

ASSESSMENT OF QUALITY OF SERVICE IN BANK OFFICES BY METHODS OF THE THEORY OF MASS SERVICE

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Abstract

In work the assessment of quality of service is given in bank offices by methods of the theory of mass service on the basis of which the comparative analysis of real indicators of functioning of branches of the bank is made. Offers on increase in efficiency of service of the lagging behind offices are formulated, the developed scenarios of further possible strengthening and development of overall performance of all branches of the bank are step by step considered.

Keywords: quality assessment, efficiency of service, functioning indicators, branch of the bank, service stream, analysis

I. Introduction

Increase of efficiency of service, aspiration to correspond to the set level of quality, are the priority directions in work with the personnel, practically each financial institution. Especially great interest to the matter is shown by the commercial organizations which aren't provided with the state dating and working in severe conditions of the competition when fight actually goes for each real and potential client.

In such situation, especially actual is a question of preservation already received financial investments, the income and aspiration to pursue the considered, weighed economic policy of development of the enterprise. Within the solution of the matters, the greatest interest causes use of mathematical methods for the analysis of current situation, the forecast of possible decisions and creation of the corresponding scenario of development. These methods are actual and demanded as allow to organize an individual approach in the analysis of a situation that leads to more effective improvement of quality of service and work of the personnel. Thereby allowing to avoid sample actions which are characterized by high expenses, lack of optimization, short-term, unstable improvement of a situation.

Quality of service is a set of the mechanisms, actions, rules and attributes influencing satisfaction of clients at contact with bank [1]. The modern client of bank – skilled man, sophisticated in the requirements also demands a large number of services since it has a right and possibility of a wide choice in the market of banking services. It is possible to distinguish from such requirements: receiving high-quality consultation from bank workers; not the high cost of services of bank; faultless work of employees or technical devices of bank; comfort at service;

existence in bank of modern services and technologies, etc. Each client of bank chooses the indicator of quality of service, but there is the main indicator which each client puts at the head: holding time and turn, to be exact its absence.

The most widespread methods of an assessment of quality which are used at the organization of monitoring and marketing of banking institutions are based on the comparative analysis following the results of supervision or poll. Then purposeful work on elimination of defects which result is defined by the subsequent monitoring is carried out. Unlike this approach, the theory of mass service allows not only to improve separate indicators, but also to optimize process in general. In addition, existence of probabilistic indicators, allows to make already on the basis of the received values preliminary forecasts and according to them to build the plan of action, and to plan estimated results.

In this work, work on an assessment of quality of service in bank offices on the basis of methods of the theory of mass service is carried out. By results, which offers on increase in efficiency of service of the lagging behind offices were formulated and proved. The possible scenarios of further development in strengthening and development of overall performance of branches of the bank leading to increase of number of potential clients and the corresponding economic benefit are counted.

II. Main results

We will consider analytical model of system of mass service with expectation, not the limited arriving flow of requirements of clients and the following characteristics: the system has n of the serving channels, each of which can serve at the same time only one requirement [3]. The simplest (Poisson) flow of requirements with parameter λ comes to it,

$$P_k(t) = \frac{(\lambda t)^k}{k!} e^{-\lambda t} \quad (1)$$

If at the time of receipt of the next requirement in system on service already there is not less n of requirements, the requirement stands in line and expects the beginning of service [3]. A holding time of each requirement of t – a random variable which submits to the exponential law of distribution with parameter μ ,

$$F(t) = 1 - e^{-\mu t} \quad (2)$$

Parameter $\alpha = s/\mu$ – average of experts which needs to be had to serve in unit of time all coming clients is entered, where s – average of the clients arriving for a unit of time, $\bar{t} = 1/\mu$ – the average time of service by one expert of one client.

And the necessary condition $\alpha/n < 1$ which assumes that turn can't grow infinitely, so, the number of the serving experts has to be more average of the experts necessary in order that for a unit of time to serve all arriving clients.

On the basis of this model four real branches of the bank with the following entrance data presented in table 1 were considered. In this case understand additional offices of bank within one settlement as bank office. Using tools of the theory of mass service it is easy to receive the following indicators of functioning of office (table 2) which accept the corresponding values for each branch of the bank (table 3).

Table 1: Basic data on customer service in branches of the bank

Branch of the bank	Number of experts, n	Average time of service by one expert of one client, \bar{t} (min.)	Average of the clients coming to bank within an hour, s
1	10	4,2	124
2	6	5,8	55
3	7	5,3	70
4	8	5,0	94

Table 2: Settlement formulas

Probability of that all experts are free	$P_0 = \left[\sum_{k=0}^{n-1} \frac{\alpha^k}{k!} + \frac{\alpha^n}{n!(1-\alpha/n)} \right]^{-1}$
Probability of that all experts are occupied with service	$P_n = \frac{\alpha^n}{n!(1-\alpha/n)} P_0$
Average time of expectation of clients beginning of service (min.)	$\tilde{t} = \frac{P_n}{\mu(n-\alpha)}$
Average length of turn (persons)	$\bar{L} = \frac{\alpha P_n}{n(1-\alpha/n)}$
Average of free experts (persons)	$\bar{N} = \sum_{k=0}^{n-1} \frac{n-k}{k!} \alpha^k P_0$
Coefficient of loading of experts	$K = 1 - \bar{N} / n$

Table 3: Indicators of quality of functioning of branches of the bank

Branch of the bank	1	2	3	4
Probability of that all experts are free	0,000114	0,002567	0,001153	0,000055
Probability of that all experts are occupied with service	0,577765	0,706923	0,677664	0,93
Average time of expectation of clients beginning of service (min.)	1,83834	4,90395	3,74957	17,3329
Average length of turn (persons)	3,7992	5,5002	5,1309	44,000
Average of free experts (persons)	1,320	0,683	0,817	0,167
Coefficient of loading of experts	0,868	0,886	0,883	0,979

Primary analysis, the obtained data, reflects excellent and harmonious work of staff of office No. 1, moderate work of staff of office No. 2, 3, and weak work in office No. 4.

Owing to the lowest probability of that all experts are free, the highest probability of employment and the corresponding coefficient of loading, it is possible to claim that office No. 4 on the verge of an overload, both physical, and psychological. In too time, from a position of a psychological factor, at an average stream 94 persons an hour and the average length of turn 44 persons, it is possible to claim that soon in office recession of clients and as a result loss of potential profit will be observed.

In this situation, the offer on increase in overall performance of this office will be pertinent. Considering that the average time of service of the client in it is rather low, on the second place on all offices, it makes sense to add working unit. Addition only of one working unit (table 4, the

Stage 1), reduces probability of employment of all experts by a third, average expectation of the client practically by 7 times, and average the turn length 10 times.

The most important point for collective and the enterprise, in this case, is decreases of coefficient of loading and emergence of "free hands", average of free experts – 1,17. In such situation, it is possible to assume increase in speed of service, at the expense of more favorable situation, quiet work of experts and reduction of psychological and moral pressure from the present turn. As a result the increase in average time of service by one expert of one client at 2 seconds, leads to indicators when the average time of service doesn't exceed also 3 minutes (table 4, the Stage 2). That will increase efficiency of service, will keep and, perhaps, will increase average of clients and visitors in general.

Table 4: *Improvement of quality of functioning of branches of the bank No. 4*

Index	Office 4	Stage 1	Stage 2
Probability of that all experts are free	0,000055	0,000255	0,000399241
Probability of that all experts are occupied with service	0,93	0,60	0,514533
Average time of expectation of clients beginning of service (min.)	17,3329	2,47613	1,87383
Average length of turn (persons)	44,000	4,0	2,61439
Average of free experts (persons)	0,167	1,17	1,48
Coefficient of loading of experts	0,979	0,870	0,835556

The picture observed in branches of the bank No. 2, 3 is most widespread and universal (tab. 3). In too time, rather high coefficients of loading of experts and absence free, testifies that any hitch of one of operators, can instantly lead to formation of more long line and beat out office from stable work.

In this case, increase the working units not urgently, but development of a situation develops in this direction. In too time the increase at one established working post in offices No. 2, 3, in the circumstances will lead to more effective results, than procrastination of time to a situation when it is comparable with that occurs in office No. 4.

However, it should be noted that not always there is an opportunity to fill up staff since it demands also economic expenses. In that case, one of options of increase of overall performance of banks is increase of professionalism of workers which can consist not only in passing of courses of vocational training, retraining, etc., but also in debuggings of the process of work, and on a place, in concrete working situations. An indispensable condition of this debugging is the analysis of how there is a work in office and introduction of changes on places, for each office individually. Are for this purpose necessary simply observers, and participants of process, i.e. specialists operators.

Improvement of quality in this case consists, not in "piece" strengthening of permanent members of staff, and in creation of mobile group of experts 3-4 persons who will be serially thrown between branches of the bank, and to be engaged in increase of level of overall performance.

For example, we will consider the branch of the bank No. 2 in which the situation is stable and moderate. Introduction to this division of 3 new experts, will naturally significantly increase all indicators (table 5, the Stage 1). By results of the analysis, it is obvious that the highest average speed of service of the client on all branches of the bank (table 1) is the main reason for low efficiency. After carrying out planned actions on a place, the average time of service of the expert,

perhaps to raise till 4,5 min. This indicator isn't maximum (4,2 min.) therefore it can be quite reached.

In a result, after such actions, with initial number of experts in 6 people, but more with a high speed of service of 4,5 min., this office is essential to raise the indicators (table 5, the Stage 2), in comparison with initial (table 5). As a result, such changes, the branch of the bank No. 2, will be able to increase average, coming to bank with 55 to 70 people (table 5, the Stage 3), without essential loss of quality and efficiency, having kept some gain, in comparison with initial situation.

Table 5: *Mobile improvement of quality of functioning of branches of the bank No. 2*

Index	Office 2	Stage 1	Stage 2	Stage 3
Probability of that all experts are free	0,002567	0,00480593	0,0144418	0,00292659
Probability of that all experts are occupied with service	0,706923	0,109843	0,316216	0,680888
Average time of expectation of clients beginning of service (min.)	4,90395	0,909783	1,38663	3,46659
Average length of turn (persons)	5,5002	0,158551	0,695674	4,76622
Average of free experts (persons)	0,683	3,68333	1,875	0,75
Coefficient of loading of experts	0,886	0,590741	0,6875	0,875

After that the mobile group of experts can be transferred to other branch of the bank, to increase the skill, to train others and to develop new ways of individual improvement of quality of work and efficiency of service. In such approach, obligatory the condition will act entry into mobile group of experts of the business and existence at them the corresponding qualification, and experience.

Financial validity of this offer is confirmed over time since creation of mobile group to allow:

- Systematically to raise and modernize all branches of the bank in general;
- To carry out the analysis of current situations on a place;
- To carry out "live" monitoring of branches of the bank;
- To eliminate system errors and defects in work;
- To transfer experience of the leading branches of the bank to other offices.

As a result, even in the analysis of an initial situation, use of this group on all four offices, on average will increase total number of clients of the people coming to bank on 35-40, without loss of quality, growth of turns and invariable number of experts in offices. In the same conditions, pointed addition of the same number of experts in various offices will increase this number on 18-20 of people, without any further dynamics.

References

- [1] Isaev, R. A. Business engineering and management in commercial bank. M.: VOICE-PRESS, 2010.
- [2] Hakimov, E. A. The methods of the theory of mass service used for an assessment of quality of service in commercial bank//Marketing in Russia and abroad. 2010. No. 1. Pp. 30-36.
- [3] Venttsel, E. S. Probability theory. M.: "Academy", 2005.