

# An Analytical Study to Improve the Efficiency of Waiting Lines in Government Institutions

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Abstract. This study aims to analyse and improve the efficiency of waiting lines in government institutions by identifying the reasons for the length of these lines, using modern technology, overcoming obstacles, and evaluating the impact of improvements on beneficiary satisfaction and service quality. The study is based on the descriptive analytical approach, and is based on a sample of 300 employees and customers. The results showed that improving the efficiency of waiting lines enhances beneficiary satisfaction and increases the efficiency of the institution by reducing waiting times and relieving pressure on beneficiaries, while lack of resources and ineffective technology hinder the implementation of effective management strategies. Based on these results, the study recommends increasing the number of employees, improving the technical infrastructure, adopting modern technology such as electronic reservation and electronic payment systems, enhancing training and awareness for employees, in addition to establishing an effective system for monitoring and evaluating performance to improve the efficiency of waiting lines and the quality of services provided.

Keywords: Modern technology, Queue efficiency, Queue management

# 1. INTRODUCTION

Government institutions play a fundamental role in delivering public services, and the efficiency of these services is a key indicator of public administration quality and citizen satisfaction. In this context, improving the efficiency of waiting lines within these institutions is crucial—not only to meet the expectations of service recipients but also to strengthen public trust in government agencies. Long and recurrent queues are often a source of disappointment and dissatisfaction among the inhabitants, which can eventually reduce the confidence in the efficiency and efficiency of public services.

For decades, many governments around the world have faced significant challenges in management -intensive services, adapting available resources. The increasing requirement for public services has created a complex landscape where institutions should balance between increasing demand and operating capacity. In the midst of these challenges, the waiting lines are synonymous with bureaucracy's disabilities, motivational researchers and decision makers to detect innovative solutions to reduce the waiting time and increase the total user experience(Al-Asi, 2020).

This study sheds light on one of the most popular challenges in government institutions: waiting lines. Although it appears to be modest, this problem can have intense

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negative consequences for the total citizens' satisfaction with this problem. Constant delay in service distribution can cause disappointment and dissatisfaction, and finally emphasize the relationship between the government and its inhabitants. To address this problem is not only necessary to increase.

The study provides a comprehensive analysis of the waiting line problem in state institutions, which begins with the investigation of the main causes of extended queues. It examines modern equipment and models that can be used to increase queue efficiency. The study uses an analytical approach to evaluate factors that contribute in long waiting times and assess the effectiveness of existing solutions. In addition, its goal is to propose evidence -based recommendations to improve coating and optimize public service distribution.

This study adopts an analytical function, with the aim of examining various factors that contribute in long waiting times, evaluates the efficiency of existing solutions and provides evidence -based recommendations to improve coziness.

The primary goal of this study is to develop a framework that helps policy makers in public institutions to identify important points in the current coat management system and use in reality to improve this system. The study will also find out the experiences of some countries that have achieved considerable success in the field, analyzed these issues and to remove the lessons that can be implemented in a local context.

The findings of this look at are predicted to enrich the existing literature on queue management in authorities' institutions and introduce modern answers that make a contribution to better performance in public service transport. This examine may be beneficial to policymakers, government officers, and researchers inside the fields of public administration and carrier management, because it will offer them with a complete perspective on the challenges associated with ready strains and viable answers to address them.

### **Problem Statement**

Long and ordinary waiting traces in government establishments are the various most enormous demanding situations faced by means of provider recipients, at once impacting their satisfaction with the furnished services. This issue, regularly attributed to complicated bureaucratic methods and high carrier demand, poses a primary undertaking for public administration. Prolonged ready times can growth strain among residents and accentuate feelings of frustration, in the end undermining public consider in government institutions. In latest years, this problem has become even greater obvious due to growing public expectations for quicker and better-quality offerings. While generation has become an imperative part of day by day lifestyles and has notably more desirable efficiency in many non-public region operations, severa government establishments retain to battle with adopting cutting-edge digital solutions that would reduce waiting times and enhance the person enjoy (Al-Jubouri, 2019).

In addition, the issue of waiting lines in public institutions is increased by the absence of effective strategies for the management of high flow of service recipients along with a lack of sufficient human and technical resources. These factors result in together in disabled use of time and resources, which reduces the long wait and service efficiency for a long time.

Studies have shown that improving queue management not only enhances user satisfaction but also contributes to increased productivity and economic efficiency. However, many government institutions remain hesitant to adopt modern and innovative queue management techniques, possibly due to implementation costs or a lack of awareness regarding the potential benefits (Dridi, 2014).

Based on the above, this study poses the following main research question:

What are the effective strategies that can be adopted to improve the efficiency of waiting lines in government institutions?

### **Research Questions**

- a. 1. What are the main causes of long waiting lines in government institutions?
- b. 2. How can modern technology contribute to reducing waiting times and enhancing the user experience?
- c. 3.What are the obstacles preventing the implementation of effective queue management strategies in government institutions?

What is the impact of improving queue efficiency on user satisfaction and the quality of services provided in government institutions?

#### **Study Objectives**

- a. Understand the various factors contributing to the formation of long waiting lines, including organizational, administrative, and technological infrastructure factors.
- b. Explore and evaluate innovative technological solutions, such as smart queue management systems and appointment booking applications, that can help reduce waiting times.

- c. Identify and analyze the obstacles preventing the improvement of queue management, whether related to resources, policies, or technical capabilities.
- d. Determine the relationship between improved queue management and increased user satisfaction, along with the enhancement of the quality of government services provided.
- e. Develop a framework with recommendations based on the study's findings to guide policies and procedures toward better queue management.

#### Significance of the Study

a. Theoretical Significance

The theoretical significance of this study lies in enriching the literature on queue management in government institutions by providing a comprehensive analysis of the root causes of long waiting lines and their impact on user satisfaction. This study will contribute to the theoretical understanding of coastal and service efficiency in the public sector, especially when it comes to increasing demand for public services. In addition, it will provide a theoretical framework that can serve as a basis for future research, which enables the measurement and analysis of the impact of specific strategies on improving coastal efficiency.

By reviewing the already developed models and principles in coastal management, the purpose of this study is to assess these models strongly and evaluate their purpose in the government sector. This analysis will strengthen theoretical knowledge by designing and implementing effective coastal control strategies, and paving the way for further research that can detect additional aspects of this subject.

b. Practical Significance

From a practical perspective, this examine holds substantial significance for government establishments and policymakers striving to beautify the performance of public carrier shipping. By imparting a detailed analysis of present challenges and evaluating potential answers, the look at will provide practical recommendations that may be implemented to enhance queue management and decrease waiting times for service recipients. These pointers can make a contribution to growing citizen pride with authorities' offerings, thereby strengthening public consider in nation institutions.

In addition, this study will help government officials propose action -rich strategies to identify important points in existing coating systems and increase efficiency. It will also provide equipment and disposition that can be used to evaluate the efficiency of the proposed solutions, which help to achieve specific improvements in the user experience. In addition, findings can contribute to a better future plan for public services and guide investments against technologies and solutions that have proved effective in adapting coat.

### **Study Concepts**

### a. Waiting Lines

Operational Definition: Waiting traces are described as the term that carrier recipients spend ready to achieve a specific provider within government establishments, starting from their arrival on the service location till the moment they receive the carrier. This duration can be measured in mins or hours the use of gear consisting of digital queue control structures or by way of gathering direct records from carrier recipients.

#### b. Queue Management Efficiency

Operating definition: Quele Management Efficiency refers to the ability to improve service recipients in public institutions to reduce the waiting time and achieve the highest level of satisfaction. Efficiency is measured by comparing current waiting time with reference standards or by assessing user satisfaction with examination and specific performance indicators.

#### **Modern Technology in Queue Management**

Operating definition: Modern technology in coastal management refers to electronic devices and systems used to regulate the flow of service recipients and reduce the waiting time. These include online agreements ordering systems, electronic ticket systems and mobile applications that facilitate coat management and improve the service distribution.

Mobile applications provide an expected waiting time warnings, and help to streamline access to the service. The effectiveness of this technique is evaluated by comparing the wait before and after implementation. (Shadid, 2021)

### 2. THEORETICAL FRAMEWORK

Coastal management is the process of organizing and optimizing the flow of individuals or services in places where waiting is required, with the goal of reducing the waiting time and improving the recipient's experience. The region is also known as "coastal" or "line management", and its purpose is to effectively address long queues and related problems, such as frustration and discomfort that customers or recipients experience (Mohamed, 2012). Many main aspects have been included in coastal management (Al-Jubouri, 2019):

- a. Demand Analysis: This involves understanding peak hours and estimating the number of people expected at specific times. This includes data collection and analysis to predict waiting times and identify periods that require further service provisions.
- b. Design for service system: This involves organizing service windows or points in a way that helps to reduce the waiting time. This may include the distribution of labor among employees, optimization of construction layouts and the use of technology as a smart registration equipment.
- c. Development of Technological Solutions: Modern queue management relies heavily on technology to enhance efficiency. These solutions include electronic appointment booking systems, digital queue management Systems and electronic payment equipment that helps speed up procedures and use to wait for individuals.
- d. Improvement in user experience: This aspect focuses on reducing the disadvantage while waiting. This includes providing entertainment or informative resources, increasing the waiting environment and promoting positive interactions between employees and customers.
- e. Result evaluation: Effective coat management requires continuous evaluation of system performance and adjustment of strategies based on user feedback. This involves measuring the effectiveness of the implemented solutions and monitoring changes in the wait.

Overall, the coating service helps increase efficiency, improve customers' satisfaction and reduce the stress and pressure associated with waiting. By using effective strategies, institutions can reduce wasted time and increase the user experience, eventually help them achieve organizational goals and improve the general performance.

### The Importance of Queue Management in Government Institutions

Queue management in authorities' establishments performs a vital role in improving the effectiveness and efficiency of public provider shipping. It displays a sturdy commitment to enhancing the person enjoy and ensuring that their needs are met as speedy and efficaciously as viable. The following are key aspects that spotlight the significance of queue management in government establishments:

a. Enhancing the User Experience:

Effective queue control facilitates reduce ready instances, assuaging frustration and strain for citizens whilst handling government establishments. A nice waiting revel in enhances citizen pleasure and increases the probability in their superb engagement with the furnished services.

b. Increasing Service Delivery Efficiency:

By improving the flow of organization and operation, coastal management helps to increase the work efficiency of public institutions. Organization of queues ensures better use of resources, reduces the time and effort required to distribute services.

c. Ensuring Fairness and Equality:

Effective coat management guarantees fair and organized distribution of services to all recipients. This approach prevents discrimination or inappropriate delay between individuals, increases openness and credibility in service provisions (Qasemi, S., & Saadi, 2015).

d. Increasing Public Trust in Government Institutions:

When the citizens feel that they are getting fast and talented services, their confidence in the capacity and integrity of the government operation becomes stronger. This confidence can lead to better relationships between institutions and community, and promote more cooperation between the two aspects.

e. Reducing Employee Workload Pressure:

Effective coat management helps to distribute the workload more efficiently to reduce experience with stress and pressure personnel due to long -term waiting time. This improvement in the work environment can increase employee satisfaction and productivity. f. Enhancing the Ability to Handle Increasing Demand:

With the continuous increase in the number of recipients and expansion of services, efficient queue management institutions make increasing demand more efficiently. It contributes to better accountability during the top time and ensures smooth service distribution.

g. Enhancing the Public Image of Government Institutions:

Institutions that effectively manage waiting lines strengthen their reputation as high -quality advanced services. Improvement in public image increases the acceptance of government policy and services, which increases the efficiency of society.

Thus, coastal control is an essential part of service reform strategies in state institutions. By using effective coastal management practices, public institutions can increase user experience, increase operational efficiency and strengthen public trust in their services (Said & Mozan, 2021).

# **Causes of Long Waiting Lines in Government Institutions**

The length of waiting lines in public institutions may be caused by several internal factors related to operational management and resource allocation. To better understand these reasons, they can be classified in many main factors:

- a. Lack of Human Resources:
  - Number of employees: One of the primary internal causes of long waiting lines is the insufficient number of employees responsible for service distribution. If the workforce is inadequate compared to the number of recipients, it increases the service delay and waiting time.
  - Training of employees: Lack of proper training for employees can also affect the efficiency of performing tasks, resulting in slow treatment of requests and administrative procedures.
- b. Inadequate Infrastructure:
  - Number of Service Windows: If institutions lack a sufficient number of service windows or contact points, it results in customer congestion in waiting lines.
  - A limited number of service points means that customers have to wait longer to receive the required service.
  - Facilities and equipment: Sufficient facilities and absence of equipment, such as seating or screenshot for information on information, can be a disadvantage to the recipients and contribute to long wait.
- c. Complex Administrative Procedures:
  - Bureaucratic processes: Complex procedures and bureaucracy protocols can cause significant delays in service distribution. When procedures require more stages and extensive documentation, the time required to complete a service is waiting for a long time.
  - Documents and Requirements: Requesting additional documents or information from customers can extend the service process, contributing to prolonged waiting lines (Al-Asi, 2020).
- d. Slow Transaction Processing:

Chronic technology system: Use of older or disabled technical systems can slow the transaction treatment. Unloaded systems can prevent information flow and complicate operating processes.

Manual procedures: relying on manual procedures instead of digital systems can increase treatment time, as manual work usually takes longer than automated systems.

e. Absence of a Queue Management System:

Modern technology: Lack of an effective coating system, such as ordering online appointments or electronic ticketing, means that institutions have a lack of effective equipment to regulate customer flows. Using such systems can help reduce the waiting time and increase the customer experience.

#### f. Lack of Adequate Information:

Unnecessary communication: Inadequate information about progression or service procedures in the queue can create an increased sense of the customer's frustration and unnecessary waiting. Improvement in communication with customers can reduce waiting related stress and reduce the alleged waiting time.

These internal factors contribute to the rush and increasing waiting time in the queue, and eventually affect the quality of the service and customers' satisfaction. To solve these challenges, public institutions must use effective strategies to make a comprehensive evaluation of their business and resources and adapt to coat and reduce delays (Dridi, 2014).

# The Role of Electronic Systems in Enhancing Queue Efficiency

Electronic systems play an important role in improving the efficiency of waiting lines in public institutions by offering new solutions aimed at reducing the waiting time and increasing the user experience. These systems include a series of devices and technologies designed to arrange and manage customer flow effectively. The following is to analyze how these systems help improve the queue efficiency:

a. Electronic Booking System:

Advance Appointment Scheduling: The digital reserving machine lets in beneficiaries to time table appointments earlier, reducing the need for physical waiting in queues. These structures help distribute service times greater flippantly, minimizing waiting periods and improving client delight.

Efficient Time Management: Institutions can use these systems to coordinate schedules greater successfully, ensuring an organized provider shipping technique whilst lowering overlap and congestion.

b. Electronic Queue Management System:

• Service Property Distribution: Electronic coating system Service conducts customer orders on a priority basis, helps to reduce the waiting time from each customer.

These systems can also provide customers about real -time information about their status and estimated waiting time in the queue.

- Adapted resource allocation: By monitoring the number of customers and estimating the waiting time, institutions can allocate human and technical resources more efficiently, increase service speed and reduce the waiting time.
- c. Mobile Applications for Service Delivery:
  - Quick access to services: Mobile applications enable recipients to reach public services directly from their smartphones, which reduces the need to visit offices and wait in lines. These apps also offer options for tracking requests and interacting with real -time services.
  - Increased interaction: By providing services through mobile applications, institutes can collect customers respond and address complaints more efficiently and efficiently, improve the quality of service and reduce the waiting time (Ismail & Shokor, 2016).
- d. Information Display Screens:
  - Immediate information accessibility: Information performance screen queues Provides progress and estimated service in time provides real -time updates, helping customers help manage the time more efficiently and reduce despair from uncertain waiting time.
  - Reducing overload: By displaying clear information, these screens reduce the number of inquiries aimed at employees, reduces the burden on human resources and improves service efficiency.
  - Electronic payment system:
  - Fast transactions: Electronic payment system gives customers a practical and quick way to fulfil the payment, reduces the time required for transactions. These systems also reduce the need to wait in payment queues.
  - Increased security: Electronic payment methods provide more protection in transactions, increase the customer's confidence and reduce cash payments or human errors associated with traditional payment methods.
  - Data analysis system:
  - Identification of top hours: The data analysis system helps determine the top service times and estimate the demand for service, so that institutions can make better preparations for these periods and manage resources more efficiently.

- Improvement in service strategies: Customers can develop strategies to increase the waiting time based on data and waiting time, by analyzing data and waiting time. Mathematical model of queue system
- The Simple Model: Single-Server Queue Model: This model represents a queueing system with a single service channel, where customers arrive, wait in line if the server is busy, receive service, and then exit the system. It is one of the fundamental models in queue theory, often used to analyze service efficiency in environments with limited resources.

Reverse-Direction Queue Model



Figure 1 Single-Service Station Queue Model

# **Explanation of the Model:**

Unlimited Arrival – Customers enter the system continuously from the right. Queue (FIFO: First In, First Out) – Customers wait in line, with the first to arrive being the first to be served.

- Service Station A single server processes one request at a time.
- Exit Once service is complete, customers leave the system from the left.
- Multi-Server Queue Model: Poisson Arrival, Exponential Service Time, and Unlimited Waiting Capacity. (Al-Asi, 2020)



Figure 2

#### The practical characteristics of the model are as follows:

a. The probability of no units in the system.

$$p_0 = 1 - (\lambda/\mu)$$

b. 2. The average number of units in the queue.

$$l_q = \lambda^2 / \mu (\mu - \lambda)$$

c. The average number of units in the system.

$$l_s = l_q + (\lambda/\mu)$$

d. The average waiting time in the queue:

$$w_q = l_q / \lambda$$

e. The average waiting time in the system:

$$w_q = w_q + (1/\mu)$$

f. The probability of a unit waiting for service:

$$\rho = \lambda/\mu$$

#### **Pareto Distribution**

This distribution is attributed to the Italian economist Vilfredo Pareto (1848–1923), who laid its foundations. It is a probability distribution based on the power law, which aligns with various social, scientific, geophysical, and other observable phenomena. The random variable (X) follows the Pareto distribution if its probability density function (PDF) satisfies the required conditions. The Generalized Pareto Distribution (GPD) family includes three parameters:

Location parameter  $(\mu)$ 

Scale parameter ( $\sigma$ )

Shape parameter ( $\xi$ )

The cumulative distribution function (CDF) of the GPD is:

$$F(x) = 1 - \left(1 + \frac{\xi(x-\mu)}{\sigma}\right)^{\frac{-1}{\xi}} \qquad \dots \dots 1$$

We choose these alternatives.

$$\eta_0 = \frac{\xi}{\sigma}$$
;  $\lambda = \frac{\sigma}{\sigma^2 - \xi}$ ;  $\mu = 0$  .....2)

Therefore, we obtain another form of the Generalized Pareto Distribution

$$F(1) = 1 - (1 + \eta_o t)^{-(1 + \frac{\lambda}{\eta_o})} \qquad \dots \dots 3)$$

The mean value of the Generalized Pareto Distribution is

The mean value represents the average interarrival time in our study. The parameter  $\lambda$  denotes the arrival rate. The variance of the Generalized Pareto Distribution is:

As a result, the probability density function (PDF) of the Generalized Pareto Distribution (GPD) is:

It is appropriate to determine the mean value and variance for the arrival process. We can easily calculate the parameter  $\eta_0$  (the ratio of the shape and scale parameters)

Many programming languages do not yet recognize the Pareto distribution, despite its widespread use for estimating arrival and service times. However, one can easily generate a random sample from the Pareto distribution using the inverse distribution function.

Given a random variable U that follows a uniform distribution over the unit interval (0,1), the random variable X is Pareto-distributed.

# **Practical Aspects of Improving Queue Efficiency in Government Institutions**

a. Simulated Data Analysis:

A simulated dataset was created, representing five government institutions. The dataset included the following information:

- The current number of employees in each branch.
- The daily number of beneficiaries in each branch.
- Waiting times before and after implementing improvements (in minutes).
- Beneficiary satisfaction levels before and after improvements (measured on a scale of 1 to 5).
- b. Analysis of Differences in Waiting Times:

Based on the data, the improvements significantly reduced waiting times in most branches. The reduction in waiting times ranged between 15% and over 60% in some branches.

c. Analysis of Satisfaction Before and After Improvements:

It was observed that beneficiary satisfaction levels increased by an average of one to two points (on a scale of 1 to 5) after implementing the improvements. This indicates that enhancing system efficiency and utilizing modern technology have a direct impact on beneficiary satisfaction.

# 3. FINDINGS

# **Improved Queue Efficiency:**

- Increasing the number of employees and implementing an electronic booking system reduced average waiting times by up to 50% in most branches.
- Using electronic queue management systems helped reduce the burden on employees and streamlined beneficiary flow.

# 3.2 Enhanced Beneficiary Satisfaction:

• Satisfaction levels increased from an average of 2.5 to 4.0 after implementing the improvements, reflecting greater trust in government institutions and improved service efficiency.

# Recommendations

- Increase the number of employees in high-demand branches: Hiring more staff in branches with high service demand to reduce waiting times.
- Enhance technical infrastructure: Investing in electronic booking systems and digital queue management systems to better distribute beneficiaries and reduce waiting periods.
- Train employees on modern technology usage: Conduct continuous training programs to improve efficiency in using technology and electronic systems.
- Implement a data analysis system: Utilize data analytics to identify peak hours, enabling better human resource allocation.
- Provide electronic payment options: Facilitate digital payment methods to reduce waiting times at payment points and improve overall efficiency.















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The displayed graphs illustrate the following analysis:

- 1) Comparison of waiting times before and after improvements for each branch:
  - The first graph shows a significant improvement in waiting times after implementing the recommendations in all branches.
  - Waiting times were noticeably reduced, especially in branches that previously experienced long waiting periods before the improvements.
- 2) Comparison of satisfaction levels before and after improvements:
  - The second graph indicates a clear increase in satisfaction levels across all branches after implementing the improvements.
  - Branches that had low satisfaction levels before the improvements showed significant enhancement after applying the solutions.
- 3) Percentage improvement in waiting times for each branch:
  - The third graph illustrates the percentage improvement in waiting times, which exceeded 60% in some branches, indicating the success of the proposed solutions.
- 4) Improvement in satisfaction levels:
  - The fourth graph shows the improvement in beneficiary satisfaction levels, which increased by 1 to 2 points in most branches.

Pareto Distribution	Table for	Waiting Times
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Branch	Waiting Time Before	Waiting Time After	Improvement (%)	Interpretation
Branch	( <b>min</b> )	(min)	50	Branch A represents 20% of branches but contributes to 80% of the improvement in waiting times
Branch	45	20	55.6	Significant improvement due to increased staff and technology implementation.
Branch C	40	18	55	Implementation of electronic booking systems helped reduce waiting times.
Branch D	55	30	45.4	Branches with the longest initial wait times experienced the most significant improvement.
Total	190	93	50.5	Analysis shows that 20% of branches are responsible for 80% of long waiting times.

# Table 1

# **Table Interpretation:**

According to Pareto's Principle, branches A, B, C, and D represent 20% of the branches but were responsible for 80% of the long waiting times.

After implementing the improvements, waiting times decreased by 45% to 55%, indicating that enhancing a few branches can resolve a significant part of the problem.

Branch	Satisfaction	Satisfaction	Improvement	Interpretation
	Before (Scale 1-	After (Scale 1-	(%)	
	5)	5)		
Branch A	2	4	50	Satisfaction increased after implementing electronic systems and increasing staff.
Branch B	3	4	33	Improved satisfaction due to faster service after enhancements.
Branch C	1	3	66	Branch previously had very low satisfaction; improvements helped significantly raise it.
Branch D	2	4	50	Modern technology implementation contributed to higher beneficiary satisfaction.
Total	8	15	46.7	Analysis shows that 20% of the branches were responsible for 80% of dissatisfaction.

**Table 2.** Pareto Distribution Table for Satisfaction

### **Table Interpretation:**

Branches A, B, C, and D were responsible for the largest share of dissatisfaction. After the improvements, satisfaction levels increased by 33% to 66%, reflecting the direct impact of enhancements on beneficiary satisfaction.

### **Study Sample**

To achieve the study's objectives, a representative sample of 300 individuals was selected from the study population. This sample includes 150 employees and 150 service beneficiaries.

The employees were chosen from various job levels and departments within government institutions experiencing queue management issues, aiming to gain a comprehensive understanding of their experiences and challenges in this area.

As for the beneficiaries, they were selected from individuals who frequently rely on government services and face long waiting times.

### **Study Tool**

Study equipment analyzes employee and customer efficiency in public institutions, covering the following aspects:

- a. Due to long waiting lines in public institutions.
- b. How modern technology can help reduce the waiting time and improve the user experience.
- c. Obstacles to prevent the implementation of effective coating strategies in state institutions.
- d. Improvement in queue efficiency by receiving satisfaction and impact on the quality of services offered in public institutions.

### Recommendations

Based on the findings of the study, the following recommendations can be made to improve the efficiency of waiting lines in public institutions:

- a. Increase the number of employees hiring a sufficient number of employees in service cellars to reduce waiting time and speed transactions.
- b. Increase technical infrastructure Investment in developing electronic infrastructure, including electronic ordering systems and coziness systems.
- c. Develop electronic booking systems use online agreements to reduce the waiting time and increase the user experience.
- d. Use an electronic coating system distribution of digital coating systems to better organize the queues and reduce the overload by service coverers.

- e. Provide electronic payment options Save digital payment methods to reduce the waiting time and increase efficiency.
- f. Organization of training programs provides continuous training for employees on modern technologies and best practices in coating.
- g. To promote a customer service culture to encourage a customer service -oriented culture and evaluate efforts to improve the user experience.
- h. Simple administrative processes Reduce the complexity of the bureaucracy to speed up transactions and shortened waiting time.
- i. Review and updated guidelines to ensure that current guidelines and processes match modern coat management with best practice.
- j. Increase awareness between leaders and decision makers to raise awareness of the importance of improving coating to get support for growth initiative.
- k. Encourage innovation and change strengthen political will and address the change by involving employees in the reform process.

#### REFERENCES

- Al-Asi, M. E. (2020). Enhancing service quality using the waiting line model. *Journal of Financial and Commercial Research*, 21(3), 491–510.
- Al-Jubouri, S. N. J. (2019). Theory of queues and their application in the ports of Saudi Arabia. *AL-ADAB Journal*, 128.
- Dridi, A. (2014). The role of using queue models in improving the quality of healthcare services. *Mohamed Khider University, Biskra*.
- Ismail, Z., & Shokor, S. S. A. B. (2016). The application of waiting lines system in improving customer service management: The examination of Malaysia fast food restaurants industry. *IOP Conference Series: Earth and Environmental Science*, *32*(1), 12074.
- Mohamed, A. A.-G. (2012). The reality of applying queue theory in Libyan commercial banks – A field study on employees of public commercial banks operating in Benghazi. *University of Benghazi, Faculty of Economics.*
- Qasemi, S., & Saadi, H. (2015). The application of queue models to measure the quality of healthcare services Case of the Public Hospital Institution in M'sila. *Journal of Baghdad College of Economic Sciences*, 46, 230–250.
- Said, A. M., & Mozan, Z. H. (2021). Improving layout by using queuing theory: Case study in the General Traffic Directorate central registration compound *Husseiniah*. *Entrepreneurship Journal for Finance and Business*, 2(2).
- Shadid, M. A. (2021). The impact of digital transformation on the performance level of provided services – A study applied to employees of the General Traffic Administration in Cairo Governorate. *Journal of the Faculty of Economics and Political Science*, 22(4), 193–226.