Determinants of Queue Management System: A study of NBP customers in Lahore

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Dedication

I would like to dedicate my work to my spiritual teacher, friend and guide Mian Mushtaq Ahmed Azeemi (Late). Only your encouragements and guidelines made me able to achieve my targets in life. I pray for you every day and you remain with me all the time Beloved Mian Mushtaq.

Abstract

In today's highly competitive business environment, customer has become the foundation of any business success. All service industries particularly banks, pay special attention to provide best possible services to its customers. National Bank of Pakistan, being the largest public sector bank of Pakistan, constantly strive to improve its services for customers and to minimize their issues. One of the prominent issue NBP customers mostly complaint about, is of long waiting queues in order to obtain a specific service. To solve the queuing problem in NBP, a survey questionnaire was developed in which 02 items were adopted and 30 items developed and validated by Alumni of Harvard University, Professors from various universities of Turkey, Germany and Pakistan as well as 07 Vice President and above ranked senior executives of NBP. Out of total 3,192,500 customers of NBP, customers belonging from Lahore city only which are 584,465 has been selected as a sampling frame. NBP has total 84 branches in Lahore out of which every third branch is selected totaling to 28 branches after sorting them alphabetically. Total 336 questionnaire forms were distributed amount 28 branches. Total response rate is 95%. Using rotated component matrix in the Exploratory Factor Analysis (EFA), this has been found in this study that "Customer's Waiting Experience" & "Communication through Cell Phones" are the two most significant determinants of queue management system perceived by the customers of National Bank of Pakistan in Lahore city. In light of the determinants found in this research, NBP needs to update their existing old paper/ token based queue management system. The existing traditional queuing management system is not only causing frustration, dissatisfaction among NBP customers but it is also one of the major source of loss of customers. This research was conducted in Lahore city only. It can be conducted all over Pakistan specially its rural areas to test what is the adaptability of this system there and what is the level of willingness present there among the customers.

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CHAPTER 1: INTRODUCTION

1.1 Background of Study

In this fast paced, technologically advanced and modern world, Pakistani students belonging to Government owned colleges have to still wait in long queues many time even up to many hours for the purpose of paying their college fees only (Ghani, 2016). If a customer waiting in line for services, it may potentially be a lost customer (Sheu, McHaney, & Babbar, 2003). A survey conducted by Great Clips showed that 94% customers want to wait for only 5 to 10 minutes or less in order to get served (Guarini, 2012). Customer's waiting time should be managed and controlled because waiting to get served is cause of frustration for the customers due to the fact that people have a very busy lives (Davis & Heineke, 1994).

87% customers in a survey conducted by Great Clips, showed their willingness to use some kind of technology in order to reduce their waiting time (Guarini, 2012). Because of the rapid growth in ICT and Technology Services, e-services now a days has become very popular alternative for many organizations that manage customer queues. E-services helps the service industry to reduce physical visits of customers in their premises by some extent (Mohammadi & Yaghoubi, 2008). However, it is not possible at all to provide every kind of services electronically as the customers still need to come physically in many situations for verifying their entity such as for ID cards and passports (Jidin, Yusof, & Sutikno, 2016).

Queues are formed in any service organization when the demand of serving the customer exceeds its supply (Guarini, 2012). This is because generally one customer can be entertained from one service counter at a time (Hillier, 2012). In a service office such as Bank, queuing process starts when a customer arrives and it is considered as an input. The total customers served as basically output of queuing process. Customers have to wait for their turn to be served in this queuing process till they get served. Usually, the number of employees serving the customers are outnumbered by the total number of waiting customers in a queuing (Delgado, van Ackere, & Larsen, 2011).

To date, there are number of solutions that have been proposed to manage customer queues in order to bring efficiency in service sector. A large number of papers have been published shedding light on queuing model analysis using queuing theories and computer simulations. The key focus of all these papers is mainly to optimize the queuing time especially during peak hour thereby increasing the overall efficiency and service of the service organization. These analysis produced various outcomes such as it helped more accurately calculating customer's expected total waiting time (Huang, Yao, & Ji, 2014), to know what is the optimum number of needed service counters (Ullah, Zhang, Iqbal, & Ayat, 2014), and also the actual number of employees required to efficiently serve customers (Liao & Chiang, 2013). The conventional ways of managing customer queues are to issue paper printed queue number or tickets or may be a physical token printed coin. These methods has many issues in them such as paper tickets littering and also long customers queue waiting time. A cell phone based queuing management system however, may help in reducing long queuing problem in servicing organization such as bank and thereby increasing customer's satisfaction (Jidin et al., 2016).

National Bank of Pakistan is the largest Public Sector Bank in Pakistan having a branch network of 1450 plus branches across Pakistan and abroad. In the year 2016, the total assets of NBP were PKR 1,799 billion and the total deposits were PKR 1,657 billion. NBP's pre-tax profit in the year 2016 was PKR 37.14 billion (Nbp, 2017). However NBP is seriously facing long customer queuing problem in almost its every branch. Long queues at around 31 colleges for both boys as well as girls in the city of Pakistani capital Islamabad, are seen usually two times a year at the designated branches of National Bank of Pakistan (Pakistan's largest public bank). Students explain that these long queues are one of the major causes of high frustration for them and they have to skip important classes just to pay their college fee (Ghani, 2016).

Limited literature have been found in the area of removing queuing problems from large Pakistani organizations such as National Bank of Pakistan, using technologically advanced queuing management systems such as SMS or mobile app based queue management systems. Therefore, there is a need to find out the determinants of queue management system perceived by the customers of NBP, in order to solve the queuing problem in NBP.

1.2 Problem Statement

Long customer queuing is one of the most significant factor that frustrates NBP customers (Ghani, 2016). In any service organization and banks in particular, key decision makers and managers can be found mostly concerning about reducing the waiting time of their customers. One of the key factors in today's competitive world that plays its major role in the success of any organization, is increasing its customer's level of satisfaction by improving the quality of service that an organization is providing. Banking companies give special importance to enhance their service quality using all possible means. Two factors which play very significant role as in developing customer's mindset about quality of service in Bank, are queue length and waiting time. Therefore, banks' managers are always found very much concerned about providing the best possible service configurations that can satisfy customers as well as the service providers (Madadi, Roudsari, Wong, & Galankashi, 2013).

In Pakistan, service sector has become more than 55% of the total gross domestic product (WorldBank, 2016). The direct labor cost of service industry can go up to 60 to even 70% (Tan & Netessine, 2014). Managing appropriate level of working staff has become a prominent issue these days. To have larger number of working staff to provide better queuing management is costly but less number of staff can cause long customer waiting lines in service industry (J. Wang & Zhou, 2017). In order to find a cost effective solution to the queuing problem that increases customer dissatisfaction and may lead to ultimately loss of customer in NBP, there is a need to explore determinants of queue management system perceived by its NBP's own customers. These determinants have not been previously explored in the context of Pakistan's largest public sector bank.

1.3 Research Question

- What are the determinants of queue management system perceived by the customers of NBP in Lahore?

1.4 Research Objectives

- To examine the determinants of queue management system perceived by the customers of NBP in Lahore.

1.5 Significance

This study signifies its importance in finding out the determinants of queue management system that can be helpful in solving the queuing problem in NBP. Customers always tries to find and choose the available alternative options that have the lesser waiting time (Clemmer & Schneider, 1989). It therefore, will help customers in solving the queuing problem using technology. This study helps operation mangers as well as the policy makers of NBP to use mobile based system of managing queues in order to increase customer satisfaction. This study will also be helpful for other service sector organizations who has queuing problem, in deciding whether to adopt the mobile based queue management system can play its part in increasing customer's comfort level and satisfaction with the organization.

1.6 Scope and Limitations

This study has number of benefits as mentioned above. However it has few limitations as well. There was a limited time so the researcher could only perform this study in NBP branches situation in Lahore city only. This study can be done in rural cities of Pakistan and even other countries and on various industries to get the better insight.

CHAPTER 2: LITERATURE REVIEW

Every organization which is in the business where there is a need to directly interact with its customers faces the issue of queues. Customers wait to get served, can be found in verity of organizations including manufacturing organizations, service industries, profit and non for profit organizations, private and public enterprises. Usually, the issue of long customer waiting time or queuing problem can be seen in hospitals, from almost everywhere from IT companies to government offices, and in almost every other type of service providing company from banks and grocery stores to restaurants and hotels. In almost any situation, the major issue with long customer queue is that customers do not like to wait (Davis & Heineke, 1994). Scientists found that in service organizations like banks, queuing is one of the major cause of the loss of customers. As research found that the total time a customer waits for service in a bank's queue, the quality of service that Bank's branches provide, the service of Bank's staff and the customer's convenience effect largely on customer's experience. The most important component that impacts customer's experience is in fact, his or her waiting time for service. One of the main complaint that customers do that increase their dissatisfaction level, is regarding standing in long queues in a particular Bank for getting served (Xiao & Zhang, 2010).

Even if the service of a particular Bank or service organization is quite good, still the customer's perception about the service is largely dependent upon the total time he or she has to wait in line or a queue in order to get served. For example, with the rapid economic development, the awareness regarding cost of time as well as improving the service efficiency especially in queues has gained significant importance in the eyes of people. However, still the queuing problem do exist in number of service areas such as medical clinics, shopping Malls, markets, Banks etc. And this queuing problem gets amplified usually in evening and weekends (W.J. Xing et al., 2015). Hence to manage customer queues in business organizations such as banks, has become an important issue due to the fact that all such places do experience high amount of customer visits especially during their peak hours. In today's highly challenging and competitive working environment, customer satisfaction is considered as one of the major cause of concern. It is therefore there exists a need to find out all possible and effective ways of resolving queuing problem as it can be one of the major cause of customer dissatisfaction (Xiao H et al., 2010).

The improper queuing management nowadays not only causing tension and stress among customers but also with the employees. Due to this, service oriented organizations such as banking industry is facing severe problem of managing lengthy queues the same problem can be found in other places such as airports and the queuing problem gets amplified during peak hour making it even more difficult to manage. Long queues not only inclined customers towards shifting to other service companies who provide better services but it also is a main cause of job satisfaction among the employees of the organization (Md. Nasir Uddin et al., 2016).

We cannot unfortunately skip waiting from our daily lives. Waiting is a thing that we all face in daily routine from going post offices to supermarkets to even situation of mere pleasure. Overall, in our total life, we do spend lot of time waiting (Carvalho & Belo, 2016). Waiting is such a thing that almost always prevails. Waiting has an increasing trend, it tends towards worsen because of the increasingly progressive specialization of the society of ours. If someone think in detail regarding the time that has passed in queues, he will conclude that will truly impressed (Maister, 1985).

The time we pass waiting in a queue, depends up on many kind of factors, such as the number of people who are standing ahead of us in a queue, the number of people present on a service counter as well as how the employee efficiently performs its job in the counter. Due to these facts, it is difficult to predict the exact waiting time of a queue. Furthermore, due to factors like these, there exist large amount of variations between the total waiting of one customer with the other. To reduce the variable up to some extent, it would be very important to know the time of customer entering the organization, total time of his waiting in a queue and the time consumed to serve him or her. It is also very important for the serving organization to know regarding average size of queue it experience especially during peak hours as well as the total time its employees remain unoccupied (Gurumurthi & Benjaafar, 2004).

The type of queues may be different in different situations and places, for instance people may orderly queued up in lines for the purpose of purchasing tickets from counter(s). On the other hand, in places such as Banks and post offices, token or waiting numbers are normally issued to

customers which are printed on paper. This may lead to another issue of heavy usage of papers for the purpose of issuing token number to customers (Jidin et al., 2016).

Nowadays, customers are much more concern about their time than ever before. In this constantly demanding competitive work environment, the increasing expectations and need to accomplish more in lesser time has gained significant importance. It is learned by service providers in this challenging work environment these days that customer value time allot more today compared with the past and they considered waiting time in queue as wasted time (Sheu et al., 2003). The reason waiting queue gets develop is that every customer cannot be entertained immediately all the time as she or he reaches to obtain the service (Hillier, 2012).

Waiting lines have been studied quite widely under the theory termed queuing theory. Queuing theory is one of the most commonly used technique for quantitative analysis. It was developed in 1903 My K.Erlang. A customer has to go through a waiting line in case of rush especially in order to avail a desired service. This is because usually one customer can be entertained from one counter at a time. Queues are used as another term for representing waiting lines, can also be formed when machines waiting to get repaired, or trucks in line to be unloaded, or airplanes for example lined up on a runway waiting for obtaining the takeoff permission (Hillier, 2012). Whenever a customer stands in a queue, it has to spend time to get his or her turn to get served. This time is called waiting time. Waiting lines can easily be seen in every day these days, for instance, it can be seen when people shopping for groceries, buying fuel gasoline, or making a bank transaction, or even waiting in line standing at the railway station for ticket reservation. There are three basic components of a queuing process. Namely, arrivals, the actual waiting time in a queue and the service facilities (Gupta, Tiwari, & Joshi, 2016). In order to reduce the customer waiting time which my lead to customer's dissatisfaction, service operation managers constantly strive to shorten the customer waiting time (Durrande-Moreau, 1999).

Queue management system and processes have been studied from various angles over the years. (Sheu et al., 2003) Studied customer's waiting time particularly how the service process design effects customer's waiting time. Figure-1 below shows four various kinds of service designs that are extensively found in research literature (Sheu et al., 2003).

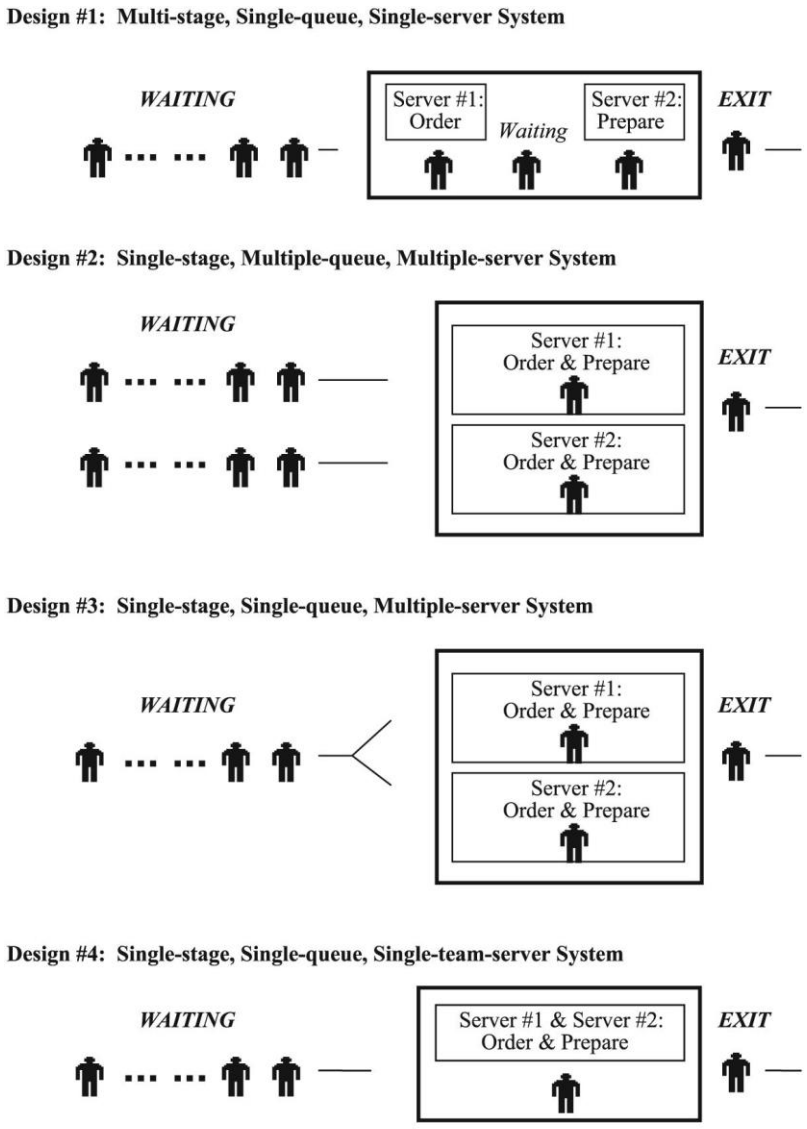


Figure 1: Different kinds of queuing service designs

The above figure shows four different designs in which queues are formed.

Design-1: In this design, there exist multiple stages. However single queue is formed. This kind of queue management system has one server and ordering and preparation stages are different. In this case, customer first enters for being served, he waits till the counter gets available and go through the next counter in a sequence in order to get completely served.

Design-2: Design queue is single staged but having multiple queues.

Design-3: It has single queue but having multiple servers.

Design-4: In design 4, there exist single server who performs both of the tasks in case tasks more than one.

No single process like the above, is best suited for all situations and all kinds of queues. In order to manage queues efficiently, managers should use alternate designs in combination (Sheu et al., 2003).

Characteristics of a queuing system

Every queuing system comprises of three main parts (Bose, 2013):

(1) The arrival of customers considered as inputs to the queuing system. This is also termed as the calling population,
(2) The formed queue or waiting line.
(3) The service counter or the facility.

Before developing any queuing model, these three components are examined in complete details with their characteristics.

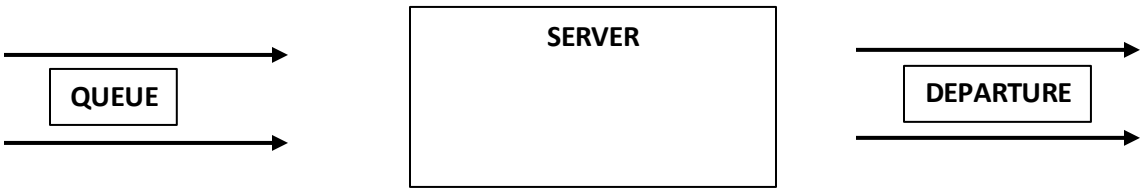
Arrival Characteristics:

The input source component of the queuing system consists of three characteristics.

a) The size of the calling population
b) The arriving patterns of customers
c) The behavior of the arriving customers

Size of Calling Population:

It is considered size of population can be limited or unlimited. In case the number of arrivals of customers at any given time is just a small part of prospective customers, this type of2calling population is considered as of unlimited type. Mostly, unlimited type of calling population is assumed by most of the queuing models. In any queuing system, there exist one or more servers that provide services to coming customers. As shown in the figure 2 below.



(Bose, 2013)

Figure 2: Simple Queuing Model

The customer's arrival process explains how a customer entering into the system. Customers arrive into the system on random basis. A queue shows basically the actual number of customers who are waiting to get served. The queue length can be limited or unlimited. Banking queues are an example of unlimited type of queue lengths (Bose, 2013).

Customer wants a service which takes a certain amount of time. For arranging customers, and to choose the next customer from a queue, a scheduling algorithm is used. Few of the most commonly used algorithms are:

a) FCFS Algorithm (First Come First Serve): In this type of algorithm, every customer will be served first who will arrive first and so on. This is generally considered the fairer system amount the minds of customers and they all think of themselves as equal.

b) RSS (Random Selection of Queuing Service): This algorithm selects or picks customers on random basis. This way, each of the customer has an equal chance of being selected.

c) PRI (Priority Service): This customers are given priority depending up on various factors. The customers with high priority, will be served first in this type of algorithm.

d) SPF (Shortest Processed First): If the service time is known in advance, this type of algorithm can be used because it picks such customers first that are having shortest service time (Alias, 2007).

Queue Service:

A queuing system consists of number of queuing models. These are:

a) SQ (Single Queuing Service): In this type of model, every customer will have to wait till the counter or service point becomes ready to accept him to provide required service.

b) MQ (Multiple Queueing Service): In this type of model, each customer desire and tries to choose the queue which he or she thinks is the shortest one.

c) DQ (Diffuse Queuing Service): In this type of model, every customer is required to take a ticket from machine with a single or multiple buttons on them in order to get a specific service. The customer starts monitoring the ticket number being served after obtaining her or his ticket. In this type of model, customer cannot estimate the time when they will be served (ALLEN AO, 1990). As the customer stands in a queue, with every passing time, his or her following factors (Figure-3) gets effected in the sequence mentioned below (Davis & Heineke, 1994):

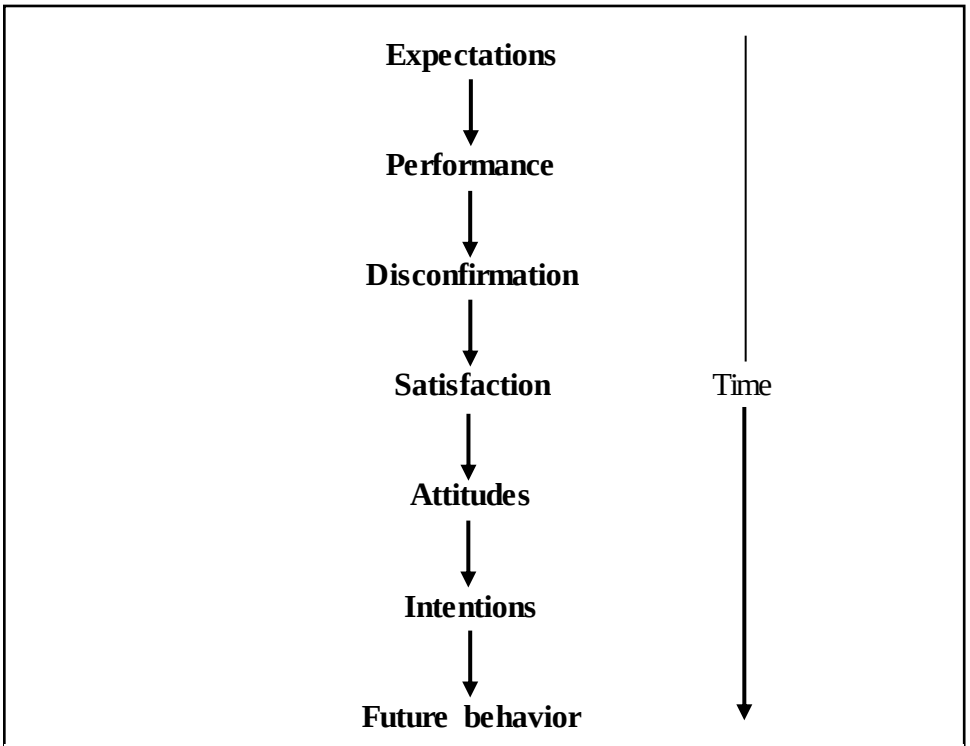


Figure 3: Factors of customer satisfaction over time (Davis & Heineke, 1994)

There exist a close relation between customer's satisfaction and waiting time. Both are negatively related.

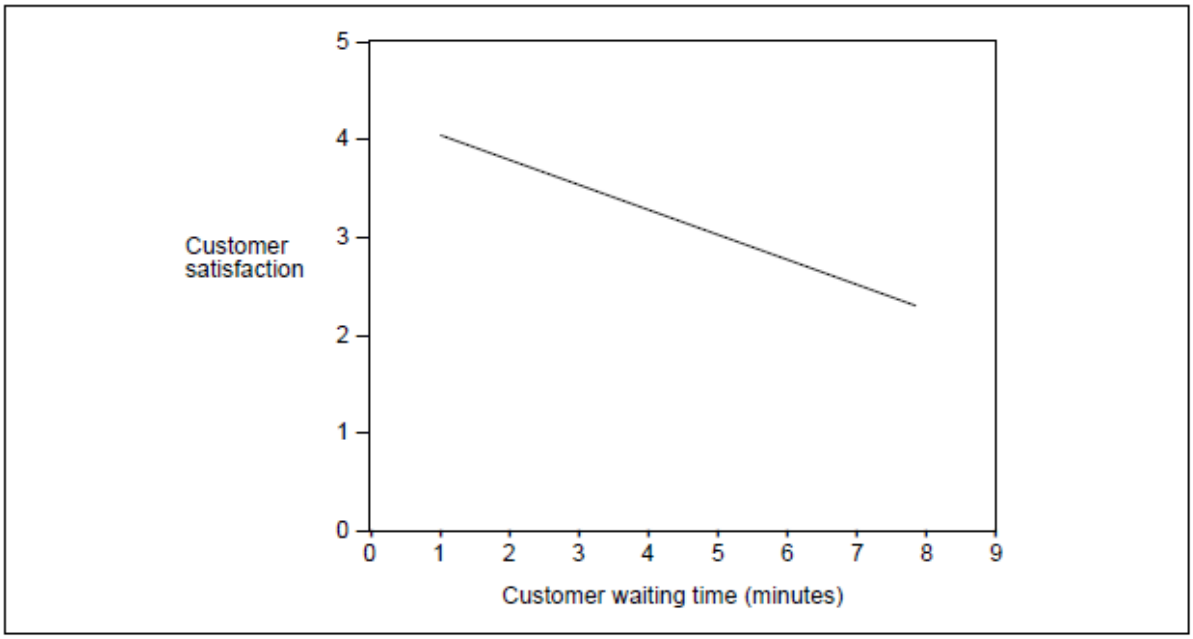


Figure 4: Customer satisfaction with waiting time

(Davis & Heineke, 1994)

In a recent study, it was argued that customer's perception regarding waiting experience depends on number of factors. Such as physical factors, psychological factors, and emotional factors. If for example there would be no queue at all, it may create the impression that the service being provided in not having that much value. Similarly, short queues may attract less customers in some businesses. Therefore there is a need not to complete eliminate the queue but a better option can be to give people an option to join a queue, than they may skip and perform some of their other important task and rejoin when their turn is nearly arriving (Gumus, Bubou, & Oladeinde, 2017).

Customer's perception regarding waiting lines depends upon factors such as customer feels occupied time shorter compared to unoccupied time. Since human based service counters can have an issue of stoppage due to number of factors, customers wants a service counter to get started as soon as possible in case of service stoppage. If a customer is feeling anxiety, it feels waiting time longer. This is also a perception of customers that the other line moves faster i.e. many times when selecting among many queue lines such as at an airport, customers think that they have chosen the wrong line as that particular line is slow compared to other line (Maister, 1985). It was also found

by the same researcher that customers perceive uncertain waits longer compared to certain waits. Similarly unexplained waits also seems longer to customer compared to explained waits. And finally when a customer waits alone, he feels wait longer than when he wait in group.

Physical layout related to service environment can also pay its role in influencing overall performance through influencing worker's effort (Shunko, Niederhoff, & Rosokha, 2017). If the visibility to the human who is working at the queue server is not clear, it decreases feedback which may ultimately impact worker's performance (Schultz, Juran, Boudreau, McClain, & Thomas, 1998).

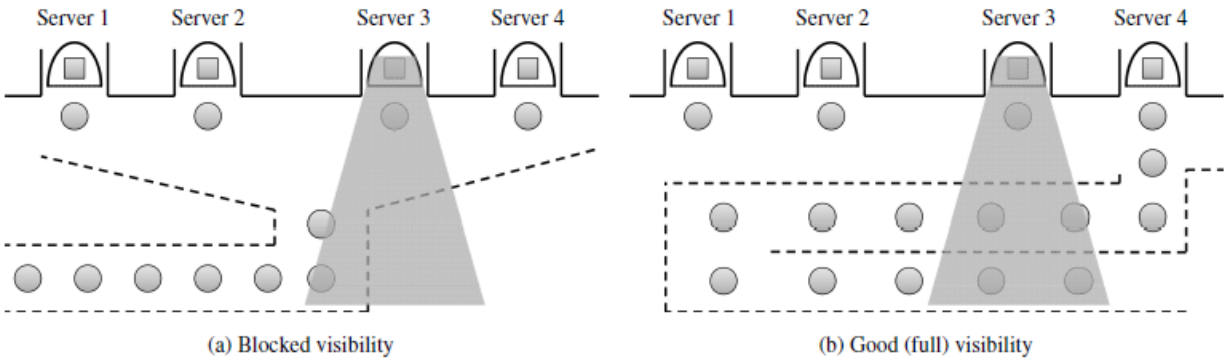


Figure 5: Physical layout related to service environment

(Shunko et al., 2017)

In the above figure-5 in section (a) blockade visibility, the server three can see limited number of people waiting to get served which may affect worker's performance whereas in section (b) of the above figure on the righter side, server 3 has much better view of the people and the queue length to get served. Figure-6 below showing parallel queuing system on the other hand.

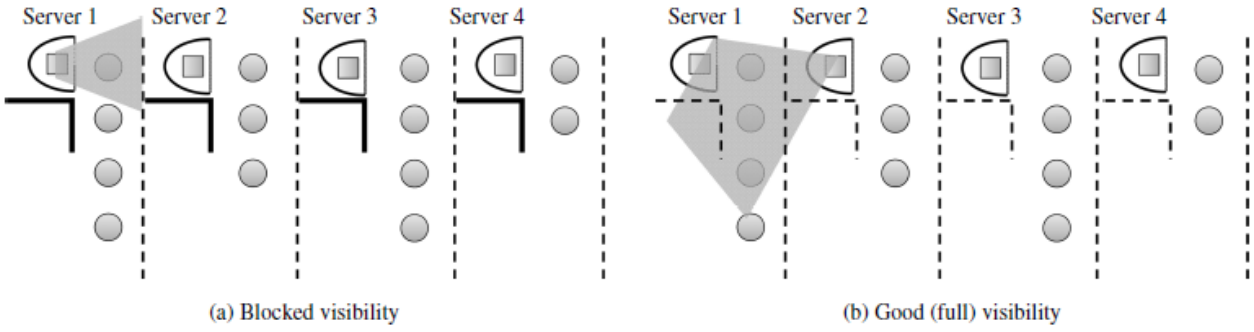


Figure 6: parallel queuing system

(Shunko et al., 2017)

When the customers joins and then leaves the queue after getting served, they create a perception of waiting time for their next visits. This can be represented in the following model (van Ackere, Haxholdt, & Larsen, 2013):

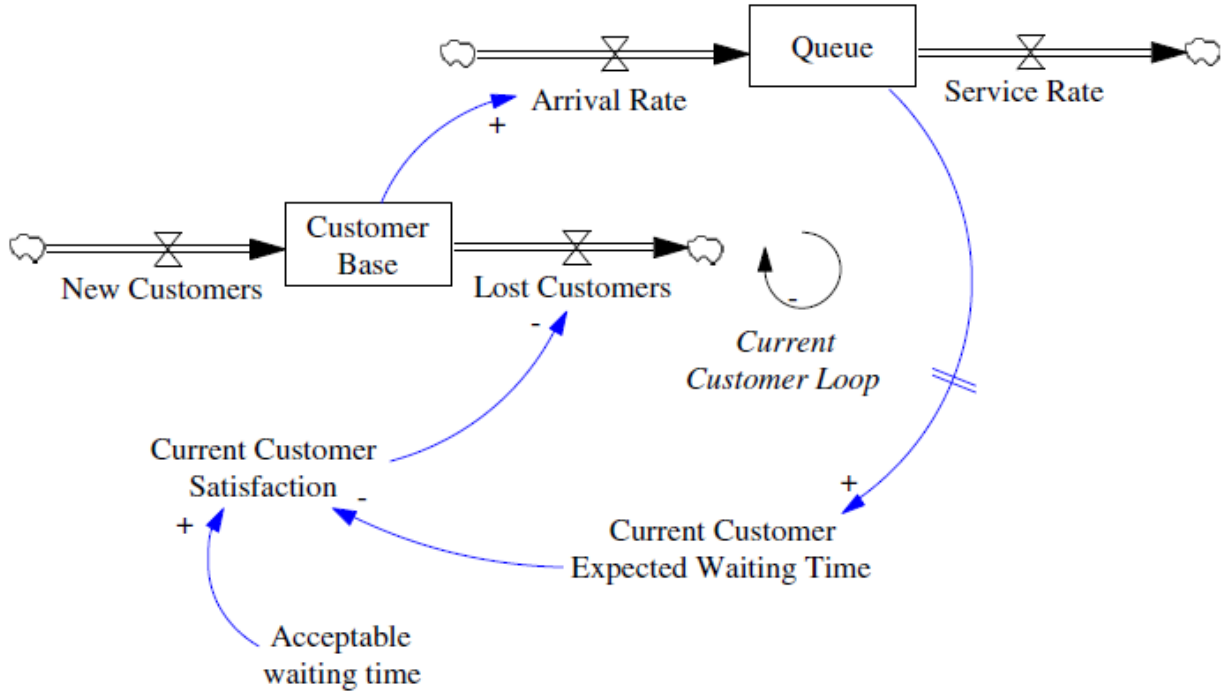


Figure 7: Queue behavior Model in case of existing customers

Behavior in case of existing customers:

The above figure-7 shows that A customer arriving from the left side and joining the queue. After getting served and leaving the queue, will get to know the exact amount of waiting time he observed and will than use this to calculate the average serving time for his subsequent visits if any. On every visit, customer will not consider the average of existing wait time but consider the next waiting time based on his recent experience. This model in the above figure is for the retention of existing customers. If however, the queue will be too long, its output will than become a negative feedback loop. Means a customer will leave and seeing him or her, it is quite possible that more number of people will leave the queue as a result and comparatively less will join (van Ackere et al., 2013).

Behavior in case of potential customers:

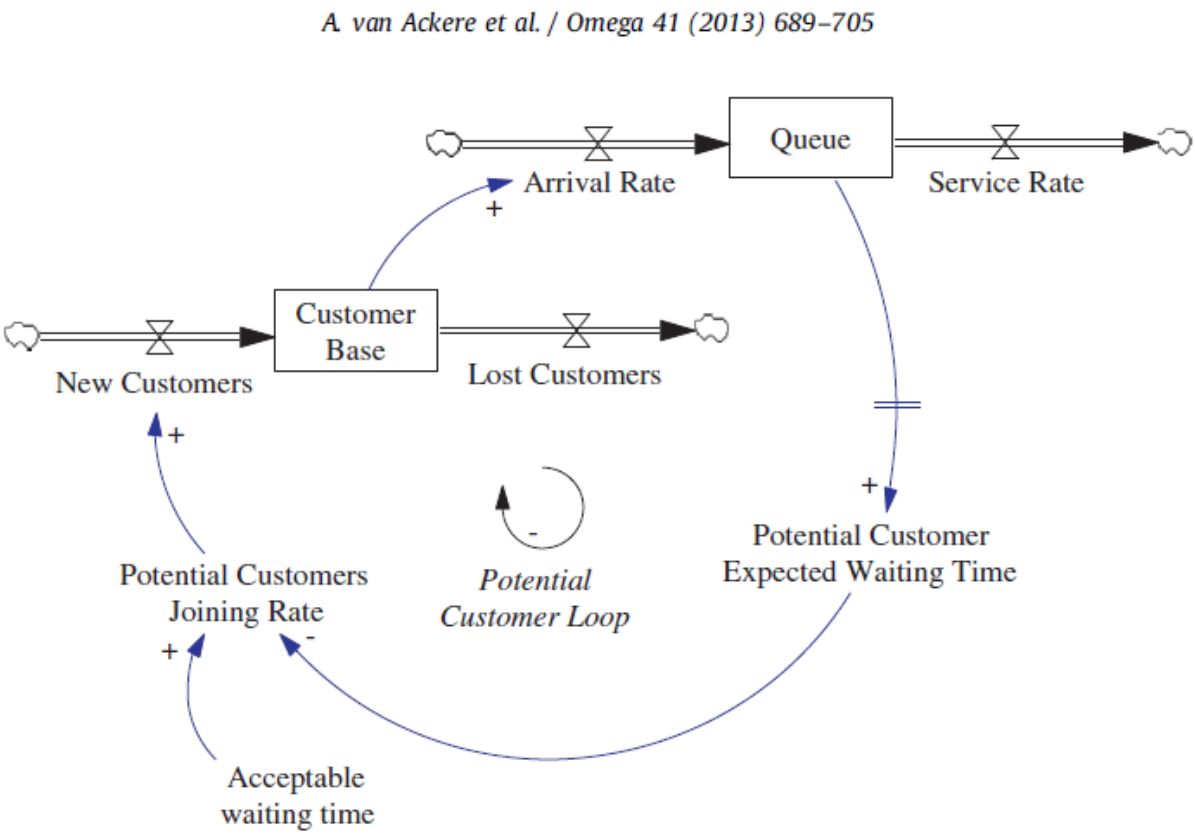


Figure 8: Queue Behavior Model in case of new customers

The above figure-8 shows behavior in case of new customers. It has a same logic of that of the old existing customer's case except new or potential customer do not come with any prior experience. They will have to rely on word of mouth in order to create the expectation of waiting time in their minds. This is also a negative feedback loop as if the perceived waiting exceeds the expected waiting time, more customers will leave and less will join the queue (van Ackere et al., 2013).

Capacity Management of Service Facility:

The second part of the research conducted by (van Ackere et al., 2013) was about the capacity management of the service facility in place. Following figure present this model:

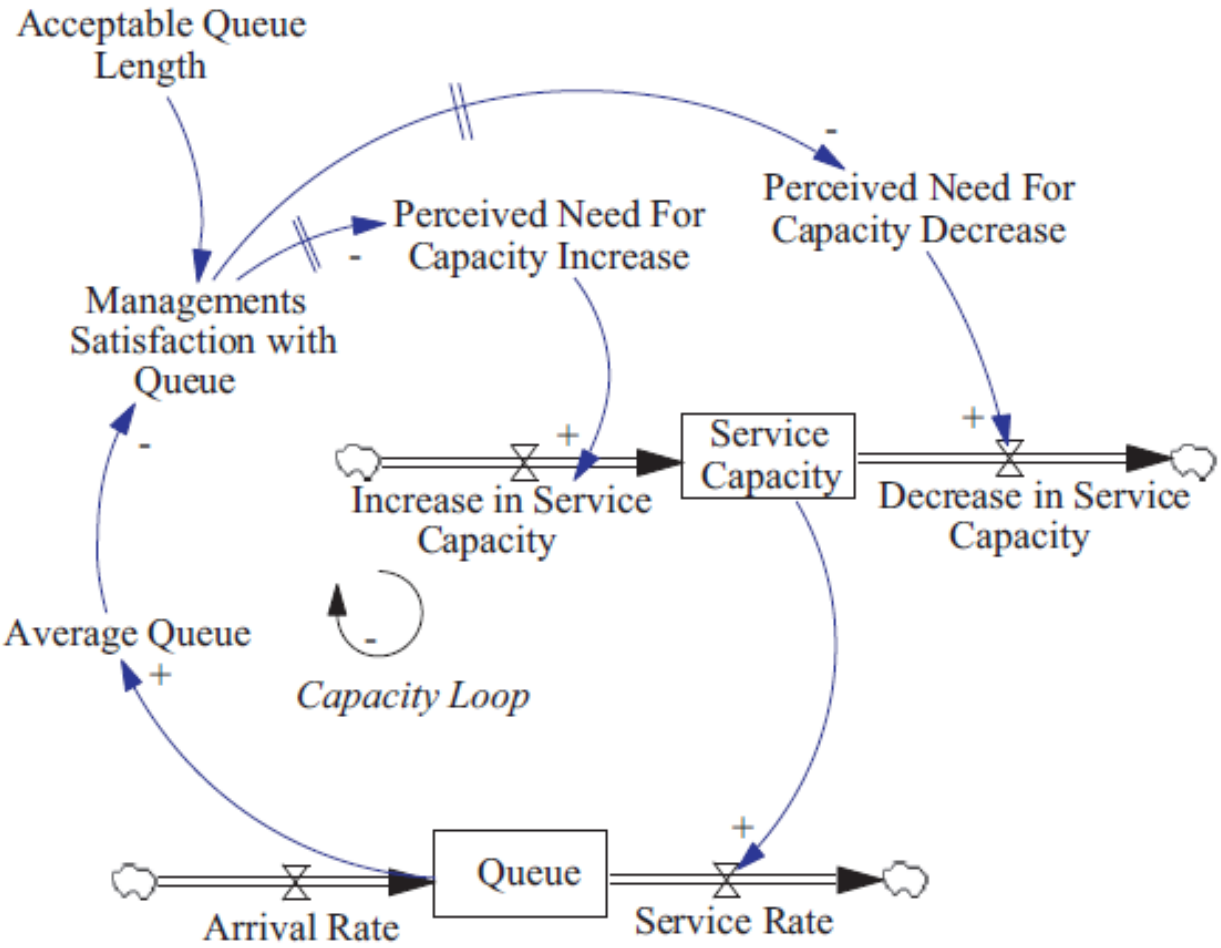


Figure 9: Capacity Management of Service Facility

The above figure-9 depicts that service capacity determine the actual waiting time in a queue. There exist two kinds of ways to adjust capacity. One is a fastest way of adjusting the capacity such as increase overtime of staff to motivate them to use more time. However on the other case, it may need ample amount of time to adjust the capacity for example if a capacity demands making of new counters, new rooms or building or an enhanced IT infrastructure. Hence the time required to manage the capacity depends upon industry to industry. The resulting change will enforce the demand meeting supply thereby creating a balancing capacity loop (van Ackere et al., 2013).

Customer behavior and capacity management interaction:

This fourth and the final figure-10 of the behavior model showed how customer behavior and capacity management diagrams presented above can interacts to make a better understanding of the model.

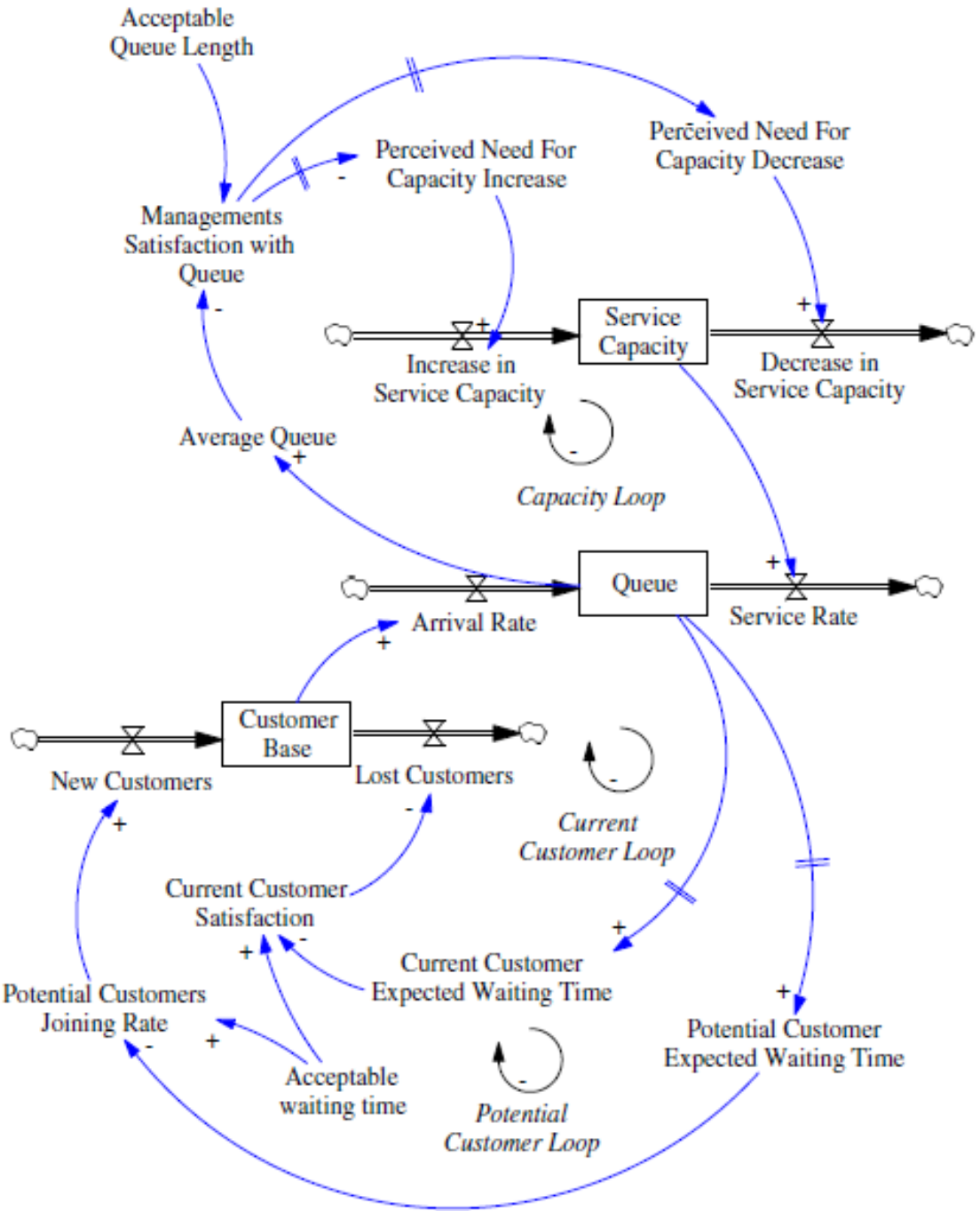


Figure 10: Customer behavior and capacity management interaction

Both of the above models linked in the above picture in order to find out that how both model linked together in undesirable situations (van Ackere et al., 2013).

Large number of research work on queue management primarily stressed the need for optimization of performance measures as well as equilibrium analysis. (Naor, 1969) started work on it. Than some of the recent works conducted by (Allon & Federgruen, 2008), (Bassamboo & Randhawa, 2010) and (X. Wang, Debo, Scheller-Wolf, & Smith, 2010). How managers actually make capacity decisions in queuing management was researched recently based on the model of (van Ackere et al., 2013) using laboratory experiment by (Delgado-Alvarez, van Ackere, Larsen, & Arango-Aramburo, 2017).

If the servicing organization such as banks, government organizations, and grocery or retail stores will not optimize the service level of them, they will have to face long customer queues. Therefore there is a need to understand the customer demands and what he actually required in order to improve the quality of service and reduced queue time (Shao, Xie, Xia, Yin, & Dong, 2009). For banks, service quality is one of the most significant component which is based primarily on customer queues (Zhiying & Jing, 2006).

(Shao et al., 2009) used agent simulation technique for banks to find out the best suited level of cost as well as customer satisfaction resource configuration. A similar study was conducted by three researchers (Sarkar, Mukhopadhyay, & Ghosh, 2011) who applied simulations to find out the best possible alternative for the purpose of reducing bank's service time of counters by taking into consideration the utilization rate of service counter in detail. Simulation was also used by another researcher (Sandmann, 2012) who studied delays in queues using correlated service time. (Hammond & Mahesh, 1995) Tried and proposed a model in which a system to manage bank teller and policies used to achieve the required level of quality using simulation. Two different studies used six-sigma with DAMIC for banking operation for enhancing queues and banking services conducted by (Zhang & Liu, 2007) and (Zhiying & Jing, 2006).

Customers become infuriated if they observe they queues are not being managed as per social justice or when the violation of first in first out queuing process is observed (Larson, 1987). Some "classes" of customers value their time more than others and they as a result, become willing to pay to reduce or even totally eliminate waiting lines (Glazer & Hassin, 1986). In current era, customers do not want to wait in queues and consider this waiting time as a wasting time. This is because they have busy lives. Hence there is a dire need for an efficient, cost effective and intelligent queue management system that can help reducing customer waiting time thereby increasing customer satisfaction.

Innovative approaches to queuing management such as mobile based queue management systems facilitate customers by providing facility such as take tokens remotely, enter in a virtual linear queue using short messaging service and mobile application. The goal of such kind of system is to reduce waiting time using cost effective means, to speed up the queuing process, to enhance the quality of service and thereby to increase customer satisfaction level (Serasinghe & Vasanthapriyan, 2016).

In a latest research, work is going on to develop an application for queuing management where user send virtually a request to the queuing server for the purpose of taking a token. The queuing server scans the request and issues a virtual token. A confirmation message sent to the user device which additionally contain a web URL link. This web page contains information of the user position in the queue which can be see virtually plus with a facility to start chat with the server or agent if requested by the user. Additionally this web page may also include highly related advertising based on user information (Torre, Stearns, Harris, & Kelly, 2016). In an another recent study, the effect of queue or waiting lines configuration have studied with human servers (J. Wang & Zhou, 2017).

Work is also going on to develop computer based method for managing queues in such a way that can send a device's location of both the customer and the server to a specialized computer software, which than can somehow maintain a virtual queue in a server. The system than again

sends request to the user when his or her device (such as a mobile phone or a tab or a mobile watch) found within the predetermined space (Backer & McCune, 2016).

Limited literature have been found in the area of removing queuing problems from large Pakistani organizations such as National Bank of Pakistan, using cost effective, user friendly and technology advanced queuing management systems. Therefore there is need to find out the determinants of queue management system perceived by the customers of Pakistan's largest public sector bank who always found complaining about the existing paper based queue management system of NBP.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Overview

In this chapter, methods used to collect data for this research are mentioned. Empirical approach has been used as a research strategy. A survey was conducted with the customers of National Bank of Pakistan in all the branches situated in Lahore as this provides deep insight into the actual problem(s) that they are facing and what solution can help them in solving.

3.2 Type of Research

This research is based on the quantitative research methodology. The type of research is cross-sectional where data is gathered once from customers of the Bank.

3.3 Data Collection Approach

All the data collected for this research is primary data. This primary data was collected using a questionnaire from customers of National Bank of Pakistan's branches situated in the City of Lahore, Pakistan.

3.4 Population

Total population of this study includes all the customers of NBP 3,192,500. These figures are taken from IT center of NBP upon request of researcher.

3.5 Sampling Strategy

Two tier sampling has been used to conduct this research. In the first tier, a list of all the NBP branches situated in the city of Lahore, Pakistan were obtained from National Bank of Pakistan's regional IT center which is 84. This list was sorted alphabetically and then every third branch was picked from the list making them total 28. Total 12 questionnaires were distributed to every branch so that the total number of filled forms can be at least 320 as recommended by (Hair et al., 2010) sample size of questionnaire items multiple by 10 (i.e. 32 X 10 = 320) as sample size.

In the second tier, these forms are filled using simple random sampling from customers from these 28 branches.

3.6 Unit of Analysis

Random customers of NBP branches were taken as unit of analysis for this study.

3.7 Sample Characteristics

Total 336 questionnaire forms were distributed among 28 branches of NBP situated in Lahore city. Total 333 filled forms were received out of 336 initially distributed. Out of 333, 13 forms were discarded due to incompletely or improperly filled. Therefore, total 320 forms have been taken selected for this analysis.

Table 1: Research Questionnaire

No. of questionnaire forms distributed	Total filled questionnaires received	No. of questionnaires discarded	Total responses recorded	Response rate
336	333	13	320	95.00%

3.8 Sample Size

Our sample size which is 320 which as explained earlier selected based on two tier sampling however, it is matched with (Hair et al., 2010) as well who recommended sample size of questionnaire items multiply by 10 (i.e. 32 X 10 = 320).

3.9 Sampling Frame

Out of total population, customers belonging from NBP Lahore city only which are 584,465 has been selected as a sampling frame.

3.10 Data Collection Procedure

For the purpose of data collection, all the Branch Managers or Operation Managers of the selected branches were contacted telephonically. Then personal visits were made along with questionnaire in every selected branch. As per convenience, questionnaires were distributed randomly to customers present or entering in the branch as different time frames. The

questionnaire form was designed along with cover letter to explain the purpose of the study being conducted. Every respondent was explained in detail in case of any difficulty found in understanding any question by the branch staff.

3.11 Data Analysis Technique

Using the quantitative method, all the collected data using questionnaires from the selected sample, was sorted than analyzed using IBM's statistical software SPSS. Various analysis were conducted on the gathered data such as demographic analysis, descriptive analysis, cross tabulation analysis, correlation analysis and Exploratory Factor Analysis (EFA). Data consistency as well as its stability was known using reliability analysis including the value of Cronbach's alpha. Correlation analysis showed the strength amount the variables. Values of KMO, Bartlett's test and Chi-square showed that we can proceed further on Exploratory Factor Analysis. The rotated component matrix in the Exploratory Factor Analysis was extracted to show which items of each variable is strongly loaded on components in related columns.

3.12 Ethical Considerations

Complete ethics were considered when performing this study. Upon request of executives of NBP, the total number of customers of each branch is not mentioned in this study. Only the overall number of customers of whole Lahore region is mentioned i.e. the total of overall 84 branches of Lahore city. Furthermore, the name and contact number of the respondent were taken as optional at the end of the study. Participants were not forced to mention that for the purpose of maintaining complete confidentiality of the Bank.

CHAPTER 4: DATA ANALYSIS & INTERPRETATION

Following keywords have been used here to represent frequently used terms:

Waiting Lines	**WL**
Queue Management System	**QUESYS**

4.1 Demographic Analysis

4.1.1 Analysis: Age Groups

The table 5.1 shows that out of total 320 respondents, 105 or 32% are of age group 60 plus. Mostly in NBP lines of people can be observed that visit the bank for pension payments and that complaint most about the tiring long lines what are difficult to bear for them in this age group.

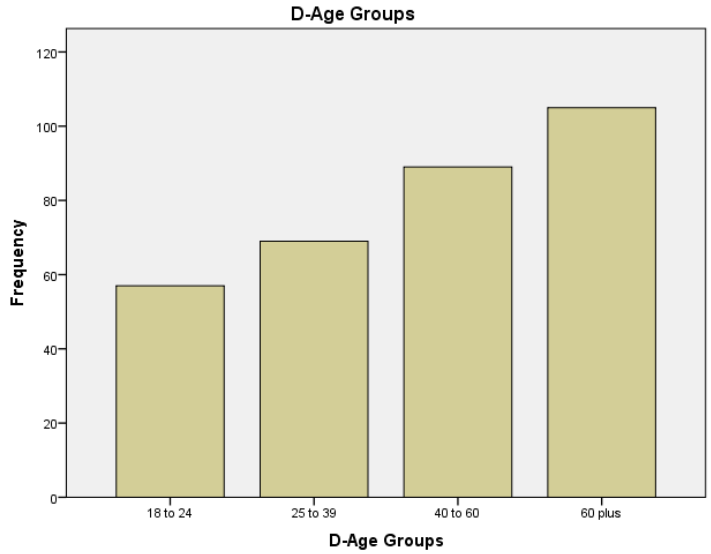
Statistics

Status of records

N	Valid	320
	Missing	0

Table 2 : Age Group of Customers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 to 24	57	17.8%	17.8%	17.8%
	25 to 39	69	21.6%	21.6%	39.4%
	40 to 60	89	27.8%	27.8%	67.2%
	60 plus	105	32.8%	32.8%	100.0
	Total	320	100.0	100.0	

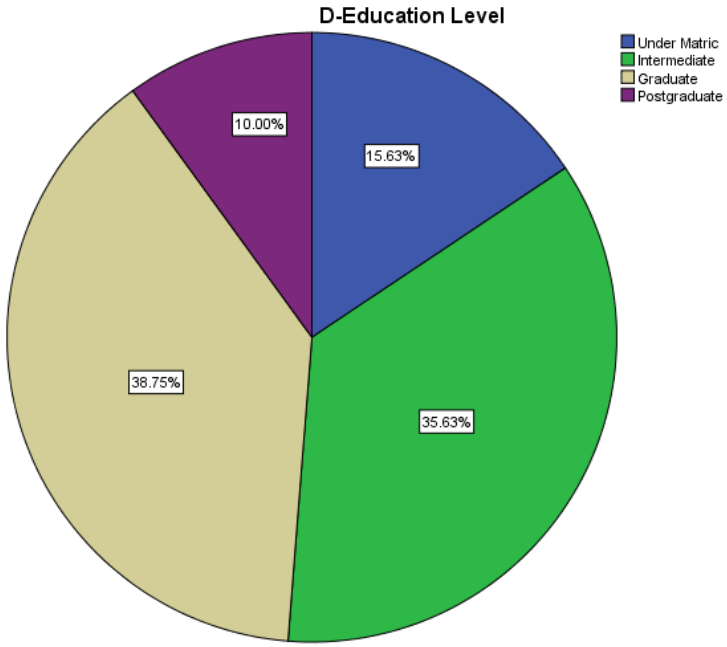


4.1.2 Analysis: Education Level

The letter "D" in start of variable name shows that it's a demographic variable. This denotation is using throughout in the coming analysis as well. Out of total respondents, 124 or 38.8% are graduate. Intermediate are 35.6%. Most of the candidates were either graduate or intermediate level qualified.

Table 3: Education level of Customers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under Matric	50	15.6	15.6	15.6
	Intermediate	114	35.6	35.6	51.2
	Graduate	124	38.8	38.8	90.0
	Postgraduate	32	10.0	10.0	100.0
	Total	320	100.0	100.0	

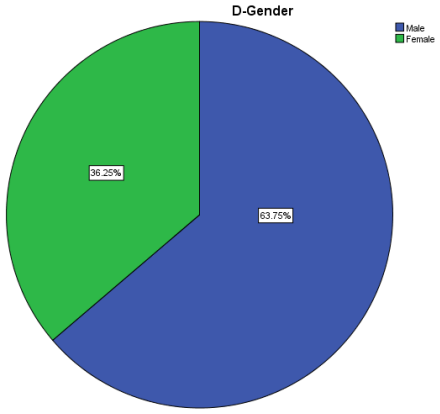


4.1.3 Analysis: Gender

Out of 320, total 116 females filled the forms which is 36.3%. Remaining were male customers.

Table 4: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	204	63.7	63.7	63.7
	Female	116	36.3	36.3	100.0
	Total	320	100.0	100.0	

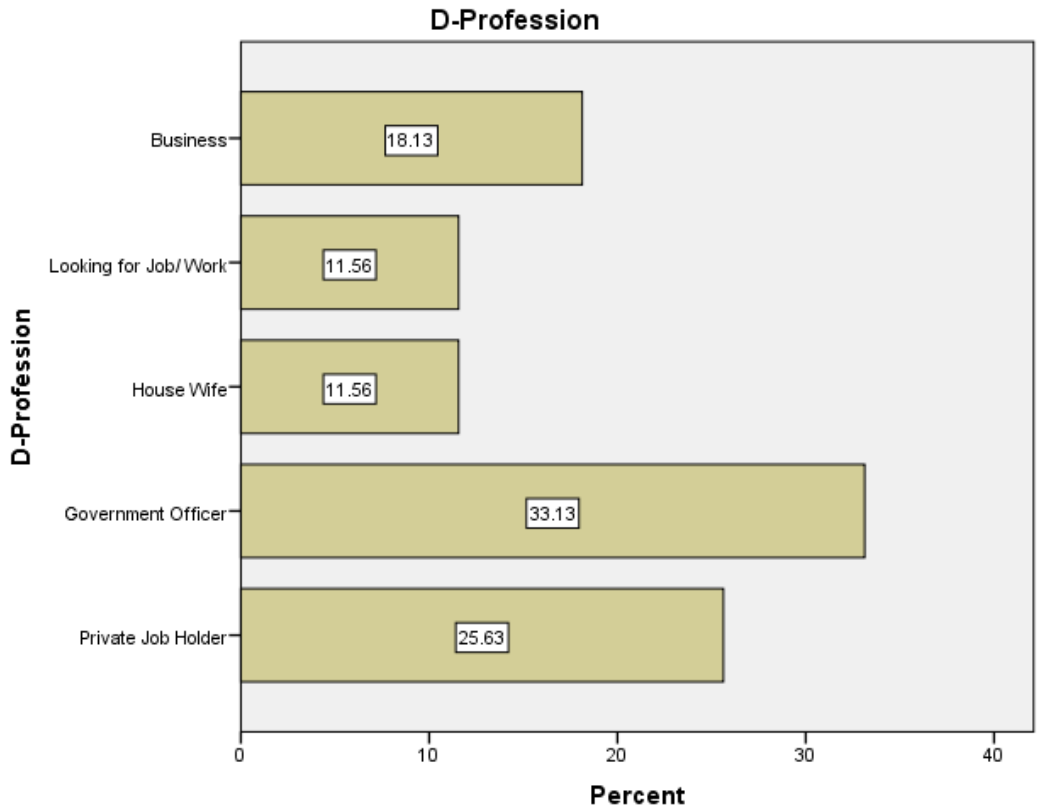


4.1.4 Analysis: Profession

Out of total 320 responses, 106 (total 33.1%) were government officers. This is probably because Government officers mostly open their bank accounts in NBP.

Table 5: Profession

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private Job Holder	82	25.6	25.6	25.6
	Government Officer	106	33.1	33.1	58.8
	House Wife	37	11.6	11.6	70.3
	Looking for Job/ Work	37	11.6	11.6	81.9
	Business	58	18.1	18.1	100.0
	Total	320	100.0	100.0	



4.1.5 Analysis: City

More than 90% of total respondents were belonged to Lahore City.

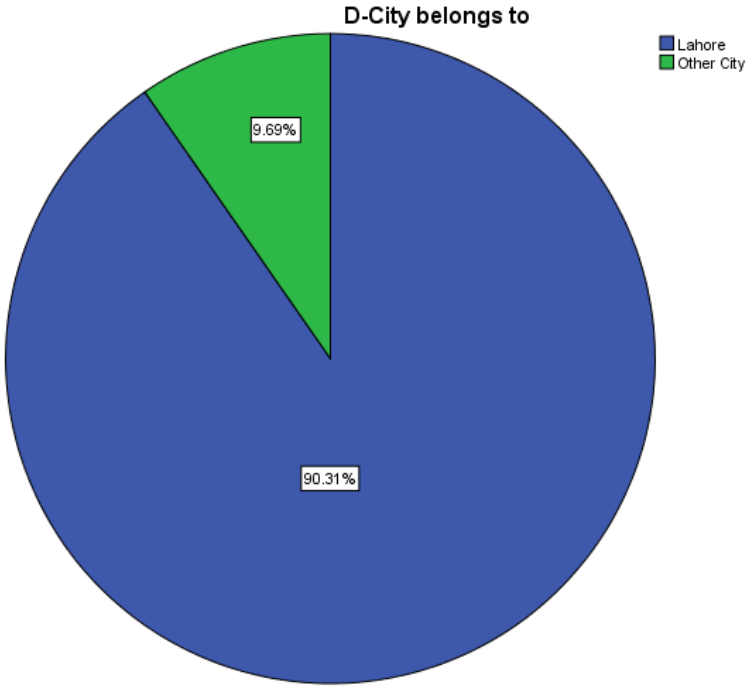


Table 6: Belonging City

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lahore	289	90.3	90.3	90.3
	Other City	31	9.7	9.7	100.0
	Total	320	100.0	100.0	

4.1.6 Analysis: Existing customer

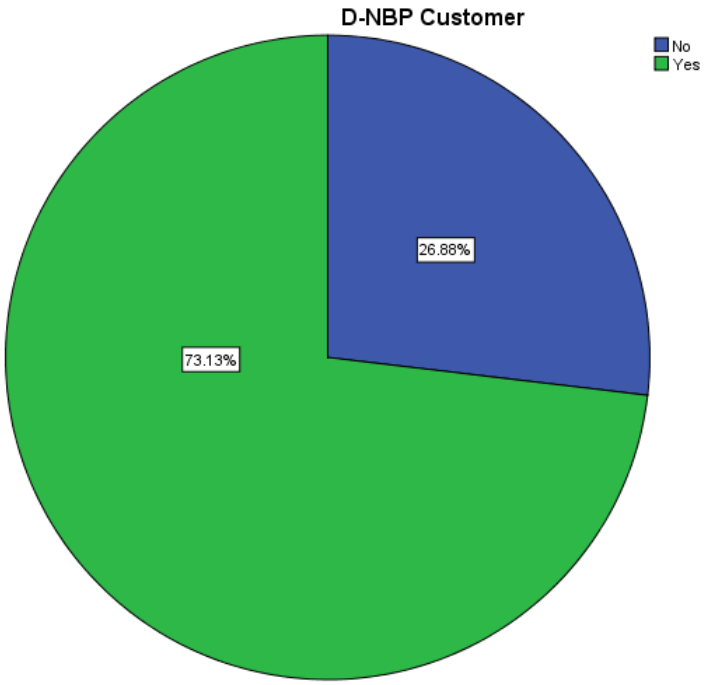


Table 7: Existing NBP customers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	86	26.9	26.9	26.9
	Yes	234	73.1	73.1	100.0
	Total	320	100.0	100.0	

4.1.7 Analysis: Visit Frequency

As the graph predicts, most of the respondents were such those visit monthly once or several times.

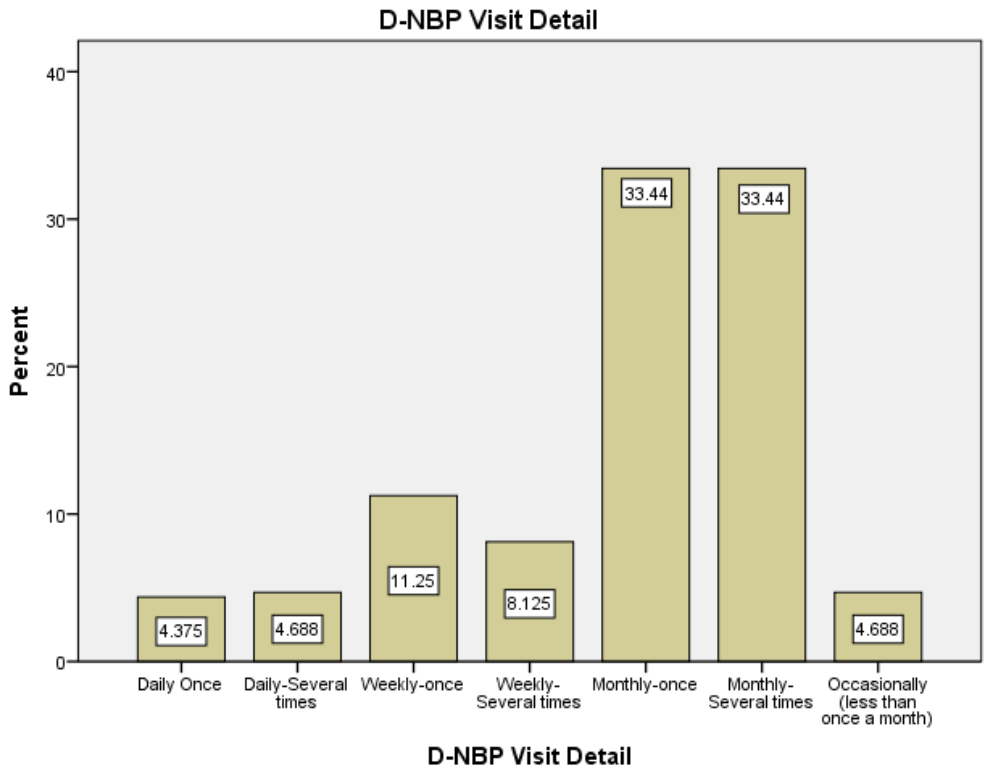


Table 8: Visit frequency of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily Once	14	4.4	4.4	4.4
	Daily-Several times	15	4.7	4.7	9.1
	Weekly-once	36	11.3	11.3	20.3
	Weekly-Several times	26	8.1	8.1	28.4
	Monthly-once	107	33.4	33.4	61.9
	Monthly-Several times	107	33.4	33.4	95.3
	Occasionally(less than once a month)	15	4.7	4.7	100.0
	Total	320	100.0	100.0	

4.1.8 Analysis: Visit Purpose

The graph shows that most of the respondents visits NBP for the purpose of cash withdrawals of for their pension payment related funcations.

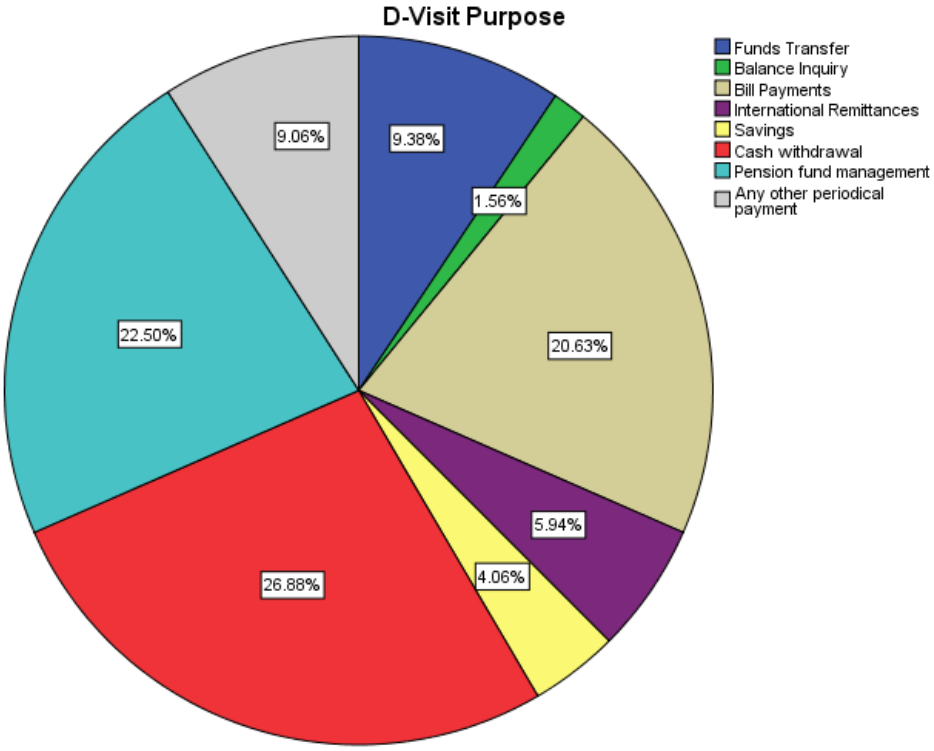


Table 9: Visit purpose

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Funds Transfer	30	9.4	9.4	9.4
	Balance Inquiry	5	1.6	1.6	10.9
	Bill Payments	66	20.6	20.6	31.6
	International Remittances	19	5.9	5.9	37.5
	Savings	13	4.1	4.1	41.6
	Cash withdrawal	86	26.9	26.9	68.4
	Pension fund management	72	22.5	22.5	90.9
	Any other periodical payment	29	9.1	9.1	100.0
	Total	320	100.0	100.0	

4.1.9 Analysis: Should the visit purpose information be saved by the bank

Over 97% of the respondents showed confidence in the bank in providing their information.

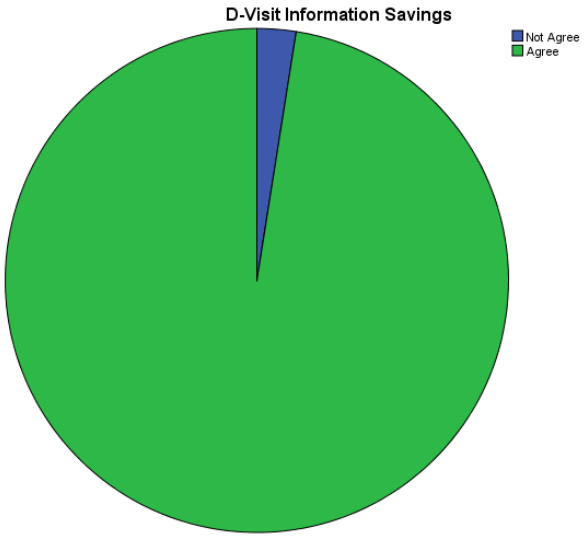


Table 10: Opinion of information sharing

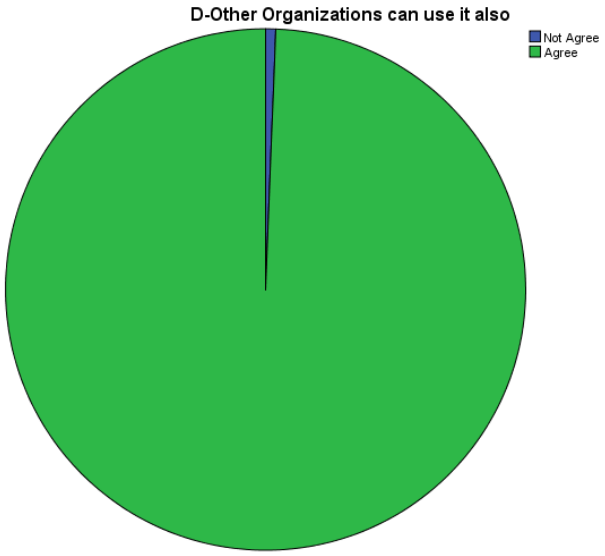
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Agree	8	2.5	2.5	2.5
	Agree	312	97.5	97.5	100.0
	Total	320	100.0	100.0	

4.1.10 Analysis: Mobile based system can benefit other organizations than NBP

Almost all the respondents 318 out of 320 which is 99.4% give their agreement on that this system must be used by other organizations as well who are facing queuing problems.

Table 11: Opinion on whether this system should be used by others

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Agree	2	.6	.6	.6
	Agree	318	99.4	99.4	100.0
	Total	320	100.0	100.0	



4.1.11 Analysis: Number of customers willing to pay QMS cost

Limited number of people (only 18.4%) agreed paying QMS cost.

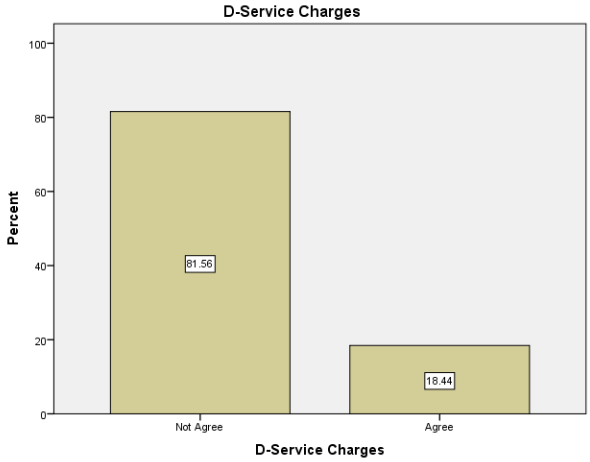


Table 12: Service charges born by the customer

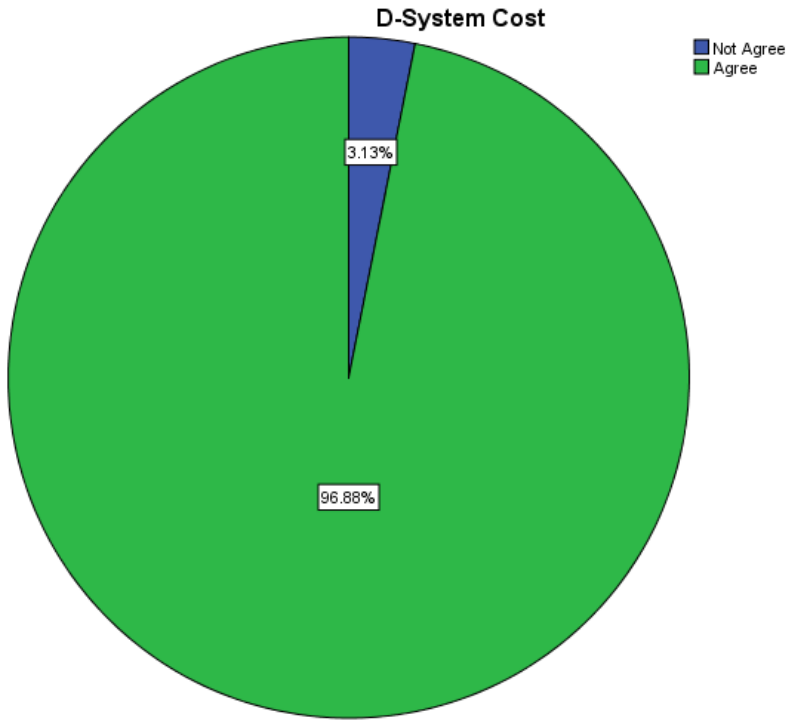
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Agree	261	81.6	81.6	81.6
	Agree	59	18.4	18.4	100.0
	Total	320	100.0	100.0	

4.1.12 Analysis: QMS cost should be beard by NBP

Over 96.6% respondents responded that the cost of QMS must be beard by the Bank.

Table 13: Service charges born by Bank

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Agree	10	3.1	3.1	3.1
	Agree	310	96.9	96.9	100.0
	Total	320	100.0	100.0	



4.1.13 Analysis: Customers willing to receive bank's promotional SMS with QMS

86.6% people showing their consent regarding that they will welcome accepting bank's messages regarding their other products or services with the same Queue management related messages.

Table 14: Marketing about Bank's Other Services

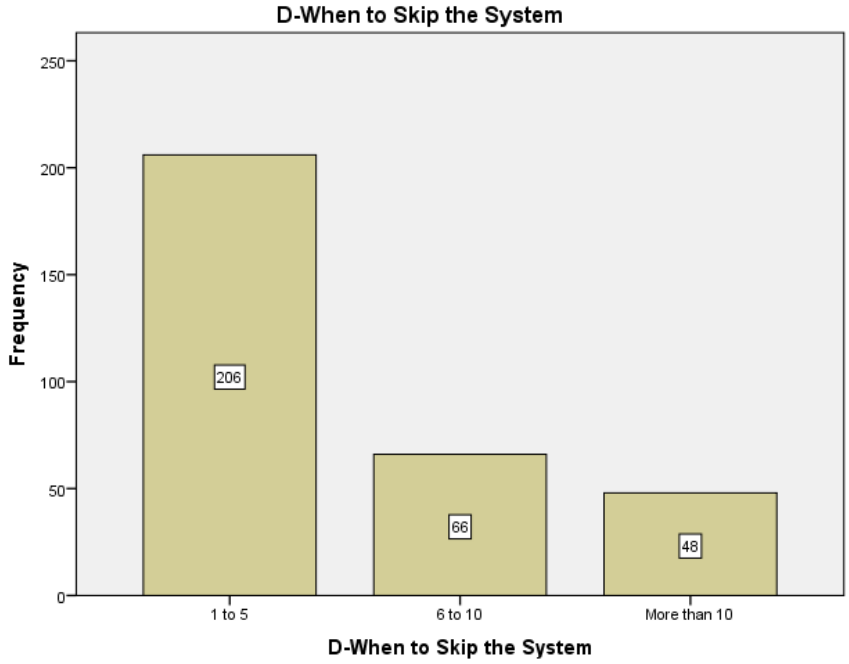
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Agree	43	13.4	13.4	13.4
	Agree	277	86.6	86.6	100.0
	Total	320	100.0	100.0	

4.1.14 Analysis: When a customer can stand in line and skip QMS

Over 64% respondents were of the view that they can only wait in line and skip using this system in case the existing queue will be of less than 5 customers.

Table 15: When a customer can skip QMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 to 5	206	64.4	64.4	64.4
	6 to 10	66	20.6	20.6	85.0
	More than 10	48	15.0	15.0	100.0
	Total	320	100.0	100.0	

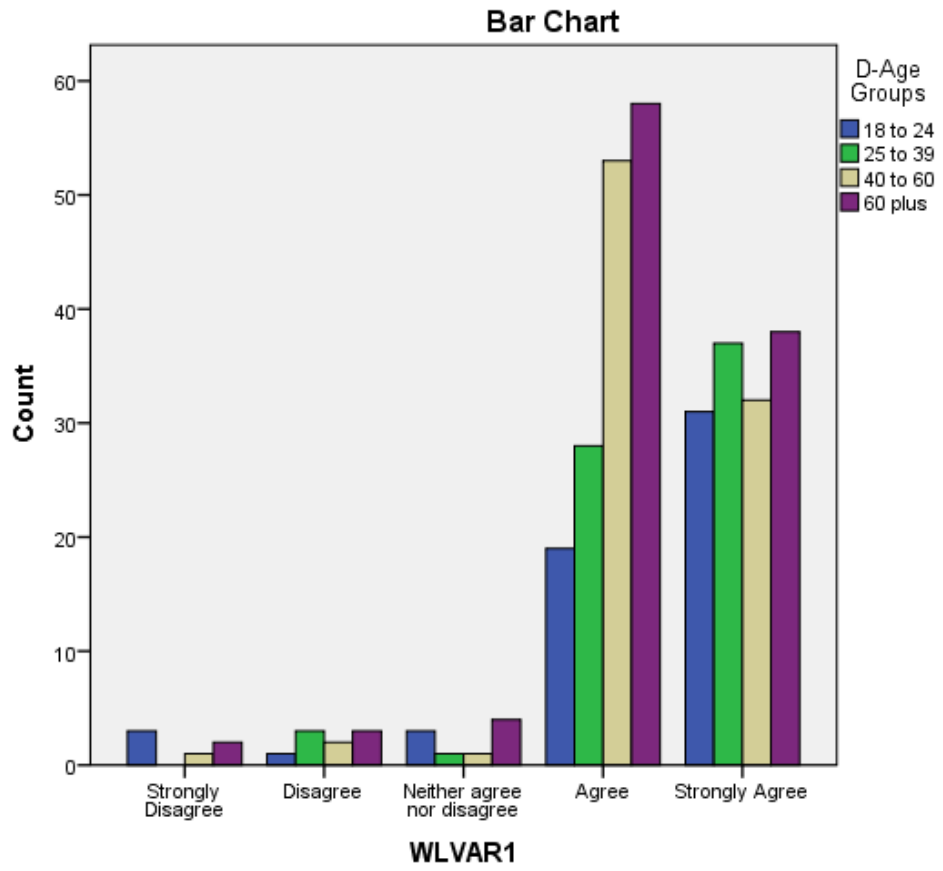


4.1.15 Analysis:

Waiting lines needs improvements emphasized mostly by people over the age of 60 plus who are major customers of NBP for pension payments and who do not wait to wait at all in this age.

*Table 16: Waiting Lines Needs Improvement * D-Age Groups Crosstabulation*

		D-Age Groups				Total
		18 to 24	25 to 39	40 to 60	60 plus	
WLVAR1	Strongly Disagree	3	0	1	2	6
	Disagree	1	3	2	3	9
	Neither agree nor disagree	3	1	1	4	9
	Agree	19	28	53	58	158
	Strongly Agree	31	37	32	38	138
Total		57	69	89	105	320

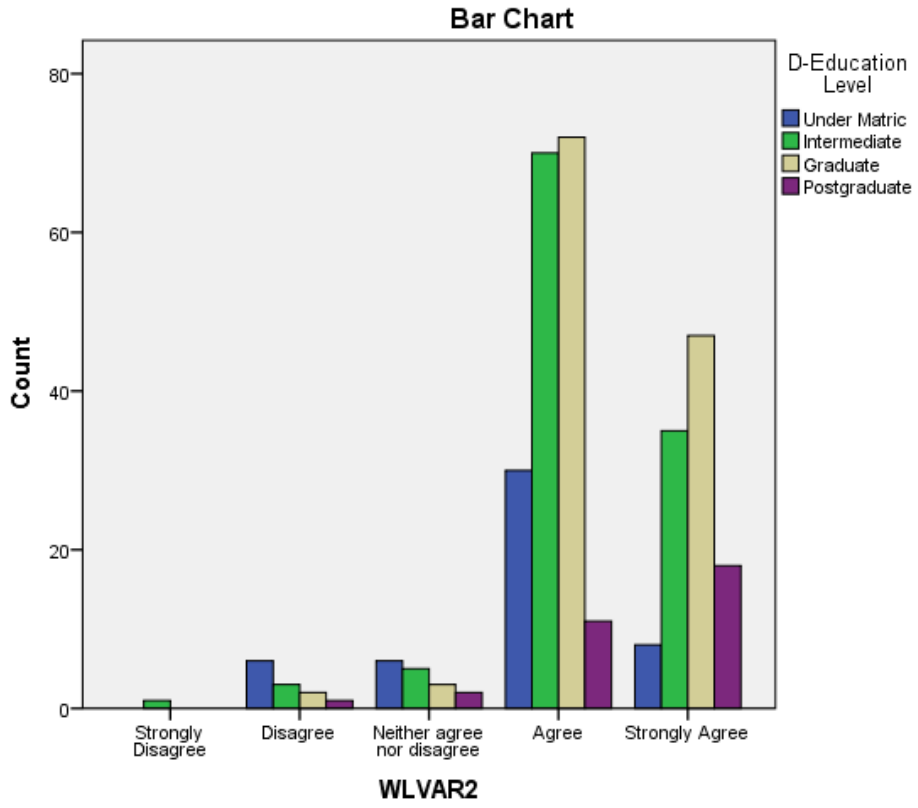


4.1.16 Analysis:

Educated people critically identified that waiting is one of the key element of overall customer service of NBP.

*Table 17: Queuing as Key Element * Education Level Cross tabulation*

		D-Education Level				Total
		Under Matric	Intermediate	Graduate	Postgraduate	
WLVAR2	Strongly Disagree	0	1	0	0	1
	Disagree	6	3	2	1	12
	Neither agree nor disagree	6	5	3	2	16
	Agree	30	70	72	11	183
	Strongly Agree	8	35	47	18	108
Total		50	114	124	32	320



4.1.17 Analysis: Long waiting lines in NBP cause frustration to customers mostly to 60 plus year of people who are the major segment of NBP customers and who gets the most frustrated due to long waiting in line in NBP.

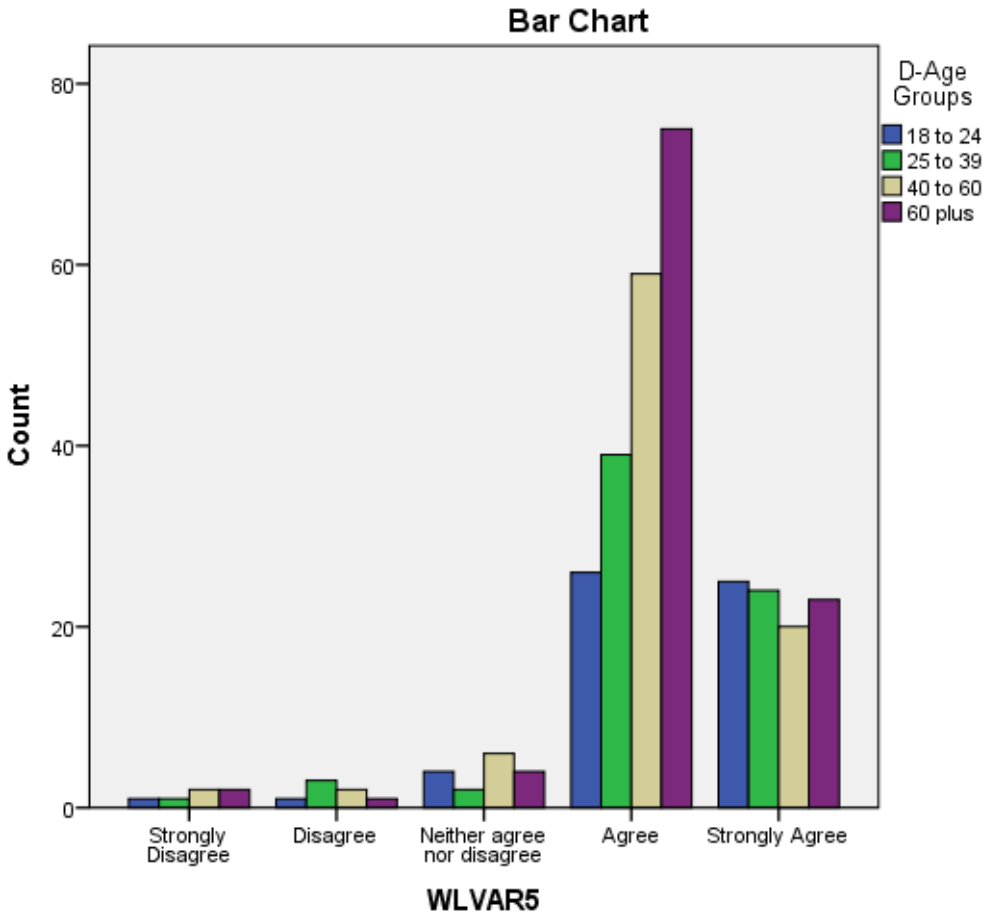
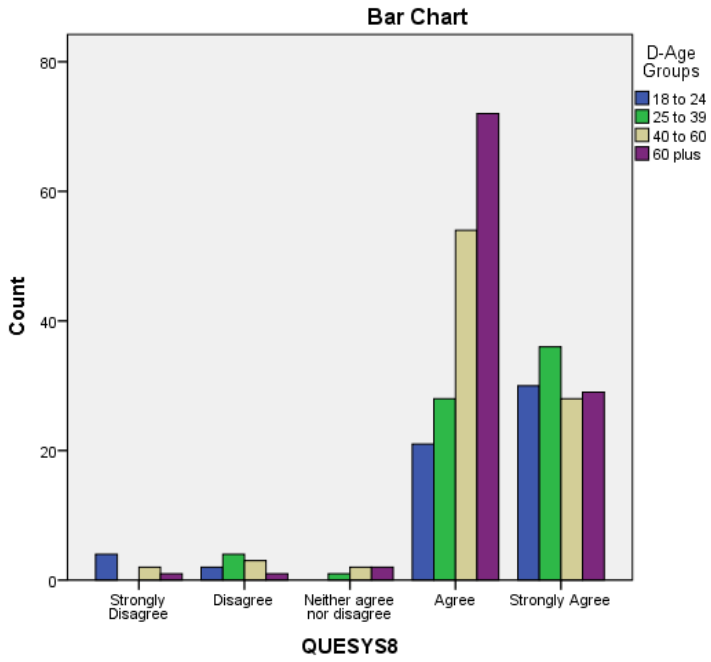
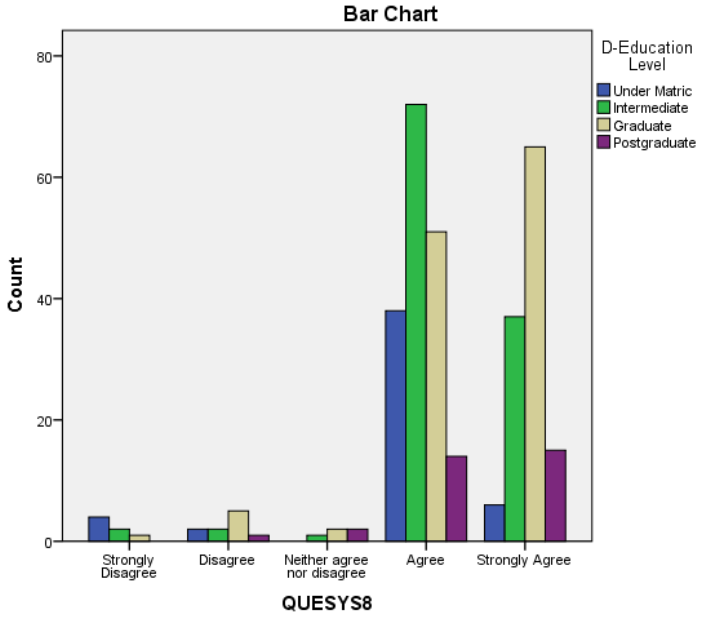


*Table 18: Waiting Cause Frustration * Age Groups Cross tabulation*

		D-Age Groups				Total
		18 to 24	25 to 39	40 to 60	60 plus	
WLVAR5	Strongly Disagree	1	1	2	2	6
	Disagree	1	3	2	1	7
	Neither agree nor disagree	4	2	6	4	16
	Agree	26	39	59	75	199
	Strongly Agree	25	24	20	23	92
Total		57	69	89	105	320

4.1.18 Analysis: The survey showed that even people from larger age groups lesser education levels are skilled mostly these days in using cell phones for adopting innovative queue management system. Which is a good sign as people can now adopt technology products using mobile systems in Pakistan from Personal Banking Like easy paisa to booking a taxi ride like UBER to getting ready in adopting queuing system in order to efficiently solve their daily life problems.

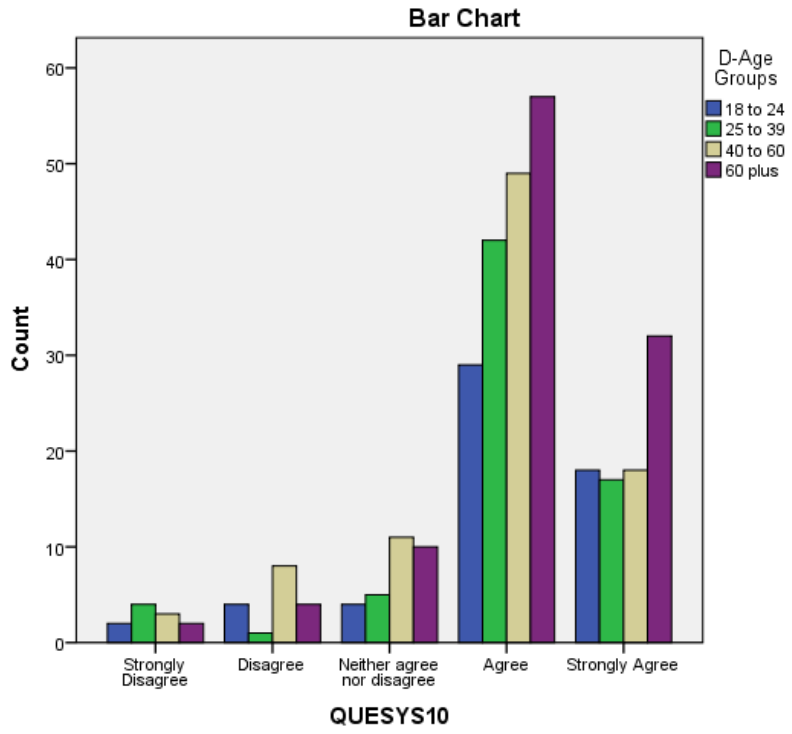




4.1.19 Analysis: In addition to previous observation in point 5.1.8, the people who are 60 plus in this research, stressed the need for additional phone call to further clarify their token number and estimated time. This shows their level of comfort is comparatively less with younger people who do not even think need for such call. They are comfortable in SMS only. NBP can try and save calling costs by have a check box who want to avail additional cost and can mostly target 60 plus aged customers or can offer them free as a business gesture.

*Table 19: Requirement of Additional Call * Age Groups Crosstabulation*

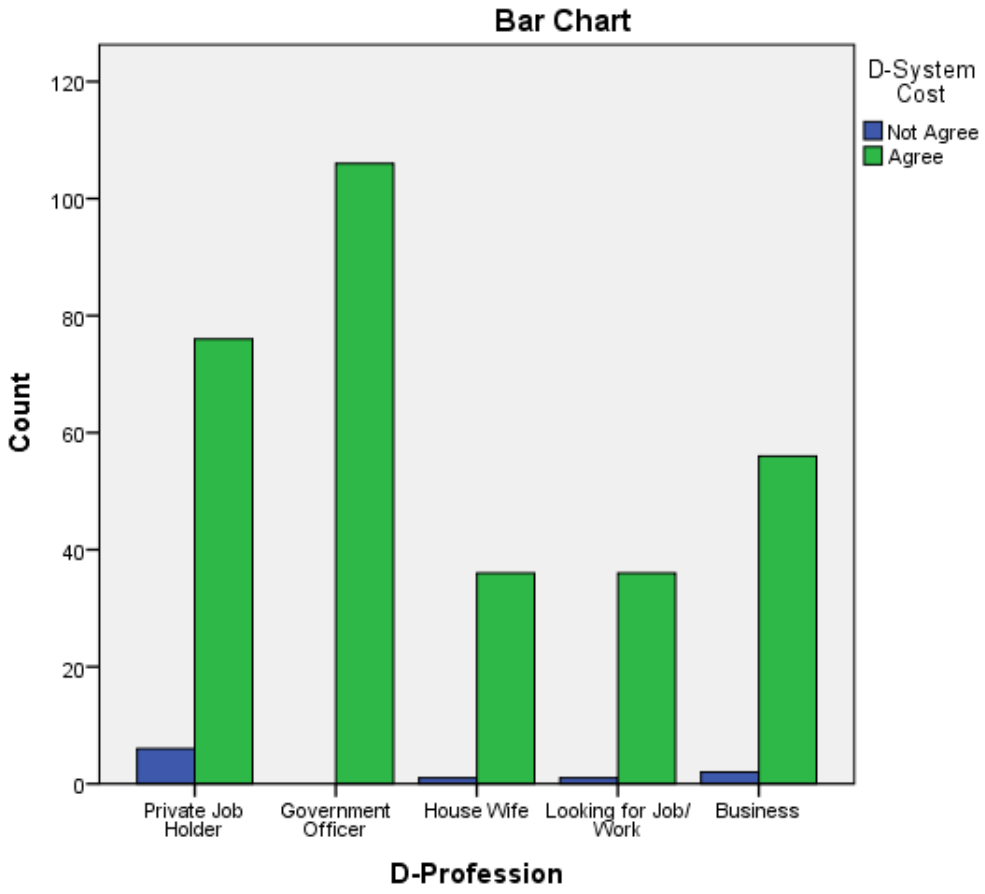
		D-Age Groups				Total
		18 to 24	25 to 39	40 to 60	60 plus	
QUESYS10	Strongly Disagree	2	4	3	2	11
	Disagree	4	1	8	4	17
	Neither agree nor disagree	4	5	11	10	30
	Agree	29	42	49	57	177
	Strongly Agree	18	17	18	32	85
Total		57	69	89	105	320



4.1.20 Analysis: Even the business owners or private job holders or people belonging from any profession were of the view that cost of this system must not be shared with customers and should be beard by the Bank.

*Table 20: D-Profession * D-System Cost Crosstabulation*

		D-System Cost		Total
		Not Agree	Agree	
D-Profession	Private Job Holder	6	76	82
	Government Officer	0	106	106
	House Wife	1	36	37
	Looking for Job/ Work	1	36	37
	Business	2	56	58
Total		10	310	320



4.1.21 Analysis: It's a general perception in Pakistan that being a conservative society, females generally do not provide their cell numbers to number of organizations. However this research shown the opposite. Which means and nowadays Pakistani females are willing to provide their cell numbers in order to get better served.

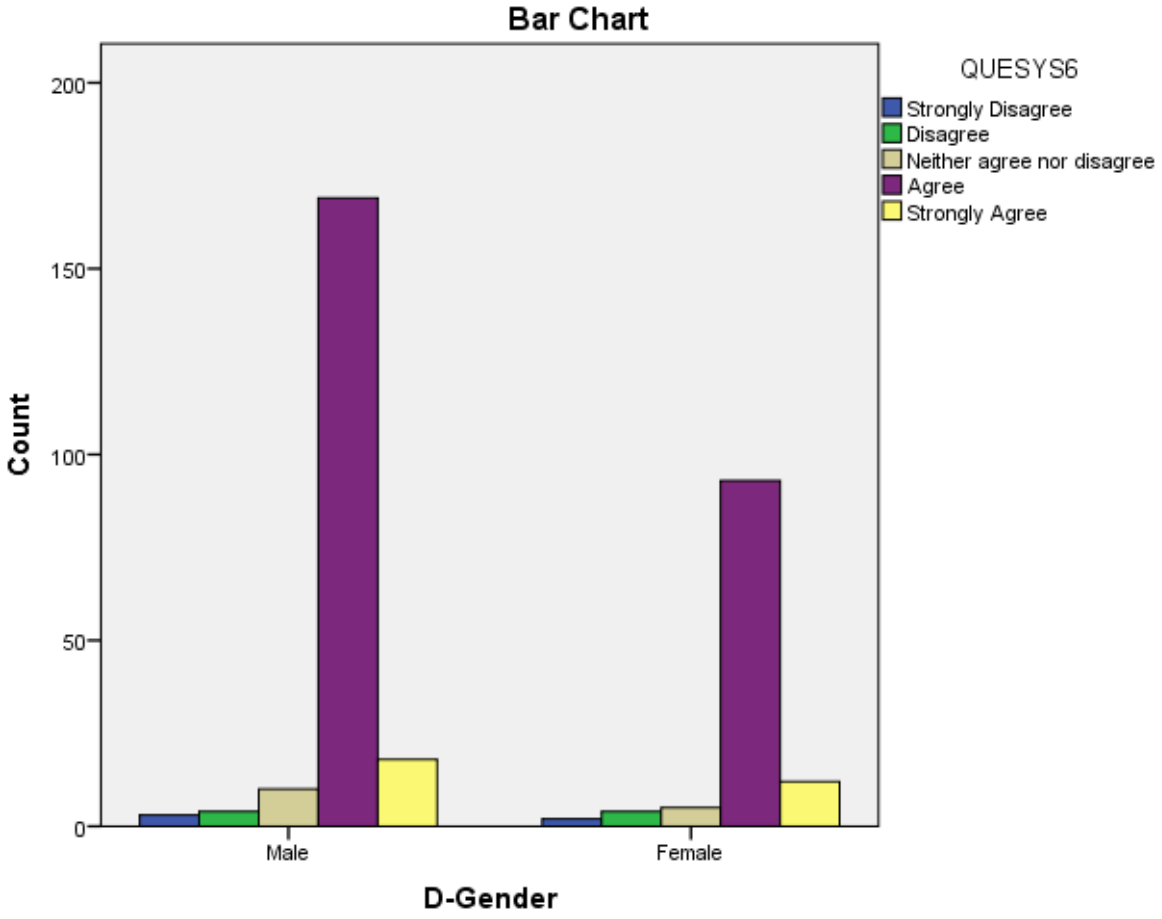


*Table 21: Gender * Will to provide Cell Number Crosstabulation*

		QUESYS6					Total
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	
D-Gender	Male	3	4	10	169	18	204
	Female	2	4	5	93	12	116
Total		5	8	15	262	30	320

4.1.22 Analysis: Research showed that aged people are the top of the list who gets so frustrated with long waiting customer lines in NBP that many time they have left queues without completing their transaction.

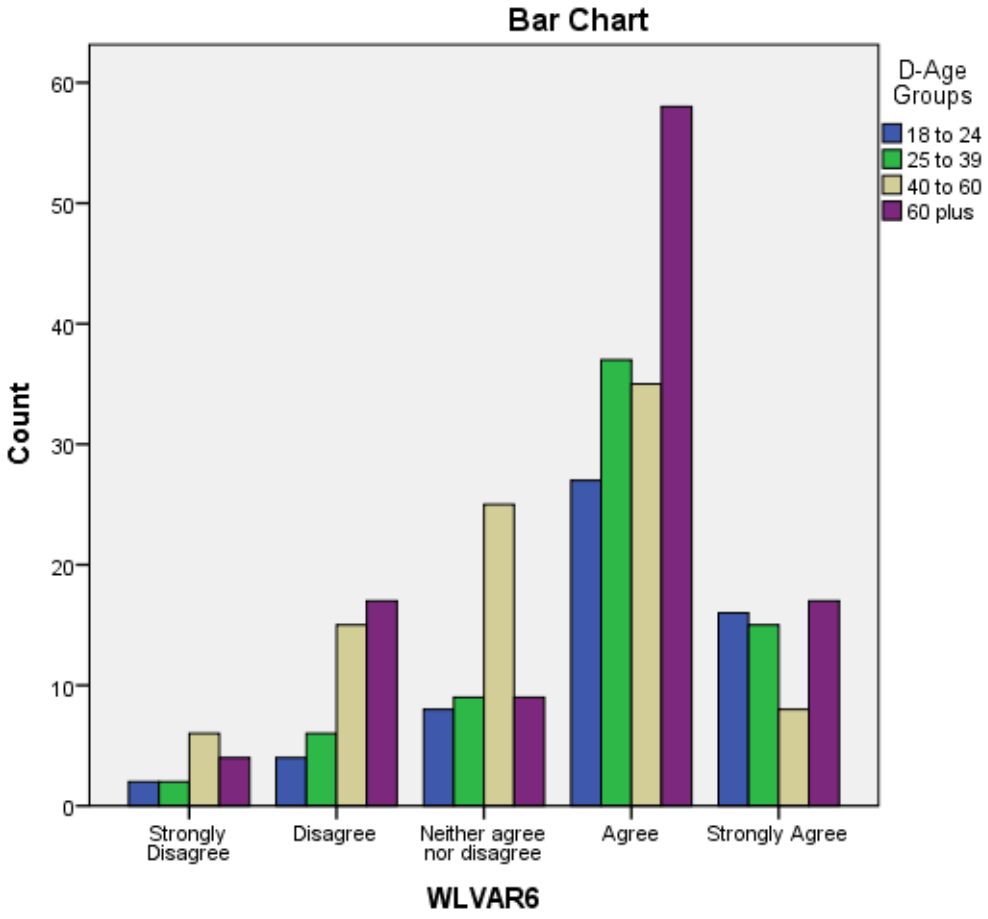


*Table 22: Queue Left * Age Groups Crosstabulation*

		D-Age Groups				Total
		18 to 24	25 to 39	40 to 60	60 plus	
WLVAR6	Strongly Disagree	2	2	6	4	14
	Disagree	4	6	15	17	42
	Neither agree nor disagree	8	9	25	9	51
	Agree	27	37	35	58	157
	Strongly Agree	16	15	8	17	56
Total		57	69	89	105	320

4.2 Descriptive Analysis

Table 23: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
WLVAR1	320	1.00	5.00	4.2906	.81131	-1.748	.136	4.435	.272
WLVAR2	320	1.00	5.00	4.2031	.72526	-1.124	.136	2.344	.272
WLVAR3	320	3.00	5.00	4.5625	.58922	-.985	.136	-.024	.272
WLVAR4	320	3.00	5.00	4.3688	.59908	-.362	.136	-.670	.272
WLVAR5	320	1.00	5.00	4.1375	.75937	-1.576	.136	4.708	.272
WLVAR6	320	1.00	5.00	3.6219	1.05529	-.775	.136	-.028	.272
WLVAR7	320	1.00	5.00	4.2375	.77571	-1.656	.136	4.742	.272
WLVAR8	320	1.00	5.00	4.2906	.80354	-1.778	.136	4.682	.272
QUESYS1	320	1.00	5.00	4.3281	.62484	-1.227	.136	4.922	.272
QUESYS2	320	1.00	5.00	4.3156	.68829	-1.491	.136	4.944	.272
QUUSYS3	320	1.00	5.00	4.1437	.71567	-1.096	.136	3.046	.272
QUESYS4	320	1.00	5.00	4.1781	.70566	-.913	.136	1.853	.272
QUESYS5	320	1.00	5.00	4.0844	.67355	-1.464	.136	5.114	.272
QUESYS6	320	1.00	5.00	3.9500	.61639	-2.233	.136	8.988	.272
QUESYS7	320	1.00	5.00	3.7469	.77277	-1.375	.136	2.926	.272
QUESYS8	320	1.00	5.00	4.2406	.81612	-1.792	.136	4.729	.272
QUESYS9	320	1.00	5.00	4.1438	.75406	-1.568	.136	4.796	.272
QUESYS10	320	1.00	5.00	3.9625	.93947	-1.317	.136	1.989	.272
Valid N (listwise)	320								

The table above showing the breakdown of Data Normality and Descriptive analysis. In various columns, the values of N (which is total number of received responses i.e. 320), other statistical factors such as standard deviation, skewness and kurtosis and values of minimum and maximum are also presented in the above table. Minimum as well as maximum value shows basically the authenticity of data also the computation of data. Mean as in all the cases, value above 3, which shows that responses gathered from all the responses were more towards agreement with what was asked in the questions.

4.3 Reliability Analysis

This analysis is done in order to get the insight that how consistently the measuring instrument measuring the concept. Reliability analysis measures the consistency of data as well as its stability (Sekaran & Bougie, 2003). One of the widely used measure for data reliability is Cronbach's alpha (Siribaddana, 2010). The Cronbach's alpha value as shown in the table below, is 0.865. This value is well above 0.70 which represents good reliability level of data. This value of alphas is considered as acceptable reliability level (Hair Jr, 2006).

Table 24: Case Processing Summary

		N	%
Cases	Valid	320	100.0
	Excluded[a]	0	.0
	Total	320	100.0

a. Listwise deletion based on all variables in the procedure.

Table 25: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.865	.871	18

4.4 Correlation Analysis

Correlation statistics are given in the following table. It represent the strength among the variables. It has both magnitude and direction any one or both of these can be negative or positive (Sekaran & Bougie, 2003).

Table 26: Correlations

		AWL	AQSYS
AWL	Pearson Correlation	1	.451**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	32.930	19.273
	Covariance	.103	.060
	N	320	320
AQSYS	Pearson Correlation	.451**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	19.273	55.532
	Covariance	.060	.174
	N	320	320

**. Correlation is significant at the 0.01 level (2-tailed).

Interpretation:

As mentioned already, there are two variables used in this study WL for representing waiting lines and QSYS represents queue management system. Averages for both the variables are taking and denoted by the above table as AWL and AQSYS. In Pearson Correlation, the diagonal values of the averages of both the variables are 1 hence they are correlated.

4.5 Exploratory Factor Analysis (EFA):

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
WLVAR1	4.2906	.81131	320
WLVAR2	4.2031	.72526	320
WLVAR3	4.5625	.58922	320
QUESYS1	4.3281	.62484	320
QUESYS6	3.9500	.61639	320
QUESYS7	3.7469	.77277	320
QUESYS8	4.2406	.81612	320

Table 27: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.749
Bartlett's Test of Sphericity	Approx. Chi-Square	533.392
	df	21
	Sig.	.000

Interpretation:

The values in the above table-27 such as KMO, Bartlett's test and Chi-square let us decide to proceed further for exploratory factor analysis or not. In the above table-27, the value of KMO is .749 which is between 0.7 and 0.8 and therefore acceptable. KMO is tool for measurement of the adequacy of the sample. Its acceptable value give a go ahead for factor analysis to proceed further (Kaiser, 1974). Then the value of chi-square is 533 and bartlett's test which shows the strength of relationship between the variables and to find out the sample has equal variance or not (Snedecor and Cochran, 1983). The value of abartlett's test is significant, so we can proceed to performing EFA.

Table 28: Anti-image Matrices

		WLVAR1	WLVAR2	WLVAR3	QUESYS1	QUESYS6	QUESYS7	QUESYS8
Anti-image Covariance	WLVAR1	.486	-.269	-.137	-.079	-.025	-.020	-.122
	WLVAR2	-.269	.546	-.121	-.055	.065	-.054	-.015
	WLVAR3	-.137	-.121	.724	-.011	-.088	.011	-.030
	QUESYS1	-.079	-.055	-.011	.791	-.194	-.025	.002
	QUESYS6	-.025	.065	-.088	-.194	.633	-.280	-.151
	QUESYS7	-.020	-.054	.011	-.025	-.280	.743	-.025
	QUESYS8	-.122	-.015	-.030	.002	-.151	-.025	.807
Anti-image Correlation	WLVAR1	.726[a]	-.521	-.231	-.128	-.045	-.034	-.194
	WLVAR2	-.521	.708[a]	-.192	-.084	.111	-.084	-.022
	WLVAR3	-.231	-.192	.851[a]	-.014	-.130	.015	-.039
	QUESYS1	-.128	-.084	-.014	.826[a]	-.274	-.033	.002
	QUESYS6	-.045	.111	-.130	-.274	.676[a]	-.408	-.211
	QUESYS7	-.034	-.084	.015	-.033	-.408	.728[a]	-.032
	QUESYS8	-.194	-.022	-.039	.002	-.211	-.032	.840[a]

a. Measures of Sampling Adequacy(MSA)

Table 29: Communalities

	Initial	Extraction
WLVAR1	1.000	.756
WLVAR2	1.000	.729
WLVAR3	1.000	.531
QUESYS1	1.000	.385
QUESYS6	1.000	.737
QUESYS7	1.000	.596
QUESYS8	1.000	.333

Extraction Method: Principal Component Analysis.

Interpretation:

In Table-29 of communalities, value of all the items are above 0.5 except QUESYS1 & QUESYS8. Since this is an exploratory research, therefore these items have not removed from communalities.

Table 30: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.855	40.786	40.786	2.855	40.786	40.786	2.152	30.736	30.736
2	1.212	17.310	58.096	1.212	17.310	58.096	1.915	27.360	58.096
3	.806	11.511	69.608						
4	.733	10.465	80.072						
5	.631	9.017	89.089						
6	.432	6.170	95.259						
7	.332	4.741	100.000						

Extraction Method: Principal Component Analysis.

Interpretation

The above Table-30 showed cumulative percentage value 58 which is closed to 60 and therefore accepted.

Table 31: Component Matrix

	Component	
	1	2
WLVAR1	.781	
WLVAR2	.698	
WLVAR3	.645	
QUESYS6	.626	.588
QUESYS1	.575	
QUESYS8	.567	
QUESYS7	.546	.546

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Table 32: Rotated Component Matrix

	Component	
	1	2
WLVAR2	.850	
WLVAR1	.840	
WLVAR3	.709	
QUESYS6		.854
QUESYS7		.770
QUESYS1		.553
QUESYS8		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Interpretation

The above Rotated Component matrix showed that items WLVAR1, WLVAR2 & WLVAR3 loaded strongly on factor 1. These factors are following three questions:

ITEM	DESCRIPTION
WLVAR1	Waiting customer lines in NBP needs improvement.
WLVAR2	Customer queuing is one of the key element of overall customer service of NBP.
WLVAR3	Waiting in lines in NBP is not a wonderful experience.

Therefore it is found that the factor in which the above items are strongly loaded is "**Customer's Waiting Experience**".

On the other hand, following items are loaded strongly on component-2 as shown by above table-32 of Rotated component matrix:

ITEM	DESCRIPTION
QUESYS1	If (NBP) can provide waiting customers with information on expected service time (on their cell phones), then those customers will experience less discomfort while waiting. Adopted from (Davis & Heineke, 1994; Larson, 1987).
QUESYS6	I am willing to provide my cell number to NBP for mobile based queue management system.
QUESYS7	I am willing to provide my visit purpose information every time I visit NBP for mobile based queue management system.

On the basis of above items, it is found that the factor in which the above items are strongly loaded is "**Communication through Cell Phones**".

Therefore, using rotated component matrix in the Exploratory Factor Analysis, this has been found in this study that Customer's Waiting Experience & Communication through Cell Phones are the two most significant determinants of queue management system perceived by the customers of National Bank of Pakistan in Lahore city.

Table 33: Component Transformation Matrix

Component	1	2
1	.756	.654
2	-.654	.756

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Overall Interpretation of EFA:

The KMO value is well above 0.7. Communalities in two items are below 0.5 however they cannot be ignored due to the less number of available items in each variable. The rotated component matrix determined two significant factors. One is "Communication through cell phones". Therefore customers are of the view that communication using cell phones can help solving long queuing problems in NBP. Second factor is "Customer's waiting experience". Hence there is a dire need of better queuing managing queues in NBP using mobile based QMS as per the research.

CHAPTER 5: DISCUSSION & CONCLUSION

This chapter explains all the outcomes of this research in detail that are obtained from this study. It also discusses the key findings, conclusion and recommendations.

5.1 General Discussion

National Bank of Pakistan is Pakistan's largest public sector bank operating since 1949. It has a branch network of nearly 1500 branches situated all over Pakistan and some in abroad. Total 15,000 plus employees are working for the bank and the bank is provide full scale of commercial banking services although it is a state owned entity.

Large queues can always be observed in most of NBP branches throughout the year (Ghani, 2016). In this ear, people have very busy lives and waiting to get served is a cause of frustration for the customers (Davis & Heineki, 1994). Therefore, there is dire need in NBP to try and use cost effective and efficient means to solve queuing problems. This will lead to enhancing customer satisfaction and thereby increasing business volume.

5.2 Discussion on Key Findings & Implications

From the analysis of data the key findings are hereunder:

- There are two major determinants of queue management system in NBP
    a) Customer's waiting experience
    b) Communication through cell phones

Using Rotated component matrix in the Exploratory Factor Analysis (EFA), it was found that items of variable customer waiting lines, are strongly loaded on Customer Waiting Experience and items of variable Queue management system strongly loaded on Communication through cell phones. Meaning thereby that customers of NBP Lahore branches, perceive that waiting is a problem and using cell phones this waiting problem can be solved.

Customers want to perform other important tasks instead of waiting in lines:

- Now a days customers want to save their precious time in order to perform other important tasks.

Customers of NBP (although mostly senior citizens) are comfortable taking tokens remotely on cell phones:

- Above 90% of the respondents were of the view that they are familiar with cell phones and using cell phone it will be convenient for them to take advance tokens with estimated waiting time.

5.3 Recommendations

In light of the determinants found in this research, NBP needs to update their existing old paper based queue management system. The existing traditional queuing management system is not only causing frustration, dissatisfaction among NBP customers but it is also one of the major source of loss of customers.

This can be done by adopting cost effective way of mobile phone based queue management system. Using such system, customers can take tokens remotely using mobile phones or mobile app. This system not only issues tokens to customers remotely, but it also alert them when their turn is nearly arriving. A customer can perform other important tasks of her or his for example instead of waiting in long and tiring queues in NBP. This will not only improve NBP's customer service and industry image, but it will also help in attracting more customers and increased business.

5.4 Future Research

This research was conducted in Lahore city only. It can be conducted all over Pakistan specially in rural areas to test what is the adaptability of this system since it is based on cell phones to know the adoptability there and what is the level of willingness present there among the customers. This research can be widely spread on verity of other business operations as well such as government offices where queuing problem do exists, fast food restaurants, hospitals and medical clinics, big shopping malls and grocery stores, passport offices, post offices, license obtaining offices and virtually all sorts of business that are currently observing high volume of customer lines. This research uses Exploratory Factor Analysis (EFA). To get the deep insights, CFA (Confirmatory factor analysis) can be applied on the same research as well as use of an application of SEM (structural equation modelling) can be performed.

5.5 Conclusion

Customer queuing is one of the most severe problem in Pakistan's largest Public Sector Bank, National Bank of Pakistan (NBP). In this technologically advanced era, this is an utmost need as pointed out by customers of various age groups, education background and frequent visitors in this research, that this problem can be solved using latest toolsets such as cell phones.

It will help reducing frustration amount customers, increase business for the Bank, and help management of the bank take better business decisions.

APPENDIX - A

1 Questionnaire

Queue Management System Questionnaire

This survey is being conducted to evaluate the existing queue management system in NBP. Using this questionnaire, an evaluation is being carried out regarding Customer Service Queue Management at NBP; to see if we can provide better queuing management services to the valued customers. Thanks you very much for sparing your time to fill this form; it will only take your less than 10 minutes time. Please return your completed questionnaire to the Branch Manager or Operations Manager of the Branch. Your answers will kept confidential. In case you have any queries about the questionnaire, please contact the researcher under signed.

M Abu Baker Islam

Contact Number: 0092 300 44 09 469

Email: ab.itwork@gmail.com

M. Phil Scholar,

Bahria University, Lahore Campus (A Project of Pakistan NAVY)

Form Filling Directions: Kindly mention below your level of agreement or disagreement with each of these regarding Queuing Management System in NBP. Place an "X" mark in the box of your answer. Scale of number 1 to 5 is being here. Where 1 indicates Strongly Disagree, 2 – Disagree, 3 – Neither Agree nor Disagree, 4 – Agree and 5 for Strongly Agree.

	"1" Strongly Disagree	**"2" Disagree**	**"3" Neither agree nor disagree**	**"4" Agree**	**"5" Strongly Agree**
1. Waiting customers lines in NBP needs improvement					
2. Customer queuing is one of the key element of overall customer service of NBP					
3. Waiting in lines in NBP is not a wonderful experience					
4. Waiting in lines in NBP not a pleasant experience even in the well renovated NBP branches (Solomon and Surprenant, 1985)					
5. Long waiting lines in NBP cause frustration					
6. Many times I have left long waiting line in NBP without completing my task					
7. I think my waiting time in NBP queues, can be utilized to perform my other important tasks					
8. I think long customer queues in NBP creates bad impression for the Bank.					

	"1" Strongly Disagree	"2" Disagree	"3" Neither agree nor disagree	"4" Agree	"5" Strongly Agree
9. If (NBP) can provide waiting customers with information on expected service time (on their cell phones), then those customers will experience less discomfort while waiting (Davis & Heineke, 1994; Larson, 1987).					
10. I think the informed estimated wait time will allow me to better utilize my waiting time					
11. I think system should also alert me when my turn is nearly arriving					
12. I will feel more comfortable visiting NBP when I will know my estimated serving time in advance					
13. I am willing to adopt paper less mobile based queue management system					
14. I am willing to provide my cell number to NBP for mobile based queue management system					
15. I am willing to provide my visit purpose information every time I visit NBP for mobile based queue management system					
16. I am convenient in using cell phones to read SMS about my waiting time and token number					
17. I think this system if used in other companies, will increase customer satisfaction their as well					
18. I think along with SMS, NBP should also make an additional automatic phone call to further clarify/confirm my token and estimated time					

Demographic Information:

19. Please select you age group

a) 18 to 24
b) 25 to 39
c) 40 to 60
d) 60 Plus

20. Education status:

- Under Matric
- Intermediate
- Graduate
- Postgraduate

21. Gender:

a) Male
b) Female

22. Profession:

a) Private Job Holder
b) Government Officer
c) House wife
d) Looking for job/work
e) Business

23. You belong from:

a) Lahore
b) Other city

24. Are you an existing customer of NBP?

a) Yes
b) No

25. What is your visit frequency in NBP?

a) One time in a day
b) Many times in a day
c) One time in a week
d) Many times in a week
e) One time in a month
f) Many times in a month
g) Occasionally (less than one visit per month)

26. For which service do you mostly visit NBP? You can choose one or more options.

- Funds Transfer
- Balance Inquiry
- Bill Payments
- International Remittances
- Savings
- Cash withdrawal
- Pension fund management
- Any other periodical payment

27. I do not feel uncomfortable if NBP saves my every visit information to better serve me in future

a) Agree
b) Not Agree

28. I think other service organizations such as banks, health service clinics, supermarkets, and government offices should also use this mobile based service queue management system

a) Agree
b) Not Agree

29. I am willing to pay nominal service charges to NBP to avail this system

a) Agree
b) Not Agree

30. I think cost of this system should be beard by the bank

a) Agree
b) Not Agree

31. I do not feel uncomfortable by getting additional information about bank's latest products & services in my token number SMS

a) Agree
b) Not Agree

32. I may skip this mobile based queue management system in case the following number of customers already present in a queue ahead of me:

e) 1 to 5
f) 6 to 10
g) More than 10

Your Name (Optional): _____

Thank you!

Cell Number (Optional): _____

In this study, the developed questionnaire only adopted two item from (Davis & Heineke, 1994; Larson, 1987) regarding information of expected waiting time and from (Solomon and Surprenant, 1985) regarding perception of waiting time in well renovated and comfortable business outlets. All the other items were developed by the researcher and validated by experts of Harvard University, USA, German university experts, Yasar University, Turkey professor and PhD professors of Pakistan. Moreover the questionnaire is also validated by 07 executive professionals of National Bank of Pakistan working as senior management position. The questionnaire was modified as per instructions of all the experts who validated it. The final questionnaire was given to all the customers of NBP.

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