A Simulator for the Assessment of Manpower Requirement for Technology Savvy Banking

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Summary
The objective of this paper is to forecast the manpower requirement for technological banking. The major problem that the banks are facing is to explore the manpower requirement so as to provide better services to the customer as well as to increase the business per employee. Forecasting the requirement of manpower in bank depends on the basis of the transactions demanded by the customers. There are some transactions that cannot be handled through an ATM and to replenish and maintain the money stock in ATM, human resource is needed to be deployed. The output of the present simulator gives the future requirement of staff for a bank given a particular number of account holders. The role of simulator will be advantageous for the human resource department of a bank.

Key words:
ATM, Simulation, Manpower, Demanded Transactions.

1. Introduction

In the present era of technology, the customers are not aware of Internet banking hence they carry out the day-to-day transactions through ATM. Banking industry is moving from real banking to virtual banking. Banks are establishing more and more ATMs and are paying higher emphasis on it. Adaptation of information technology in banking industry has reduced the workforce (Bhasin, 2002) thereby increases the per employee business. It helps to increase the productivity and helps the banks to take care of even larger customer base and this will ultimately add up to the bottom line of the banks. Technology has resulted in lesser pressure on the employee in terms of entertaining customers and reducing the repetitive tasks (Swain, 2005). Bank employee can utilize the time required for the physically present customers to deal with several customers by ATM. Taking into view, the use of an ATM in banking industry the simulator has been designed in the present study so as to decide the future hiring of the staff in a bank. Simulation provides an ideal way to study the complex customer service scenarios by providing criteria against which performance can be measured. Simulation applications have also recently appeared in the Public Service Sector, specifically in the delivery of emergency services (Trochim and Davis, 1986). Simulation is being used with good effect to predict manpower and throughput (number of persons treated per day) for such delivery systems. So, it helps in updating the customer status as well as increased per employee business. The present paper has been divided in three sections. Section-I introduces the concept of the paper while section-II outlines the simulation of manpower requirement while section-III deals with the design of the algorithm for future manpower requirements of a bank. The last section is about the discussion and conclusion.

2. Simulation of Manpower Requirement

Manpower forecasting is a difficult problem and there are several reasons for it. First, manpower forecasting is a complicated task because multiple objectives are involved, for example multiple service-level conditions (Wilfred et al., 2001). Second, manpower forecasting is complicated by the fact that the arrival process is stochastic, i.e., the exact arrival time of a customer is unpredictable. Third, the total daily workload is hard to predict, since there are many external factors involved. For example, it observes a correlation between the weather and the number of accidents. Good service levels require accurate forecasts of the workload and thus are very important. Fourth, the productivity of an employee is not constant during the day, and is hard to predict. Due to presence of random and unpredictable factors such as weather accurate prediction cannot be made. Inaccurate predictions usually have much impact on service levels. For example, because of underestimations of workload service levels can be expected to be low during a day (Parker, 1996).
Use of technology decreases the requirement of staff and costs have been declined. As the more and more transactions will be carried out through an ATM, the running cost of a bank will go on decreasing accordingly. In the present paper, the simulation technique is being used with good effect to predict the staff size. Computer based simulations are an effective tool for human system integration optimization, as well as for studying the risks associated with complex interaction between team and

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systems. The proposed modular simulation environment empowers analysts to choose the best discrete event based simulations to address questions of manning (Burack, 1988). It describes an environment for manning and technology optimization that leverages many of the technologies and methods. A key goal of study is to develop a feasibility prototype for the banking industry. This foundation work is essential for ensuring the resulting feasibility prototype, and will demonstrate immediate value by providing the capability of both estimates the relationship between a technology and manning as well as to compare the manning requirements associated with sets of competing technologies (Khoong, 1996).

Simulation identifies and quantifies the impacts of technology on employee performance. It may be the substitute of the costly experimentation with real system. Using simulator the bugging and installation time may be reduced along with operational cost. Moreover, it may improve the results of banking industry in terms of efficiency and effectively handling the transactions in routine (Banks Jerry et al., 2003).

The whole analysis will depend on the number of transactions demanded. If the total demand is less than the capacity of transactions handled manually then the use of technology may not be advisable and vice-versa. In the present paper, a simulator has been designed to assess the requirement of staff. In the present simulator, the input in terms of staff in position has been varied to assess the impact of technology. Operating cost is computed by varying the manpower. The inputs to the simulator are: total staff in position, transaction time, and transactions carried out per employee, per transaction cost of an ATM, and per transaction cost of a staff member. A random number generator has been used to generate the random number using the poison distribution. The output of the generator will be treated as the demanded transactions. As manpower in bank is varied, the number of transactions carried out through an ATM varies accordingly. Then the operating cost of running a bank has been calculated on the basis of the transactions carried out through ATM and by staff. To eliminate the problem of variation in the demand the cost in a cycle is calculated for 180 days.

Terms and notations

ATM - Automatic teller machine
IT - Information technology
DT - Daily transactions
TC - Transaction carried out
TS - Total staff
TCOS - Transactions carried out by the staff
TCOA - Transactions carried out through an ATM
PTCS - Per transaction cost of staff
PTCA - Per transaction cost of an ATM
TS - Total staff in position in a bank
Lamda - Mean arrival time

3. Algorithm: Sim_Manpower_Requirement

Step1: Set Sum := 0.0, lamda := 200 and input TC, PTCS, PTCA and TS

Step2: Repeat for day := 1 to 180

Set TCOS := TC * TS

Generate random transactions for the day using poison distribution in the variable DT

If (DT <= TCOS)

Set TCOA := 0

Set TCOS := DT

Else

Set TCOA := DT – TCOS

Set TOC := (TCOS * PTCS) + (TCOA * PTCA)

Print desired statistics

Set data[day-1][0] := day

Set data[day-1][1] := DT

Set data[day-1][2] := TCOS

Set data[day-1][3] := TCOA

Set data[day-1][4] := TOC

Set Sum := Sum + TOC

Set average := sum/180

Step3: Exit

4. Discussion and Conclusion

This simulator was designed and developed to guide the banks in decision making process in respect to future recruitment and/or hiring of staff. The need for effective manpower forecasting has been primarily driven by the technological initiatives in the banking industry, wherein the deployment of staff is of strategic importance. One important parameter that influences the manpower requirement in banking system is the number of transactions demanded in a given period of time. If all the staff is busy at any point of time then a new coming customer waits in a queue. Long waiting times result in frustrated and dissatisfied customers. It was therefore important for banks to optimize the staffing so that the waiting times experienced by the customers were minimized. At the same time, banking industry could not afford overstaffing in order to minimize the operating cost.

A specific goal for manpower forecasting was to achieve a certain level service, while avoiding the overstaffing. The problem could not be solved analytically or numerically, because the demanded numbers of transactions are stochastic in nature. Resultantly, the present problem was solved using the simulation approach. For modeling the system it was assumed that the demanded transactions follow a poison distribution with λ as average number of customers.

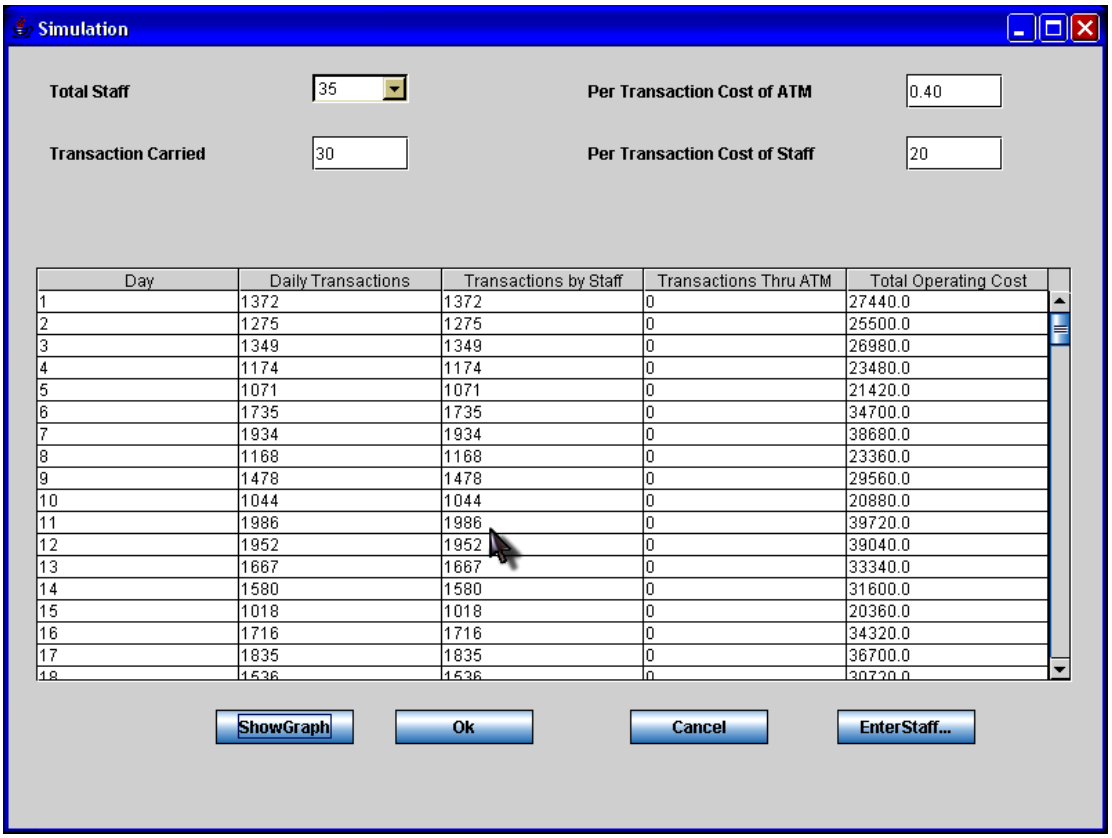

Figure 1: Snapshot of the output of the simulator (Sim_Manpower_Requirement)

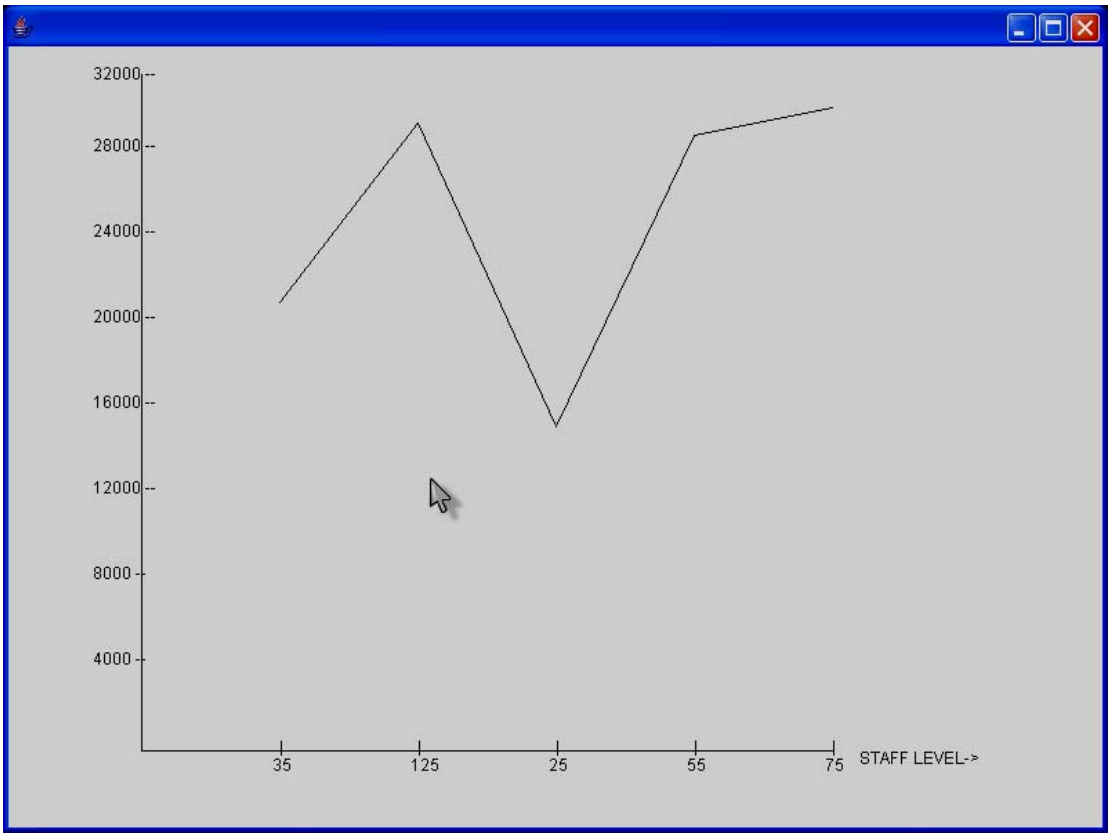

Figure 2: Graph of the output of the simulator (Sim_Manpower_Requirement)

The simulator experiment was conducted for 180 days by providing random number of customers' transactions following a poison distribution by keeping the staff at constant level. The experiment was repeated for several staff levels. Value of λ depends upon total number of account holders. For a particular bank say having ten thousand accounts holders the value of λ was assumed to be 200, the operating costs are shown in figure 2. From the figure-2, it is clear that the operating cost of bank is minimum i.e. Rs. 15,000/- when the staff level is 25.

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