The Analysis of the Customer Request Processing in a Financial Institution

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**ARTICLE INFO**

*Article history:
Accepted February 2013
Available online 30 May 2013*

**JEL Classification**
G 21, C 51, C63

**Keywords:**
Financial institution, Financial service, Simulation modeling

**ABSTRACT**

This paper presents the numerical simulation of the customer requests processing by generalists and specialists in a financial institution using ARENA software. The model considers three types of requests: standard requests, direct special requests and special requests received by telephone or e-mail. The requests processing time and costs receive a detailed analysis: the processing time, the waiting time and the total time, the requests number and the requests cost dependencies as a function of the standard requests incoming frequency are presented.

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1. Introduction

The research literature [1,2] reveals the preoccupation of the financial institution for their performance increase through the services quality increase, problem solving decrease by anticipating their appearance, the application of managerial techniques that increase the customer satisfaction and the simplification of the front office employee activities. In order to increase the organizational performances, it is recommended the implementation of four efficient methods: „Root Cause Analysis”, „Benchmarking”, „Process Reengineering” and „Continuous Improvement”.

These methods must be used inside a bank for the efficiency increase of the two activity fields of the working environment: front office and back office activity fields. If the front office activities have as objective the efficiency increase of those activities where the customer interacts with the bank employee, the back office activities have as objective the efficiency increase of those activities that are not seen by the customer (for example: ATM programming, internal audit). Between the front office and back office activities there is a strong dependence even if the front office activities are oriented toward the customer, while the back office activities have a technical orientation.

Applying the four methods mentioned above, the financial institutions can reduce the costs and the number of unsatisfied customers increasing, in the same time, the service quality and the customer satisfaction. The research results emphasize the fact that the financial institutions must take operational and strategic actions both in the front office and the back office fields.

A detailed study of the front office and back office activities of the Australian banks was realized by Delpachitra and Beal [3] for the lending operations regarding: home loans, personal loans, small and large business loans. The objective of this study was the determination of benchmarks for the most efficient operations of lending products and the determination of the motives for the differences of the cost structures of front office and back office operations and processes.

Zomerdijk and Jan de Vries [4] are completing the previous works by analyzing the way the front office and back office activities influence the design of the service delivery systems. Key design decisions necessary for the front office and back office organization were identified, decisions that must be taken at a service delivery system design. Three design decisions were studied and their role in the front office and back office work structure was determined: the decision of working with the customer, de decoupling decision and the grouping decision. The main conclusion of this study is that the financial institutions should consider the organizational decisions in a unified way taking into consideration simultaneously the front office and back office activities design.

Michael Zapf [5] considers further the front-back office activities design but he considers that a special role for a business success is the company-customer contact: a successful interaction leads to a strong customer—company relation, while a less successful interaction leads to the customer loss. Therefore, the design of proper interaction processes that allow a bank a rapid and efficient approach of the customers becomes very important. The most important characteristics of the generic services were determined for the

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** Dunarea de Jos University of Galati, Romania. E-mail addresses: maria.neagu@ugal.ro (M. Neagu), vali_m80@yahoo.com (V. Marin),
banking sector: the difficulty (standard vs. special requests) and the communication channel: synchronous (telephone, chat) vs. a-synchronous (e-mail, fax). The design dimensions are determined as a function of the generalist or specialist employee with working responsibilities in the front office and back office regions and the integration degree of synchronous and a-synchronous requests. Zapf [5] establishes the strong and week aspects of the communication integration emphasizing the fact that the communication integration is often more efficient than the separate communication channels.

Having in view the complexity of the problems treated by the research literature, we can conclude that the activities developed by a financial institution are numerous and diverse and that they require a permanent improvement of their efficiency. In this context, this paper develops a simulation model that has as main objective the improvement of front office and back office activities of a financial institution.

Section 2 of this work defines this model built using ARENA software, a model that defines the analysis and finalization activities of the standard requests, special requests and direct special requests. The program was run for different values of the mean incoming period of time of the standard requests, while all the other process parameters of the process remain constant. A eight hours working day was considered.

Section 3 of this work presents the modeling results and their analysis regarding the number of requests solved in one day, the time necessary to solve a request and the cost of this process as well as the variation of these variables as a function of the process parameters. The results obtained in this paper gives us an estimation of the cost of a process and a method to choose the best organizational version of the activities of a financial institution.

Section 4 of the paper emphasizes the conclusions of this work. This model can be used for improving the efficiency of the activities and the organizational structure of a financial institution.

2. Numerical simulation of customer requests analysis

The numerical simulation of the customer financial requests is presented by Figure 1. In the front office activities, the generalists receive the standard customer requests and the direct special customer requests. A part of these requests are accepted for further analysis. The special customer requests will be analyzed by specialists and, if it is the case, they will finalize and solved them favorably. The standard requests received by the generalists will be analyzed by the generalists. If they are accepted, they will pass the process of a final analysis and they are solved favorably.

The process of standard customer requests incoming is modeled (Figure 1) as a random process and it is described by the statistical theory using a probability density function of exponential type with a mean value for the requests incoming period of time of 15 minutes. The model considers that in every working day (8 hours) a generalist receives a maximum of 40 standard requests.

Similarly, the generalist receives not only standard requests but also direct special requests. The direct special requests have a smaller frequency of arrival than the standard requests. The model considers that the medium period of time of these type of requests arrival is 30 minutes and their maximum number in one day is 20 requests. The bank employee registers the special requests that arrive by telephone or e-mail.
This type of requests are received directly by specialists and they are modeled as having a frequency of arrival of 30 minutes; the maximum number of special requests received daily is of 15 requests.

Standard requests and the direct special requests are received by a generalist. He gathers them (a process that is modeled by the "Requests reception" process from Figure 2) and he solves them in the order of their arrival. (see the "Save criterion"— "First" from Figure 2).

The requests analysis (the "Requests analysis" process) by the generalists is modeled by Figure 3. Each request waits the availability of the necessary resource which is modeled here as a computer. A number of three computers are used simultaneously: "Computer 1_1", "Computer 1_2" and "Computer 1_3". The generalists analyze the request in a time period which has a minimum value of 5 minutes, a medium value of 10 minutes and a maximum value of 15 minutes. Then, they decide (Figure 4) if the requests will progress toward the request analysis or they will be rejected.
We considered for this analysis that there is a degree of acceptance of 99% for the incoming requests. The accepted requests will be further sorted in standard requests (that we are further analyzing) and special direct requests that will be sent to a specialist toward analysis. This selection process is shown by Figure 5.

The generalists will finalize the standard requests in the "Standard requests finalization" process, a process similar to that described by Figure 3 and using the same three resources defined at "Requests analysis" process. The minimum, average and maximum period of time for the standard requests finalization process is 10 minutes, 15 minutes and 20 minutes, respectively.

The process of special requests gathering for a specialist during one working day is modeled by the "Specialist requests repository" process, a process similar to the one presented by Figure 2. The specialist analyzes these requests by a process presented by Figure 6: the average value necessary to analyze a request is 20 minutes, the minimum value is 10 minutes and the maximum value is 25 minutes. The specialists use three resources simultaneously called: "Computer 2_1", "Computer 2_2" and "Computer 2_3".
After analyzing the special requests, the specialists take the decision to accept or to reject a request in the "Decision special requests" process. A percentage of 90% of the special requests will be analyzed further by the specialists, using the same resources, in the "Special requests finalization" process. An extra time is necessary with a minimum, average and maximum value of 15, 10 and 20 minutes, respectively.

![Figure 6. Modeling of requests analysis by specialists](image)

### 3. Numerical simulation results and discussions

The ARENA program was run using the model described above and a labor cost of 12$/hour not only for the generalists but also for the specialists.

The simulation results presented by Figure 7 show that the process imply a total labor cost of 569$. The cost of the activities that are adding value is 389$, the cost of the transfer activities is 180$.

**Key Performance Indicators**

<table>
<thead>
<tr>
<th>All Entities</th>
<th>Average</th>
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</thead>
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<tr>
<td>Non-Value Added Cost</td>
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</tr>
<tr>
<td>Other Cost</td>
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</tr>
<tr>
<td>Transfer Cost</td>
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</tr>
<tr>
<td>Value Added Cost</td>
<td>389</td>
</tr>
<tr>
<td>Wait Cost</td>
<td>0</td>
</tr>
<tr>
<td>Total Cost</td>
<td>569</td>
</tr>
</tbody>
</table>

![Figure 7. Main performance indicators](image)

The results shows also that eight working hours have as a result the solution for 14 special requests, 15 direct special requests and 26 standard requests. From a total of 117 requests that arrived in 8 hour period of time, 55 requests (special, special direct and standard requests) were positively solved.

The numerical modeling results presents also the minimum, average and maximum time periods for the working, transfer and waiting activities as well as the total time periods for each requests: special request, direct special requests and standard requests.

The program described above was run for different values of the standard requests incoming frequency while all the other parameters of the analysis process are kept constant. The obtained data offer us an image on the variation of the solved request in one working day, the period of time for the requests solution and the cost of this process as a function of the process parameters.
Figure 8 presents the dependence of the cost of a request as a function of standard request incoming frequency. The processes of the request analysis (standard and direct special requests) and the requests finalization (standard requests) by the generalist, the processes of analysis and finalization of the special requests and direct special requests by the specialists were considered. Moreover, the cost of a request analysis by a specialist or a generalist is presented.

We can notice that increasing the arrival frequency of the standard requests, the cost of a request analysis by a generalist increases for a frequency between 7 minutes and 25 minutes, then this cost decreases for a frequency between 25 minutes and 35 minutes. The maximum cost for a request analysis by a specialist is register also for a standard request incoming frequency of 25 minutes.

Analyzing the number of solved requests (Figure 9), we can notice that a medium value of 25 minutes for the standard requests incoming frequency leads to a maximum number of solved standard requests and a minimum number of solved special requests. The direct special requests register a minimum number when the standard requests arrive at an average period of time of 15 minutes, then the number of this type of request increases as the frequency of the standard requests increases.

The total time necessary for solving a request is the sum of the waiting time and the processing time. The variation of the total time and its elements is presented in the following figures. Figure 10 presents the total time variation necessary for solving a request as a function of the average time between two successive arrival of the standard requests.
We can notice that the total time necessary to a generalist for the analysis (of the standard and the special direct request) and the finalization (of standard requests) of a request decreases when the frequency of the incoming standard requests increases in the range 7\(\div\)25 minutes. This aspect can be explained by the decrease of the waiting time for these processes, as we can notice in Figure 11. The increasing variation of the waiting time explain the increase of the total time necessary for a generalist on the range 25\(\div\)35 minutes.

For a specialist, the analysis of the special and direct special requests that are handling to him shows that the waiting time has the greatest influence on the total time value.

The processing time for a request for the model analyzed in this paper do not vary very much for the four processes analyzed here. This variation is presented by Figure 12 for a variation of the standard requests incoming frequency between 7 and 35 minutes.
4. Conclusions

This paper presents an analysis of the efficiency and the cost of the front office and back office activities in a financial institution in the process of requests analysis and finalization. Three types of requests were considered: standard requests, direct special requests and special requests. While the standard requests are analyzed and finalized by the institution generalists, the direct special requests are analyzed by the generalists and the accepted ones are finalized by the specialists. The special requests that arrive by telephone or e-mail are solved completely by the institution specialists.

The simulation model presented in this paper with the objective of improving the front office and back office financial institution activities related to a customer request was built using the ARENA software. It allows the presentation and the analysis of the standard, special and direct special customer requests processing activities. The model we constructed is modeling the customer requests solving process in 8 hours period of time considering an average cost of 12$/hour for the resources. The results obtained using the numerical simulation present the details of the financial requests processing, the costs of this process, the waiting, processing and the total time for each entity in the process, the number of the customer requests solved in 8 hours time period, etc.

The results we obtained showed that the number of solved requests has a maximum for a frequency of standard requests arrival of 35 minutes. These results depend on the input values we used, the average processing time for the analysis and finalization of the standard and the special requests. The process parameters we used determined a smaller special request waiting time for an incoming standard requests frequency greater than 25 minutes. Consequently, the total time for the special requests diminish and the number of special requests that are solved increases. We are noticing that the total number of the solved requests increases for incoming standard requests frequency greater than 25 minutes even if the number of the standard requests that are solved diminishes slightly.

This paper opens the road for detailed and precise analysis of a great variety of processes regarding the financial requests solution in a financial institution. Different organizational structures and resources that are used influence the results. The method presented determines the costs necessary for a request processing and it helps choosing the best organizational structure.

Bibliography