A Simulation on ATM service performance: A case study

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The banking industry has significantly gained benefits using the ATM facility. The main objective of this is to minimize the customer waiting in money transactions and provide an efficient service for 24 hours daily. Thus analyzing the performance of such system is very important. Accordingly, this study aimed to investigate the performance of an ATM service system of a selected state bank in Sri Lanka. The system formed a large queue just after the end of daily working hours of government officials. This has created long waiting times of the customers in the weekdays. Therefore, the study selected the hour from 4.30 pm to 5.30 pm on two consecutive week days for data collection and the sample of customers were selected among the period. The respective times for customers waiting in the queue and service receiving were recorded. Then, inter arrival and service times were calculated using those records, included with 100 observations. The system was simulated and analyzed using the student version of Rockwell ARENA 14.5. The study inserted calculated values to the Input Analyzer and found corresponding probability distributions. Both arrivals and service provision followed BETA distributions. Thus they were input to the ARENA model. The study identified the system to be single server queuing system with infinite waiting room capacity. Also, the population was infinite. Furthermore, the customers did not leave without being served and the service discipline was identified as First-Come-First-Served. The ATM system was modeled using the modules in both basic process and advanced transfer panels of the analysis tool. The model was run for a replication length of one hour. The results revealed that the customer service rate of the ATM was 86.44%. Furthermore, the system showed average waiting times of a customer in the queue and the system to be 4.5 and 5.5 minutes respectively. Also, the average number of the customers in the queue was 4. Therefore, the study suggested to provide another ATM facility considering the financial feasibility. Assuming further the queuing as a single line for both ATMs, the average waiting times in the queue and the proposed system can be reduced to 2.20 and 3.49 minutes respectively. Thus new ATM system can serve its customers with the rate of 86.7%. Accordingly, this would further reduce the corresponding number of customers in the queue to be 1.

Keywords: ARENA Simulation, ATM Service Performance, Queuing Theory, Single Server Queuing System