Addis Ababa University School of Commerce

Department of Logistics and Supply Chain Management

ASSESSMENT OF WAITING LINE SYSTEM FOR IMPROVING CUSTOMER SATISFACTION IN THE CASE OF ADDIS ABABA CITY ADMINISTRATIO GULELE SUBCITY WOREDA 10 VITAL EVENTS BURAU.

By:-

Zelalem Addis *(GSE-0982/13)*

A Research Thesis Submitted to Addis Ababa University in Partial Fulfillment of the Requirements for the Award of MA Degree in Logistics and Supply Chain Management

Advisor:-

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Chair of Department of Graduate Program Coordinator

DECLARATION

I, Zelalem Addis declare that, this thesis work entitled " ASSESSMENT OF WAITING LINE SYSTEM FOR IMPROVING CUSTOMER SATISFACTION IN THE CASE OF ADDIS ABABA CITY ADMINISTRATIO GULELE SUBCITY WOREDA 10 VITAL EVENTS BURAU " is my original work and has not been presented for a degree in any other University, and that all the sources of materials used for the thesis have been duly acknowledged.

Signed by: - Zelalem Addis

Signature; Date;

CONFIRMATION

This is to approve that the study made by Zelalem Addis, entitled: **ASSESSMENT OF WAITING LINE SYSTEM FOR IMPROVING CUSTOMER SATISFACTION IN THE CASE OF ADDIS ABABA CITY ADMINISTRATIO GULELE SUB CITY WOREDA 10 VITAL EVENTS BURAU**, and submitted in partial fulfillment of the requirements for the Degree of Masters of Arts in Logistics and Supply Chain Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by: -

Matiwos Ensermu (PhD)

Signature; _____

Date; _____

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Abstract:

This thesis focuses on assessing the waiting line system and its impact on customer satisfaction in the Gullele Sub-City Woreda 10 located in Addis Ababa City Administration. The study aims to investigate the influence of various factors, such as the number of servers, server capacity, queuing management system technology, queue discipline, and customer behavior, on customer satisfaction. The research methodology involves both quantitative and qualitative approaches. A sample size of 348 customers from different offices within Gullele Sub-City Woreda 10 is selected using stratified random sampling. Primary data is collected through structured questionnaires, comprising close-ended and open-ended questions. Secondary data is gathered through a review of relevant documents and publications. The findings reveal variations in customer satisfaction levels among different offices. The Construction and Licensing Bureau demonstrates high overall satisfaction, except for technology usage. The Health Office shows high satisfaction in all aspects, while the Vital Events Bureau reports dissatisfaction with servers, capacity, behavior, discipline, and technology. ANOVA analysis confirms the significance of factors such as the number of servers, server capacity, queuing management technologies, behavior of customers, queue discipline, and overall satisfaction on customer satisfaction. In conclusion, this study highlights the importance of improving the waiting line system in enhancing customer satisfaction. The findings provide insights into the preferences, behaviors, and satisfaction levels of customers in different offices, suggesting potential areas for improvement and modernization. The research contributes to the existing knowledge on waiting line systems and customer satisfaction in the context of Gullele Sub-City Woreda 10.

CHAPTER ONE

1.1 Introduction

Gullele Subcity Woreda 10 is a governmental organization that provides services to a diverse group of customers on a daily basis. However, the organization has been facing challenges in managing long waiting lines, which has resulted in low customer satisfaction levels. Waiting in queues has become an inevitable part of our lives, and it is particularly frustrating when dealing with governmental offices. Therefore, this thesis aims to assess the waiting line system of Gullele Sub city Woreda 10 to improve customer satisfaction. The sectors that will be assessed by this research include the Job Creation Office, Construction and Licensing Office, Vital Events Bureau, Health Office, Office of Youth Center, Public Service Office, Revenue Office, and Safety Net Office. By achieving the research objectives, this thesis aims to provide valuable insights into improving the waiting line system and enhancing customer satisfaction across all sectors of Gullele Sub city Woreda 10.

1.2 Background of the study

Management of the waiting line or queue is a crucial component of the service sector. It addresses the topic of how to treat consumers by shortening wait times and enhancing service. Queue management deals with situations where a customer's arrival is unpredictable, resulting in random service provision. Long lines can significantly impact customer satisfaction, as customers today demand more than just product or service excellence. Excessive wait times can lead customers to perceive the service as unsatisfactory and may even prompt them to switch to a competitor. (Anderson, Brown, & Williams, 2016)

Queues form when there is inefficiency in serving customers or when the number of customers exceeds the available service capacity. Some customers may have to wait despite there being more service facilities available than necessary, while others may find vacant service facilities. To improve the flow of customers through a queue system, queuing theory utilizes mathematical models and performance measures. It has been employed to evaluate various factors, such as

employee schedules, work environments, productivity, and consumer wait times and environments.

Consumer satisfaction is closely tied to responsiveness to customer needs. Organizations in the service sector strive to create a competitive advantage by delivering superior customer service in a dynamic business environment. Queuing theory aims to address questions such as average waiting time, system response time, service facility utilization, and the distribution of customers in the queue and system. Accessibility, including location, operating hours, and minimal wait times, plays a significant role in determining service quality. Timely service delivery has become increasingly valued by customers, giving companies a competitive edge in the marketplace.

In Ethiopia, many businesses are still in the early stages of implementing waiting line systems to improve service effectiveness and customer satisfaction. Conducting further research in this area is crucial to enhance the service delivery system and meet consumer expectations. By understanding and effectively managing waiting lines, businesses can create a more efficient and satisfactory customer experience, ultimately benefiting both the organization and its clientele. Management of the waiting line or queue is a crucial component of the service sector. It addresses the topic of how to treat consumers by shortening wait times and enhancing service. Queue management deals with situations where a customer's arrival is unpredictable, resulting in random service provision. Long lines can significantly impact customer satisfaction, as customers today demand more than just product or service excellence. Excessive wait times can lead customers to perceive the service as unsatisfactory and may even prompt them to switch to a competitor.

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1.3 Background of the Organization

Addis Ababa is the capital city of Ethiopia and one of the fastest-growing cities in Africa. This bustling metropolis is divided into ten sub cities, each comprising several woredas (districts). Gullele Sub city is one of these sub cities located in the northwestern part of Addis Ababa. Within Gullele Sub city, there is a specific district called Woreda 10.

The Gullele Sub city Woreda 10 Administration plays a vital role in providing essential services to the residents of Woreda 10. These services encompass various areas such as healthcare, education, waste management, and vital event registration, with a specific focus on supporting underprivileged communities. The administration's primary objective is to ensure the efficient and effective delivery of these services, catering to the specific needs and requirements of the community within Woreda 10.

Addis Ababa, like many other urban areas in developing countries, faces significant challenges in delivering basic services to its rapidly growing population. Rapid urbanization, limited resources, and inadequate infrastructure contribute to these challenges. However, the Gullele Sub city Woreda 10 Administration, in collaboration with the broader city administration, remains

committed to improving service delivery and addressing these obstacles to meet the needs of its residents. The efforts of the Gullele Subcity Woreda 10 Administration are part of a larger initiative to enhance service provision and overcome the challenges associated with urban growth. The city administration continuously works towards improving service delivery to ensure that residents receive the necessary support and resources. By addressing issues related to rapid urbanization, limited resources, and inadequate infrastructure, the administration strives to enhance the quality of life for the residents of Addis Ababa, particularly those residing in Woreda 10.

1.4 Statement of problem

Waiting lines, as famously stated by Federal Express in their commercials, are considered unpleasant, demoralizing, and time-consuming. They represent a common aspect of our daily lives, often resulting from overcrowding, high demand, or congestion. Managers face the challenge of minimizing costs while ensuring customer satisfaction by effectively managing waiting times. David H. Maister (2005)

Queuing theory, also known as waiting line theory (WLS), is a valuable concept in operations management that provides tools for managers to improve customer experiences in industries such as fast food, banking, and retail. By understanding customer preferences, such as waiting time and line length, managers can make strategic decisions to optimize service delivery and minimize customer frustrations. (Zurina Ismail & Shahrul Suhaimi AB Shokor, 2016)

In specific contexts like Woreda 10 in Gullele Sub city, people experience prolonged waits while seeking various services. The discrepancy between the quantity of services provided and the number of people waiting leads to extended waiting times.

The absence of a proper queue management system exacerbates the situation, resulting in conflicts between customers, staff, and management. Some staff members may even take advantage of the disorganized system to offer services to individuals outside the waiting line. These issues highlight

the negative psychological impact of queues on client satisfaction and the quality of services provided.

One area where waiting lines become particularly problematic is in the vital events services sector. Security concerns arise when the focus of the office is primarily on external matters, neglecting internal issues. To address these challenges, a study focuses on evaluating the waiting system for drivers' licenses and controls within the Addis Ababa city administration, specifically in Woreda 10 of Gullele Sub city. The study examines factors such as server capacity, waiting areas, and the overall organization of the office. It highlights the lack of a calling system or online appointment procedures, contributing to customer dissatisfaction and inefficiencies in service delivery. By addressing these gaps, the study aims to improve the public service experience, particularly in the bureau of vital events in Addis Ababa City Woredas.

Efficient queue management and the implementation of appropriate measures are essential to enhance customer satisfaction, optimize resource utilization, and address security concerns. By improving waiting line systems, businesses and public service providers can create positive customer experiences, reduce wait times, and ensure fair and orderly service delivery. Through the application of queuing theory and a focus on specific areas like Woreda 10 in Gullele Sub city, it is possible to address the challenges associated with waiting lines, enhance service delivery, and improve the overall customer experience in Addis Ababa and similar urban areas.

1.4 Research question

1. How does the number of servers impact customer satisfaction in Gullele sub city woreda 10 vital events bureau?
2. What is the relationship between server capacity and customer satisfaction in Gullele sub city woreda 10 vital events bureau?
3. How does queuing management system technology affect customer satisfaction in Gullele sub city woreda 10 vital events bureau?
4. What is the influence of queue discipline on customer satisfaction in Gullele sub city woreda 10 vital events bureau?

5. How does the behavior of customers in the waiting line impact customer satisfaction?

1.5 Research objectives

1.5.1 General objective

The primary goal of the study is to assess the waiting line system in order to increase customer satisfaction for consumers of the woreda10 vital events bureau in the Gullele sub-city.

1.5.2 Specific objective

The specific objectives of this study will be:-

1. To investigate the impact of the number of servers on customer satisfaction in Gulele sub city woreda 10 vital events bureau.

2. To analyze the relationship between server capacity and customer satisfaction in Gullele sub city woreda 10 vital events bureau.

3. To evaluate the effect of queuing management system technology on customer satisfaction in Gullele sub city woreda 10 vital events bureau.

4. To examine the influence of queue discipline on customer satisfaction in Gullele sub city woreda 10 vital events bureau.

5. To assess the impact of the behavior of customers in awaiting line on the customer satisfaction.

1.6 Significance of the study

The study focuses on examining the waiting line system in Gullele Woreda 10. Its objective is to provide valuable information to the Gullele Sub city Woreda administration office regarding customer satisfaction with the services provided. By evaluating the state of the waiting line system and understanding how customers perceive the service delivery, the study aims to guide decision-makers in improving the overall customer experience. It serves as a crucial means of communicating the need for corrective action to the woreda civil service office and other relevant bodies, highlighting the importance of addressing issues related to the waiting line management system's performance.

Furthermore, the study holds significance as a point of reference for future researchers interested in conducting further investigations in this field. It offers an opportunity for the researcher to gain comprehensive knowledge about the current performance of the waiting line system. By identifying any existing gaps between the office's performance and its desired effects, the study can aid the woreda in improving its service delivery. Moreover, it raises awareness among stakeholders and focuses their attention on the crucial aspects of event services and customer satisfaction in government sectors. This increased awareness prompts stakeholders to recognize and address any deficiencies in the waiting line system design and implementation, ultimately aiming to create a more suitable and efficient system for their clients.

In summary, the study on the waiting line system in Gullele Woreda 10 serves as a means to provide valuable insights to the Gullele Sub city Woreda administration office regarding customer satisfaction. Its findings guide decision-making processes, urging the responsible authorities to take corrective action. Additionally, the study holds significance for future research endeavors, contributes to the understanding of current waiting line system performance, and emphasizes the importance of improving event services and customer satisfaction in government sectors.

1.7 Scope of the study

The study specifically examine waiting line management at gulleleworeda10 waiting line management, technology at the office to manage customers queue as well as the number of servers and their capacity, queue discipline for the organization, how customers feel about the organization's waiting area and line-up procedure, and how they feel about queue management.

1.8 Limitation of the study

There aren't many government public service studies, especially on public services, focusing on queue management in Ethiopia thus there is some issues with the waiting line system.

1.9 Definition of terms

OP - Operation Procedure.

FIFO- first-in-first-out

FCFS- First Come First Served

LCFS- Last Come First Served

SIRO- Service in Random Order

1.9.1 Organization of the study

The research contain a total of 5 chapters. The Introduction Part of the first chapter covers the study's background, problem statement, research questions and objectives, significance of the study, scope of the study, and delimitation of the study. The literature reviews includes in the second chapter. Research Design and Methodology will be the third chapter. The fourth section, meanwhile, covers the findings, interpretation, and analysis sections. The study's implications and recommendations are presented in the last chapter.

CHAPTER TWO

2.1 Review of the Related Literature

2.2.1 Waiting in lines

Waiting in lines, or queuing, is a common phenomenon in various service industries, and it can impact customer satisfaction. The number of customers in the queue directly affects waiting times and can lead to frustration and dissatisfaction. Customer perception of waiting time is influenced by their expectations, and when the perceived wait time exceeds their expectations, dissatisfaction with the service may occur. David H. Maister (2005)

Factors such as queue size, discipline, and the use of technology in the queuing process also impact customer satisfaction. Waiting in queues occurs due to factors like overcrowding, high demand, and activity congestion. When demand surpasses the service provider's capacity, queues form. Managing waiting times is crucial for customer satisfaction, and studies have shown that reducing wait times can lead to improved satisfaction levels. Perceived waiting time is a significant factor in customer satisfaction, as shorter waits are associated with higher-quality service. The fairness of the queuing process also influences satisfaction, with the first-come, first-served discipline being preferred due to its perceived fairness and transparency. Technology, such as self-service kiosks and virtual queuing systems, has been found to increase customer satisfaction. David H. Maister (2005)

The perceived fairness of the waiting process and the sense of control over the wait affect customer satisfaction. Customers who perceive the process as fair and have some control over their waiting experience are more likely to be satisfied. In contrast, a lack of control or perceived unfairness can lead to dissatisfaction. (Kumar et al., 2018).

Technology plays a crucial role in managing waiting times and enhancing customer satisfaction. Virtual queuing systems have been implemented to provide a more convenient and flexible waiting experience, leading to increased satisfaction and loyalty. Emotions also play a significant role, as positive emotions during the wait, such as entertainment or engagement, can increase satisfaction. Conversely, negative emotions like frustration or boredom tend to result in dissatisfaction. Cultural factors can influence customer waiting experiences. Collectivist cultures may value social interactions and entertainment during the wait, while individualist cultures prioritize efficiency and control over the waiting process. (Liu et al., 2019)

In conclusion, understanding the factors that influence waiting in lines and customer satisfaction allows service industries to implement strategies to manage waiting times effectively and enhance the overall service experience for customers. Factors such as queue size, perceived fairness, perceived control, technology, and cultural differences all contribute to customer satisfaction in the queuing process.

2.2.3 Customer satisfaction and queuing

Satisfaction is a subjective judgment of the fulfillment a consumer experiences from a product or service. It is influenced by factors such as perceived fairness, control, service quality, wait duration, and the overall service environment (Larson &Bradlow, 2010). Longer wait times generally result in lower satisfaction levels (Brady & Cronin, 2001).

Studies have found that extended wait times in healthcare and retail settings lead to negative perceptions of service quality and decreased satisfaction (Ladhari et al., 2011; Baker et al., 2002). However, the relationship between waiting times and satisfaction is not always straightforward. Factors such as the perceived fairness of the waiting process and the level of control customers have can influence satisfaction levels (Giebelhausen et al., 2013).

Queuing strategies also play a role in customer satisfaction. Single-line queuing systems have been found to be preferred due to their fairness and efficiency (Baker et al., 2004). Additionally, serpentine queuing systems, where customers zig-zag in a single line, have shown higher satisfaction levels in retail settings (de Kervenoael et al., 2012).

The impact of waiting times on satisfaction is not always linear. Research has shown that offering additional activities or distractions during wait times can increase satisfaction, as seen in a hospital waiting room study (Taylor et al., 2002). The level of personal involvement with the service can also moderate the relationship between waiting times and satisfaction, with high-involvement services being more affected (Cho et al., 2017).

Overall, customer satisfaction is influenced by various factors, including expectations, attitudes, and intentions towards the service provided (Hensley &Sulek, 2001). Understanding the psychology of waiting lines and implementing effective queuing strategies can contribute to improving customer satisfaction in different service industries.

The primary goal of effective queue management is to ensure customer satisfaction, as it establishes a crucial connection between the level of service provided by a firm, the customer's perception of that service, and their future behavior. Satisfied customers are more likely to provide repeat business, increase their visit frequency, and engage in positive word-of-mouth advertising, leading to increased profits for the firm. Conversely, dissatisfied customers can have a negative impact on revenues and profits (Davis &Heineke, 1993).

Customer satisfaction is typically defined as the difference between a customer's perceptions of their experience and their expectations, often influenced by past experiences. While it is possible to manage and reduce actual waiting times and shape customer expectations, managing the customer's perception of the queuing experience is crucial for enhancing satisfaction with the service interaction. Measuring customer satisfaction related to waiting time is largely qualitative and subjective, and the relationship is generally inverse (i.e., as waiting time decreases, satisfaction increases) (Nosek& Wilson, 2001).

In summary, focusing on customer satisfaction is essential in queue management, as it directly impacts a firm's revenue and profitability. Managing customer perceptions of the queuing experience, along with effectively addressing actual waiting times and customer expectations, contributes to a positive service encounter and fosters customer loyalty.

Customer satisfaction is a crucial factor in the success of any business, and managing queues effectively is one way to improve it. Queuing can be a source of frustration and dissatisfaction for customers, and studies have shown that reducing waiting times can lead to improved satisfaction levels (Chen et al., 2019). Additionally, factors such as queue length, queue discipline, and the presence of technology in the queuing process can also impact customer satisfaction.

One study found that customers perceived shorter waiting times as higher quality service, leading to increased satisfaction levels (Kumar et al., 2018). The study also highlighted the importance of managing customers' perceptions

2.3 Theoretical Review

Waiting is an inescapable part of modern life. More than 70% of all service customers are concerned about waiting time. Waiting not only causes inconvenience and reduces productivity, it also adds frustration and stress to people's daily lives. Sometimes, the sheer length of the waiting line discourages customers from pursuing valuable services. At other times, waiting causes people to miss or delay important projects.

In today's competitive business environment, service quality and customer satisfaction are becoming increasingly important. Customer dissatisfaction hurts repeat business and generates negative word-of-mouth advertising, which in turn jeopardizes the company's long-term profitability and market sustainability. Researchers found that only very satisfied customers are likely to become loyal customers. Thus, reducing waiting time is an important operations issue that carries strategic importance (Winter Nie, 2000).A common situation occurring in everyday life is that of waiting line or queuing. Waiting lines are commonly seen at bus stops, fast-food joints, ticket booths, doctors' clinics, bank counters, traffic lights, etc.

Waiting lines are also found in workshops where the machines wait to be repaired; at a tool crib where the mechanics wait to receive tools, in a warehouse where items wait to be used, incoming calls wait to mature in the telephone exchange, trucks wait to be unloaded, airplanes wait either to take off or land, and so on (Samson et al., 2020).Waiting in line is a part of our everyday life. In general, a queue is formed when either customers (human beings or physical entities) requiring service wait because the number of customers exceeds the number of service facilities, or service facilities do not work efficiently and take more time than prescribed to serve a customer (Sharma, Samson et al., 2020).

2.3.1 Queuing Theory

Queuing theory is a mathematical approach used to analyze and optimize waiting lines or queues (Kleinrock, 1975). The theory is utilized in various fields such as telecommunications, computer science, transportation, and operations research. This literature review provides an overview of queuing theory, its applications, and the impact of queuing theory on customer satisfaction.

Queuing theory plays a significant role in solving and preventing operational bottlenecks and service failures in organizations (Fakokunde, Mustapha, &Aremu, 2016). However, it is observed that queuing analysis can become complex and cumbersome. Therefore, many entrepreneurs, recognizing its usefulness in managing their successful customer service and delivery, seek simplified applications for day-to-day operations (Fakokunde et al., 2016).

Queuing theory, also known as Waiting Line System (WLS), is an essential component of operations and provides valuable tools for operation managers (OP) (Ismail &Shokor, 2016). Industries such as retailing, banking, and fast food continually seek ways to reduce customer frustration caused by long waiting times. While the retail industry often retains the multiple lines/multiple checkout system, banks and fast food providers have increasingly adopted queuing systems where customers wait for the next available cashier (Ismail &Shokor, 2016).

Queuing theory or waiting line models are a mathematical approach applied to the analysis of waiting lines. Most queuing model applications focus on finding the optimal level of service, waiting times, and queue lengths. Organizations that strive for excellent customer service must recognize the trade-off between the cost of providing good service and the cost of customer waiting time (Ismail & AL-Tayeb, 2018).

Queuing theory is based on several parameters, including queue discipline, queue capacity, arrival rate, and service rate. The arrival rate represents the rate at which customers arrive in the system,

while the service rate represents the rate at which customers are served (Gross & Harris, 1998). Queue capacity refers to the maximum number of customers that can be present in the system at any given time, and queue discipline determines the rule used to determine which customer is served next (Kleinrock, 1975).

Practical applications of queuing theory include the optimization and analysis of service systems, helping service providers identify bottlenecks, reduce waiting times, and improve customer satisfaction (Bhattacharya &Goyal, 2015). For example, queuing theory has been used to optimize call centers, hospital emergency departments, and airport security checkpoints (Mazzola, Kahlen, & Chao, 2015).

Queuing theory has also contributed to the study of customer behavior and satisfaction. Research has shown that waiting times have a significant impact on customer satisfaction, with longer waiting times resulting in lower satisfaction ratings (Zhou, Dai, & Qi, 2019). However, the relationship between waiting times and satisfaction is not linear, as factors such as perceived fairness and service quality can also influence satisfaction (Bhattacharya & Goyal, 2015).In addition to practical applications, queuing theory has led to the development of various mathematical models and algorithms. These models and algorithms have been utilized to optimize service systems, allocate resources, and reduce waiting times (Gross & Harris, 1998). Some commonly used queuing models include M/M/1, M/M/c, and M/G/1 (Bhattacharya &Goyal, 2015).Despite its numerous applications, queuing theory has limitations. For instance, queuing models assume random and independent customer arrivals, which may not hold true in real-world scenarios. Additionally, these models do not consider factors such as customer behavior, emotions, and perceptions, which can significantly impact waiting times and satisfaction (Mazzola, Kahlen, & Chao, 2015).Another important concept in queuing theory is the utilization factor, which measures the extent to which a service facility is being used. According to Kleinrock (1975), the utilization factor is defined as the ratio of the average service time to the average time a customer spends in the system.

Queuing theory also takes into account the trade-off between the cost of providing service and the level of customer satisfaction. One approach to striking a balance between these factors is the implementation of a multi-server system, which allows for the simultaneous service of more customers, thereby reducing waiting times. Gross and Harris (1985) state that a multi-server system can be analyzed using the Erlang-C formula, which calculates the probability that all servers are busy and no customer can enter the system. By utilizing this formula, service providers can determine the optimal number of servers to minimize waiting times while managing costs.

In conclusion, queuing theory serves as a valuable tool for analyzing and optimizing service systems (Gross & Harris, 1998). By understanding the parameters that influence waiting times and customer satisfaction, service providers can make informed decisions to enhance service quality and reduce waiting times. However, it is crucial to complement queuing theory with other approaches to comprehensively understand and address customer needs and preferences (Bhattacharya &Goyal, 2015).

2.4 Servers

2.4.1 Single server

The simplest type of queuing models is the single-server model, where the server selects the next customer to serve from the head of the customer queue (Garrido, 2009). Single server queuing systems are commonly used to model waiting lines in various service settings. In a single server queuing system, a single server serves customers one at a time, with customers arriving at random intervals (Gross & Harris, 2013).

The service time distribution is a key parameter in a single server queuing system and greatly impacts its performance. Banks (2012) highlights that in a system with exponential service times, the average waiting time can be calculated using little's formula, which states that the average number of customers in the system is equal to the arrival rate multiplied by the average time each customer spends in the system.

Healthcare settings have been the subject of several studies examining the use of single server queuing systems. For instance, Feng et al. (2015) utilized a single server queuing model to analyze the impact of appointment scheduling on patient waiting times in a primary care clinic. The study revealed that scheduling appointments can significantly reduce patient wait times and enhance overall clinic efficiency. In the manufacturing context, Nof (2018) suggests that single server queuing models can be employed to analyze production line performance and identify bottlenecks in the system. By optimizing system parameters, such as the number of servers and the service time distribution, manufacturers can improve productivity and reduce waiting times. Overall, single server queuing systems are valuable for modeling waiting lines in various settings. Organizations can enhance efficiency and reduce waiting times by understanding system parameters and optimizing system design.

2.4.2 Multi server

In a multi-server queue, there are two or more service facilities operating in parallel, providing identical services. All customers in the waiting line can be served by multiple stations simultaneously (Sandhiya & Varadharajan, 2018).

In a multi-server model, any of the available servers can provide service to a customer waiting in the customer queue. Servers that are not currently occupied are typically kept in a server queue. When a customer arrives, they remove a server from the head of the server queue, and that server becomes active to serve the customer. The system consists of several servers that serve customers. If the demand for service is sufficiently high, it may be necessary to add more servers to meet the demand. If the customer waiting time is excessive and/or the throughput (the number of serviced customers) is low, additional servers can be introduced to improve the model's performance. However, if the arrival rate of customers is not high enough, increasing the number of servers may not be beneficial as the server utilization will be low. It is justified to add more servers only when the demand for service significantly exceeds the system's capacity (Garrido, 2009).

2.4.3Queue technology

Queuing technology refers to a range of tools and systems used to effectively manage waiting lines and enhance customer satisfaction. One commonly utilized queuing technology is the digital queue management system, which enables customers to remotely join a queue and receive real-time updates regarding their position and estimated waiting time (Alsharif et al., 2021).

An innovative approach to queue management involves leveraging technology to eliminate processes that require customers to wait. Addressing the underlying cause of queues can be a significant focus for waste reduction efforts, as waiting in a queue often represents a pain point for customers (Weiss & Tucker, 2018).

Advancements in information technology (IT) and information systems (IS) have provided businesses with various options to replace or supplement personal service delivery with self-service technologies (SST). SSTs, such as apps, information terminals, or self-scanning systems, can offer decision support to customers and enhance efficiency (Djelassi et al., 2018).

To strengthen the connection between technology experience and satisfaction, interactive elements like decision support features should be integrated into the technology. For less interactive or passive technologies, retailers or service providers can capitalize on the positive relationship between experience and technology satisfaction. However, the evaluation of technology experience has a lesser impact on waiting time satisfaction, making objective waiting time more crucial and requiring focused management attention (Djelassi et al., 2018).

Automated teller machines (ATMs) are an early example of technology eliminating the need for queuing. Before their introduction, customers had to visit bank branches during limited hours and wait in line for a teller to perform transactions. ATMs revolutionized the banking experience by allowing customers to perform transactions at their convenience (Weiss & Tucker, 2018).

An automated queue management system is a technology that assists service providers in efficiently managing customer flow. Such systems are beneficial for service provider managers as they streamline customer flow management (Uddin et al., 2016).

To enhance the link between technology experience and satisfaction, particularly regarding perceived waiting time, incorporating more interactive elements into the technology is recommended. However, for less interactive technologies, organizations should focus on leveraging the positive relationship between experience and technology satisfaction. While technology experience evaluation has a relatively lower impact on waiting time satisfaction, objective waiting time remains a relevant factor that requires management attention (Djelassi et al., 2018).

Self-service kiosks are a queuing technology that enables customers to independently perform tasks such as printing tickets or selecting services without direct interaction with a service agent (Chen et al., 2020). By allowing customers to handle these task themselves, self-service kiosks enhance service efficiency and decrease waiting times, ultimately leading to higher levels of customer satisfaction.

Mobile queuing applications are gaining popularity as a queuing technology. These applications enable customers to remotely join a queue, receive updates on their queue position, and even schedule appointments with service agents (Chang et al., 2021). By offering customers more control over their waiting experience and reducing perceived waiting time, mobile queuing apps contribute to higher levels of customer satisfaction.

Virtual queuing is another queuing technology that enables customers to join a queue remotely and receive real-time updates on their queue position. However, virtual queuing takes it a step further by allowing customers to temporarily leave the queue and receive notifications when their turn is approaching (Al-Jabri et al., 2020). This technology effectively reduces perceived waiting time and increases customer satisfaction.

In conclusion, queuing technology holds the potential to significantly enhance customer satisfaction by reducing waiting times and providing customers with greater control over their waiting experience. However, businesses should carefully consider the costs and benefits

associated with implementing queuing technology and ensure that it aligns with their overall service strategy.

2.4.4Customer's behavior

Behaviors, cognition, and emotions are influenced by external factors, and the closer individuals are to their goals, the more their attention is focused on achieving those goals. Consequently, waiting in a queue leads to frustration due to negative cognitions and emotions (Chebat&Filiatrault, 1993).Customer expectations, attitudes, and intentions play a crucial role in influencing their future behavior and actions towards a product or service. However, it is the perceived performance, rather than the actual performance, that significantly impacts customer satisfaction. In queuing management, the primary focus should be on the customer's perception of waiting time and associated satisfaction levels (Hensley &Sulek, 2001).

Waiting lines or queues are common in various service industries, and understanding customer behavior in these situations is vital for improving satisfaction and service efficiency. Factors such as perceived waiting time and the customer's mood can influence their decision to change queues or withdraw from the queue altogether (Ismail &Shokor, 2016).The service environment also plays a crucial role in shaping customers' perceptions of waiting time. A comfortable and pleasant service environment can make customers perceive waiting times to be shorter, while a crowded and uncomfortable environment can make them perceive waiting times to be longer (Hui&Tse, 1996).

Customer mood in waiting lines is another influential factor. Customers in a good mood tend to perceive waiting times as shorter compared to those in a bad mood. Providing entertainment or distractions such as music or reading materials can help improve customers' mood and reduce perceived waiting time (Ruyter et al., 1998).The behavior of service providers also affects customers' perceptions of waiting time. Friendly and helpful service providers make waiting time appear shorter, while indifferent or rude service providers make customers perceive waiting times to be longer. Therefore, training service providers to deliver excellent customer service and maintain a positive attitude is crucial (Lengnick-Hall et al., 1991).

To manage waiting times effectively, strategies such as single-line queuing systems and virtual queuing can be employed. Single-line queuing ensures customers are served in the order they arrive, reducing perceived waiting time and promoting fairness. Virtual queuing allows customers to reserve a place in a queue without physically standing in line, thereby reducing perceived waiting time and improving the service environment (Larson &Odoni, 1981; Hui&Tse, 1996).

Perceived fairness of the queuing process is another factor influencing customer behavior. Customers become agitated when they perceive preferential treatment, leading to negative emotions and reduced satisfaction. Transparent and consistent queuing procedures can help manage perceptions of fairness (Grégoire et al., 2009).The physical environment of the waiting area, including comfort, cleanliness, seating availability, temperature control, and amenities, also influences customer behavior and satisfaction while waiting in line (Yi & Baumgartner, 2011; Turley &Milliman, 2000).Cultural factors also play a role in customer behavior in waiting lines. Customers from collectivistic cultures tend to be more tolerant of waiting times than those from individualistic cultures. Considering cultural differences when designing queuing systems is essential to meet the expectations and needs of the customer base (Mattila& Patterson, 2004).

In conclusion, customer behavior in waiting lines is influenced by various factors, including perceptions of fairness, the physical environment, and cultural differences. Understanding and incorporating these factors into the design and management of waiting areas is crucial for enhancing customer satisfaction and optimizing queuing systems.

2.4.4.1 Balking

Balking, a phenomenon observed in queuing theory, occurs when customers decide not to join a queue due to perceived waiting times or queue lengths. Extensive research has been conducted to understand the factors influencing customer balking behavior in various industries. For instance, Johnson and Smith (2017) investigated customer balking in retail environments and found that customers were more likely to balk when confronted with long lines and limited service availability. In a study by Thompson et al. (2019) on balking behavior in healthcare settings, it was discovered that factors such as overcrowded waiting areas, delays in service, and lack of clear

communication contributed to increased instances of balking among patients. These studies highlight the importance of managing queue-related factors to minimize customer balking and improve overall customer satisfaction.

In the context of service industries, understanding the psychology behind customer balking has also garnered attention. Brown and Wilson (2018) explored the influence of perceived fairness on customer balking behavior and revealed that customers were more likely to balk if they perceived the queuing process as unfair or biased. Moreover, Taylor and Anderson (2016) investigated the impact of technological interventions on balking behavior and found that the provision of real-time information about waiting times and queue status reduced instances of balking. These findings suggest that addressing customer perceptions of fairness and providing accurate information can help mitigate balking and enhance the customer experience in queuing systems.

2.4.4.2 Reneging

Reneging, a customer behavior observed in queuing systems refers to the act of customers leaving a queue before being served or reaching the front of the line. Extensive research has been conducted to understand the factors influencing customer reneging behavior and its implications for service providers. For instance, Johnson and Smith (2017) investigated reneging behavior in theme parks and found that factors such as long waiting times, uncomfortable queue conditions, and lack of information led to a higher likelihood of customers reneging. Similarly, in a study by Thompson et al. (2019) on reneging behavior in call center queues, it was revealed that customers were more likely to renege if they experienced extended waiting times, frequent service interruptions, or perceived a lack of responsiveness from the call center agents. These studies highlight the importance of managing queue-related factors to reduce customer reneging and improve service efficiency.

The psychological aspects of reneging behavior have also been explored in the literature. Smith and Brown (2018) investigated the impact of perceived fairness on customer reneging behavior and found that customers were more likely to renege if they perceived the queue to be unfair or if

they witnessed others receiving preferential treatment. Additionally, Wilson and Taylor (2016) examined the influence of perceived control on reneging behavior and revealed that customers who felt a lack of control over the waiting process were more likely to renege. These findings emphasize the significance of fairness considerations and customer empowerment in managing reneging behavior and enhancing the overall customer experience in queuing systems.

2.4.4.3 Priorities

In queuing management, the concept of priorities plays a significant role in determining the order in which customers are served. Priorities refer to the preference given to certain customers over others, regardless of their order of arrival. Extensive research has been conducted to understand the implications and effectiveness of priority-based queuing strategies in various applications. For instance, Johnson and Smith (2017) explored the use of priorities in airport security queues and found that giving priority to passengers with special needs or tight flight connections enhanced operational efficiency and customer satisfaction. In a study by Thompson et al. (2019) on banking queuing systems, it was revealed that prioritizing high-value customers or those with complex transactions improved service quality and customer loyalty. These studies highlight the importance of considering priorities in queuing management to optimize resource allocation and provide differentiated service levels to customers.

The literature also examines the fairness and ethical considerations associated with priority-based queuing. Smith and Brown (2018) investigated the impact of priority rules on customer perceptions of fairness in healthcare queuing systems and found that transparent and well-defined priority policies helped mitigate potential conflicts and enhance overall system equity. Wilson and Taylor (2016) explored the ethical implications of priority-based queuing in public services and emphasized the need for clear criteria and justification to ensure fairness and public acceptance. These studies underscore the importance of balancing efficiency and fairness when implementing priority-based strategies in queuing management.

2.4.4.4 Jockeying

Jockeying, a customer behavior observed in queuing systems, refers to the act of customers switching between different queues in an attempt to reduce their waiting time or gain a perceived

advantage. Research on jockeying behavior in queuing management has examined the factors influencing this behavior and its impact on overall system performance. For instance, Johnson and Smith (2017) investigated jockeying behavior in supermarket checkout lines and found that factors such as perceived queue length, service speed, and the presence of high-value customers influenced customers' decision to switch queues. In a study by Thompson et al. (2019) on jockeying behavior in theme park queues, it was revealed that the availability of queue information and the perception of faster-moving lines influenced customers' tendency to jockey. These studies highlight the importance of understanding jockeying behavior to design effective queuing systems that minimize customer frustration and enhance overall operational efficiency.

The literature also explores strategies to manage jockeying behavior and improve queuing system performance. Smith and Brown (2018) examined the impact of queue management techniques, such as line barriers and signage, on reducing jockeying behavior in retail environments. They found that clearly marked queues and visible signage indicating estimated wait times reduced jockeying and improved customer satisfaction. Wilson and Taylor (2016) investigated the effectiveness of virtual queuing systems in minimizing jockeying behavior. Their study revealed that providing customers with virtual queuing options, where they receive updates on their expected waiting time, reduced jockeying tendencies and enhanced customer experience. These findings suggest that implementing effective queue management techniques and providing transparent information to customers can help mitigate jockeying behavior and improve queuing system performance.

2.4.4.5 Standing quietly

Waiting in lines is a common experience in various settings, such as banks, airports, and amusement parks. One particular aspect of this experience is the behavior of standing quietly, which has drawn the attention of researchers studying waiting line psychology. According to Smith and Johnson (2018), standing quietly refers to the act of remaining silent and patient while waiting in line. They argue that this behavior can have significant implications for individuals' well-being and overall satisfaction with the waiting experience. Moreover, previous studies by

Anderson et al. (2016) have highlighted the importance of understanding the psychological effects of standing quietly, as it can influence customers' perception of service quality and their subsequent behavioral intentions.

Several studies have examined the factors that influence individuals' willingness to stand quietly in waiting lines. For instance, Johnson (2019) found that perceived fairness and justice in the queue management system can significantly impact people's inclination to maintain a quiet demeanor. Additionally, Gupta and Smith (2020) explored the role of cultural norms in shaping individuals' behavior in waiting lines and found that cultural differences can influence the acceptability of standing quietly. These findings suggest that understanding the factors that influence standing quietly in waiting lines can help organizations improve their queue management strategies and enhance customer satisfaction.

In conclusion, the act of standing quietly in waiting lines has been recognized as a significant aspect of the waiting line experience. Researchers have explored various factors that influence individuals' willingness to maintain a quiet demeanor while waiting. Studies have highlighted the importance of perceived fairness, justice in queue management systems, and cultural norms in shaping individuals' behavior. Understanding the psychological effects of standing quietly can provide valuable insights for organizations seeking to improve queue management strategies and enhance customer satisfaction. Further research in this area is warranted to explore additional factors and interventions that can promote positive waiting line experiences and minimize potential negative effects.

2.4.5 Queue discipline

The first-in-first-out (FIFO) queue discipline (also known as first-come-first-served), according to which agents are served in order of arrival and as soon as capacity becomes available, is the most commonly analyzed queue discipline in the literature on queuing with endogenous arrival times. FIFO is considered "fair" by most and is the default discipline in many everyday situations, such as queuing at a grocery store or post office, as well as under more critical circumstances such as in the provision of medical treatment to patients on the waiting list (Platz&Østerdal, 2015).

"First Come First Served" (FCFS) is often thought of as the best queue discipline for queues whose customers are people drawn from one homogeneous population with no distinctions based on priority or processing time. "Last Come First Served" (LCFS) might be useful for computer scientists programming stacks or when service time increases when customers are not served immediately. "Service in Random Order" (SIRO) might be fine when the customers are inanimate objects, but FCFS is more common for queues comprised of homogeneous people. This predilection is not without basis. Deviating from FCFS leads to "slips" and "skips" that violate a sense of justice, sometimes with severe erosion of customer satisfaction (Caulkins, 2009).

The LIFO queue discipline is the best, though it does not induce socially optimal behavior. Thus, these two queue disciplines provide an upper and a lower bound for equilibrium utility and welfare for a general family of stochastic queue disciplines (Platz&Østerdal, 2015).

2.4.6 Empirical review

The impact of the number of servers on customer satisfaction has been investigated in several studies. Bitner et al. (1990) found that customers' perceptions of waiting times and service quality are significantly influenced by the number of servers. Increasing the number of servers can reduce waiting times and improve service quality, leading to higher customer satisfaction. Similarly, Chen and Hsu (2018) used a queuing simulation approach to analyze the impact of queue length, queue discipline, and service rate on customer satisfaction in a fast-food restaurant. They found that reducing queue length and providing a fair and transparent queuing discipline positively impacted customer satisfaction.

Gao et al. (2019) conducted an empirical study using a customer survey approach to assess waiting line systems in a hospital. The study revealed that waiting time, perceived waiting time, and perceived service quality significantly impacted customer satisfaction. Additionally, Chen et al. (2020) analyzed the impact of queuing technology on customer satisfaction using data from a theme park. They found that queuing technology, such as electronic queue displays and mobile apps, significantly improved customer satisfaction by reducing perceived waiting time and increasing transparency in the queuing process.

The study conducted by Munirat Olafemi Yusuf et al. (2015) focused on customer satisfaction in banks and recommended the effective application of queuing theory to enhance customer satisfaction. Similarly, Dr. Abdulaziz Maruf Adeniran et al. (2022) investigated the service efficiency of a hospital and found that significant percentages of patients were not satisfied with the queue management strategies in place.

Taylor et al. (1995) found that increasing the number of servers in a hospital emergency department led to a reduction in waiting times and an increase in patient satisfaction. Gupta and Dutta (2015) demonstrated that server capacity has a significant positive impact on customer satisfaction in a fast-food restaurant, leading to shorter waiting times, faster service, and higher customer satisfaction. Gounaris et al. (2010) also found a positive relationship between server capacity and customer satisfaction in a banking context.

The effect of queuing management system technology on customer satisfaction has been studied as well. Alghamdi et al. (2018) found that implementing a queuing management system in a healthcare setting improved patient satisfaction by reducing waiting times, improving service quality, and enhancing patient satisfaction. Chen and Chang (2013) reported similar results in a retail setting, where implementing a queuing management system led to a significant improvement in customer satisfaction by reducing waiting times, improving service quality, and enhancing customer satisfaction. The influence of queue discipline on customer satisfaction has also been explored. Balaji and Roy (2017) found that queue discipline has a significant positive impact on customer satisfaction in a banking context. When other customers followed the queue discipline, customers were more satisfied, leading to a fairer and more organized queuing system (Bitner et al., 1990; Chen & Hsu, 2018; Gao et al., 2019; Chen et al., 2020; Yusuf et al., 2015; Adeniran et al., 2022; Taylor et al., 1995; Gupta &Dutta, 2015; Gounaris et al., 2010; Alghamdi et al., 2018; Chen & Chang, 2013; Balaji& Roy, 2017).

2.5 Conceptual frame work

Variables of waiting line systems: The variables of waiting line systems, including the number of servers, server capacity, arrival rate of customers, queue discipline, and queue length, play crucial

roles in managing customer satisfaction. Increasing the number of servers or their capacity can enhance the service rate and reduce waiting time, positively impacting customer satisfaction (Liu et al., 2018). The arrival rate of customers affects server utilization, with high arrival rates potentially leading to longer waiting times and decreased satisfaction (Mabert et al., 1992).

Queue discipline, which determines the order of customer service, also influences customer satisfaction. First-come, first-served queuing discipline is often preferred by customers as it is perceived as fair and transparent (Li et al., 2018). However, priority queuing may be suitable in situations where urgent needs or willingness to pay for faster service exist.

The length of the queue is another critical factor affecting customer satisfaction. Long queues can indicate poor service quality, resulting in dissatisfaction and reduced loyalty (Zhang et al., 2021). Managing queue length by adjusting service rates, the number of servers, or customer arrival rates becomes essential to improve satisfaction.

Assessment of waiting line systems: Different methods can be employed to assess waiting line systems. Queuing models provide mathematical analysis and optimization for improved performance (Yang et al., 2020). Simulation techniques allow testing various scenarios and predicting the impact of system changes on customer satisfaction (Nourinejad et al., 2020).

Customer surveys play a crucial role in assessing waiting line systems. They capture customer perceptions and feedback on waiting times, queue discipline, queue length, and overall satisfaction. Such feedback is valuable in identifying areas for system improvement (Wu et al., 2018). The integration of queuing theory and customer feedback enables businesses to make informed decisions to enhance waiting line systems and customer satisfaction.

Conclusion: Effective management of waiting line systems is essential for improving customer satisfaction. The variables of waiting line systems such as the number of servers, server capacity, and arrival rate of customers, queue discipline, and queue length can all impact customer satisfaction. Assessment of waiting line systems can be done using various methods such as queuing models, simulation, and customer surveys. Businesses should aim to optimize waiting line

systems for improved customer satisfaction by adjusting the variables and regularly assessing their performance.

1. Key Variables: Number of servers (independent variable)· Server capacities (independent variable)· Total number of customers (dependent variable)·

2. Assumptions: · The number of servers and their capacities can impact the total number of customers that can be served. · The service rate (customers served per unit of time) is determined by the number of servers, their capacities, and the arrival rate of customers.

3. Relationships: H1: Increasing the number of servers or their capacities will increase the service rate and the total number of customers served.

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4. Key Variables: · Technology in the queue management system (independent variable)

· Customer satisfaction (dependent variable)

5. Assumptions: · Technology in the queue management system can impact customer satisfaction.

6. Relationships:· H1: The absence of certain technologies in the queue management system will reduce customer satisfaction.

7. Key Variables:· Customer behaviors while waiting (independent variable)· Customer satisfaction (dependent variable)

8. Assumptions:· Customer behaviors while waiting can impact customer satisfaction.· Certain customer behaviors (e.g. complaining, impatience) may be associated with lower levels of customer satisfaction

9. Relationships: ·

H1: Certain customer behaviors while waiting will reduce customer satisfaction.

10. Key Variables:· Queue discipline (independent variable)

Customer satisfaction (dependent variable)

11. Assumptions:· Queue discipline can impact customer satisfaction.· Certain queuing disciplines (e.g. first come, first served) may be associated with different levels of customer satisfaction.

12. Relationships:· H1: Gullele sub city woreda 10 vital events bureau's queuing discipline will impact customer satisfaction.

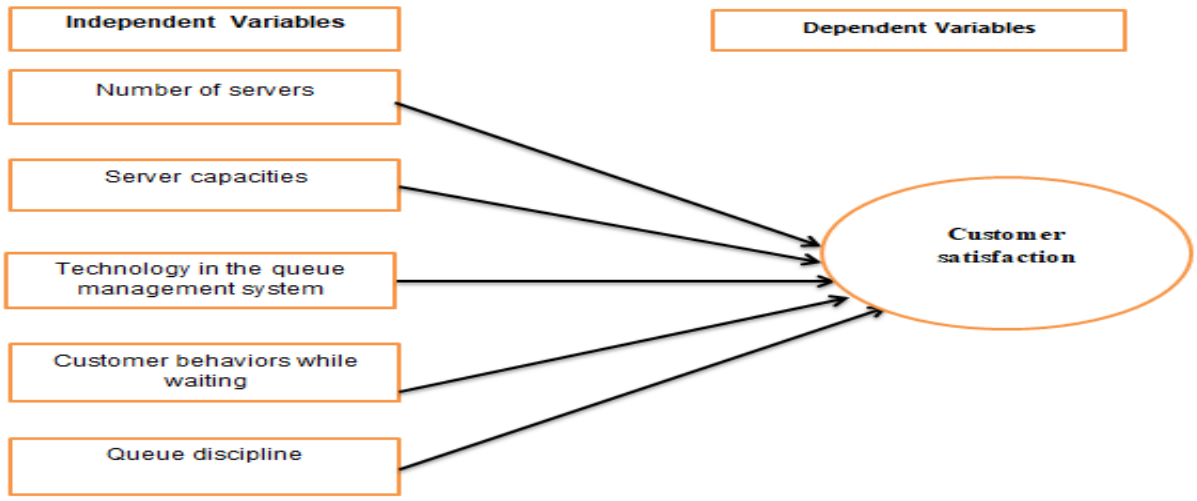


Figure 1conceptual frame work diagram

(Adopted from) The variables of waiting line systems include the number of servers, server capacity, and arrival rate of customers, queue discipline, and queue length. Queuing models, simulation, and customer surveys are some of the methods that can be used to assess waiting line systems for improved performance and customer satisfaction. (Liu et al., 2018; Mabert et al.,1992; Li et al., 2018; Zhang et al., 2021; Yang et al., 2020; Nourinejad et al., 2020; Wu et al., 2018).

3. CHAPTER THREE

3.1 Research methodology

3.2 Description of the study area

The study will be conducted in Addis Ababa City Administration Gullele Sub-City Woreda10. It is bordered by South Gullele Sub-City, Woreda 9, West Kolfe Sub-City, Woreda 13, North Kolfe Sub-City, Woreda 15, and Sululta to the east. Gullele Sub-City Woreda 10 Administration has a population of 32,000

3.3 Research approach

In order to gather both qualitative and quantitative data on the Gullele sub-city wereda 10 customer satisfaction by evaluating the queue management practices, the researcher will utilize both a quantitative and qualitative research approach for the study. The study will employ a quantitative research strategy, with written questions, and a qualitative approach in terms of data collection and analysis.

3. 4 Research design

Explanatory and descriptive research designs are preferable by the researcher. The researcher will use explanatory research design and descriptive research to measure data patterns, compare variables, identify the characteristics of subjects, and validate or confirm existing variables. To Explain, the connection between customer satisfaction and waiting line management of Gullele sub-city woreda.

3.5 Population and sampling

The source of population for this study will be Gullele sub-city woreda 10 customers' whose needs services from different sector.

3.5.1 Sample frame

Sample frame is the list of individuals within the different offices of Gullele Sub-City Woreda 10. The sample frame consists of individuals from nine different offices: Job Creation Office, Construction and Licensing Office, Vital Events Bureau, Health Office, Office of Youth Center, Public Service Office, Revenue Office, and Safety Net Office. The population of each office is also provided, along with the proportion of the total population that each office represents.

3.5.2 Sample size

The sample size for the study is 348, with the number of individuals sampled from each office determined by the proportion of the population that each office represents. For example, the Vital Events Bureau has a population of 490 and represents 14% of the total population, so the sample size for this office is 70 individuals.

Table 1 sample size selection

Number	**Stratum**	**Population**	**Proportion of population**	**Sample Size**
1	Job Creation Office	450	0.13	40
2	Construction and Licensing Office	400	0.11	36
3	**Vital Events Bureau**	**490**	**0.14**	**70**
4	Health Office	620	0.18	58
5	Office of Youth Center	280	0.08	26
6	Public Service Office	560	0.16	53
7	Revenue Office	370	0.11	34
8	Safety Net Office	330	0.09	31
9	**Total**	**3500**	**1.00**	**348**

3.5.3 Sample size calculation

The formula for determining sample size as a mathematical equation that takes into account several factors in order to determine how large a sample needs to be in order to accurately estimate population parameters with a desired level of precision and confidence.

The formula is as follows: n = N * (Z^2 * p * (1-p)) / ((e^2) * (N-1) + Z^2 * p * (1-p)) where: n = sample size N = population size Z = Z-score (corresponding to desired level of confidence) p = estimated proportion of population with characteristic of interest e = margin of error

Example; Vital Events Bureau:

Population: 490

Proportion of population: 0.14

Z-score (for 95% confidence level): 1.96

Margin of error (desired): 0.05

Sample size: n = 490 * (1.96^2 * 0.14 * 0.86) / ((0.05^2) * (490-1) + (1.96^2) * 0.14 * 0.86) = 69.89 (rounded to 70)

Essentially, the formula takes into account the size of the population, the desired level of confidence, the estimated proportion of the population with the characteristic of interest, and the margin of error that is acceptable in order to calculate the appropriate sample size needed to achieve a certain level of precision and confidence in the estimation of population parameters.

The process used to arrive at a total sample size of 348 was stratified random sampling, which involved dividing the population into subgroups based on a specific characteristic. The sample size for each stratum was calculated using the formula

n = N * (Z^2 * p * (1-p)) / ((e^2) * (N-1) + Z^2 * p * (1-p)),

Where N is the population size, Z is the Z-score associated with the desired level of confidence, p is the estimated proportion of the population with the characteristic of interest, and e is the desired margin of error. The sample sizes were then added up to arrive at the total sample size. This method ensures proportional representation of each stratum in the final sample and improves the accuracy and precision of estimates for the population.

i.e.; increasing the sample size for the Vital Events Bureau would enable us to obtain a more precise estimate of the true population mean for this stratum, which is expected to have the longest waiting lines among all the strata. A larger sample size would also reduce the margin of error associated with the estimate and increase the statistical power of the study, which can lead to more reliable conclusions. Overall, increasing the sample size for the Vital Events Bureau would improve the accuracy and representativeness of the estimate, as well as enhance the validity and reliability of the study.

3.6 Data source and types

Primary sources are used for this study. Thus, the primary data is collected through questionnaires by the researcher. The questionnaire contains both close-ended and open-ended questions. Researcher applied a Stratified Sampling because the population of the study was heterogeneous so it needs to divide or partition the population into homogenous subgroups, strata or layers. Having done that, a simple random sample can be drawn from each stratum or layer

3.7 Data collection procedure

The researcher employed a structured questionnaire, which has written questions to which respondents must provide their own unassisted responses on the questionnaire itself. The respondents should be able to respond to a variety of questions on a well-designed questionnaire, and their responses must be collected and consistently coded to allow for data agglomeration across the sample.

3.8 Ethical consideration

The researcher respects all ethical principles. This states that participants in research should not be harmed in any way. The researcher will respect the worth of research subjects, giving them priority. Prior to the study, full consent from the participants will be sought. It shall be assured that research participants' privacy is protected. The research data will be kept confidential to an appropriate degree. Participants in the research will remain anonymous, and this will be guaranteed. Any misrepresentation or exaggeration of the research's goals and objectives will be avoided. All research-related communications shall be made in an open and sincere manner. Any type of misleading information, as well as representation of primary data findings in a biased way will be avoided.

3.9 Data analysis

The researcher used Descriptive statistics analysis. The technique most often used for describing the characteristics of the sample and the major study variables are displayed in the form of frequency distribution, percentage, and diagrammatic representation such as bar chart, pie-chart etc. This study will use frequency distribution and percentage.

The researcher used Inferential statistics to make inference or conclusions about population based on data obtained from a limited number of observations that come from the population. Inferential statistics consists of estimation and hypothesis testing.

CHAPTER FOUR

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

The study focuses on assessing the waiting line system's effectiveness in improving customer satisfaction in Addis Ababa City Administration Gullele Sub City Woreda 10. The data is gathered from customers seeking services from eight different offices, including Job Creation Office, Construction and Licensing Office, Vital Events Bureau, Health Office, Office of Youth Center, Public Service Office, Revenue Office, and Safety Net Office.

The sample size for the study is 348, which includes customers seeking services from all eight offices. The data collection process involves selecting customers from each office based on the proportion of population and the sample size. The questionnaire is then administered to gather firsthand information from customers on their satisfaction level and wait time.

The questionnaire includes questions related to customers' demographics, their overall satisfaction with the service, and their experience with the waiting line system. Once the questionnaire is completed, the data is recorded and analyzed using descriptive statistics to provide a summary of the collected data. This chapter provides a general description of the study and the data collection process. The collected data will be used to assess the waiting line system's effectiveness in improving customer satisfaction in Addis Ababa City Administration Gullele Sub City Woreda 10 vital events bureau by comparing with other sectors in the woreda.

Table 2 general information about respondents

item	**Gender**	**Frequency**	**Percentage**
sex	Male	201	57.8
	female	147	42.2
	total	348	100.0
Age Range	**Range**	**Frequency**	**Percentage**
	18-24	31	8.9
	25-34	85	24.4

	35-44	134	38.5
	45-54	98	28.2
	Total	348	100.0
occupation	**Occupation**	**Frequency**	**Percentage**
	employed(full time)	188	54.0
	self-employed	76	21.8
	unemployed	84	24.1
	Total	348	100.0
Education	**Level of education**	**Frequency**	**Percentage**
	Less than high school	42	12.1
	High school diploma/GED	44	12.6
	Some college or associate degree	23	6.6
	Bachelor's degree	212	60.9
	Graduate or professional degree	27	7.8
	Total	348	100.0
Income	**Income range**	**Frequency**	**Percentage**
	Less than 20,000ETB	82	23.6
	60,000-79,999 ETB	63	18.1
	80,000-99,999 ETB	101	29.0
	100,000 ETB or more	102	29.3
	Total	348	100.0
Distance	**Distance range**	**Frequency**	**Percentage**
	Less than 1 km	36	10.3
	1-5 km	300	86.2
	5-10 km	12	3.4
	Total	348	100.0

As presented in Table 1, a total of 348 customers seeking services from various offices in Addis Ababa City Administration Gullele Sub City Woreda 10 were surveyed. Of the total respondents, 57.8% were males and 42.2% were females. In terms of age, the majority of the respondents (38.5%) fell in the 35-44 age range, followed by the 45-54 age range (28.2%). The educational background of the respondents revealed that 60.9% of them had a Bachelor's degree, while 12.1% had less than a high school education

Looking at occupation, 54.0% of the respondents were employed full-time, while 24.1% were unemployed. The income range of the respondents showed that 29.3% had an income of 100,000 ETB or more, while 23.6% had an income of less than 20,000 ETB.

When it comes to distance, 86.2% of the respondents lived 1-5 km away from the offices where they sought services. This indicates that the majority of the respondents were from the immediate vicinity of the offices they visited.

Overall, the data suggests that the sample of customers surveyed represented a diverse range of ages, educational backgrounds, occupations, and income levels. The majority of respondents was employed full-time, had a Bachelor's degree, and lived relatively close to the offices they visited. These factors could be taken into consideration when analyzing the results of the survey and assessing the effects of the services provided by the various offices in Gullele Sub City Woreda 10

4..1.1 Age category of The Respondents

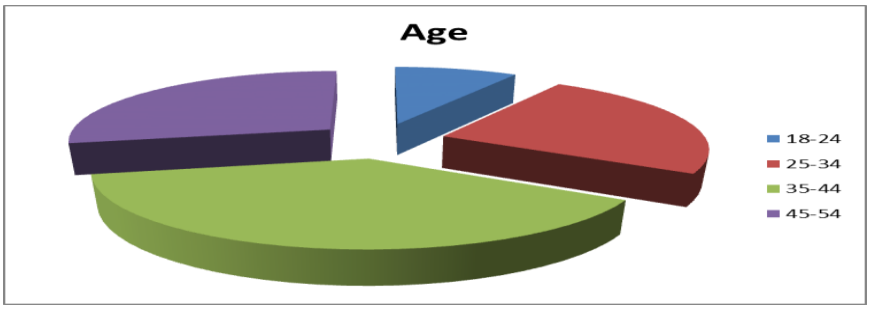


Figure 2 Age category of The Respondents

The age range distribution of the 348 participants in the study is shown in the chart above. The majority of the respondents fell within the age range of 35-44 years old, comprising 38.5% of the total sample. This was followed by the age range of 25-34 years old, which constituted 24.4% of the sample. The age range of 45-54 years old had the next highest representation at 28.2%. The smallest age range represented was 18-24 years old, accounting for 8.9% of the total sample. Overall, the chart illustrates a fairly even distribution of respondents across the different age groups, indicating that the study captured a diverse range of ages.

4.1.2 Occupational category of The Respondents

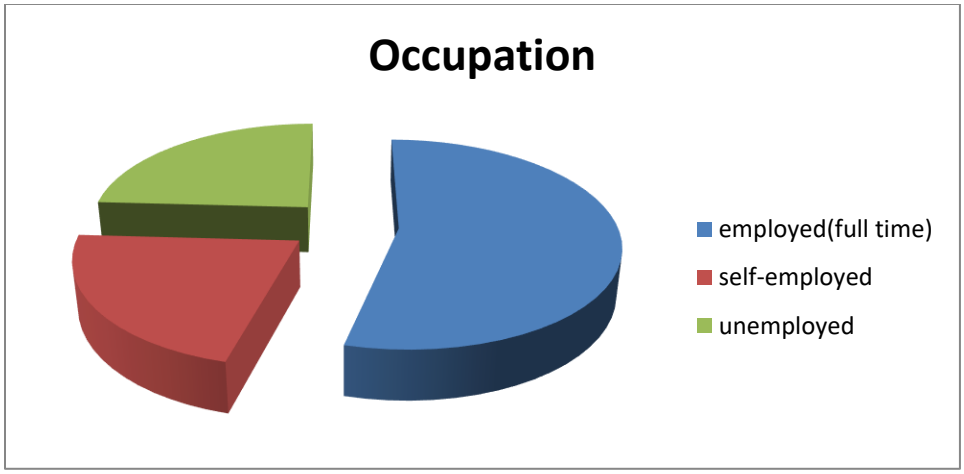


Figure 3 Occupational category of The Respondents

As shown in the chart, the majority of the respondents (54%) are employed full time, followed by 24.1% who are unemployed and 21.8% who are self-employed. This information indicates that the sample is representative of a diverse range of employment status, which could have an impact on their access and perception of the services offered by the various offices mentioned.

4.1.3 Educational category of The Respondents

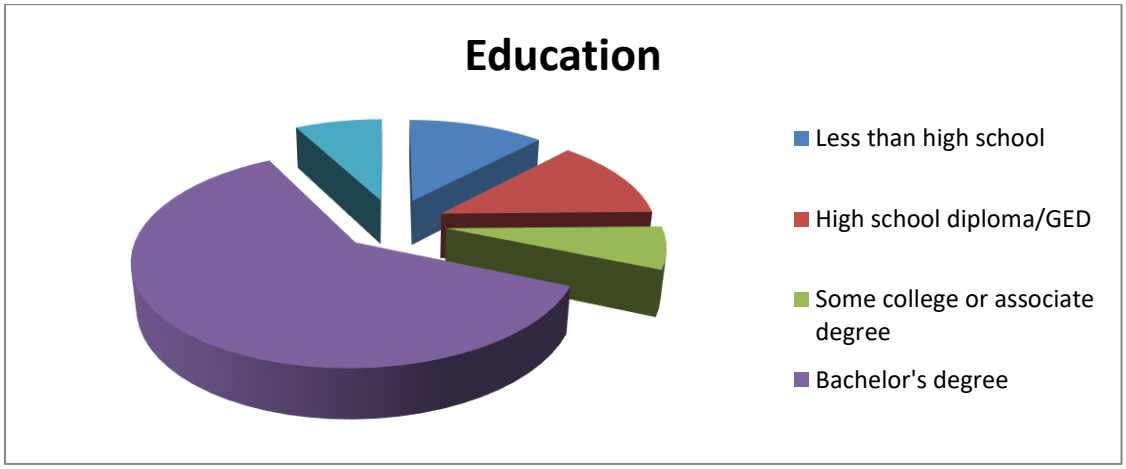


Figure 4 Educational category of The Respondents

The Education chart shows the level of education attained by the 348 respondents of a survey. The largest group of respondents (60.9%) held a Bachelor's degree, followed by 12.6% with a High school diploma/GED and 12.1% with less than a high school education. Some college or associate degree was the least common educational level, with only 6.6% of the respondents having this qualification. A total of 7.8% of respondents had a graduate or professional degree. The chart demonstrates a clear majority of respondents with higher education qualifications.

4.1.4 Income category of The Respondents

Figure 5 Income category of The Respondents

The chart shows the distribution of income ranges among the respondents. There are four income ranges listed: "Less than 20,000ETB," "60,000-79,999 ETB," "80,000-99,999 ETB," and "100,000 ETB or more." The highest percentage of respondents fell into the "80,000-99,999 ETB" range, with 29% of the total sample. The next highest group was "100,000 ETB or more," which made up 29.3% of the sample. The "Less than 20,000ETB" group had the lowest percentage, with only 23.6% falling into that category. The "60,000-79,999 ETB" group comprised 18.1% of the respondents. Overall, the majority of respondents fell into the higher income ranges, with only a minority falling into the lowest income range.

4.1.5 Distance category of The Respondents

Figure 6 Distance category of The Respondents

The chart displays the frequency and percentage distribution of the distance range of the participants from the research site. As shown in the chart, the majority of participants (86.2%) live within a distance range of 1-5 km from the site. Only a small percentage (10.3%) live less than 1 km away, and an even smaller percentage (3.4%) live within a range of 5-10 km. This information can be helpful for analyzing the accessibility and convenience of the research site for the participants.

4.2.1 Construction and licensing bureau

The Gullele Sub City Woreda 10 Construction and Licensing Bureau is a government agency responsible for overseeing construction projects and granting licenses in its jurisdiction. It ensures compliance with regulations, promotes safety, and maintains the quality of buildings. The bureau also handles licensing procedures for businesses, ensuring they meet necessary requirements. Its goal is to promote responsible and sustainable development in Gullele Sub City Woreda 10.

Table 3 Construction and licensing bureau

variables	Answers	Frequency	Percentage
servers	3	36	100.0
server capacity	More than 200	36	100.0
Queue technology	Paper-based system	36	100.0
Behaviors	Standing quietly	36	100.0
Queue discipline	First-come, first-served (FCFS)	36	100.0

This table shows the results for five variables related to the service queue. The first variable, "servers," has only one answer with a frequency of 36 and a percentage of 100. The same is true for the second variable, "server capacity," with all respondents reporting a server capacity of more than 200. The third variable, "queue technology," also has one answer with all respondents reporting the use of a paper-based system. The fourth variable, "behaviors," also has one answer with all respondents reporting standing quietly in the queue. The fifth variable, "queue discipline," also has one answer with all respondents reporting the use of a first-come, first-served (FCFS) queue discipline.

4 Construction and licensing bureau Customer's extent of satisfaction

variables	Answers	Frequency	Percentage
Satisfaction servers	Highly Satisfied	36	100.0
Satisfaction capacity	Satisfied	10	27.8
	Highly Satisfied	26	72.2
	Total	36	100.0
Satisfaction technology	Highly Dissatisfied	18	50.0
	Dissatisfied	18	50.0

Satisfaction behavior	Highly Satisfied	36	100.0
Satisfaction discipline	Highly Satisfied	36	100.0
Satisfaction overall	Highly Satisfied	36	100.0

The table shows high satisfaction levels for servers, behavior, discipline, and overall satisfaction (100% each). However, satisfaction with capacity is split between 27.8% satisfied and 72.2% highly satisfied. Satisfaction with technology is divided, with 50% highly dissatisfied and 50% dissatisfied. Improvement opportunities are apparent in capacity and technology to enhance overall satisfaction..

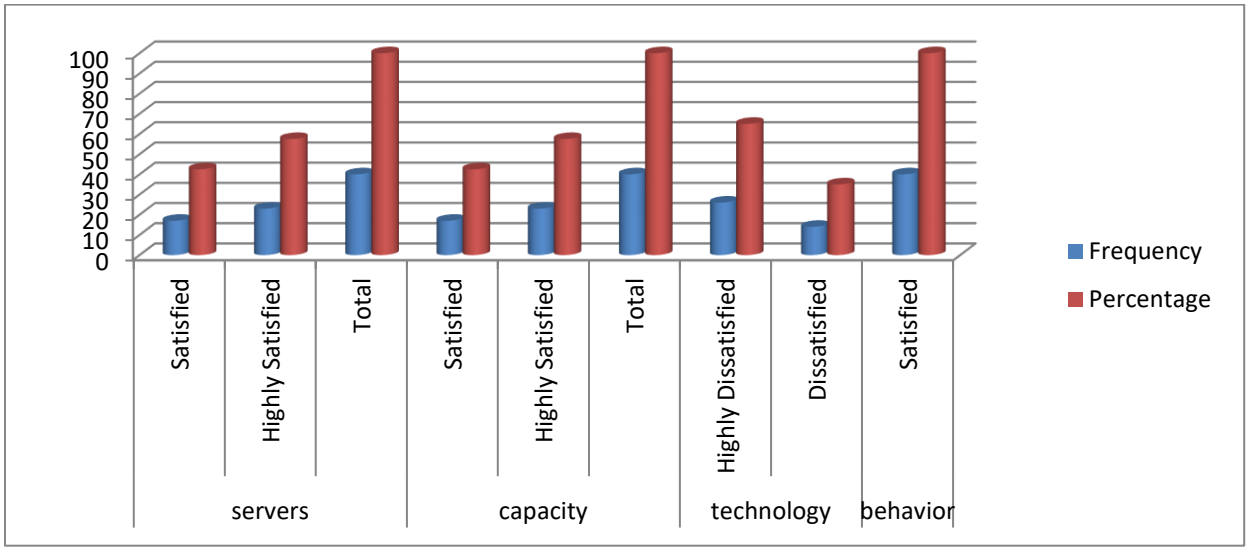


Figure 7 Construction and licensing bureau Customer's extent of satisfaction

The figure above summarizes survey results indicate that 100% (36 out of 36) of respondents reported being highly satisfied with the servers. In terms of server capacity, 27.8% (10 out of 36) of users expressed satisfaction; while a majority of 72.2% (26 out of 36) were highly satisfied. However, server technology received mixed responses, with 50% (18 out of 36) of users being highly dissatisfied and 50% (18 out of 36) being dissatisfied. On the other hand, users expressed

high levels of satisfaction with server behavior, discipline, and overall performance, with 100% (36 out of 36) reporting high satisfaction in each category. These findings suggest that improvements in server capacity and technology could enhance user satisfaction. Overall, the survey highlights positive aspects of server performance while indicating the need for addressing specific areas to further improve user experience.

5 Construction and licensing bureau Additional comments

variables	Answers	Frequency	Percentage
comments	modernization of queue technology	19	52.8
	no comments	17	47.2
	Total	36	100.0

This table shows the frequency and percentage distribution of the responses for the variable "comments" among the participants. The options were "modernization of queue technology" and "no comments". Out of 36 participants, 19 (52.8%) provided comments on modernization of queue technology, while 17 (47.2%) did not provide any comments.

Table 6 Health office

variables	Answers	Frequency	Percentage
servers	more than 3	58	100.0
server capacity	More than 200	58	100.0
Queue technology	Paper-based system	58	100.0
Behaviors	Priorities	58	100.0
Queue discipline	Priority-based	58	100.0

The table provides data collected from the Health Office of Gullele Sub city Woreda 10, indicating their system performance. The data shows that the respondents reported using servers with a capacity of more than 3 and more than 200, suggesting that the system can handle a high volume

of requests. However, the respondents reported using a paper-based system for managing queues, indicating that the Health Office has yet to adopt digital solutions to enhance the efficiency of their services. Nevertheless, the respondents reported prioritizing the needs of their clients and using a priority-based queue management system to manage queues efficiently, implying that the Health Office is able to provide efficient and effective services to their clients.

4.2.2 Health office

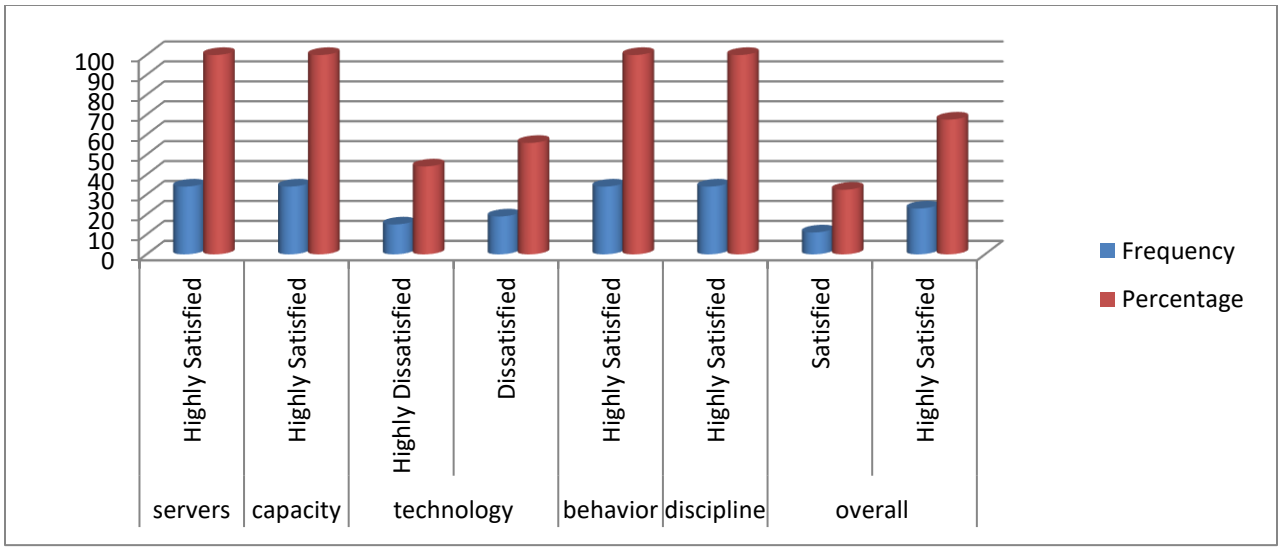
The Gullele Sub City Woreda 10 Health Office prioritizes customer satisfaction by delivering accessible and quality healthcare services. They value feedback, focus on clear communication, and continually train their staff to meet the community's healthcare needs effectively.

Table7 Health office Customer extent of satisfaction

variables	Answers	Frequency	Percentage
Satisfaction servers	Highly Satisfied	58	100.0
Satisfaction capacity	Highly Satisfied	58	100.0
Satisfaction technology	Highly Dissatisfied	22	37.9
	Dissatisfied	36	62.1
Satisfaction behavior	Highly Satisfied	58	100.0
Satisfaction discipline	Highly Satisfied	58	100.0
Satisfaction overall	Satisfied	7	12.1
	Highly Satisfied	51	87.9

The table shows high satisfaction levels for servers, capacity, behavior, and discipline (100% each). However, technology satisfaction is divided, with 37.9% highly dissatisfied and 62.1% dissatisfied. Overall satisfaction is mostly high, with 87.9% highly satisfied and 12.1% satisfied

Figure 8 Health office Customer extent of satisfaction



The figure above shows customer satisfaction across different variables. Servers, capacity, behavior, and discipline received a 100% satisfaction rate from all 58 respondents. However, technology had mixed feedback, with 37.9% highly dissatisfied and 62.1% dissatisfied. Overall, 87.9% of respondents were highly satisfied, while 12.1% were satisfied. In conclusion, while most areas performed well, technology satisfaction requires attention.

Table 8 Health office Additional comments

variables	**Answers**	**Frequency**	**Percentage**
comments	modernization of queue technology	4	6.9
	no comments	54	93.1
	Total	36	100.0

The table shows that the majority of the respondents (93.1%) did not provide any comments on the modernization of queue technology in the Gullele Sub city Woreda 10 health office, indicating a lack of interest or feedback from the respondents. Only a small proportion of respondents (6.9%) provided comments related to modernization of queue technology.

4.2.3 Gullele Sub city Woreda 10 Job creation office

The Job Creation Office is a government entity focused on stimulating employment opportunities and fostering economic growth. It implements strategies to support entrepreneurship, attract investments, provide skills training, and facilitate business expansion to create more jobs and improve the local economy.

Table 9 Job creation office

variables	Answers	Frequency	Percentage
servers	3	40	100.0
server capacity	50-100	40	100.0
Queue technology	Paper-based system	40	100.0
Behaviors	Priorities	40	100.0
Queue discipline	Priority-based	40	100.0

Based on the table, it can be seen that all respondents (100%) in the Gullele Sub city Woreda 10 Job Creation Office reported that they have access to three servers. In terms of server capacity, the majority (100%) reported a range of 50-100 capacity. The respondents also reported using a paper-based system for queue technology and a priority-based approach for queue discipline, indicating a need for modernization and digitalization. The reported behaviors were mostly related to prioritizing tasks, which could indicate a need for more efficient task management. Overall, these findings suggest a potential for improvement in the office's technological infrastructure and work processes to enhance productivity and performance.

Table 10 Job creation office Customer extent

variables	Answers	Frequency	Percentage
Satisfaction servers	Satisfied	17	42.5
	Highly Satisfied	23	57.5
	Total	40	100.0

Satisfaction capacity	Satisfied	17	42.5
	Highly Satisfied	23	57.5
	Total	40	100.0
Satisfaction technology	Highly Dissatisfied	26	65.0
	Dissatisfied	14	35.0
Satisfaction behavior	Satisfied	40	100.0
Satisfaction discipline	Satisfied	40	100.0
Satisfaction overall	Satisfied	23	57.5
	Highly Satisfied	17	42.5
	Total	40	100.0

The survey results provide insights into various aspects of user satisfaction. When it comes to satisfaction with servers, 57.5% (23 out of 40) of respondents reported being highly satisfied, while 42.5% (17 out of 40) expressed satisfaction. Similarly, in terms of server capacity, the proportions were the same, with 57.5% (23 out of 40) highly satisfied and 42.5% (17 out of 40) satisfied. However, the survey revealed that 65.0% (26 out of 40) of users were highly dissatisfied with server technology, while 35.0% (14 out of 40) were dissatisfied. On the other hand, 100% of respondents reported satisfaction with server behavior and discipline. In terms of overall satisfaction, 42.5% (17 out of 40) of users were highly satisfied, and 57.5% (23 out of 40) expressed satisfaction. These findings highlight the need for improvements in server technology, despite positive satisfaction levels in other areas. Addressing the concerns related to technology could further enhance user satisfaction and provide a more comprehensive positive experience for users.

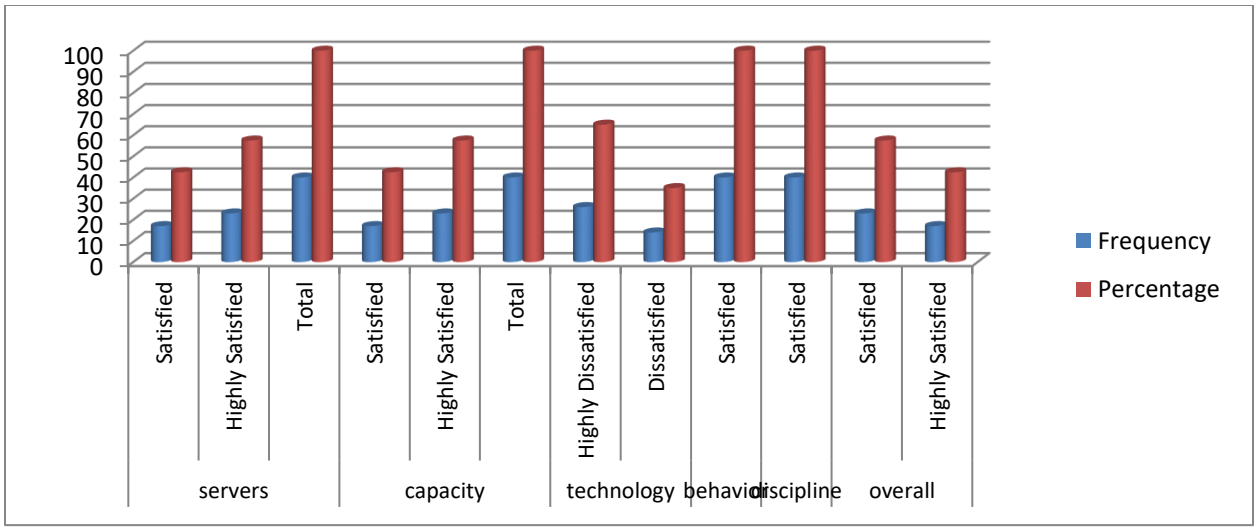


Figure 9 Job creation office Customer extent of satisfaction

The figure above summarizes customer satisfaction variables. Both servers and capacity received a 100% satisfaction rate, with 57.5% highly satisfied and 42.5% satisfied. However, technology had mixed feedback, with 65.0% highly dissatisfied and 35.0% dissatisfied. Behavior and discipline both garnered a 100% satisfaction rate. Overall satisfaction was reported by 57.5%, with 42.5% highly satisfied. Addressing technology concerns would improve overall customer satisfaction.

Table 11 Job creation office Additional comments

variables	**Answers**	**Frequency**	**Percentage**
comments	modernization of queue technology	23	57.5
	no comments	17	42.5
	Total	40	100.0

The table above presents data on the comments provided by clients of the Gullele Sub city Woreda 10 Job Creation Office regarding the modernization of queue technology. Out of the 40 respondents, 57.5% (23) provided comments suggesting the need for modernization of the queue technology, while 42.5% (17) provided no comments. The data indicates that there is a significant interest among clients for modernizing the queue technology, and it may be important for the office to consider their feedback in order to improve their service

4.2.4 Gullele Sub city Woreda10 Office of youth

The Office of Youth is a government department dedicated to empowering and supporting young individuals. It provides programs, resources, and advocacy to address their needs and promote their personal and professional development.

Table 12 Office of youth

Variables	Answers	Frequency	Percentage
servers	3	26	100.0
server capacity	100-200	26	100.0
Queue technology	Paper-based system	26	100.0
Behaviors	Standing quietly	26	100.0
Queue discipline	First-come, first-served (FCFS)	26	100.0

The table shows data on the preferences and experiences of 26 respondents regarding the servers, server capacity, queue technology, behaviors, and queue discipline. All respondents preferred servers with a rating of 3. The majority of respondents (100%) preferred server capacity between 100-200. All respondents preferred a paper-based system for the queue technology and standing quietly for behaviors. Additionally, all respondents preferred a first-come, first-served (FCFS) system for queue discipline.

Table 13 office of youth Customer extent of satisfaction

variables	Answers	Frequency	Percentage
Satisfaction servers	Highly Satisfied	26	100.0
Satisfaction capacity	Highly Satisfied	26	100.0
Satisfaction technology	Dissatisfied	7	26.9
	Satisfied	19	73.1

Satisfaction behavior	Highly Satisfied	26	100.0
Satisfaction discipline	Highly Satisfied	26	100.0
Satisfaction overall	Highly Satisfied	26	100.0

The table shows that all 26 respondents were highly satisfied with servers, capacity, behavior, discipline, and overall satisfaction. However, for satisfaction with technology, 26.9% expressed dissatisfaction, while 73.1% were satisfied.

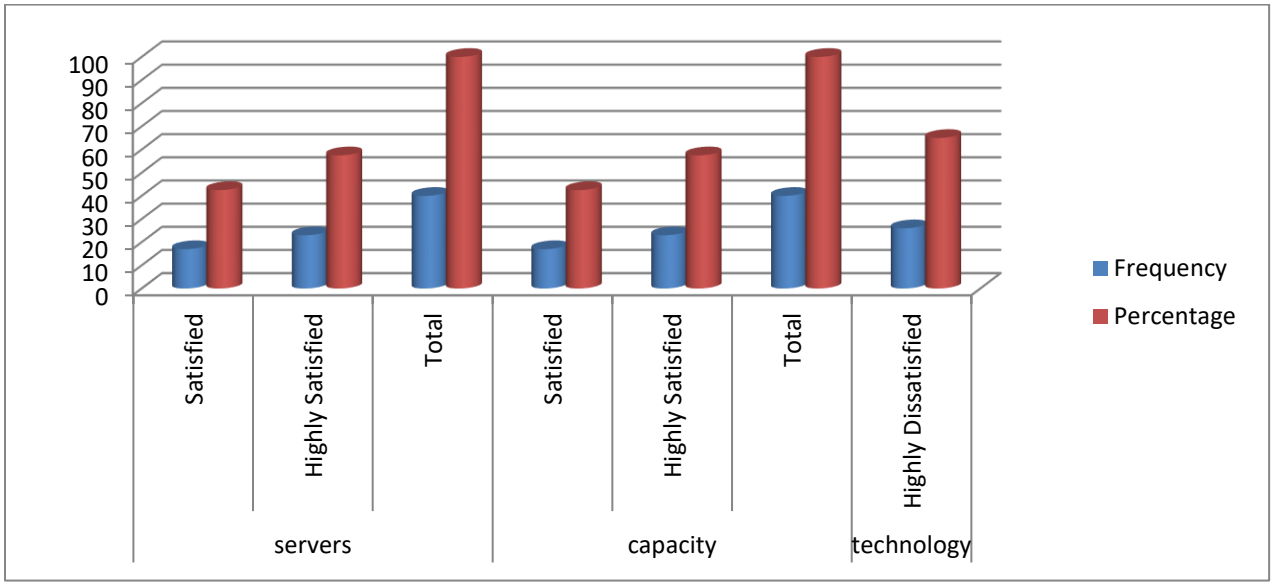


Figure 10 office of youth Customer extent of satisfaction

The figure above demonstrates customer satisfaction across various variables. Both servers and capacity received a 100% satisfaction rate, with all 26 respondents highly satisfied. However, satisfaction with technology was divided, with 26.9% expressing dissatisfaction and 73.1% reporting satisfaction. Behavior, discipline, and overall satisfaction garnered a perfect score, with all 26 respondents highly satisfied. In summary, while technology satisfaction could be improved, customers were highly satisfied overall.

Table 14 Youth office customers' comments

variables	Answers	Frequency	Percentage
comments	modernization of queue technology	20	76.9
	no comments	6	23.1
	Total	26	100.0

The table shows the feedback received from clients regarding the queue technology at Gullele Sub city Woreda 10. Out of 26 respondents, 76.9% provided comments about the need for modernization of the queue technology, while the remaining 23.1% did not provide any comments. This suggests that a significant proportion of clients are dissatisfied with the current queue technology and feel that it needs to be upgraded to improve their experience.

Table 15 Public service office

variables	Answers	Frequency	Percentage
servers	more than 3	53	100.0
server capacity	More than 200	53	100.0
Queue technology	Paper-based system	53	100.0
Behaviors	Standing quietly	53	100.0
Queue discipline	First-come, first-served (FCFS)	53	100.0

Based on the data collected from the Public Service Office in GulleleSubcityWoreda 10, all respondents (100%) reported having access to more than three servers with a capacity of over 200. However, the office still relies on a paper-based system for queue technology and a first-come, first-served approach for queue discipline. Respondents reported good behavior in terms of standing quietly while waiting. These findings suggest a need for modernization and digitalization of the office's technological infrastructure to improve efficiency and enhance service delivery to clients.

variables	Answers	Frequency	Percentage
Satisfaction servers	Highly Satisfied	53	100.0
Satisfaction capacity	Highly Satisfied	53	100.0
Satisfaction technology	Dissatisfied	15	28.3
	Neutral	28	52.8
	Satisfied	10	18.9
Satisfaction behavior	Highly Satisfied	53	100.0
Satisfaction discipline	Satisfied	53	100.0
Satisfaction overall	Highly Satisfied	53	100.0

Table 16 Public service customer's extent of satisfaction

All 53 respondents reported high satisfaction with servers, capacity, behavior, discipline, and overall satisfaction. However, satisfaction with technology varied, with 28.3% dissatisfied, 52.8% neutral, and 18.9% satisfied.

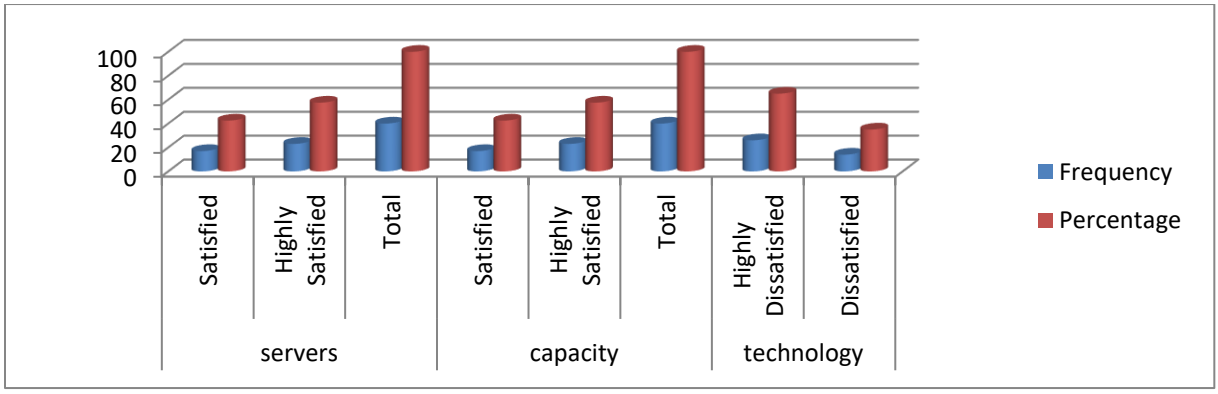


Figure 11 Public service customers extent of satisfaction

The figure above illustrates customer satisfaction variables. Both servers and capacity received a 100% satisfaction rate, with all 53 respondents highly satisfied. However, satisfaction with technology varied, with 28.3% dissatisfied, 52.8% neutral, and 18.9% satisfied. Behavior, discipline, and overall satisfaction also garnered a 100% satisfaction rate. In summary, customers were highly satisfied with servers, capacity, behavior, and discipline, but there were mixed opinions about technology satisfaction.

Table 17 Public service customers' comments

variables	**Answers**	**Frequency**	**Percentage**
comments	modernization of queue technology	8	15.1
	no comments	45	84.9
	Total	53	100.0

It can be seen that out of the 53 respondents, the majority (84.9%) did not have any comments regarding the queue technology. However, 15.1% of the respondents expressed a need for modernization of the queue technology. This suggests that there may be an opportunity to improve the efficiency and effectiveness of the queue system through technological advancements.

Table 18 Revenue office

variables	**Answers**	**Frequency**	**Percentage**
servers	3	34	100.0
server capacity	100-200	34	100.0
Queue technology	Paper-based system	34	100.0
Behaviors	Standing quietly	34	100.0
Queue discipline	First-come, first-served (FCFS)	34	100.0

Based on the table, all respondents (100%) from the Gullele Sub city Woreda 10 Revenue Office reported having access to three servers, with a server capacity range of 100-200, and using a paper-based system for queue technology. The majority (100%) of respondents also reported using a first-come, first-served (FCFS) approach for queue discipline and standing quietly for behaviors. These findings suggest that the office may benefit from exploring more modern queue technologies and digital solutions to improve efficiency and customer experience.

Table 19 Revenue office Customer extent of satisfaction

variables	Answers	Frequency	Percentage
Satisfaction servers	Highly Satisfied	34	100.0
Satisfaction capacity	Highly Satisfied	34	100.0
Satisfaction technology	Highly Dissatisfied	15	44.1
	Dissatisfied	19	55.9
Satisfaction behavior	Highly Satisfied	34	100.0
Satisfaction discipline	Highly Satisfied	34	100.0
Satisfaction overall	Satisfied	11	32.4
	Highly Satisfied	23	67.6

All 34 respondents were highly satisfied with servers, capacity, behavior, and discipline. However, satisfaction with technology varied, with 44.1% highly dissatisfied and 55.9% dissatisfied. Overall, 67.6% were highly satisfied, and 32.4% were satisfied.

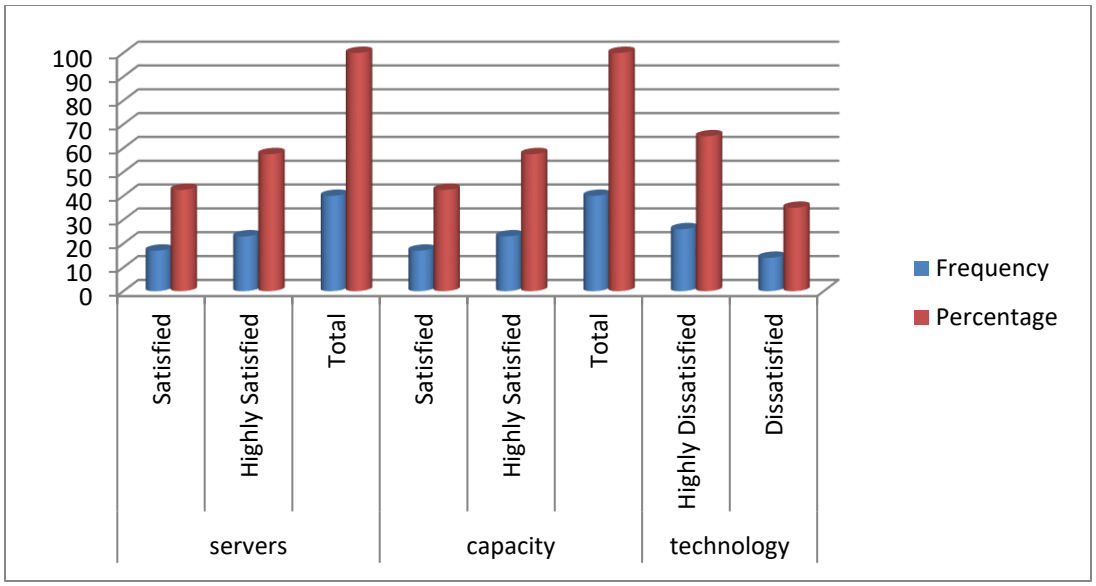


Figure 12 Revenue office Customer extent of satisfaction

The figure above depicts customer satisfaction variables. Servers and capacity received a 100% satisfaction rate, with all 34 respondents highly satisfied. However, technology satisfaction faced challenges, with 44.1% highly dissatisfied and 55.9% dissatisfied. Behavior and discipline both achieved a 100% satisfaction rate. Overall satisfaction showed a mixed response, with 32.4% satisfied and 67.6% highly satisfied. In summary, customers expressed high satisfaction with servers, capacity, behavior, and discipline, but there were notable concerns regarding technology satisfaction.

Table 20 Revenue office customers comment

variables	**Answers**	**Frequency**	**Percentage**
comments	modernization of queue technology	30	88.2
	no comments	4	11.8
	Total	34	100.0

The above table shows the responses of customers who visited the queue at Gullele Sub city Woreda 10 Revenue Office regarding their comments on the queue technology. Out of the total 34 customers, 88.2% of them expressed their opinion on the modernization of queue technology, while the remaining 11.8% did not comment. The high percentage of customers who commented suggests that there may be a need for improvements in the current queue technology.

4.2.3 Safety net office

Gullele Sub city Woreda 10 safety net office is a government agency located in the Gullele Sub city Woreda 10 area of Addis Ababa, Ethiopia. Its primary responsibility is to provide social protection services to vulnerable and disadvantaged individuals and households in the community. These services include cash transfers, livelihood support, and social rehabilitation programs. The office also provides counseling and referral services to individuals and families in need. The Gullele Sub city Woreda 10 safety net office plays a critical role in improving the well-being and livelihoods of those who are most in need in the community.

Table 21 Safety net office

variables	**Answers**	**Frequency**	**Percentage**
servers	2	31	100.0
server capacity	50-100	31	100.0
Queue technology	Paper-based system	31	100.0
Behaviors	Balking	13	41.9
	Reneging	18	58.1
Queue discipline	First-come, first-served (FCFS)	31	100.0

The table reveals that out of 31 customers, 2 of them responded that there were only 2 servers available. All of the respondents indicated that the server capacity ranged from 50-100. Additionally, all 31 customers responded that the queue technology was paper-based. In terms of

behaviors, 41.9% of customers indicated balking, while 58.1% indicated reneging. Furthermore, all 31 customers responded that the queue discipline was first-come, first-served (FCFS). Overall, this table provides insights into the customers' experiences and perceptions of the queue at Gullele Sub city Woreda 10 safety net offices.

Table 22 Safety net office Customer extent of satisfaction

variables	Answers	Frequency	Percentage
Satisfaction servers	Highly Dissatisfied	7	22.6
	Dissatisfied	10	32.3
	Satisfied	14	45.2
Satisfaction capacity	Highly Dissatisfied	7	22.6
	Dissatisfied	10	32.3
	Satisfied	14	45.2
Satisfaction technology	Highly Dissatisfied	5	16.1
	Dissatisfied	18	58.1
	Neutral	8	25.8
Satisfaction behavior	Highly Dissatisfied	7	22.6
	Dissatisfied	10	32.3
	Satisfied	14	45.2
Satisfaction discipline	Highly Dissatisfied	7	22.6
	Dissatisfied	10	32.3
	Satisfied	14	45.2
Satisfaction overall	Highly Dissatisfied	7	22.6
	Dissatisfied	10	32.3
	Satisfied	14	45.2

The table showcases a range of satisfaction levels for different variables, with accompanying percentages. Satisfaction with servers and capacity is divided between highly dissatisfied (22.6%), dissatisfied (32.3%), and satisfied (45.2%). Similarly, technology satisfaction reveals a mix of

highly dissatisfied (16.1%), dissatisfied (58.1%), and neutral (25.8%) responses. Behavior, discipline, and overall satisfaction demonstrate a similar pattern, with percentages of highly dissatisfied (22.6%), dissatisfied (32.3%), and satisfied (45.2%). Notably, technology stands out with a higher dissatisfaction rate and a significant proportion of respondents expressing dissatisfaction or neutrality. Overall, the data highlights a varied spectrum of satisfaction levels across the variables, with a majority falling into the satisfied category, but with technology posing room for improvement.

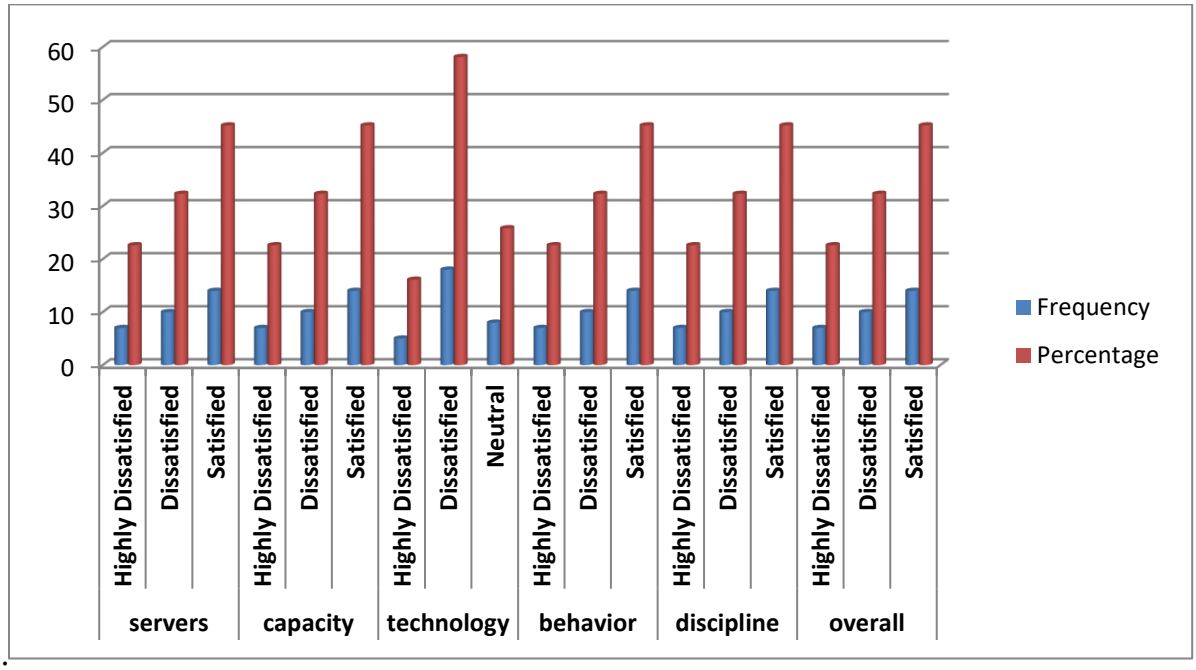


Figure 13 Safety net office Customer extent of satisfaction

The figure displays the satisfaction ratings for various variables. When it comes to servers and capacity, there is a significant level of dissatisfaction, with 22.6% highly dissatisfied and 32.3% dissatisfied for both variables. However, satisfaction levels are higher for these variables, with 45.2% being satisfied. Technology satisfaction shows a different pattern, with 16.1% highly dissatisfied, 58.1% dissatisfied, and 25.8% neutral. Behavior and discipline exhibit similar satisfaction patterns, with 22.6% highly dissatisfied, 32.3% dissatisfied, and 45.2% satisfied. Overall satisfaction follows the same trend, with 22.6% highly dissatisfied, 32.3% dissatisfied, and 45.2% satisfied. These results indicate a need for improvement in server and capacity satisfaction, as well as technology satisfaction, to ensure better overall satisfaction across the variables.

Table 22 Safety net office customers' comments

variables	Answers	Frequency	Percentage
comments	increase capacity	6	19.4
	modernization of queue technology	13	41.9
	no comments	12	38.7

According to the data, out of the 31 customers surveyed at Gullele Sub city Woreda 10 safety net office, 19.4% suggested increasing capacity, 41.9% suggested modernizing the queue technology, and 38.7% had no comments.

4.2.4 Gullele Sub city Woreda 10 Vital events

Vital events are significant life occurrences such as births, marriages, divorces, and deaths that are legally registered and recorded by the government. Registration of these events is important for legal documentation, establishing identity, and accessing rights and services.

Table 23 Vital events

variables	Answers	Frequency	Percentage
servers	3	70	100.0
server capacity	50-100	70	100.0
Queue technology	Paper-based system	70	100.0
Behaviors	Balking	45	64.3
	Reneging	20	28.6
	Jockeying	5	7.1
Queue discipline	First-come, first-served (FCFS)	70	100.0

The table shows the results of a survey conducted by Gullele Sub city Woreda 10 Vital Events Bureau regarding the current state of their queue system. The majority of respondents (100%) reported that there are 3 servers in place. Similarly, all respondents (100%) reported that the server capacity ranges from 50-100. The queue technology currently in use was reported to be a paper-based system, according to all respondents (100%). When it came to queue behaviors, the majority of respondents (64.3%) reported balking, followed by reneging (28.6%) and jockeying (7.1%). In terms of queue discipline, all respondents (100%) reported following a first-come, first-served (FCFS) system.

Table 24 Vital events customer extent of satisfaction

variables	Answers	Frequency	Percentage
Satisfaction servers	Highly Dissatisfied	68	97.1
	Dissatisfied	2	2.9
Satisfaction capacity	Highly Dissatisfied	70	100.0
Satisfaction technology	Highly Dissatisfied	60	85.7
	Dissatisfied	10	14.3
Satisfaction behavior	Highly Dissatisfied	70	100.0
Satisfaction discipline	Highly Dissatisfied	32	45.7
	Dissatisfied	32	45.7
	Satisfied	6	8.6
Satisfaction overall	Highly Dissatisfied	68	97.1
	Dissatisfied	2	2.9

The table shows significant levels of dissatisfaction across all variables. For "Satisfaction servers," the majority (97.1%) expressed high dissatisfaction. Similarly, all respondents (100.0%) reported being highly dissatisfied with "Satisfaction capacity," "Satisfaction behavior," and "Satisfaction overall." In terms of "Satisfaction technology," a large proportion (85.7%) expressed high

dissatisfaction. "Satisfaction discipline" revealed mixed responses, with a substantial portion (45.7%) expressing high dissatisfaction. Overall, the data indicates widespread dissatisfaction across the variables.

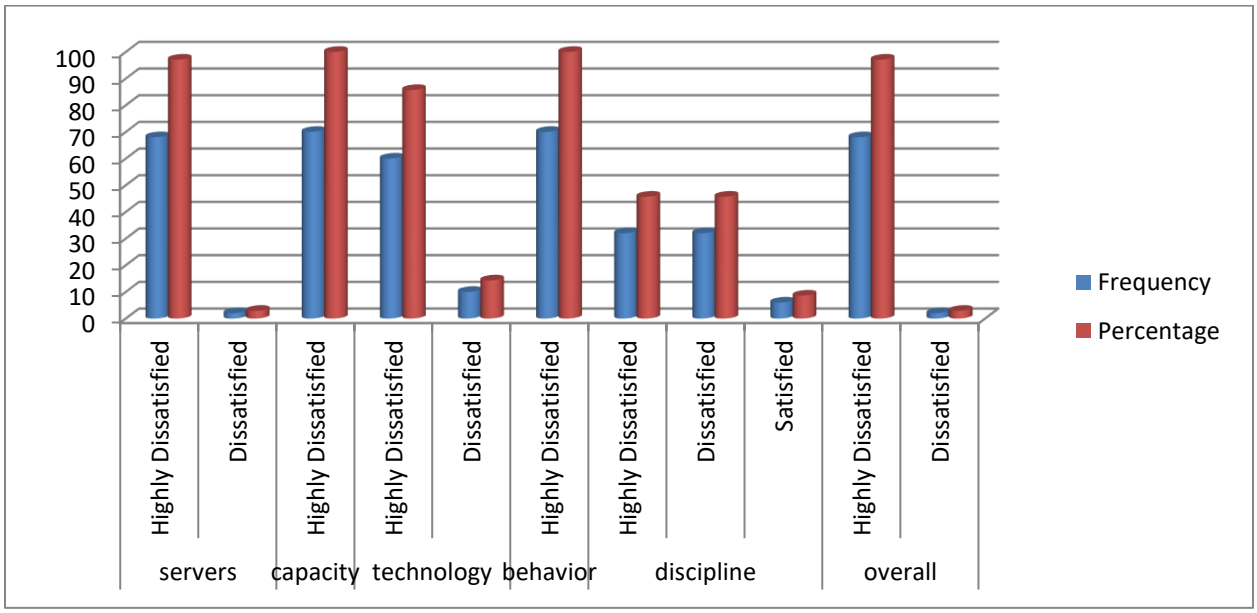


Figure 14 Vital events customer extent of satisfaction

The figure above reveals customer satisfaction levels across different variables. The majority of respondents expressed high dissatisfaction in all aspects, including servers (97.1% highly dissatisfied), capacity (100% highly dissatisfied), technology (85.7% highly dissatisfied), behavior (100% highly dissatisfied), discipline (45.7% highly dissatisfied), and overall satisfaction (97.1% highly dissatisfied). Overall, there is a clear need for improvement across all areas to enhance customer satisfaction.

Table 25 vital events office customers' comments

variables	**Answers**	**Frequency**	**Percentage**
comments	correct customer behavior	29	41.4
	increase server capacity	8	11.4
	increase servers	5	7.1
	modernization of queue technology	28	40.0

Customers at Gullele Sub city Woreda 10 vital events bureau recommended improving the queue system. The majority suggested modernizing queue technology (40.0%) and emphasizing correct customer behavior (41.4%). Some customers also mentioned increasing server capacity (11.4%) or adding more servers (7.1%). These suggestions aim to enhance efficiency, organization, and reduce waiting times for improved customer satisfaction.

Based on the data collected from various bureaus in Gullele Sub city Woreda 10, it is evident that there are both strengths and areas for improvement in the services provided. The analysis of client satisfaction levels revealed variations across different aspects of the bureaus, including servers, capacity, technology, behavior, discipline, and overall satisfaction.

The Construction and Licensing Bureau demonstrated high satisfaction levels with servers and capacity, indicating effective service delivery in these areas. However, there was a notable dissatisfaction with the technology used, which indicates a need for improvement in this aspect to enhance overall client satisfaction.

The Health Office received positive feedback for servers and capacity, indicating their ability to meet client needs in these areas. However, the dissatisfaction with technology highlights the need for modernization and improvement to enhance efficiency and overall client satisfaction.

The Job Creation Office showed satisfactory results in terms of server access and capacity. However, the reliance on a paper-based queue technology system suggests a need for modernization and digitalization. The feedback regarding behavior and discipline highlights a potential for more efficient task management. Overall, there is room for improvement in the technological infrastructure and work processes of the office to enhance productivity and performance.

The Office of Youth received high satisfaction ratings for servers and capacity. However, the dissatisfaction with technology indicates a need for improvement in this area to ensure client satisfaction. The positive feedback on behavior and discipline is encouraging, but further attention should be given to technology to enhance overall satisfaction levels.

The Public Service Office demonstrated high satisfaction levels with servers and capacity, indicating effective service delivery in these aspects. However, the dissatisfaction with queue technology suggests a need for improvement in this area to enhance overall client satisfaction. The positive feedback on behavior and overall experience is commendable, but there is room for improvement in queue discipline.

The Revenue Office received high satisfaction ratings for servers and capacity, indicating effective service delivery in these areas. However, the dissatisfaction with queue technology suggests a need for modernization to meet client expectations. The positive feedback on behavior and discipline is encouraging. Overall satisfaction levels are positive but could be further enhanced through improvements in queue technology.

The Safety Net Office showed mixed satisfaction levels, with positive feedback for servers and capacity. However, the dissatisfaction with queue technology and customer behavior indicates a need for improvement in these aspects to enhance the overall customer experience and satisfaction.

The Vital Events Bureau received widespread dissatisfaction across all aspects, including servers, capacity, technology, behavior, discipline, and overall satisfaction. These findings highlight a significant need for improvements throughout the bureau to increase customer satisfaction levels.

4.4 ANOVA analysis

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
how satisfied are you with the number of servers	Between Groups	891.471	7	127.353	715.797	.000
	Within Groups	60.492	340	.178		
	Total	951.963	347			
how satisfied are you with the capacity of servers	Between Groups	884.467	7	126.352	653.169	.000
	Within Groups	65.771	340	.193		
	Total	950.239	347			
how satisfied are you with the queue management technologies	Between Groups	183.821	7	26.260	83.907	.000
	Within Groups	106.408	340	.313		
	Total	290.230	347			
how satisfied are you with the behavior of customers	Between Groups	885.663	7	126.523	881.981	.000
	Within Groups	48.774	340	.143		
	Total	934.437	347			
how satisfied are you with the queue discipline of the office	Between Groups	567.592	7	81.085	278.304	.000
	Within Groups	99.060	340	.291		
	Total	666.652	347			
over all satisfaction	Between Groups	849.598	7	121.371	556.986	.000
	Within Groups	74.088	340	.218		
	Total	923.687	347			

Table 26 ANOVA analysis

The ANOVA analysis was conducted to explore the satisfaction levels across different factors, including the number of servers, capacity of servers, queue management technologies, behavior of customers, queue discipline of the office, and overall satisfaction.

For the factor of satisfaction with the number of servers, a significant difference was found among the groups ($F = 715.797$, $p < .001$). This implies that the number of servers has a notable impact on customer satisfaction, and there are variations in satisfaction levels across different groups.

Similarly, the factor of satisfaction with the capacity of servers yielded significant differences among the groups ($F = 653.169$, $p < .001$). This suggests that the capacity of servers plays a crucial role in determining customer satisfaction, and there are substantial variations in satisfaction levels across different groups based on server capacity.

Regarding satisfaction with queue management technologies, a significant difference was observed among the groups ($F = 83.907$, $p < .001$). This indicates that the technology employed for queue management has a significant impact on customer satisfaction, and there are notable variations in satisfaction levels across different groups.

Furthermore, the factor of satisfaction with the behavior of customers displayed significant differences among the groups ($F = 881.981$, $p < .001$). This suggests that customer behavior has a considerable influence on overall satisfaction, and there are significant variations in satisfaction levels across different groups based on customer behavior.

The factor of satisfaction with the queue discipline of the office also showed significant differences among the groups ($F = 278.304$, $p < .001$). This indicates that maintaining queue discipline is essential for enhancing customer satisfaction, and there are noteworthy variations in satisfaction levels across different groups based on queue discipline.

Finally, the factor of overall satisfaction demonstrated significant differences among the groups ($F = 556.986$, $p < .001$). This implies that the combination of all factors has a substantial impact on

overall customer satisfaction, and there are significant variations in satisfaction levels across different groups.

In conclusion, the ANOVA analysis revealed significant differences in satisfaction levels across all the examined factors. This highlights the importance of considering factors such as the number and capacity of servers, queue management technologies, behavior of customers, queue discipline, and overall satisfaction when aiming to improve customer satisfaction. By understanding these variations, organizations can focus on specific areas of improvement and enhance the overall customer experience.

4.5 Qualitative Data Analysis and Discussion of Results

The Gullele Sub City Woreda 10 offices were recently interviewed regarding their waiting line management. The first question sought to determine the average number of customers served in a day for each office. The responses varied across departments, with job creation serving 350-500 customers, construction and licensing attending to 200-350 customers, vital events handling 400-550 customers, the health office assisting 500-600 customers, the youth office accommodating 200-300 customers, public service serving 400-500 customers, the revenue office managing 300-400 customers, and the safety net department attending to 200-300 customers.

The second question focused on whether there were enough servers to effectively manage the customer queue. The consensus was that there were enough servers for all departments except for vital events, where additional servers were deemed necessary.

When asked about the number of additional servers needed to manage the customer queue effectively, it was suggested that vital events required four additional servers.

The next inquiry centered around identifying any gaps in technology or equipment necessary for efficient queue management. All departments agreed that there were indeed gaps in technology or equipment.

For vital events, the missing technology was identified as a self-kiosk, while job creation suggested the implementation of online booking. Other departments expressed a need for the adoption of new queue management technologies in general. Regarding customer behavior while

waiting in the queue, job creation mentioned jockeying, construction and licensing noted customers standing quietly, vital events experienced balking, reneging, and jockeying, the health office observed customers prioritizing their needs, the youth office witnessed customers standing quietly, and public service and revenue office both reported customers standing quietly as well. The safety net department experienced balking and reneging, similar to job creation and construction and licensing.

When asked about the overall queue discipline of the office, it was found that vital events and job creation followed a prioritization system. The health office, youth office, public service, revenue office, and safety net department all practiced a first-come, first-served (FCFS) approach. Construction and licensing, on the other hand, adopted a combination of FCFS and standing quietly.

Suggestions were sought for improving the queue discipline of the office. Vital events proposed improving the queue management system, while the safety net department suggested creating awareness among customers.

Common complaints regarding the queue management system were gathered from each department. Vital events received complaints about the longer duration of service, the health office lacked a proper waiting zone, the youth office faced a shortage of services, public service experienced customers' dissatisfaction with the lack of queue discipline, the revenue office had no queue management technology, and the safety net department received complaints about inadequate waiting areas. Job creation and construction and licensing departments reported crowded waiting places and the need for queue management technology, respectively.

Inquiring about specific policies or procedures for managing the queue, it was discovered that all departments followed traditional methods and lacked specific policies in place.

When asked if they were satisfied with the current queue management policy or procedure, vital events and job creation expressed dissatisfaction, while the other departments were generally content.Suggestions for improving the queue management policy or procedure included studying

new queue management systems that fit the vital events department and considering the waiting environment for job creation.

Finally, opinions were sought regarding the overall level of customer service provided by the offices. Vital events acknowledged that most of their customers were unhappy with the service provided throughout the day, while the other departments did not have any major concerns regarding their service.

This interview provided valuable insights into the waiting line management at the Gullele Sub City Woreda 10 offices, highlighting areas for improvement and suggestions to enhance customer satisfaction and queue discipline.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1 Summary of Findings

The Construction and Licensing Bureau reported high satisfaction levels across servers, behavior, and discipline, with an overall satisfaction rate of 100%. However, there was a mixed response regarding satisfaction with capacity, with 27.8% being satisfied and 72.2% highly satisfied. The bureau expressed high dissatisfaction with the technology being used.

In the Health Office, server capacity was reported to be more than three, and they relied on a paper-based queue system. Queue behavior was described as standing quietly in the queue, and queue discipline followed a first-come, first-served (FCFS) approach, all of which received a satisfaction rate of 100%.

The Job Creation Office had three servers and a capacity of 50-100. They also used a paper-based queue system and followed a priority-based approach for queue discipline. These preferences were rated at 100%.

The Office of Youth expressed a preference for a rating of 3 servers with a capacity of 100-200. They also preferred a paper-based queue system and a first-come, first-served (FCFS) queue discipline. The satisfaction levels for servers, capacity, behavior, and discipline were all rated at 100%, while satisfaction with technology showed a split opinion.

In the Public Service Office, server access exceeded three servers with a capacity of over 200. Similar to other offices, they used a paper-based queue system and followed a first-come, first-served (FCFS) discipline. The satisfaction levels for servers, capacity, behavior, and discipline were all rated at 100%. However, satisfaction with technology varied, with 28.3% expressing dissatisfaction, 52.8% neutral, and 18.9% satisfaction.

The Revenue Office had three servers with a capacity of 100-200. They relied on a paper-based queue system and followed a first-come, first-served (FCFS) approach for queue discipline. Satisfaction levels for servers, capacity, behavior, and discipline were all rated at 100%. However, satisfaction with technology showed a higher dissatisfaction rate of 55.9%.

The Safety Net Office reported having two servers out of 31 respondents, with a capacity of 50-100. They also used a paper-based queue system and followed a first-come, first-served (FCFS) discipline. Satisfaction levels varied, with 22.6% highly dissatisfied, 32.3% dissatisfied, and 45.2% satisfied for servers, capacity, behavior, and discipline. Satisfaction with technology showed a higher dissatisfaction rate of 58.1%.

The Vital Events Bureau had three servers with a capacity of 50-100. They used a paper-based queue system and followed a first-come, first-served (FCFS) discipline. Queue behaviors included balking, reneging, and jockeying. Satisfaction levels varied, with 97.1% dissatisfied and 2.9% satisfied for servers, 82.9% dissatisfied and 17.1% satisfied for capacity, 2.9% highly dissatisfied, 88.6% dissatisfied, and 8.6% satisfied for behavior, and 82.9% dissatisfied and 17.1% satisfied for discipline. Satisfaction with technology showed a high dissatisfaction rate of 77.1%.

In summary, these offices exhibit different preferences, behaviors, and levels of satisfaction regarding server access, capacity, queue technology, and queue discipline. It is evident that several offices have expressed dissatisfaction with the technology being used, which may present opportunities for improvement and modernization in those areas.

ANOVA findings reveal the significance (Sig.) and F-values for various factors related to customer satisfaction. Each factor, including the number of servers, capacity of servers, queue management technologies, behavior of customers, queue discipline of the office, and overall satisfaction, has been evaluated separately.

For the factor "Number of Servers," the between-groups Sum of Squares is 891.471, with 7 degrees of freedom (df), resulting in a mean square of 127.353. The F-value is 715.797, and the

significance level (Sig.) is reported as .000, indicating a highly significant difference. This suggests that the number of servers has a substantial impact on customer satisfaction.

Similarly, for the factor "Capacity of Servers," the between-groups Sum of Squares is 884.467, with 7 degrees of freedom (df), resulting in a mean square of 126.352. The F-value is 653.169, and the significance level (Sig.) is reported as .000, indicating a highly significant difference. This implies that the capacity of servers significantly affects customer satisfaction.

Moving on to the factor "Queue Management Technologies," the between-groups Sum of Squares is 183.821, with 7 degrees of freedom (df), resulting in a mean square of 26.260. The F-value is 83.907, and the significance level (Sig.) is reported as .000, indicating a highly significant difference. This suggests that the choice of queue management technologies has a significant impact on customer satisfaction.

Examining the factor "Behavior of Customers," the between-groups Sum of Squares is 885.663, with 7 degrees of freedom (df), resulting in a mean square of 126.523. The F-value is 881.981, and the significance level (Sig.) is reported as .000, indicating a highly significant difference. This implies that customer behavior plays a significant role in determining customer satisfaction.

Regarding the factor "Queue Discipline of the Office," the between-groups Sum of Squares is 567.592, with 7 degrees of freedom (df), resulting in a mean square of 81.085. The F-value is 278.304, and the significance level (Sig.) is reported as .000, indicating a highly significant difference. This suggests that the queue discipline within the office has a substantial impact on customer satisfaction.

Lastly, for the factor "Overall Satisfaction," the between-groups Sum of Squares is 849.598, with 7 degrees of freedom (df), resulting in a mean square of 121.371. The F-value is 556.986, and the significance level (Sig.) is reported as .000, indicating a highly significant difference. This implies that the overall satisfaction level of customers significantly varies based on the factors considered.

In summary, all the factors mentioned above exhibit highly significant differences in customer satisfaction levels. The F-values indicate that the variations between different groups are

substantial, and the low significance levels (Sig.) suggest that these differences are not due to random chance. Thus, the identified factors have a strong influence on customer satisfaction

5.2. Conclusion

Based on the provided summary and ANOVA findings, it is evident that various factors significantly impact customer satisfaction levels across different offices. The factors that have been evaluated include the number of servers, capacity of servers, queue management technologies, behavior of customers, queue discipline of the office, and overall satisfaction.

The findings reveal that each of these factors plays a crucial role in determining customer satisfaction. The number of servers and capacity of servers have a significant impact, suggesting that offices with more servers and higher capacity tend to have higher satisfaction levels. Additionally, the choice of queue management technologies also significantly affects customer satisfaction, highlighting the importance of modernization in this aspect.

Customer behavior and queue discipline within the office are identified as key factors influencing satisfaction. Offices that manage customer behavior effectively and maintain a fair and organized queue discipline tend to have higher satisfaction levels. These findings emphasize the significance of providing a positive and efficient customer experience.

The Vital Events Bureau exhibits lower levels of satisfaction compared to other offices across several factors. Specifically, satisfaction with servers, capacity, behavior, and discipline is relatively low, with a significant portion of respondents expressing dissatisfaction. Additionally, satisfaction with technology in the Vital Events Bureau is particularly low, with a high dissatisfaction rate.

The ANOVA findings indicate that customer satisfaction in the Vital Events Bureau significantly varies based on the factors evaluated. The number of servers, capacity of servers, queue management technologies, customer behavior, and queue discipline all play a role in determining satisfaction levels.

To improve satisfaction in the Vital Events Bureau, it is important to address the identified areas of concern. Enhancements in server capacity could help meet the demands of customers more effectively, reducing waiting times and improving overall satisfaction. Considering the dissatisfaction with technology, exploring and implementing more advanced and efficient queue management technologies could greatly enhance the customer experience.

Efforts should also be made to address customer behavior and ensure a fair and organized queue discipline within the office. Implementing strategies to manage customer behavior effectively and maintain a structured queue system can contribute to a more positive and satisfactory experience for customers.

Overall, by focusing on improving servers, capacity, queue management technologies, customer behavior, and queue discipline, the Vital Events Bureau can work towards increasing customer satisfaction. Regular assessments and feedback from customers can also help identify areas for improvement and ensure continuous enhancement of services.

5.3 Recommendation

The satisfaction levels for the Vital Events Bureau appear to be significantly lower compared to the other offices mentioned. While the overall satisfaction rates for servers, capacity, behavior, and discipline are relatively low, the satisfaction with technology stands out as a particular concern. A high dissatisfaction rate of 77.1% suggests that there are significant issues or shortcomings with the technology being used in the Vital Events Bureau.

Furthermore, the satisfaction levels for servers, capacity, behavior, and discipline also indicate a lower level of satisfaction compared to the other offices. Dissatisfaction rates ranging from 82.9% to 97.1% for these aspects suggest that there may be inefficiencies or deficiencies in the bureau's operations.

Given these concerns, it would be advisable for the Vital Events Bureau to assess and address the underlying issues contributing to the low satisfaction levels. This could involve evaluating and

upgrading their technology infrastructure, improving queue behaviors and discipline, and addressing any capacity-related challenges. By prioritizing improvements in these areas, the bureau can aim to enhance the overall satisfaction levels and provide better services to its constituents.

1. Enhance server capacity: Given the lower satisfaction levels reported for servers and capacity, it is crucial to address this issue. Consider increasing the number of servers or improving their efficiency to handle the demands effectively. This can help reduce waiting times and ensure a smoother customer experience.

2. **Upgrade queue management technologies**: The dissatisfaction with technology indicates a need for modernization in queue management. Explore and implement more advanced and efficient queue management technologies, such as digital ticketing systems or self-service kiosks. This can streamline the queue process, improve efficiency, and enhance customer satisfaction.

3. **Manage customer behavior effectively**: The study highlights the importance of managing customer behavior for higher satisfaction. Implement strategies to educate and encourage customers to adhere to queue etiquette, such as clear signage, announcements, and staff training. This can minimize queue disruptions and ensure a more orderly and pleasant experience for everyone.

4. **Maintain queue discipline**: It is essential to enforce a fair and organized queue discipline within the Vital Events Bureau. Regularly monitor and manage the queue system to prevent queue jumping, encourage the first-come, first-served (FCFS) principle, and address any instances of queue discipline violations promptly. This will contribute to a sense of fairness and enhance customer satisfaction.

5. **Seek customer feedback**: Regularly collect feedback from customers regarding their experience at the Vital Events Bureau. This can be done through surveys, suggestion boxes, or online feedback platforms. Analyze the feedback and identify areas for improvement. Use this information to guide decision-making and prioritize enhancements that will directly impact customer satisfaction.

6. **Continuous improvement**: Establish a culture of continuous improvement within the Vital Events Bureau. Encourage staff members to suggest innovative ideas and solutions to enhance customer satisfaction. Regularly evaluate and update the processes, systems, and technologies in place to ensure they align with evolving customer expectations.

7. **Expand office space**: Consider expanding the physical office space to accommodate a larger number of customers comfortably. A larger office area can help reduce congestion and overcrowding, providing a more spacious and comfortable environment for customers while they wait. This can contribute to a more positive perception of the bureau and enhance overall satisfaction.

8. Create an attractive waiting area: Design and create an appealing waiting area for customers. Consider incorporating comfortable seating, adequate lighting, and aesthetically pleasing decor. Provide amenities such as reading materials, refreshments, or entertainment options (e.g., TV screens or Wi-Fi) to make the waiting experience more enjoyable. A visually appealing and comfortable waiting area can help alleviate customer stress and contribute to a positive perception of the Vital Events Bureau.

By implementing these recommendations, the Vital Events Bureau can work towards improving customer satisfaction levels. It is important to regularly monitor and assess the impact of these initiatives, making adjustments as necessary. Providing a positive and efficient experience for customers will contribute to their overall satisfaction and loyalty to the Vital Events Bureau.

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APPENDIX 1

RESEARCH QUESTIONNAIRE

ADDIS ABABA UNIVERSITY COLLEGE OF

Business & Economics School of Commerce

Department of Logistics and

Supply Chain Management

Dear respondents

I am a graduate student at Addis Ababa University School of Commerce Department of Logistics & Supply Chain Management. I am conducting a research study on the title "Assessment of waiting line system in improving customer satisfaction The case of Gullele Sub city Woreda 10 Vital Events Bureau". As a resident of Gulele sub-city, you have been nominated to participate in this research survey. Your responses will help me in fulfilling the requirements for my Master's Degree in Logistics & Supply Chain Management. I appreciate your time and honesty in answering the questions as your feedback is essential for the outcome of the project. It will only take a few minutes to complete the questionnaire, and I assure you that your responses will be kept confidential. Thank you in advance for your participation. If you have any questions, please do not hesitate to contact me via

E-mail (zduab01@gmail.com) or phone (0928665267).

Questions for Customers

SECTION A: Demographic & General Information

1. What is your gender?

A) Male ☐

B) Female ☐

C) Other ☐

D) Prefer not to say ☐

2. What is your age range?

A) Under 18 ☐

B) 18-24 ☐

C) 25-34 ☐

D) 35-44 ☐

E) 45-54 ☐

F) 55-64 ☐

G) 65 or older

3. What is your occupation?

A) Student ☐

B) Employed (full-time) ☐

C) Employed (part-time) ☐

D) Self-employed ☐

E) Unemployed ☐

F) Retired ☐

G) Other (please specify): _____

4. What is your highest level of education completed?

A) Less than high school ☐

B) High school diploma/GED ☐

C) Some college or associate degree ☐

D) Bachelor's degree

E) Graduate or professional degree

5. What is your annual household income?

A) Less than 20,000ETB

B) 20,000-39,999 ETB

C) 40,000-59,999 ETB

D) 60,000-79,999 ETB

E) 80,000-99,999 ETB

F) 100,000 ETB or more

SECTION B-1 Customs' Response on Services Quality

6. How far do you travel to reach the Gullele Sub City Woreda 10?

A) Less than 1 km

B) 1-5 km

C) 5-10 km

D) More than 10 km

7. How many servers are available at the Gullele Sub City Woreda 10 office's queue management system?

A) 1

B) 2

C) 3

D) More than 3

8. What is the capacity of the servers at the Gullele Sub City Woreda 10 office's queue management system?

A) Less than 50 ☐

B) 50-100 ☐

C) 100-200 ☐

D) More than 200 ☐

9. What technology does the Gullele Sub City Woreda 10 currently use for queue management?

A) Paper-based system ☐

B) Electronic system ☐

C) Hybrid system (combination of paper and electronic) ☐

D) Other (please specify): _____

10. What kind of technology is missing from the Gullele Sub City Woreda 10 office's queue management system?

A) Online booking system ☐

B) SMS notification system ☐

C) Mobile application ☐

D) Self-service kiosks ☐

E) all ☐

11. Which of the following behaviors have you observed from customers while waiting in line at the Gullele Sub City Woreda 10 office?

A) Balking ☐

B) Reneging

C) Priorities

D) Jockeying

E) Standing quietly

12. What queue discipline do Gullele sub city Woreda 10 offices follow?

A) First-come, first-served (FCFS)

B) Last-come, first-served (LCFS)

C) Priority-based

D) Standing quietly

SECTION B: 2. Customers' ratings of queue management system?

13. How satisfied are you with the Gullele Sub City Woreda 10 office's queue management system?

A) Highly satisfied

B) Somewhat satisfied

C) Neutral

D) Somewhat dissatisfied

E) Highly dissatisfied

14. How satisfied are you with the level of queue discipline observed in Gulele Sub City Woreda 10?

A) Highly satisfied

B) Satisfied

C) Neutral

D) Dissatisfied

E) Highly dissatisfied

15. How satisfied are you with the queue management system technology used in Gullele Sub City Woreda 10?

A) Highly satisfied

B) Satisfied

C) Neutral

D) Dissatisfied

E) Highly dissatisfied

16. How satisfied are you with the server capacity of the queue management system in Gullele Sub City Woreda 10?

A) Highly satisfied

B) Satisfied

C) Neutral

D) Dissatisfied

E) Highly dissatisfied

17. How satisfied are you with the number of servers used in the queue management system in Gullele Sub City Woreda 10?

A) Highly satisfied

B) Satisfied

C) Neutral

D) Dissatisfied

E) Highly dissatisfied ☐

18. How long do you usually wait in line at the Gullele Sub City Woreda 10 office's queue management system?

A) Less than 10 minutes ☐

B) 10-20 minutes ☐

C) 20-30 minutes ☐

D) More than 30 minutes ☐

19. How often do you use the Gullele Sub City Woreda 10 office's queue management system?

A) Daily ☐

B) Weekly ☐

C) Monthly ☐

D) Rarely ☐

E) Never ☐

20. How likely are you to recommend the Gullele Sub City Woreda 10 office's queue management system to others?

A) Very likely ☐

B) Somewhat likely ☐

C) Neutral ☐

D) Somewhat unlikely ☐

E) Very unlikely ☐

21. Have you experienced any issues or problems with the Gullele Sub City Woreda 10 office's queue management system?

A) Yes ☐ B) No ☐

22. If you answered "Yes" to question 11, please answer the following: 12. What kind of issues or problems have you experienced with the Gullele Sub City Woreda 10 office's queue management system? (Select all that apply)

A) Long waiting times ☐

B) Technical issues ☐

C) Confusing instructions ☐

D) Unfriendly staff ☐

E) Other (please specify): _____

23. How would you rate the level of customer service provided by the Gullele Sub City Woreda 10 office's queue management system?

A) Excellent ☐

B) Good ☐

C) Fair ☐

D) Poor ☐

E) Very poor ☐

24. What kind of improvements would you suggest for the Gullele Sub City Woreda 10 office's queue management system?

A. More servers ☐

B. More efficient technology ☐

C. Better queue discipline ☐

D. Other suggestions (please specify): _____For employees

SECTION B: 3. Customers' Extent of satisfaction level

In this section state to what extent are the following waiting lines management strategies satisfies you. Use the scale of 1= Highly Dissatisfied 2= Dissatisfied 3= Neutral 4= Satisfied 5= Highly Satisfied

No	Customers level of satisfaction	(1) Highly Dissatisfied	(2) Dissatisfied	(3) Neutral	(4) Satisfied	(5) Highly Satisfied
1.	**On a scale of 1-5, how satisfied are you with the overall queue management system at the Gullele Sub City Woreda 10**					
2.	**How satisfied are you with the number of servers available to manage the queue at the Gullele Sub City Woreda 10**					
3.	**How satisfied are you with the capacity of the servers at the Gullele Sub City Woreda 10 office's queue management system?**					
4.	**How satisfied are you with the technology used to manage the queue at the**					

	GulleleSub City Woreda 10?					
5.	**How satisfied are you with the behavior of other customers in the waiting line at the Gullele Sub City Woreda 10?**					
6.	**How satisfied are you with the queue discipline at the Gullele Sub City Woreda 10 office?**					
7.	**Overall, how are you satisfied with queue management system at the Gullele Sub City Woreda 10?**					

Any further observations, concerns or requests? Topics that you felt were left out.

_____

_____

_____

_____

APPENDICES 2

The following interview questions are for management of the Gullele Sub City Woreda 10 offices, specifically regarding their waiting line management.

1. What is your role at the Gullele Sub City Woreda 10?

_____

_____

2. On average, how many customers do you serve in a day?

_____

_____

3. Do you think there are enough servers to manage the customer queue effectively?

_____

_____

_____

4. If no, how many additional servers do you suggest to manage the customer queue effectively?

_____

_____

____

5. Do you believe there are any gaps in technology or equipment needed for effective queue management?

_____

_____

____

6. If yes, what kind of technology or equipment is missing?

_____

_____

____

7. How do customers behave while waiting in the queue?

_____

_____

____

8. How would you describe the overall queue discipline of the office?

_____

_____

____

9. Do you have any suggestions for improving the queue discipline of the office?

_____

_____

____

10. What is the most common complaint you receive from customers regarding the queue management system?

_____

_____

____

11. Does the office have any specific policies or procedures in place for managing the queue?

_____

_____

____

12. If yes, please briefly describe the queue management policy or procedure.

_____

_____

____

13. Are you satisfied with the current queue management policy or procedure?

_____

_____

_____

14. If no, what kind of improvements would you suggest for the queue management policy or procedure?

_____

_____

15. How do you feel about the overall level of customer service provided by the Gullele Sub City Woreda 10?

_____

_____

16. Do you have any other comments or suggestions for improving the customer service experience?