

# Queue Management Optimization with Short Message System (SMS) Notification

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**Abstract.** Every customer has to wait for long hours to accomplish his or her transactions in banks. Banking customers face this problem every day in their daily life. By solving this issue, it will eventually speed up customer throughput and increase sales and profitability while improving productivity and operational efficiencies. Moreover, it minimizes prolonged customer waiting and reduces frustrations. The main objective of any queue management system is to achieve a better quality service to customers. In its most basic form, a queue management system will issue a queue ticket to a customer and later announce the ticket number when service is available, eliminating the need to stand in line while waiting. There were a couple of interviews and questionnaires conducted to bank customers to find out their satisfaction level about the current system and acceptance of the proposed system. In this way, the queue management system help to provide comfort as well as fairness to customers, by allowing them to maintain their position in the queue while they are seated comfortably or engaged in constructive activity. In other words, the customers still have to wait for long hours for their turn. To overcome these problems, a new way of queue management system has been introduced that is Queue Management System with SMS notification. This new system is designed with a small interface, easily accessible with smart phones for a queue management with SMS notifications especially mobile users.

**Keywords:** Queue Management System, Queue Management System with SMS notification, SMS notification

## 1. Introduction

In daily routine life, banking customers have to wait for long hours to accomplish their transactions in bank. To overcome this problem, a new way of queue management system has been introduced and called as Queue Management System with SMS notification which will issue a queue ticket to a customer and later announce the ticket number when service is available, eliminating the need to stand in line while waiting. In this way, queue management systems help to provide comfort as well as fairness to customers, by allowing them to maintain their position in the queue while they are seated comfortably or engaged in constructive activity.

SMS management system has been used by a couple of industry and it has been showed as successful. Industries which have used similar system to this are healthcare, education, travel agency , transportation, entertainment, service and support.

## 2. Literature Review

There are three main issues which have been considered to be solved in this project. The prototype presented below covers and has a rational solution for these three issues which are to speed up customer throughput and increase sales with profitability, improve operational efficiencies and most important of all is to minimize customer-waiting time and reduce frustrations.

When it comes to controlling queue, a queue management system is something that is proven to be very useful. The usefulness of this system tends to become apparent to those stores, banks, supermarkets and other retail locations that caters to the needs of hundreds of customers every day. A business owner should know that customer satisfaction is something that must be included in their primary considerations, and cannot

expect to provide those customers extreme satisfaction if they experience discomfort while waiting for their concerns to be heard. [1] [2]

### 2.1. Comparison between Invisible Queue, Visible Queue and Virtual Queue

Invisible queues are those where customers can't see current queue conditions, such as when they reach a contact centre that doesn't announce estimated waiting time. Since customers aren't informed of waiting time, they may quickly become discouraged as the waiting time drags on. This can lead to increased abandonment and customer frustration - even for those who eventually reach an agent at the counter. Customers waste precious time complaining about their experiences and may even ask additional questions on the announced queue number so that speaking with an agent was "worth the wait." [3]

Visible queue provide customers with information that they can use to determine the best use of their time. When they hear the Estimated Wait Time (EWT), callers may decide to abandon immediately or may judge that the wait is acceptable and remain on the line to speak with an agent. This visibility alleviates some customer frustration and reduces the amount of money contact centres spend on queue time for callers who eventually abandon. [4]

Virtual queues provide customers with information about current queue conditions and present them with options for handling their wait. Customers are informed of their EWT and offered the choice of remaining on hold or receiving a return call when it is their turn to speak with an agent. Customers who choose a return call can hang up the phone and let the system maintain their position in queue.

### 3. Scenario

Current Scenario

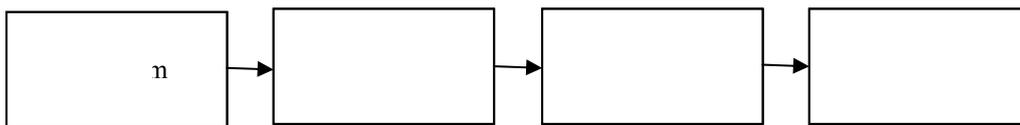


Figure 1: Traditional Queue Management Method

Proposed Scenario

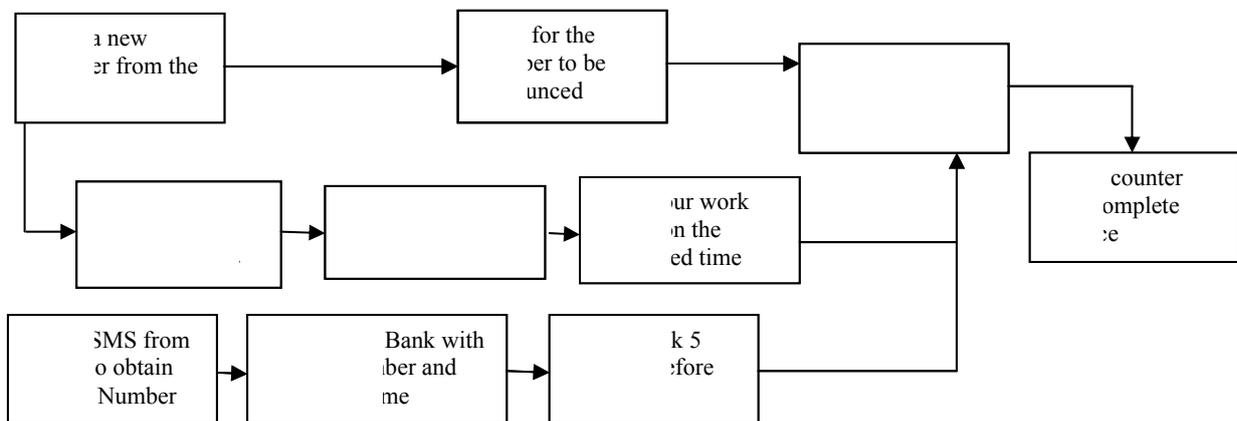


Figure 2: Queue Management with SMS Notification

### 4. Improvement done from the current Virtual Queue Management

Queue Time							Agent Talk Time				
12:00	12:01	12:02	12:03	12:04	12:05	12:06	12:07	12:08	12:09	12:10	12:11

Figure 3: Total waiting time via Traditional Method

Welcome		Virtual Queue Time						Hi	Q	Agent Talk Time			
12:00	12:01	12:02	12:03	12:04	12:05	12:06	12:07	12:08	12:09	12:10	12:11		

Figure 4: Total waiting time and time Wasted via Virtual Queue

Figure 3 shows that it has total 8 minutes of waiting time. This is just an example if the bank is empty or very few customers is present at the bank. The waiting time may multiply as customers increase. It would seem this method increases the frustration of the customers, and then a virtual queue is proposed where things were done via telephone. The advantage of this method is customers don't have to be at the bank for long hours and can settle their work via phone. Yet the problem of waiting is not solved as the customers will have to hold on to the phone until the agents talk to them. At the same time, customers walking in to bank in their money and to do other transactions which still need to be done over the counter will not be solved via phone. These still require customers to be in the bank to settle their paperwork.

The proposed system is actually meant to reduce the frustration of queue up, where customers are not given any option other than to wait until their number is announced. Due to the constraints found in this present system that this new system is recommended. Customers are given the option to do whatever they need to do while waiting for their turn to come via phone. This is possible as the rough estimation is made for the customer based on the time they will be called upon. For example if the customer sends an SMS to the bank based on the category, and there will be a reply on their queue number and also the estimated time to be served. Once the customer receives this information, the customer will be able to plan their journey and other things. If the estimated time is 1 hour, the customer do not have to be at the bank for 1 hour, they can just go anywhere to settle their things and just be at the bank 50 minutes later. This reduces the frustration of the customer waiting unnecessarily at the crowded bank.

## 5. System Design

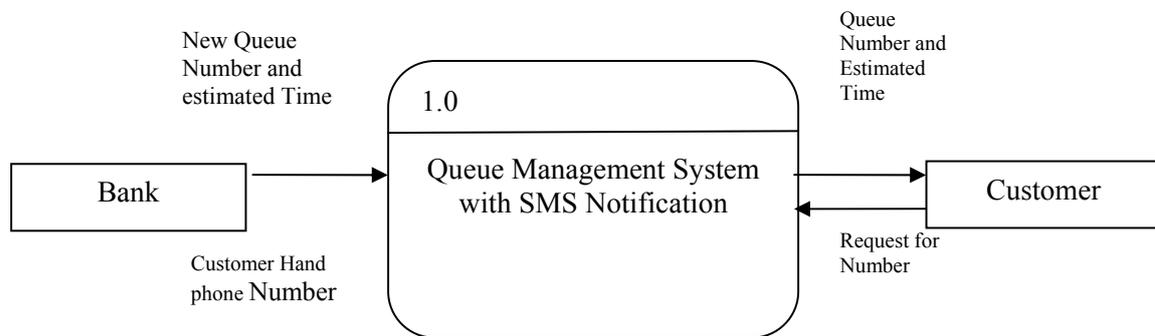


Figure 5: DFD Level 0 of the proposed System

Based on Figure 5, it is clearly shown the flow of the proposed system between the customers and the bank. The process begins from the customer who will have to send the SMS to the bank and the bank will process and reply with the Queue Number and also the estimated time.

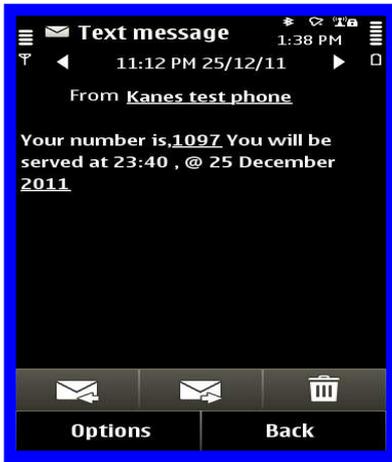


Figure 6: Code to be sent to Bank

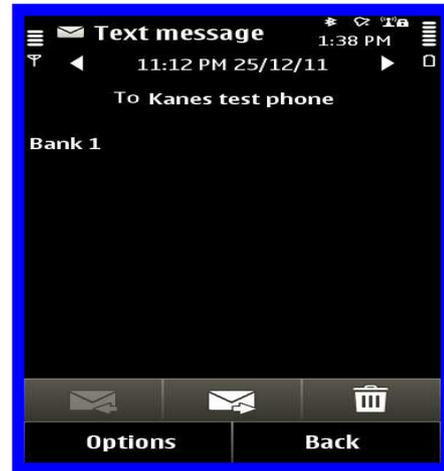


Figure 7: Sample Reply from the Bank

Figure 6 shows the sample code to be sent to the bank requesting for queue number. The term Bank is used to request for Queue Number and the number beside it is used to identify the category of queue that the customer will be selecting. This code can be changed to the criteria set by the bank. Specific terms are used just to identify what kind of reply they are expecting. In this prototype author has used two kinds of terms, which is “BANK” and “TIME”. Term BANK is used for requesting queue number and estimated time to be served and term TIME is used for requests of the estimated time to be served. This term can be used by the customer to get the queue number themselves from the bank. Upon receiving the number from the bank customer service, the customers could just send a SMS to the bank as “TIME <Queue Number>”. Then they will receive the estimated time to be served for that specific queue number.

Figure 7 shows a sample reply from the bank which consists of a queue number and estimated time the customer will be served. This uses the 24 hours’ time format to avoid any confusion. This SMS is meant to be very short to avoid the bank to be charged extra by the service provider. This SMS is set up to fit specifically just one page of the SMS. Besides that, this method also enables all kind of version of phones to receive this SMS. No graphic or other MMS related features are added.

## 6. Reporting

This proposed prototype also comes with a reporting method. This produces a complete report based on the category which enables the bank to plan their counters. With this report, the bank will be able to plan their number of counters. This will improve their productivity. Referring to figure 6, it shows how the report is produced for the bank to be able to view the report.

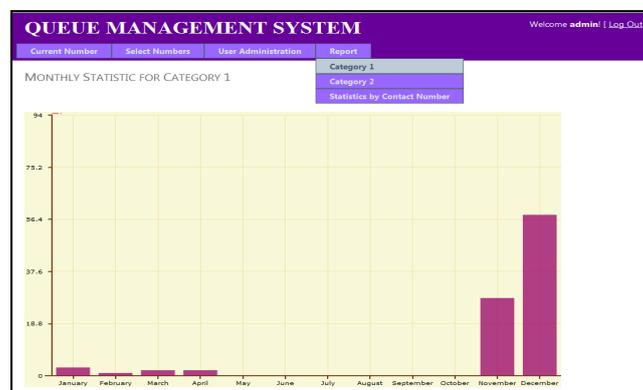


Figure 8 : Sample Reporting System

## 7. Conclusion

The success of the project can also be judged on the basis of meeting the objectives of this project. This was proved correct based on the acceptance test. Staffs’ and customers were asked to test this system and

express their feelings towards the system. Upon testing the system, customers actually agreed that this system can reduce their frustration while waiting for their number to be announced as their estimated time is known earlier. Besides that, they will also be able to do their other tasks rather than wasting hours in the bank.

Looking at the administration part of the system especially the reporting part, the bank does agree that this can be very useful for them to control their counter count.

For future enhancement, this system should be added with a couple more functions to be a perfect system. Functions that should be added to this system should be:

### **7.1. Generate Report by Date Range**

The current system does not generate report by range of date. It compiles all the report and generates the report by month. As an enhancement, it should allow users to select the range of date before it generates the report.

### **7.2. Search Engine**

The current system doesn't provide any search functions. It only provide sort functions. As for the future enhancement the system should have a search engine to ease the staff to search the hand numbers related to them. This will also avoid redundancy of complaints

### **7.3. Adding More Branches**

Currently the prototype is built in terms of focusing to 1 branch. If this is to be implemented for a complete banking service, then the SMS send should include the branch code as well. This will cover all the branches in Malaysia.

## **8. Acknowledgements**

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## **9. References**

- [1] <http://www.rsiconcepts.com/why-queue-management-system.php>
- [2] [http://www.gms.com.my/GMS\\_Home/concept.htm](http://www.gms.com.my/GMS_Home/concept.htm)
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