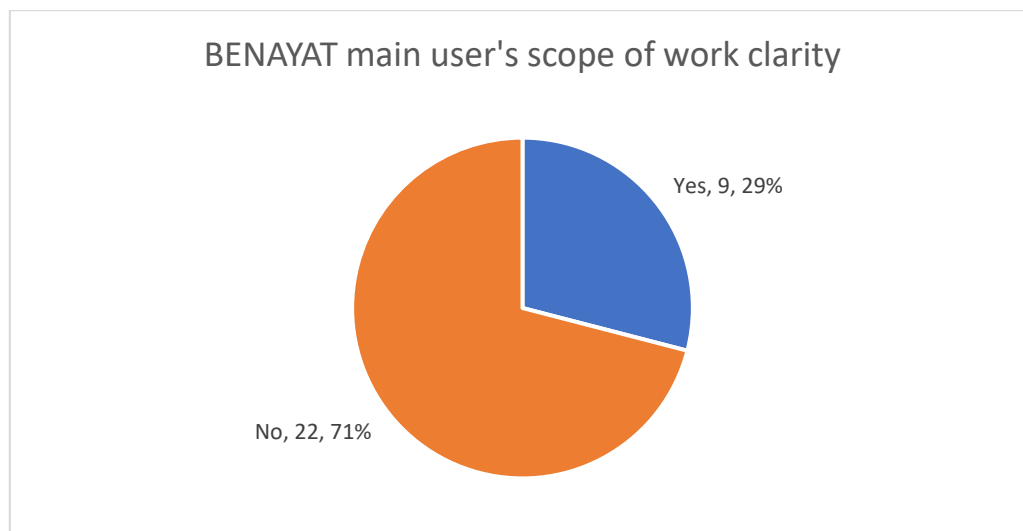


Figure 12- BENAYAT main user's scope of work clarity. (Source: Original)

Most of the respondents answered "No" indicating difficulty in understanding each stakeholder's scope of work.

5- Should we improve the quality of the Building Permit as a legal document (content, information, duration, and so on)?

Out of all the respondents, (81%) answered Yes, while (19%) answered No to the question. This indicates that most of the respondents recommend enhancing the quality of the Building Permit as a legal document.

6- Do you think we should go back to the previous Building Permit procedure?

(48%) of the respondents answered "Yes" while only (52%) answered "No". The results indicate that there is almost a tie between those who agree and disagree with going back to the previous Building Permit system.

7- Do you think we should re-engineer the processes of BENAYT Portal?

Figure (13) below shows the respondents answer for this question:

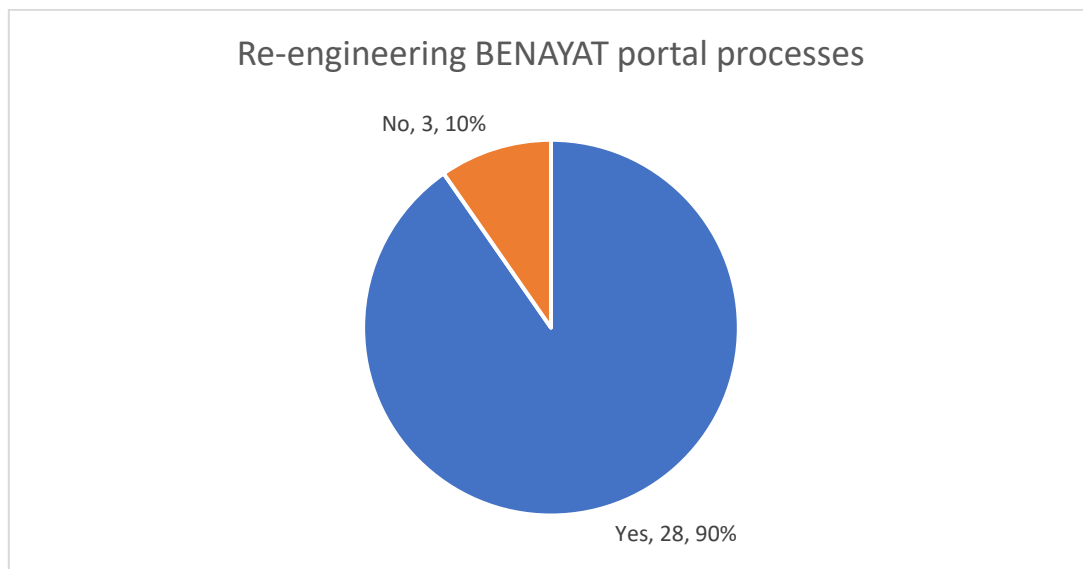


Figure 13 - Question 7 feedback. (Source: Original)

Most of the respondents answered "Yes" indicating that most of the users believed that the processes of the BENAYAT Portal should be re-engineered.

8- Do you think the Reviewing scope is clearly understood by BENAYAT stakeholders?

Figure (14) below shows the respondents answer for this question:

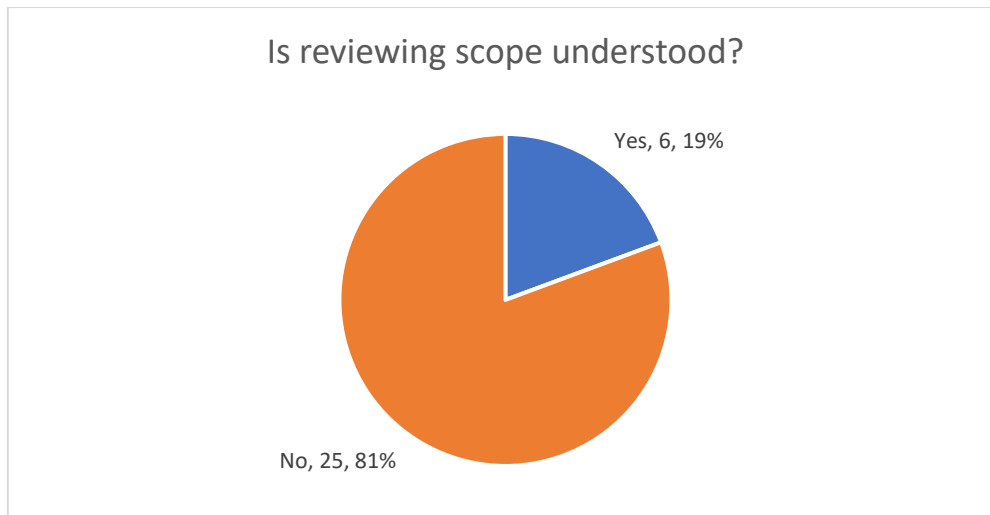


Figure 14 - Is reviewing scope understood? (Source: Original)

Based on the responses received, it appears that most users do not understand the scope of work of the EO reviewer. This lack of clarity may cause delays and other issues with the Building Permit application process.

9- Do you think that the sequence of getting a Building Permit through the BENAYAT Portal needs to be improved/re-engineered?

Again, the feedback regarding the process of BP application is toward improving and re-engineering it, as most of the respondents answered "Yes" to this question. Figure (15) below shows the respondents answer for this question:

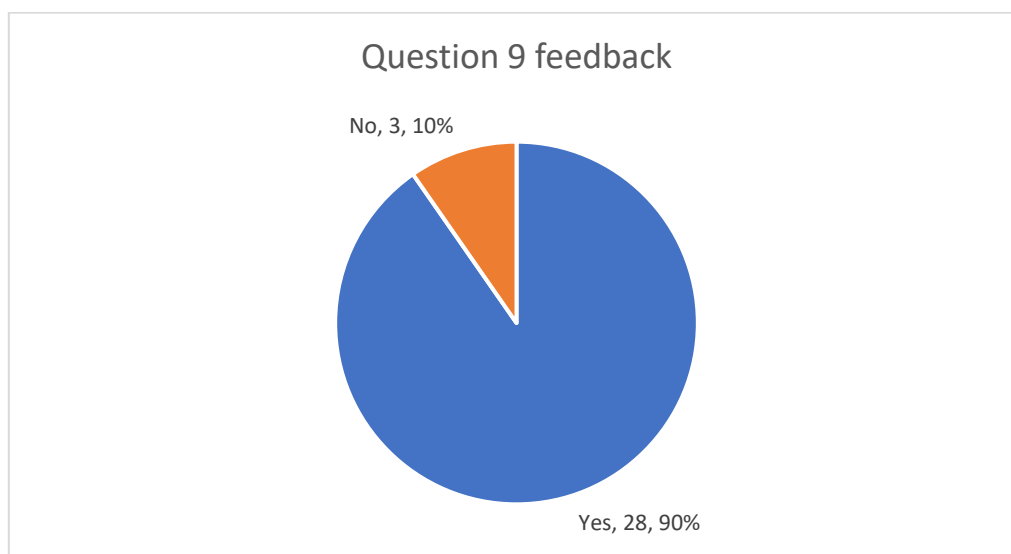


Figure 15 - Question 9 feedback. (Source: Original)

10- Do you think that the BENAYAT Portal website is user-friendly?

(61%) of the respondents answered "Yes" while only (39%) answered "No". The results indicate that enhancing the BENAYAT Portal is needed to become more user-friendly.

11- In your opinion, what is the average time it takes to get a Building Permit for a Residential Project through the BENAYAT Portal?

Figure (16) below shows the respondents answer for this question:

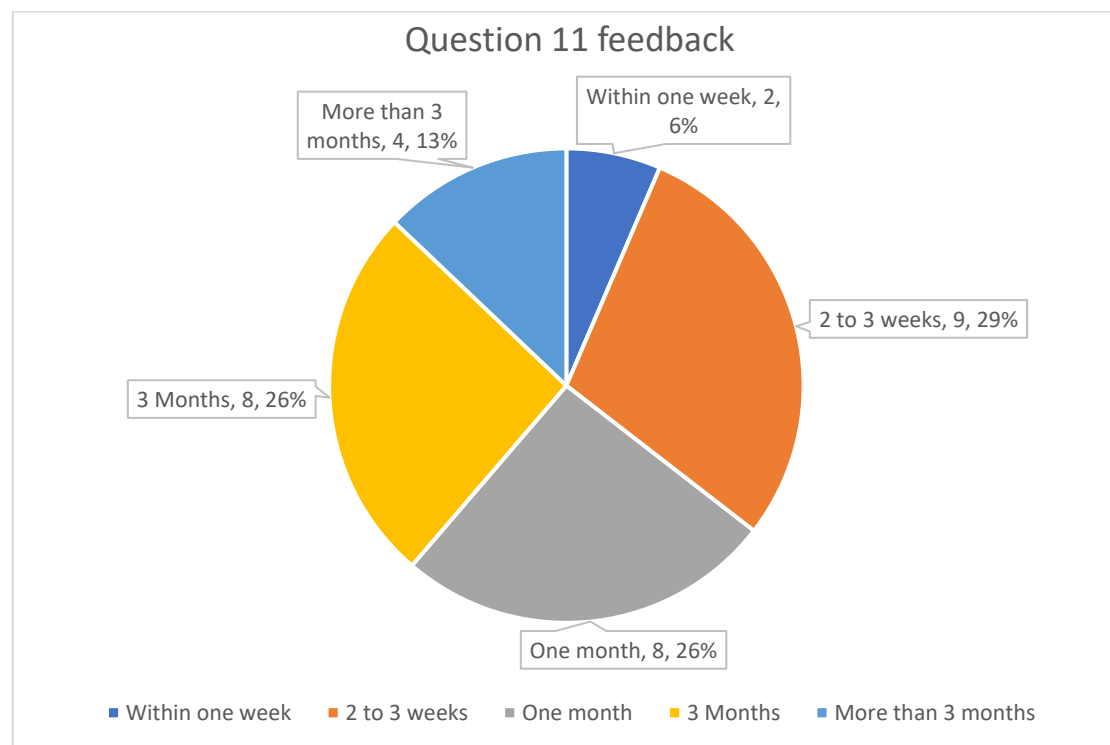


Figure 16 - Question 11 feedback. (Source: Original)

The results in Figure (16) show that (9) respondents are within the (2 to 3 weeks) category, which is the highest percentage of the sample (29%). The results also show that (8) of the sample are within the (3 Months) and (One Month) categories, (3) of the sample are within the (More than 3 months) category, and (2) of the sample are within the (One week) category.

12- On a scale of 1 to 5, where 1 is "extremely difficult" and 5 is "extremely easy", how would you rate the current process of obtaining building permits for the residential projects through the BENAYAT Portal?

Figure (17) below shows the respondents answer for this question:

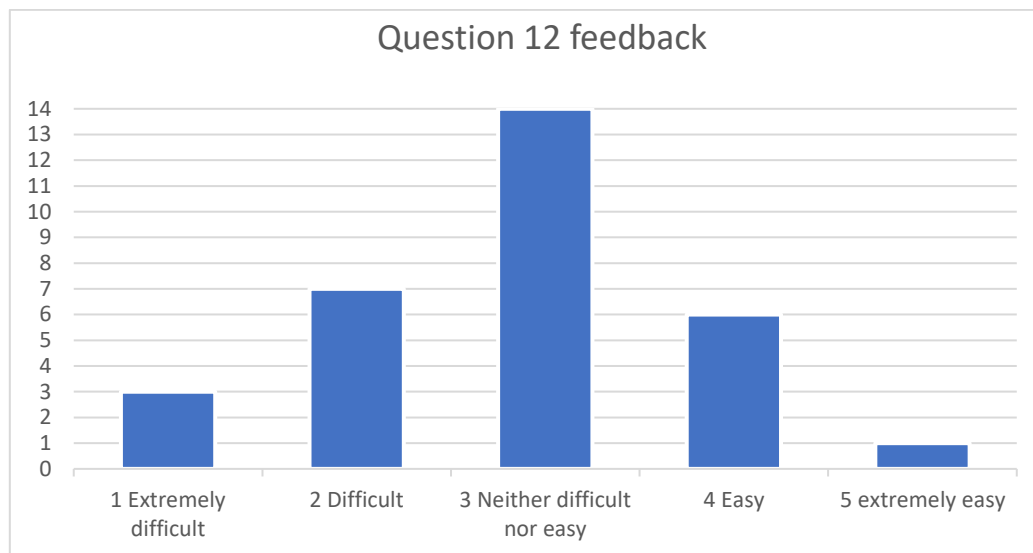


Figure 17 - Question 12 feedback. (Source: Original)

The results in Figure (18) show that (14) respondents are within the (3) category, which is the highest percentage of the sample (45%). The results also show that (7) respondents are within the (2) category, (6) respondents are within the (4) category, (3) respondents are within the (1) category, and (1) respondent only is within the (5) category.

Based on the feedback received from the respondents, the average rating for the current process of obtaining BP for residential projects through the BENAYAT Portal is 2.84, which indicates that the process is somewhat normal. As such, there is room for improvement to make the process more user-friendly and easier to navigate.

13- What are the primary challenges you face when dealing with the BENAYAT building permit system for residential projects? Please select all that apply:

- **Lengthy approval timelines**
- **Complex documentation requirements**
- **Inefficient communication channels**
- **Lack of clarity in the application process**

Table (6) below shows the respondents' answers for this question:

Table 6 - Question 13 feedback. (Source: Original)

Challenges	No. of selections	Percentage
Inefficient communication channels	25	35%
Lengthy approval timelines	17	24%
Lack of clarity in the application process	16	23%
Complex documentation requirements	13	18%

The results in the above table show that (25) respondents selected the "Inefficient communication channels" challenge, which is the highest selection with a percentage of (35%).

The results also show that (17) and (16) respondents selected "Lengthy approval timelines" and "Lack of clarity in the application process" challenges with a percentage of (24%) and (23%) respectively, and (13) respondents selected the "Complex documentation requirements" challenge with a percentage of (18%).

Also, (4) respondents added other challenges to this question as follows:

- Anonymous-4: *"Audit team is a big problem and EWA and planning section not ready to do business."*

- Anonymous-6: *"The unqualified operators of the system."*
- Anonymous-7: *"Lack of clarity in the laws."*
- Anonymous-15: *"The pre-approval phase for an industrial project took almost 40 days."*

The results indicated that there is room for improvement in various areas of the new BENAYAT Portal model for issuing BP, these improvements would be very beneficial to both main users and end-users of the system.

14- Have you encountered any instances of unnecessary delays or bottlenecks in the approval process for residential projects within the BENAYAT Portal?

More than (60%) answered (Yes) for this question, which indicate that there is an unnecessary delay in the system and improvement is needed. Figure (18) below shows the respondents answer for this question:

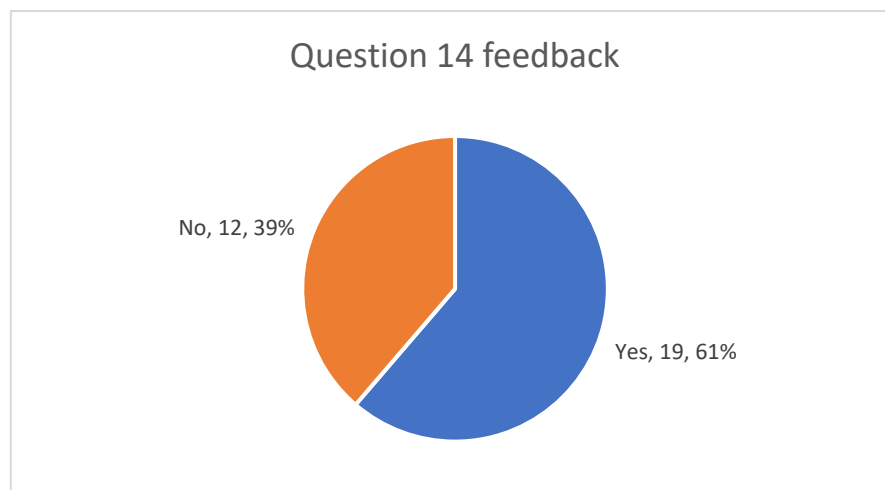


Figure 18 - Question 14 feedback. (Source: Original)

Also, below is some feedback received for this question:

- Anonymous-1: *"Yes, pre-approval is needed anytime resubmitting is required."*

- Anonymous-5: *"Yes, contacting the IGA is very difficult."*
- Anonymous-6: *"Yes, all our residential projects get stuck because of the complexity of address generation. This causes re-submittal of some projects 4 to 6 times."*
- Anonymous-7: *"Yes, because of the preapproval for planning department."*
- Anonymous-13: *"They cancelled the application because we stopped construction due to existing cables in the plot."*
- Anonymous-14: *"Don't know if the application is being processed or not."*
- Anonymous-15: *"Yes, we have a project that will not go to the pre-approval phase because the block the house is in is not stated in BENAYAT, therefore the design is stuck, we can't get a stamped drawing and BENAYAT telling us to go directly to the roads department and everybody sending us to someone else."*
- Anonymous-17: *"Yes, we required a letter from MoH, in the end ... the process was similar to the old system."*
- Anonymous-18: *"Yes, applying for address card for building entrances is more complicated especially if you have multiple villas, it's not clear in their tutorials."*
- Anonymous-19: *"Yes, we face a problem with the difference in understanding the laws by government engineers. One of them allows something and the other rejects it. The other problem is communicating with the grievances committee. It is very difficult, and the engineer in charge is not cooperative, and it takes 3 months to get a response."*

- Anonymous-21: *"Yes, the need to apply for CR, the pre-approvals for UPDA or Roads which takes a long time."*

15- Are you familiar with any alternative building permit systems or processes used in other countries for residential projects that could potentially improve the efficiency of the BENAYAT Portal? If yes, please provide details in the other box.

For this question, (29) respondents answered (No), and (2) respondents answered (Yes). The alternative BP systems that the (2) respondents refer to are: 1- Old Municipality BP System and 2- Dubai system.

It's worth noting that during the experts' interviews, two individuals mentioned that Dubai municipality visited Bahrain to study the Municipality System used for issuing BP in Bahrain. Therefore, we should improve the BENAYAT system by incorporating the positive aspects of the old municipality system.

16- Would you support the re-engineering of the BENAYAT Portal specifically for residential projects to facilitate smoother and faster permit approvals? Why or why not?

Figure (19) below shows the respondents answer for this question:

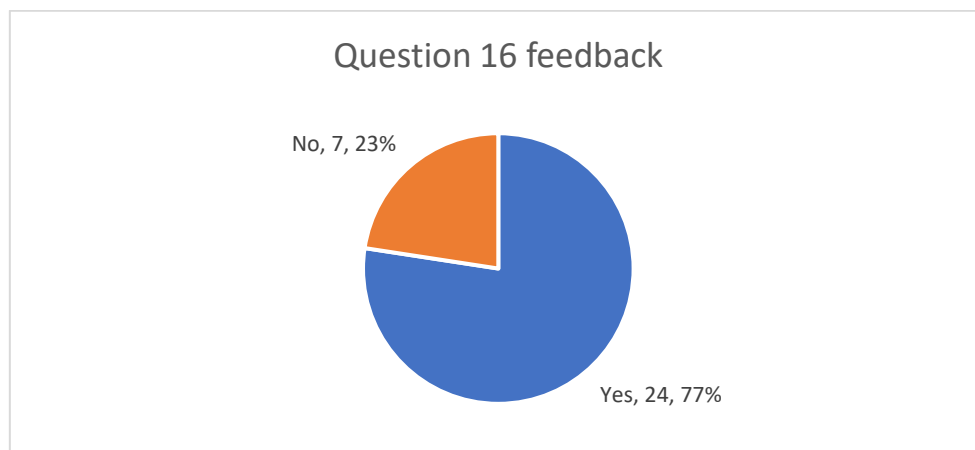


Figure 19 - Question 16 feedback. (Source: Original)

Out of all the respondents, (77%) answered Yes, while (23%) answered No to the question, which indicates that most of the respondents support the re-engineering of the BENAYAT Portal to facilitate smoother and faster permit approvals experience. Below is some feedback received for this question:

- Anonymous-1: *"Yes, to make it better."*
- Anonymous-3: *"No, one system must be good for all building types."*
- Anonymous-6: *"Yes, the system does not recognize private residential or commercial residential... they are all complicated and dealt with like investments."*
- Anonymous-7: *"Yes, sometimes per approval not applicable to the land it is needed."*
- Anonymous-8: *"Yes, to both response speed and user experience."*
- Anonymous-13: *"Yes, every time we need to resubmit, we need to write a letter and send an email to BENAYAT and then cancel the issued address cards."*
- Anonymous-17: *"Yes, better system = better experience."*
- Anonymous-20: *"Yes, BENAYAT was originally supposed to ease the process, however, the system is still a trial version with missing features."*
- Anonymous-22: *"No, complicated System."*
- Anonymous-26: *"Yes, because it must be easier for the user to build their own house."*

- Anonymous-27: *"Yes, because the system was introduced to make the process of getting building permits faster and easier, and right now it doesn't do this."*

17- What specific improvements or changes would you like to see in the re-engineered process for building permits for residential projects? Please be as specific as possible.

Below is the feedback received from the respondents to this question:

- Anonymous-1: *"Make it better."*
- Anonymous-2: *"Add amendment and additional request."*
- Anonymous-3: *"Allow making amendments and uploading progress reports."*
- Anonymous-7: *"Should be All government sections are involved in BENAYAT and should not approve any stages without final approval so no need to apply any request later even address card and cable and all others needed during construction."*
- Anonymous-5: *"Simplify thermal and electrical section by entering the data and creator just click."*
- Anonymous-6: *"1. Cancel the Audit by municipalities after getting the building permit, or at least get a qualified audit team 2. Cancel the un-smart address generation by the system or cancel the CIO involvement in the addresses 3. Eliminate the sources of resubmittal due to connectivity comments to enclose more details or additional documents 4. Cancel the client information to match national notification system... mobile and email. 5. Improve the interface to real smart and engineering rather than IT driven module that is recommended by unqualified municipality staff 6. Too much liability*

and threats to 3rd party reviewing offices complicate and delay approvals. 7. Cancel the construction follow up through the BENAYAT system... unpractical and un efficient."

- *Anonymous-7: "Clarify the new laws by workshop which save time of the Eng offices and the engineer in mun."*
- *Anonymous-8: "Improving communication channels between customers and involved entities. Additionally enhancing both the response and approval speed"*
- *Anonymous-9: "Road approval to be included at service entities approval."*
- *Anonymous-10: "I would like to see all the government directories involved in the process, instead of just three."*
- *Anonymous-11: "1- BENAYAT auditing by Municipality 2- Final auditing by Municipality to be omitted."*
- *Anonymous-12: "It should be easier."*
- *Anonymous-13: "Not to cancel the address cards to resubmit the application, to have chat access for communication."*
- *Anonymous-14: "Knowing exactly where the application is being held."*
- *Anonymous-15: "I would like to have a function that can allow us to attach modified drawings to the auditing office without resubmitting the whole application. The removal of yellow and red flags, should be called something else because it causes stress to clients, sometimes the issue is as simple as (you must make the drivers room bigger)"*

- Anonymous-16: *"BPS System has better approval process workflow, which can be adopted for BENAYAT system."*
- Anonymous-17: *"Less letters. More stakeholders (like MoH, CDD)"*
- Anonymous-18: *"Building entrances for address card application is more complicated especially u have multiple villas. U have to go back from the start from pre-approval if you have changes on the engineering data and it will take time again."*
- Anonymous-19: *"It is important to obtain initial approval from the Planning, Roads and Civil Defense Department for all projects before the project is transferred for audit by the engineering office."*
- Anonymous-20: *"No requirement for resubmit for minor details, especially if they must pass roads and urban planning departments."*
- Anonymous-21: *"To have less input in the system and let the address of IGA do more. The process of water/Elec meters and address for a complex project is way too complicated and these must be operated or with at least a fast to reach help team of the IGA."*
- Anonymous-22: *"Better to use old system of the municipality-easy to deal with all authorities for approvals."*
- Anonymous-24: *"In my opinion, the improvement I would like to see is the review and approval time frame for each department."*
- Anonymous-25: *"Procedure for big projects to be clear and improved. Add better definition to the requirements."*
- Anonymous-26: *"By having hot lines directly connected with the Authorities to solve the problems or by live chatting to solve issues, by using artificial intelligence."*

- Anonymous-27: *"1- vocabulary used to be more direct 2- any other statutory authority through which permit will pass has to have access to BENAYAT 3- pre-approval process takes too long."*
- Anonymous-28: *"Cancel the Auto-approval option. Let the auditing process happen in the governmental sector instead of other offices. Allow user to browse all requirements to be submitted for building permit instead of current situation."*
- Anonymous-29: *"Early replies & Quick approvals are vital."*
- Anonymous-30: *"We need Good communication chain."*
- Anonymous-31: *"Add Civil defense approval."*

Based on the feedback received, it is apparent that some of the respondents have similar suggestions for improving the re-engineered process for the BENAYAT Portal BP system. This feedback will be used to drive the research findings.

4.2.3 Identifying the causes of problems with the current BENAYAT model

This section of the questionnaire relates to the causes of problems with the current BENAYAT model for Residential Projects and it is in the format of a causes with ready-choice answers, these causes were created based on the data and input gathered from expert meetings and a brainstorming session conducted after the literature review of this research. 5 Likert scale was used to answer this question as follows: (Never, Rarely, Sometimes, Often, and Always). The table below show the respondent's feedback:

Table 7 - Respondents feedback for Section-3. (Source: Original)

NO	Causing a problem	% Never	% Rarely	% Sometimes	% Often	% Always
1	Relationship between Creator and Reviewer.	3.2	32.3	35.5	19.4	9.7
2	Eng. Office review scope is not defined.	12.9	12.9	35.5	29	9.7
3	Process the Auditing of the application after issuing the Final Building Permit.	6.5	12.9	32.3	25.8	22.6
4	BENAYAT requirements from the Creator (Documents and Drawings).	12.9	12.9	41.9	12.9	19.4
5	Required input data in the BENAYAT application.	9.7	6.5	51.6	12.9	19.4
6	Pre-approval stage before Eng. Office Review stage.	9.7	12.9	35.5	25.8	16.1
7	Time needed for Pre-Approval.	3.2	19.4	22.6	22.6	32.3
8	No standard for Eng. Office reviewer fees.	12.9	22.6	22.6	29	12.9
9	Resubmitting full Building Permit application after receiving a comment (from Eng. Office review stage or Service Connectivity stage).	6.5	9.7	22.6	22.6	38.7
10	Engineers' availability to receive queries and follow up is limited.	9.7	9.7	29	29	22.6
11	User experience with the BENAYAT Portal (easy to use).	6.5	19.4	29	29	16.1
12	Engineering Drawings done by creator are not standard for all Eng. Offices.	9.7	25.8	22.6	22.6	19.4
13	BENAYAT Building Permit information (details showing in the final Building Permit).	6.5	25.8	32.3	22.6	12.9
14	Design mistakes.	9.7	32.3	29	22.6	6.5
15	Drafting mistakes.	9.7	22.6	38.7	22.6	6.5
16	Building Permit Regulations clarity.	6.5	12.9	38.7	25.8	16.1

By using Excel software, the following Mean table (8) was developed:

Table 8 - Mean of data in Section-3. (Source: Original)

	Never	Rarely	Sometimes	Often	Always
Mean	8.49	18.16	32.46	23.39	17.56

The below figure (20) shows the **Mean** of the data:

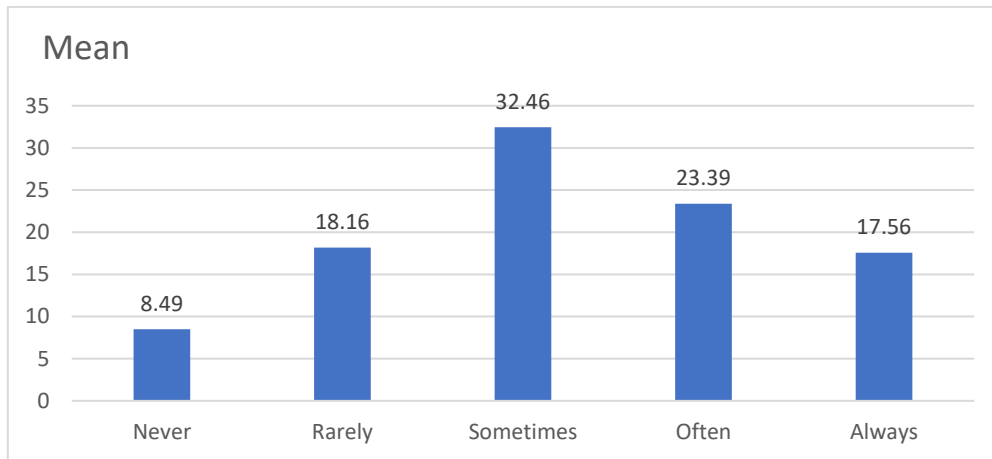


Figure 20 - Mean of data in Section-3. (Source: Original)

According to the data presented in the above figure, the most chosen response was "Sometimes" at 32.46%, followed by "Often" at 23.39%. "Rarely" and "Always" received 18.16% and 17.56%, respectively, and "Never" was the least selected option at 8.49%. This should give some credibility to the stated causes in section 3 of the questionnaire.

By analyzing the data in table (7), the causes are rearranged in table (9) below. The ranking was developed by looking into the higher selection per each scale, this ranking will be considered while reaching the research findings.

Table 9 - Rank of Causes in Section 3. (Source: Original)

NO	Causing a problem	Rank	Scale
9	Resubmitting full Building Permit application after receiving a comment (from Eng. Office review stage or Service Connectivity stage).	1	Always
7	Time needed for Pre-Approval.	2	
10	Engineers' availability to receive queries and follow up is limited.	3	Often
8	No standard for Eng. Office reviewer fees.	4	
11	User experience with the BENAYAT Portal (easy to use).	5	
5	Required input data in the BENAYAT application.	6	Sometimes

4	BENAYAT requirements from the Creator (Documents and Drawings).	7	
16	Building Permit Regulations clarity.	8	
15	Drafting mistakes.	9	
6	Pre-approval stage before Eng. Office Review stage.	10	
2	Eng. Office review scope is not defined.	11	
1	Relationship between Creator and Reviewer.	12	
3	Process the Auditing of the application after issuing the Final Building Permit.	13	
13	BENAYAT Building Permit information (details showing in the final Building Permit).	14	
14	Design mistakes.	15	Rarely
12	Engineering Drawings done by creator are not standard for all Eng. Offices.	16	

4.2.4 Effects of the proposed enhancements to the system

This section of the questionnaire relates to the effects of the proposed enhancements on the current model of the BENAYAT Portal for residential projects and it is in the format of a proposal with ready-choice answers, these enhancements were created based on the data and input gathered from the expert meetings and a brainstorming session conducted after the literature review of this research. 5 Likert scale was used to answer this question as follows: (No Effects, Slightly Effect, Moderate Effect, Great Effect, and Very Great Effect). The table (10) below show the respondent's feedback:

Table 10 - Respondents feedback for Section-4. (Source: Original)

NO	Changes/Enhancements	% No Effects	% Slightly Effect	% Moderate Effect	% Great Effect	% Very Great Effect
1	Improve the quality of Building Permit.	6.5	16.1	32.3	25.8	19.4

2	Define the scope of Reviewer and Auditor team.	9.7	19.4	12.9	29	29
3	Re-engineering BENAYAT model processes.	3.2	9.7	19.4	19.4	48.4
4	Making an easy to adopt drafting standard, to be used for Building Permit application for all Engineering Offices.	6.5	12.9	16.1	38.7	25.8
5	Include all related governmental authorities in the BENAYAT Portal.	3.2	9.7	9.7	12.9	64.5
6	Make it easy to change some inputs without resubmitting the full application.	0	9.7	0	19.4	71
7	Increase the Building Permit validity time to 2 years.	6.5	9.7	9.7	16.1	58.1
8	Reduce Building Permit fees to cover Reviewer fees for the end user beneficial.	3.2	12.9	12.9	29	41.9
9	Reduce the input data needed in the Building Permit application.	0	16.1	16.1	25.8	41.9
10	Adopting BIM for automatic drawings review as an option.	9.7	16.1	22.6	22.6	29
11	Easy channels of communication between Engineers to answer queries and follow up.	0	16.1	6.5	16.1	61.3
12	Improve the BENAYAT Portal interface.	0	9.7	22.6	19.4	48.4

The below figure (21) shows the **Mean** of the data:

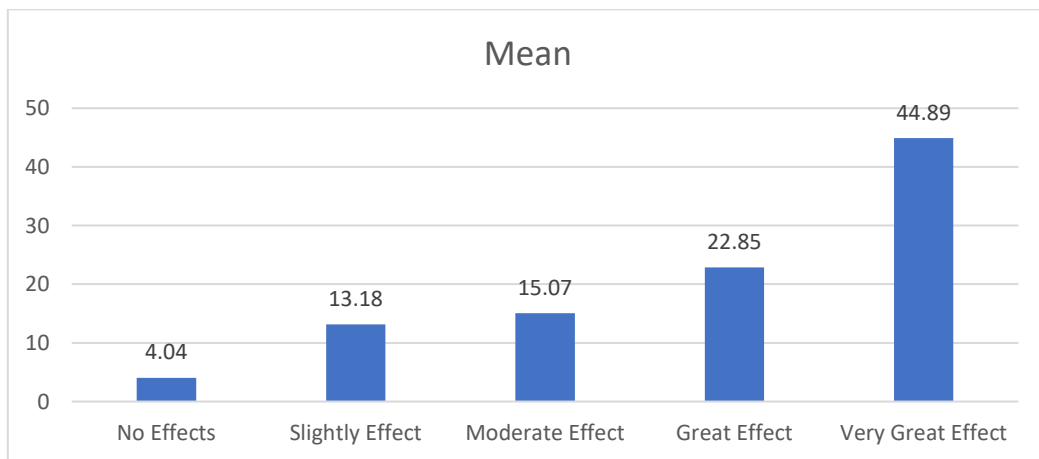


Figure 21 - Mean of data in Section-4. (Source: Original)

According to the data presented in the above figure, the most chosen response was "Very Great Effect" at 44.89%, followed by "Great Effect" at 22.85%. "Moderate Effect" and "Slightly Effect" received 15.07% and 13.18%, respectively, and "No Effect" was the least selected option at

4.04%. This should give great credibility to the proposed enhancements stated in section 4 of the questionnaire.

By analyzing the data in table (10) , the proposed enhancements are rearranged in table (11) below. The ranking was developed by looking into the higher selection per each scale, this ranking will be considered while reaching the research findings.

Table 11 - Rank of Causes in Section 4. (Source: Original)

NO	Changes/Enhancements	Rank	Scale
6	Make it easy to change some inputs without resubmitting the full application.	1	Very Great Effect
5	Include all related governmental authorities in the BENAYAT Portal.	2	
11	Easy channels of communication between Engineers to answer queries and follow up.	3	
7	Increase the Building Permit validity time to 2 years.	4	
12	Improve the BENAYAT Portal interface.	5	
3	Re-engineering BENAYAT model processes.	6	
8	Reduce Building Permit fees to cover Reviewer fees for the end user beneficial.	7	
9	Reduce the input data needed in the Building Permit application.	8	
2	Define the scope of Reviewer and Auditor team.	9	
10	Adopting BIM for automatic drawings review as an option.	10	
4	Making an easy to adopt drafting standard, to be used for Building Permit application for all Engineering Offices.	11	Great Effect
1	Improve the quality of Building Permit.	12	Moderate Effect

4.3 Implementation of Fishbone Diagram

The fishbone diagram, also known as the Ishikawa diagram or cause-and-effect diagram, is a valuable tool used to identify the root causes of a problem or effect. The diagram was initially developed by Dr. Kaoru Ishikawa, a Japanese quality control expert, to help improve the efficiency of quality control in the manufacturing industry.

The fishbone diagram is structured in a way that helps to identify the possible causes of a problem by breaking them down into smaller, more manageable categories. The categories are typically labeled as the six "Ms": Manpower, Machines, Materials, Methods, Measurements, and Mother Nature (or Environment). These categories help to ensure that all possible causes are considered.

Once the categories have been established, the next step is to identify the potential causes and list them under the appropriate category. The diagram then visually represents the relationship between the various causes and the effect, making it easier to identify the root cause. By using the fishbone diagram, organizations can more easily identify the factors that contribute to a problem and take appropriate measures to address them. It is a powerful tool that can be used in a wide range of industries and situations, from product design to process improvement, and has proven to be a highly effective method for problem-solving (Coccia, 2018).

The structure of this research was created based on the causes of delay in issuing Building Permits for residential projects through the BENAYAT Portal and their main effect. The causes were established based on the data gathered through meeting the experts, and through a brainstorming session after going through the current BENAYAT model, the below Figure (22) shows the diagram.

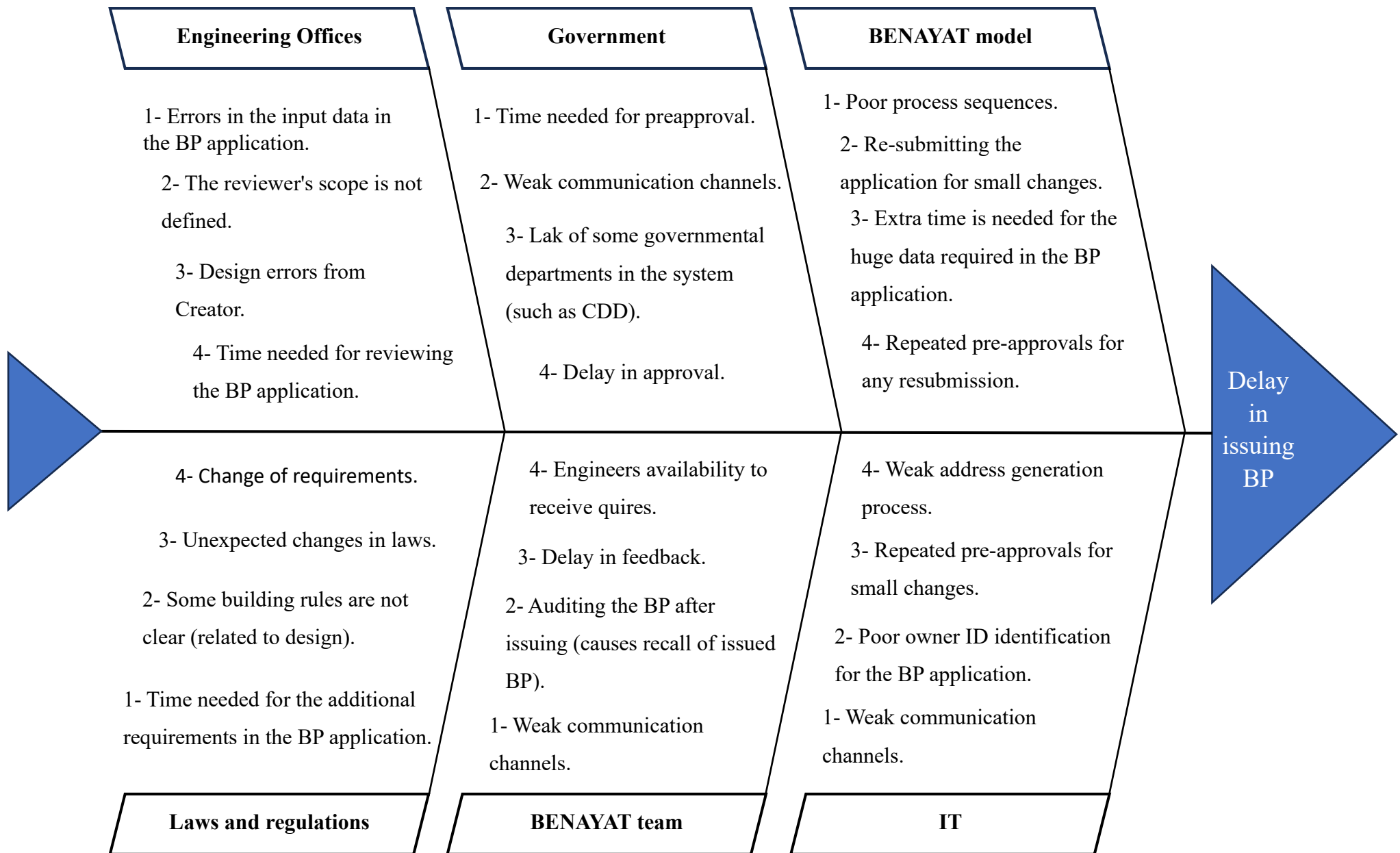


Figure 22 - Fishbone Diagram. (Source: Original)

4.4 Discussion of Results

4.4.1 Research Summary and Main Results

The research consists of a typical academic dissertation report, which is divided into four chapters. These chapters cover the innovation of service provision in the public sector, using the newly adapted system for issuing Building Permits in Bahrain BENAYAT Portal as a case study. The main objective is to identify the opportunities and challenges that affect issuing the Permits to achieve more effective use of the BENAYAT Portal.

The literature review chapter discusses the innovation in the public sector service provision. It also covers the historical background of building permits in Bahrain and how it evolved to reach the BENAYAT Portal. During the literature review, the BENAYAT Portal was introduced, highlighting both the BENAYAT main stakeholders and the process (BENAYAT model) of issuing Building Permits.

The methodology employed in this research involved a multi-method approach that aimed to collect, analyze, and combine both qualitative and quantitative data to gain a better understanding of the factors that influence the issuance of Building Permits. The research objectives were restated to ensure that the approach was appropriate to the study.

The analysis of the research data was primarily focused on the non-numerical qualitative data, while the quantitative data was used to supplement and enhance the findings of the qualitative data. This approach enabled us to gain a comprehensive understanding of the complex issues surrounding the issuance of Building Permits.

The findings of the research were obtained through structured interviews with experts and a research questionnaire. These findings revealed that using the BENAYAT Portal to issue Building Permits has

some drawbacks that need to be addressed and enhanced. The system's drawbacks were identified as the main causes of delays in issuing Building Permits.

In summary, the multi-method approach employed in this research enabled us to gain a better understanding of the factors affecting the issuance of Building Permits. The findings of the research highlighted the limitations of the BENAYAT system and identified areas that require improvement to enhance the system's effectiveness. Main finding of those drawbacks and causes of delay is summarized and discussed below:

1. BENAYAT model process sequences. The current model used by BP applications is causing a delay in the issuance of BPs and proving to be inconvenient for users. The process begins with the EO Creator in the private sector, followed by the Pre-approval stage in the public sector, then returning to the EO Creator, and subsequently moving to the EO Reviewer, both of which are in the private sector. After the reviewing process by the EO Reviewer, the application undergoes the Service Connectivity stage in the public sector. However, the primary issue is that both parties, the public and private sectors, are distinct and cannot be incorporated in this way. As per expert interviews, there are times when the BP application receives approval from the public sector but is denied approval by the private sector, or vice versa, leading to bottlenecks that are difficult to address.

Anonymous-19 suggested that obtaining initial approval from the Planning, Roads, and Civil Defense Department for all projects before transferring the project for engineering office audit is critical.

This is because the current model does not account for the different procedures that the public and private sectors follow. Therefore, the process requires significant alterations to ensure smoother and more efficient operations. Also, through the questionnaire, 90% of the respondents agreed that the sequence of getting a Building Permit through the BENAYAT Portal needs to be improved or re-engineered.

- 2. Resubmitting the full Building Permit application for any small change needed.** The BP application goes through a channel of approvals in a step-by-step way, and in any step if a small change is needed, the full application needs to be resubmitted and all the steps need to be repeated. This is a big source of delay in the issuing of building permits as it causes delays of time. As Anonymous-20 commented: *"The current system is restrictive in choices and has a rigid structure, an entire project will face resubmitting if a small detail has been missed which could delay a project over a week."*
- 3. Time needed for Pre-Approval** from the governmental departments is causing delay in getting the BP issued within a reasonable time. As Anonymous-27 commented: *"pre-approval process takes too long."* Also, Anonymous-27 stated that: *"The pre-approval phase for an industrial project took almost 40 days."*
- 4. Engineers' availability to receive queries** and follow-up is limited, from both the public and the private sector. In most cases, engineers need to discuss some information related to the BP application, and

if one party is not available today, this will cause a full day delay even if the quire is somewhat small. Anonymous-18 commented: *"The engineers who handle the review after the process of BP are not responding! They don't know how to resolve the technical issues on BENAYAT! and they will take time to respond!"*

5. No standard for EO reviewer fees. As the market is open between the EO to give their quotes/fees, this is causing a delay because one EO may take extra projects to review by giving low fees and without having the needed manpower. As such, leading to more delay and open a source of making mistakes.

6. Unsatisfactory user experience with the BENAYAT Portal. As Anonymous-6 commented in the improving part *"Improve the interface to real smart and engineering rather than IT-driven module."* Also, some IT drawbacks are within the system as Anonymous-15 commented: *"We have a project that will not go to the pre-approval phase because the block the house is in is not stated in BENAYAT, therefore the design is stuck, we can't get a stamped drawing and BENAYAT telling us to go directly to the roads department and everybody sending us to someone else."*

7. A huge number of required input data in the BENAYAT application. From the EO Creator side, there is a lot of data that needs to be inserted for any application along with the attached documents and drawings. Some inputs are confusing, and most of the time it leads to resubmitting the application. As Anonymous-15

commented: *"BENAYAT Portal requires us to put down the electrical load and thermal data in the system in a very unrealistic process."*

8. BENAYAT requirements from the Creator (Documents and Drawings). The required input data in the BENAYAT application from the Creator (Inputs, Documents, and Drawings) are a lot and confusing, and most of the time it leads to resubmitting the application.

9. Building Permit Regulations clarity. Some regulations are not clear to the EO Engineers (especially between the Creator and Reviewer), as such they go back to the BENAYAT or Municipality Engineers to get feedback which causes delays. Anonymous-19 commented: *"We face a problem with the difference in understanding the laws by government engineers. One of them allows something and the other rejects it. The other problem is communicating with the grievances committee. It is very difficult, and the engineer in charge is not cooperative, and it takes 3 months to get a response."*

10.Eng. Office review scope is not defined. Also, too much liability is kept on them. As such, the reviewing process leads to delaying the approval and issuing of the Building Permits. Anonymous-6 commented: *"Too much liability and threats to 3rd party reviewing offices complicate and delay approvals."*

11.Process the Auditing of the application after issuing the Final Building Permit. In some cases, the full project will be stopped during the construction stage, because the Audit team find a mistake in the BP. Anonymous-10 commented: *"We can't have the government audit the building permit after it gets issued, any modifications or mistakes should be modified before issuing the permit."*

By the end of this section, the researcher has answered research question number 3 (What are the challenges that the BENAYAT model has?) and achieved research objective number 2 (Analyze the current model of issuing Building Permits through the newly adopted system (BENAYAT Portal), to understand the innovation in the public service provision and how this could be replicated in other public service provisions).

4.4.2 Research Conclusion

The Building Permits approval from the relevant authorities plays a crucial role in a country's growth. Any delays in obtaining these approvals can have a negative impact on the country's development.

Local and foreign real estate investors closely look into these approvals strategy while making their investment plans. This is because the approval of the authorities serves as a guarantee of the validity and safety of the investments. Therefore, it is imperative to establish a solid foundation for citizens and investors to establish their investments, including homes, buildings, malls, hospitals, factories, and hotels.

To streamline the process of issuing building permits, the government introduced the BENAYAT Portal. The BENAYAT Portal is an electronic system designed to facilitate the issuance of building permits. However, research has shown that there are several challenges and factors that negatively affect the effectiveness of the BENAYAT model in issuing building permits. By tackling these challenges, the BENAYAT Portal can become a more efficient platform for issuing building permits, which will eventually contribute more to the growth of the country. Finally, and based on the above, research recommendations are presented in the next section.

4.5 Research Recommendations

In this section, we provide a comprehensive set of general recommendations for the BENAYAT model to enhance the issuance of building permits through the BENAYAT Portal. These recommendations are aimed at streamlining the entire process to make it more efficient and effective. We have carefully analyzed the existing system and identified the key areas that need improvement. Our recommendations cover various aspects such as simplifying the application process, reducing the processing time, improving the communication channels, and enhancing the overall user experience.

Furthermore, this section also provides some valuable suggestions for future studies. These suggestions are intended to help researchers and policymakers identify new areas for exploration and identify potential solutions to the challenges faced in the current system. We encourage further research in areas such as the integration of new technologies, the impact of legal and regulatory frameworks, and the role of stakeholders in the permitting process. By implementing the recommendations and pursuing the suggested areas of research, we believe that the BENAYAT

model can become a more efficient, transparent, and user-friendly system for building permit issuance.

4.5.1 Recommendations Related to BENAYAT Portal

Improvement is a crucial aspect of any research project as it enables researchers to identify and address issues that hamper the efficiency of a system. In the context of the BENAYAT Portal, we have identified several causes of delay and problems that hinder the issuance of building permits, and the overall main users' experience with the BENAYAT Portal.

Based on our findings, we have proposed recommendations to address these issues, which are presented in this section. We believe that these recommendations will help to reduce the time and effort spent by applicants in obtaining building permits.

Furthermore, we have developed a revised BENAYAT model that incorporates the proposed recommendations to enhance the issuance of building permits. This revised model is expected to streamline the application process, minimize any potential delays or errors, and open the door to adding the missing services to the BENAYAT Portal. Overall, our goal is to improve the BENAYAT model and make it a more efficient and user-friendly system for applicants.

Research recommendations:

- 1. Create easy channels of communication between Engineers to answer queries and follow-up.** Create simple and effective communication channels among Engineers from private and public sectors, so that they can easily ask and answer queries and follow-

up with each other. These channels should be like hotlines at a specific time within the workday; engineers can arrange to follow up and get fast responses to any queries on the spot.

2. Include all related governmental authorities in the BENAYAT

Portal. As most interviews and most of questionnaire respondents suggest, all related governmental authorities should be included in the process of issuing the building permits. The lack of Civil Defense review and approval within the current model is creating a big issue for most projects that got the BP through BENAYAT Portal. Because, after issuing the BP from the system, the project will then undergo CDD review. As such, in case of any change needed, the EO will undergo a bottleneck satiation, as the BP approval will become invalid, and they will need to get the authorities approval again to address CDD requirements. This satiation was not existed in the old municipality system (BPS), as all government authorities will review the building permit application and give their feedback before the final approval of the building permit application. The proposed model in the next section considers this issue.

3. Make it easy to change some inputs by the Creator, without

resubmitting the full application. This issue is related to the current BANAYAT model, as the model is designed in a step-by-step move (refer to Figure 5 in chapter 2 of this research). As such, in case of any small error in the data, the full application should be resubmitted and start again from the first stage, losing all the guaranteed approvals. This issue is delaying the approval process

and increasing redundant time within the Engineers in both public and private sectors. The proposed model in the next section considers this issue.

- 4. Cancel the Audit by municipalities after getting the building permit.** Building Permit is a legal document that gives the right to the owner to start the construction stage of his/her property. The auditing of the BP after giving the approval is very frustrating to both Owners and EO, and in most cases (as mentioned by the experts), Owners will be blaming the EO which created another problem. Expert-1 in the interviews mentioned that the old system Building Permit approval is valid even if someone discovers a mistake in the Building Permit, giving the building permit a highly respected value as a legal document. As such, auditing by municipalities should be within the approval of the building permit stage, not after it.
- 5. Eliminate the sources of resubmitting the building permit application.** This issue is related to the current BANAYAT model, the proposed model in the next section considers this issue.
- 6. Increase the Building Permit validity time to 2 years.** This change is needed for the Citizens who are building their homes or for small investors, as after the issuing of BP they will undergo getting financial support and this consumes time. The validity of the BP through the BENAYAT Portal is One (1) year. Increasing the BP validity to two (2) years should be beneficial to the Citizens, as it

gives them more time to arrange the financial support, do the tender, hire the Contractor, and start the construction stage.

7. Define the scope of the Reviewer. In the current model, the EO reviewer scope is not defined, and the liabilities kept over them are high. As mentioned by the experts, in some cases the EO Reviewer will reject the BP application because of a comment that is not related to the laws and regulations (for example: not showing key plan in the Floor Plans drawings). As such, Creator and Reviewer will undergo a bottleneck situation delaying the issuance of the BP. The Reviewer scope should be defined for smoother streamlining of the BP issuing.

8. Improve the BENAYAT Portal interface to a real smart and engineering interface, rather than IT-driven module. Also, as experts mentioned, the used vocabulary should be more direct and as knowing in the field of Engineering in Bahrain. For example, the Floor Plans Drawings named in the BENAYAT Portal as Horizontal Sections, which is not following the vocabulary used in the market.

9. Reduce the input data needed in the Building Permit application. According to experts, the BP application requires a significant amount of data, and some of it is redundant (for example: number of levels/floors in the project, needed address for the project, and so on). This results in prolonged processing time and increases the likelihood of errors. Therefore, it is necessary to review the input data and the necessary documents for the BP application to identify

and eliminate any redundancies. This will help save time and reduce the risk of errors.

10. Reduce Building Permit fees to cover Reviewer fees for the end user benefit. BENAYAT Portal has introduced a new party called the EO Reviewer, which comes with certain fees for the end-users. However, the BP fees for the Municipality remain unchanged. This means that the cost for the end-user has gone up. It would be beneficial for the end-users, especially the citizens who want to build their homes if the BP fees for the Municipality were reduced.

11. Improve the quality of Building Permits. As mentioned by the expert, the new BP feels and looks like a normal document. It should be revised to get similar quality of the old municipality BP documents.

12. Adopting BIM for automatic drawing review as an option. According to a study conducted by Judith, Gabriele, and Giada (2023), their proposed model for the building permit process and the prototype of the BIM-oriented and process-based web application are feasible and helpful for the building authorities. Also, the study suggests that the developed model can be adopted by different countries. Developing a system that provides Building Information Modeling (BIM) capabilities entails a considerable expense and necessitates that Engineering Offices adopt specialized software. Nonetheless, the potential advantages of having such a system (as an option for EOs to utilize when applying for Building Permits) are

highly promising, particularly with the advent of Artificial Intelligence (AI) technology.

13. Making an easy-to-adopt drafting standard, to be used for Building Permit application for all Engineering Offices. Each Engineering Office (EO) has its own unique system for drawing and plotting building drawings. Consequently, the submitted drawings through the system are likely to differ, causing delays in the review process. To reduce this delay and improve the quality of drawings, it is suggested to adopt a standardized system for the drawing's appearance. The Planning Department in Bahrain has already adopted a similar approach where applications should apply their drawings in a specified plot system. This idea could be proposed as an option for the Engineering Office to adopt in their residential villa project applications, especially for small projects.

The proposed revised model for BP applications:

After adopting the re-engineering techniques mentioned in Chapter 3 of this research, studying the BENAYAT current model, and reviewing the Building Permit System (old municipality system), the revised model is proposed.

This model aims to improve the BENAYAT Portal by including missing services such as modifying, adding, or demolishing building permits. It also addresses the current model's shortcomings, particularly the resubmission issue and approval time.

To streamline the process, the proposed model introduces a decision-making stage that reduces the time and effort required by stakeholders.

Moreover, the proposed model opens doors for complete approval of building permit applications within the private sector, particularly for small-scale projects like residential villas and small buildings.

Figure (23) illustrates the proposed revised model; the following are descriptions for each step.

- **Step 1:** EO Creator creates the BP application and forwards it to EO Reviewer in the BENAYAT Portal.

EO Reviewer – Review the application and decide whether to go to (step 2) or to retain the application to EO Creator (step 6) for modifications.

- **Step 2:** Based on the nature of the project and BP application type, the application will go under selected authorities for their review and feedback.
 - **Authorities review and feedback** – All authorities review to be done within 7 days and at the same time.
- **Step 3:** BP application feedback return to EO Reviewer
 - **EO Reviewer** – Review the authorities feedback and decide whether to go to (step 4) or to retain the application to EO Creator (step 6) for modifications.
- **Step 4:** BP application is successfully guaranteed all the needed approvals. EO Reviewer should stamp the Architectural drawings, attach them to the system, and proceed to the payment stage.
 - **Payment:** To be done by the end-user.

- **Step 5:** After payment, EO Creator can download the Building Permit Document from the system with the approved Architectural drawings.

Moreover, with further developments in the system and based on the nature of the project, we can let the EO reviewer decide if the application can move to step (4) without authority's review, which could significantly help in save time and effort.

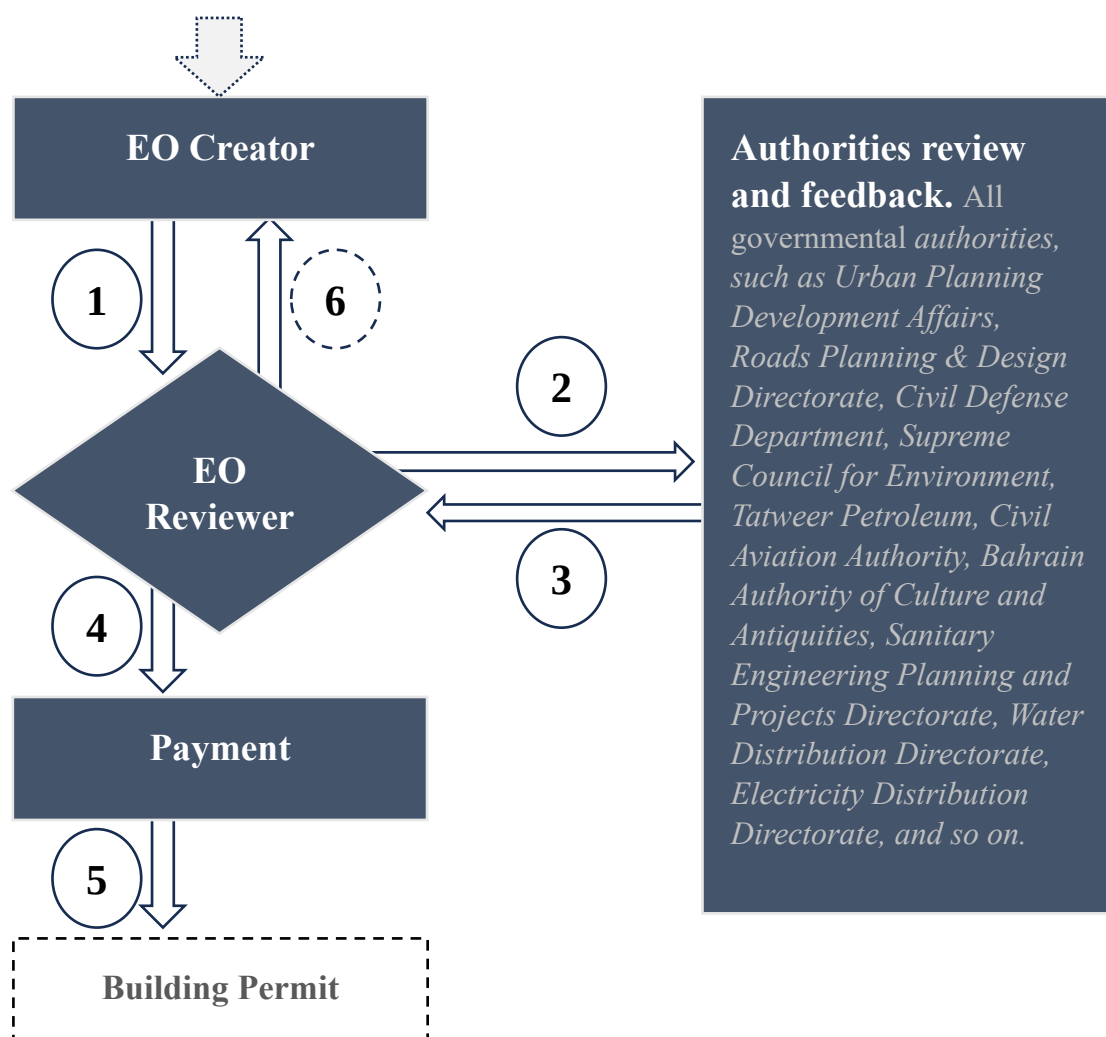


Figure 23 - Proposed revised model for BP application through the BENAYAT Portal. (Source: Original)

By the end of this section, the researcher has answered research question number 4 (How to make the BENAYAT Portal better?) and achieved research objective number 3 (Indicate the opportunities and challenges that affect issuing the Permits to achieve optimal/more effective use of the BENAYAT Portal).

4.5.2 Future Recommendations

1- Similar research could be done for the Follow-up Construction Stage in the BENAYAT Portal.

2- Similar research could be done to enhance the laws and regulations for Building in Bahrain.

3- Similar research could be done in the GCC to understand the issues that Gulf countries are facing when dealing with Building permits and getting authorities' approval to propose enhancement in this subject.

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Appendices

Appendix A1: 1973 Resolution

مرسوم بقانون رقم (١٦) لسنة ١٩٧٣ بشأن إنشاء هيئة بلدية مركزية مؤقتة لإدارة شؤون البلديات

نحن عيسى بن سلمان الخليفة ، أمير دولة البحرين ،

بعد الاطلاع على المرسوم الأميري رقم (٢) لسنة ١٩٧١ بإعادة التنظيم الإداري للدولة ،

وعلى النظام الأساسي للبلدية الصادر سنة ١٩٥١ ،

وبناء على عرض كل من رئيس مجلس الوزراء ووزير البلديات والزراعة ،

وبعد موافقة مجلس الوزراء ،

رسمنا بالقانون الاتي :

مادة - ١ -

تحل مجالس البلديات القائمة حالياً .

مادة - ٢ -

تنشأ هيئة بلدية مركزية تزاوّل جميع اختصاصات مجالس البلديات المنحلة لفترة انتقالية مدتها عامان ، وتتألف هذه الهيئة من ثمانية وعشرين عضواً يعينون بقرار من رئيس مجلس الوزراء على الوجه التالي :-
١ - أربعة عشر عضواً من المواطنين من مختلف المناطق البلدية .
٢ - أربعة عشر عضواً يمثلون وزارات الدولة ذات العلاقة .

مادة - ٣ -

يتولى وزير البلديات والزراعة رئاسة الهيئة البلدية المركزية ويمثلها لدى السلطة التشريعية في الدولة ومجلس الوزراء . ويمارس الإشراف الإداري على الهيئة وفقاً لأحكام هذا القانون .
وفي حالة غياب الوزير يحل محله وزير البلديات والزراعة بالوكالة .

مادة - ٤ -

تسرى مدة العضوية للهيئة البلدية المركزية اعتباراً من تاريخ أول اجتماع لها .
وفي حالة خلو محل أحد الأعضاء أثناء مدة الهيئة يكمل العضو الجديد مدة سلفه .
ويجب إجراء التعيين خلال شهرين من تاريخ إعلان رئيس الهيئة خلو المحل . ويجوز بقرار من وزير البلديات والزراعة الاستغناء عن ملء المحل الشاغر إذا كانت المدة الباقية للهيئة أقل من ثلاثة شهور وبشرط ألا يزيد عدد المحلات الشاغرة بالتطبيق لهذا الحكم على ربع أعضاء الهيئة .

Appendix A2: May 1977 Resolution

مرسوم بقانون رقم (١٣) لسنة ١٩٧٧

باصدار قانون تنظيم المباني

نحن عيسى بن سلمان آل خليفة أمير دولة البحرين .
بعد الاطلاع على الدستور ،
وعلى الامر الاميرى رقم (٤) لسنة ١٩٧٥ ،
وعلى النظام الاساسى للبلدية الصادر سنة ١٩٥١ ،
وعلى المرسوم رقم (٧) لسنة ١٩٧٠ بالقانون المؤقت لتنظيم تطوير الاراضى المعدل بالمرسوم بقانون رقم (١٦) لسنة ١٩٧١ ،
وعلى المرسوم بقانون رقم (١٦) لسنة ١٩٧٣ بشأن انشاء هيئة بلدية مركزية مؤقتة لادارة شئون البلديات ،
وعلى القانون رقم (٣) لسنة ١٩٧٥ بشأن الصحة العامة ،
وبناء على عرض رئيس مجلس الوزراء ،
وبعد موافقة مجلس الوزراء ،

رسمنا بالقانون الآتى :

المادة الاولى

يعمل بقانون تنظيم المباني المرافق لهذا القانون .

المادة الثانية

على الوزراء - كل فيما يخصه - تنفيذ هذا القانون ، ويحل به بعد اربعة اشهر من تاريخ نشره فى الجريدة الرسمية .

امير دولة البحرين

عيسى بن سلمان آل خليفة

صدر فى قصر الرفاع

بتاريخ ٢٦ جمادى الاولى ١٣٩٧هـ

الموافق ١٤ مايو ١٩٧٧م

Appendix A3: October 1977 Resolution

الهيئة البلدية المركزية المؤقتة

قرار بلدى رقم (٦) لسنة ١٩٧٧

بتشكيل لجنة تراخيص البناء

رئيس الهيئة البلدية المركزية المؤقتة :

بعد الاطلاع على المرسوم بقانون رقم (١٦) لسنة ١٩٧٣ بشأن انشاء هيئة بلدية مركزية مؤقتة ، والمعدل بالمرسوم بقانون رقم (١٤) لسنة ١٩٧٥ ،

وعلى قانون تنظيم المباني الصادر بالمرسوم بقانون رقم (١٣) لسنة ١٩٧٧ ولائحته التنفيذية ،

قرر :

المادة الاولى

تشكل لجنة النظر فى تراخيص البناء من ممثلى الجهات الرسمية ذات العلاقة الميينة أسماؤهم أدناه ، وذلك بالتطبيق لاحكام المادة السادسة من قانون تنظيم المباني الصادر بالمرسوم بقانون رقم (١٣) لسنة ١٩٧٧ .

ويكون تشكيل اللجنة على النحو الآتى :

١ - الهيئة البلدية المركزية المؤقتة : ويمثلها المهندسان يحيى عبدالغنى ، جدى حبيب حنا - ويكون الاول رئيسا للجنة والثانى نائبا لرئيسها ، ويمثل كل وحدة ادارية محلية مندوب عنها عندالنظر فى تراخيص البناء بالنسبة لكل وحدة .

- | | |
|--|--|
| ٢ - ادارة الصحة العامة : | ويمثلها على جعفر أنجاوى |
| ٣ - ادارة الاطفاء : | ويمثلها برين ترنر |
| ٤ - ادارة الكهرباء : | ويمثلها يوسف محمد منصور |
| ٥ - ادارة الاشغال : | ويمثلها سعد عبدالله الشروقى - عن قسم المجارى ،
وعبدالامير أحمد العصفور عن قسم الطرق . |
| ٦ - ادارة اسالة المياه : | ويمثلها محمد صالح جمعة وسعود جبر الدوسرى . |
| ٧ - ادارة التخطيط الطبيعى بوزارة الاسكان : | ويمثلها المهندس حبيب محمد على |
| ٨ - ادارة عاتف البحررين : | ويمثلها رمزى توماس هاجسون |

المادة الثانية

تختص ادارة الشئون الفنية والهندسية بالبلدية باصدار تراخيص البناء .

المادة الثالثة

يعمل بهذا القرار من تاريخ نشره فى الجريدة الرسمية .

رئيس الهيئة البلدية المركزية المؤقتة

عبدالله بن محمد الخليفة

صدر بتاريخ ٦ ذى القعدة سنة ١٣٩٧هـ

الموافق ١٩ أكتوبر سنة ١٩٧٧م

Appendix A4: April 1979 Resolution

مجلس الوزراء

قرار رقم (٨) لسنة ١٩٧٩ بتحديد الاشتراطات التنظيمية للتعمير في المناطق المختلفة في الدولة

رئيس مجلس الوزراء :
بعد الاطلاع على المرسوم بقانون رقم (١٦) لسنة ١٩٧٣ بشأن انشاء هيئة بلدية مركزية مؤقتة
لادارة شئون البلديات ،
وعلى المادة ٢٠ من قانون تنظيم المباني الصادر بالمرسوم بقانون رقم (١٣) لسنة ١٩٧٧ ،
وبناء على عرض وزير الاسكان ،
وبعد موافقة مجلس الوزراء ،

قرر :

المادة الاولى

يعمل بالاشتراطات التنظيمية للتعمير المرافقة لهذا القرار في المناطق المختلفة للدولة .

المادة الثانية

تحدد بقرار من وزير الاسكان المناطق التي تطبق عليها الاشتراطات سالفة الذكر .

المادة الثالثة

على وزير الاسكان ورئيس الهيئة البلدية المركزية المؤقتة - كل فيما يخصه - تنفيذ احكام هذا
القرار ويعمل به بعد شهرين من تاريخ نشره في الجريدة الرسمية .

رئيس مجلس الوزراء
خليفة بن سلمان آل خليفة

صدر بتاريخ ١٥ جمادى الاولى ١٣٩٩ هـ
الموافق ١٢ ابريل ١٩٧٩ م

Appendix B: Research Questionnaire

BENAYAT Portal in The Kingdom of Bahrain

Dear participants,

The scope of this study is to analyze the current model of issuing Building Permits through the newly adopted system (BENAYAT Portal) for Residential Projects in Bahrain (villas, villa compounds, apartment buildings, and so on), to identify the opportunities and challenges that affect issuing the Permits to achieve more effective use of the BENAYAT Portal.

This questionnaire survey is intended for the BENAYAT Portal's primary stakeholders (such as municipal/government engineers and private/engineering offices). The main goal here is to gather your perceptions on the service provided and understand factors affecting issuing the Building Permits positively or negatively.

This survey should take around 15 minutes to complete, and your responses will be kept anonymous and used solely for research purposes.

I would appreciate it if you could fill out this questionnaire and send your prompt reply, as I am looking forward to your opinions.

Yours faithfully,

Ali Al Radhi

Email: alialradhi7@gmail.com

Tel: 00973-33137177

Section 01: Respondent's General Information.

Please select your answer from the list:

1. State your gender:
 - Female
 - Male
2. State your age:
 - Under 30
 - 31 - 35
 - 36 - 40
 - 41 - 45
 - 46 - 50
 - Above 51
3. State your employment classification:
 - Government sector
 - Private/Engineering Office
4. State the number of years of experience you have in Residential Projects in Bahrain:
 - Under 5
 - 6 - 10
 - 11 - 15
 - Above 16
5. Type of involvement:
 - Government
 - Engineering office (Creator)

- Engineering office (Reviewer)
6. On average, how frequently do you interact with the BENAYAT Portal for residential projects in your professional capacity?
- Daily
 - Weekly
 - Bi-weekly (every two weeks)
 - Monthly

Section 02: General questions about the BENAYAT Portal and Building Permit.

Please answer the following questions with Yes or No, and when applicable kindly give your feedback:

7. Does BENAYAT improve the process of getting Building Permits for Residential projects?
8. Do you think we should improve the current BENAYAT model? If yes, explain why in the other box.
9. Are you facing issues that lead to re-submitting the full Building Permit application in the BENAYAT Portal? If yes, explain it in the other box.
10. Do you think each BENAYAT user's scope of work is clearly defined/understood?
11. Should we improve the quality of the Building Permit as a legal document (content, information, duration, and so on)?
12. Do you think we should go back to the previous Building Permit procedure?
13. Do you think we should re-engineer the processes of BENAYT Portal?
14. Do you think the Reviewing scope is clearly understood by BENAYAT stakeholders?

15. Do you think that the sequence of getting a Building Permit through the BENAYAT Portal needs to be improved/re-engineered?
16. Do you think that the BENAYAT Portal website is user-friendly?
17. In your opinion, what is the average time it takes to get a Building Permit for a Residential Project through the BENAYAT Portal?
 - Within one week
 - 2 to 3 weeks
 - One month
 - 3 Months
 - More than 3 months
18. On a scale of 1 to 5, where 1 is "extremely difficult" and 5 is "extremely easy", how would you rate the current process of obtaining building permits for the residential projects through BENAYAT Portal?
19. What are the primary challenges you face when dealing with the BENAYAT building permit system for residential projects? Please select all that apply:
 - Lengthy approval timelines
 - Complex documentation requirements
 - Inefficient communication channels
 - Lack of clarity in the application process
 - Other
20. Have you encountered any instances of unnecessary delays or bottlenecks in the approval process for residential projects within the BENAYAT Portal? If yes, please describe the situation in the other box.
21. Are you familiar with any alternative building permit systems or processes used in other countries for residential projects that could potentially improve the efficiency of the BENAYAT Portal? If yes, please provide details in the other box.

22. Would you support the re-engineering of the BENAYAT Portal specifically for residential projects to facilitate smoother and faster permit approvals? Why or why not?
23. What specific improvements or changes would you like to see in the re-engineered process for building permits for residential projects? Please be as specific as possible.

Section 03: Causes of problems with the current BENAYAT model for Residential Projects.

24. Are the following causes an issue/problem with the current model of the BENAYAT Portal for residential projects?

Please mark the rating scale from 1 to 5, where 1 is "Never" and 5 is "Always":

NO	Causing a problem	Never	Rarely	Sometimes	Often	Always
1	Relationship between Creator and Reviewer.					
2	Eng. Office review scope is not defined.					
3	Process the Auditing of the application after issuing the Final Building Permit.					
4	BENAYAT requirements from the Creator (Documents and Drawings).					
5	Required input data in the BENAYAT application.					
6	Pre-approval stage before Eng. Office Review stage.					
7	Time needed for Pre-Approval.					
8	No standard for Eng. Office reviewer fees.					
9	Resubmitting full Building Permit application after receiving a comment (from Eng. Office review stage or Service Connectivity stage).					
10	Engineers' availability to receive queries and follow up is limited.					

11	User experience with the BENAYAT Portal (easy to use).					
12	Engineering Drawings done by creator are not standard for all Eng. Offices.					
13	BENAYAT Building Permit information (details showing in the final Building Permit).					
14	Design mistakes.					
15	Drafting mistakes.					
16	Building Permit Regulations clarity.					

Section 04: Effects of changes/enhancements to BENAYAT Portal for Residential Projects.

25. In your opinion, what is the effect of the following proposed enhancements on the current model of the BENAYAT Portal for residential projects?

Please mark the rating scale from 1 to 5, where 1 is "No Effect" and 5 is "Very Great Effect":

NO	Changes/Enhancements	No Effects	Slightly Effect	Moderate Effect	Great Effect	Very Great Effect
1	Improve the quality of Building Permit.					
2	Define the scope of Reviewer and Auditor team.					
3	Re-engineering BENAYAT model processes.					
4	Making an easy to adopt drafting standard, to be used for Building Permit application for all Engineering Offices.					
5	Include all related governmental authorities in the BENAYAT Portal.					
6	Make it easy to change some inputs without resubmitting the full application.					
7	Increase the Building Permit validity time to 2 years.					

8	Reduce Building Permit fees to cover Reviewer fees for the end user beneficial.					
9	Reduce the input data needed in the Building Permit application.					
10	Adopting BIM for automatic drawings review as an option.					
11	Easy channels of communication between Engineers to answer queries and follow up.					
12	Improve the BENAYAT Portal interface.					

26. Do you have any additional comments or suggestions regarding the BENAYAT Portal for residential projects and its potential re-engineering?

The End

ملخص البحث

تغير قطاع الخدمات العامة في البحرين كثيراً في العقد الماضي بسبب استخدام التكنولوجيا الحديثة. تهدف حكومة البحرين إلى تقديم خدمات عالية الجودة بسرعة وكفاءة عالية، حيث جعلت الابتكار جزءاً من خططها التنموية الوطنية. تلعب تصاريح البناء دوراً حاسماً في تنمية أي بلد، وتعد الموافقة عليها في الوقت المناسب أمراً ضرورياً للحفاظ على استمرار التقدم في البلد. ولتسريع عملية إصدار تصاريح البناء في البحرين، قدمت الحكومة بوابة بنايات في عام 2018، وهو نظام إلكتروني يبسط عملية إصدار تراخيص البناء.

يهدف هذا البحث إلى التعرف على الفرص والتحديات التي تؤثر على إصدار التصاريح لتحقيق استخدام أكثر فعالية لبوابة بنايات. تضمنت المنهجية المستخدمة في هذا البحث نهجاً متعدد الأساليب يهدف إلى جمع وتحليل ودمج البيانات النوعية والكمية لفهم العوامل التي تؤثر على إصدار تراخيص البناء بشكل أفضل. تم الحصول على نتائج البحث من خلال مقابلات شبه منظمة مع 5 خبراء في هذا المجال، ومن خلال استبيان بحثي موجه للمستخدمين الرئيسيين لبنايات وحصل على 31 مشاركاً. ركز التحليل في المقام الأول على البيانات النوعية غير الرقمية، في حين تم استخدام البيانات الكمية لتكملة وتعزيز نتائج البيانات النوعية. وقد أتاح هذا النهج فهماً شاملاً للقضايا المعقدة المحيطة بإصدار تراخيص البناء.

سلطت نتائج البحث الضوء على القيود المفروضة على نظام بنايات وحددت المجالات التي تحتاج إلى تحسين لتعزيز فعالية النظام. العيب الأول الذي يسبب التأخير في النظام الحالي هو تسلسل العمليات، والثاني هو إجراء إعادة تقديم الطلب كاملاً لأي تغيير، والثالث هو الوقت اللازم للموافقة المسبقة، وأخيراً مدى توفر المهندسين لتلقي الاستفسارات. وقدم البحث توصيات لمعالجة هذه القضايا وغيرها، التوصية الأولى هي خلق قنوات اتصال سهلة، والثانية هي تضمين جميع الجهات الحكومية ذات العلاقة في النظام، والثالثة هي تسهيل تغيير بعض المدخلات، وأخيراً إلغاء التدقيق من قبل البلديات بعد الحصول على رخصة البناء.

وأخيراً، تم تطوير نموذج منقح يتضمن التوصيات المقترحة لتعزيز إصدار تراخيص البناء. ومن المتوقع أن تعمل التوصيات والنموذج المعدل على تبسيط عملية تقديم الطلبات، وتقليل التأخير المحتمل، وفتح الباب لإضافة الخدمات المفقودة إلى بوابة بنايات. الهدف هو تحسين بوابة بنايات وجعلها نظاماً أكثر كفاءة وسهل الاستخدام لمقدمي الطلبات.



فهم جوانب الابتكار في تقديم خدمات القطاع العام: حالة بنايات في مملكة البحرين

أطروحة مقدمة لنيل درجة الماجستير في علوم الإدارة الهندسية

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