УДК 339+400.738

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DOI: 10.32702/2306-6814.2023.1.91

MODE TOOLS FOR MANAGEMENT AND ADMINISTERING THE OBJECTS OF THE NETWORK RETAIL

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РЕЖИМНИЙ ІНСТРУМЕНТАРІЙ УПРАВЛІННЯ ТА АДМІНІСТРУВАННЯ ОБ'ЄКТІВ МЕРЕЖЕВОГО РИТЕЙЛУ

Кожен з об'єктів мережевого ритейлу має систему масового обслуговування клієнтів, яка створена для надання їм базових і супутніх послуг до, під час і після купівлі товару в торговому залі. Ця система є одночасно об'єктом управління та адміністрування. Як управління, так і адміністрування при цьому специфічні та потребують системного вивчення, оскільки елементами такої системи, у цілому, є: канали обслуговування; джерела заявок; заявки; черги. Елементами адміністрування такої системи масового обслуговування є: режими роботи каналів обслуговування мережі; загальні засади для заходів оптимізації системи масового обслуговування у мережі. Специфічним є те, що ці елементи визначаються для всіх об'єктів мережевого ритейлу одночасно. Елементами управління є введення та виведення з роботи додаткових каналів обслуговування, точки руху заявки у системі масового обслуговування, переходи між режими обслуговування клієнтів та моменти, що їх визначають; вибір заходів оптимізації. Специфічним є те, що ці елементи визначаються лише до окремих об'єктів мережевого ритейлу, однак не можуть виходити за межі, визначені системою адміністрування. Відтак дослідження орієнтоване на визначення специфіки дії режимного інструментарію управління та адміністрування об'єктів мережевого ритейлу. У межах дослідження доведено, що процеси управління та адміністрування систем масового обслуговування об'єктів мережевого ритейлу мають формуватися виходячи зі змісту методів теорії масового обслуговування. Доцільність вибору окреслених методів зумовлене загальною особливістю завдань, пов'язаних із масовим обслуговуванням клієнтів, а також випадковим характером процесів обслуговування в ритейлі. За результатами дослідження констатовано, що важливо забезпечити змінність режимів роботи системи масового обслуговування об'єктів мережевого ритейлу, для якої слід орієнтуватися на спеціальний "режимний" інструментарій, що відповідно до завантаженості трансформує процес обслуговуванням клієнтів в таких системах на всіх її рівнях, за рахунок зміни кількості доступних каналів обслуговування.

Each of the objects of the network retail has a system of mass servicing of clients, which is created for providing them with basic and accompanying services to, during, and after the purchase of goods in the trading hall. The specific thing is that this system is both a subject of management and administration. Both management and administration at the same time are specific and require systemic study, as the elements of such a system, in general, are service channels; sources of applications; applications; queues. The elements of the administration of such a service system are

modes of operation of network service channels; general principles for measures of optimization of all network service systems. The specific thing is that these items are defined for all objects of the network retail at the same time. The control elements are the introduction and withdrawal of additional service channels, application points in the mass servicing system, transitions between customer service modes and moments, and the selection of optimization measures. It's specific that these elements are defined only by the individual objects of the network retail, but cannot go beyond the limits defined by the system of administration. Therefore, the research is oriented on the determination of the specifics of the operation of the mode tools of management and administration of the network retail objects. Within the framework of the research, it's proved that processes of management and administration of systems of mass servicing of objects of network retail should be formed based on the content of methods of mass service theory. The expediency of the choice of the outlined methods is conditioned by the general feature of the tasks connected with the mass servicing of clients in retail, as well as by the casual nature of the processes of service. According to the results of the research, it's stated that important to ensure the change of the operating modes of the system of mass servicing of the objects of the network retail, for which it is necessary to orient on a special "mode tools", which according to the loading changes the process of servicing clients in such systems at all its levels, due to the change of the number of available service channels. The prospects for further developments related to the development of algorithms of flexible adjustment of loading systems of service of objects of network retail.

Ключові слова: система масового обслуговування; канали обслуговування; джерела заявок; заявки; черги.
Key words: system of mass servicing; channels of service; sources of applications; applications; queues.

PROBLEM SETTING (DESCRIPTION OF THE PROBLEM BEING ANALYZED IN GENERAL AND ITS CONNECTION WITH IMPORTANT ACADEMIC OR PRACTICAL TASKS)

Each of the objects of the network retail has a system of mass servicing of clients (or SS), which is created for providing them with basic and accompanying services to, during, and after the purchase of goods in the trading hall. The specific thing is that this system is simultaneously managed (individual object level) and managed (network level). Both management and administration at the same time are specific and require systemic study, as elements of such SS, in general, there are channels of service; sources of applications; applications; queues. However, the elements of the administration of such systems of mass service are:

— modes of operation of network service channels;

— general principles for measures of optimization of mass service systems in the network.

The specific thing is that these items are defined for all objects of the network retail at the same time. The control elements are the introduction and withdrawal of additional service channels, points of application movement in systems of mass service, transitions between modes of customer service and moments that define them; selection of optimization measures. It is specific that these elements are defined only by the individual objects of the network retail, but cannot go beyond the limits defined by the system of administration.

THE ANALYSIS OF THE LAST RESEARCH AND PUBLICATIONS IN WHICH THE SOLUTION TO THIS PROBLEM IS BEGUN

The proposed research is a continuation of the theoretical and applied work of scientists, whose interests, touched upon various aspects of management and administration of objects of network retail. The mentioned issue is devoted to the work of famous national scientists, in particular: Dankeeva O. [1], Kravets V. [2], Nesmiyanova M. [4], and Pavlov M. [5]. At the same time, most of the existing works are devoted to the management of separate complex systems of mass servicing, in particular the range of goods in retail networks of large-scale trade enterprises, and the improvement of retail technologies in modern conditions. At the same time, the peculiarities of management and administration of mass service systems are considered quite limited and ambiguous. Thus, in addition to the above works, the author focused on the results of his research [3].

THE WORDING OF THE PURPOSES OF THE ARTICLE (PROBLEM)

The purpose of the article is to determine the specifics of the operation of the mode tools of management and administration of the network retail objects.

THE PAPER'S MAIN BODY WITH FULL REASONING OF ACADEMIC RESULTS

According to the above, the processes of management and administration of systems of mass service of objects

of net retail should be formed based on the content of methods of mass service theory (namely mathematical methods of quantitative estimation of processes of mass service, which currently there is no alternative to influence on the defined processes [3]). The expediency of the choice of the outlined methods is conditioned by the general feature of the tasks connected with the mass systems of client's service in retail, as service processes' casual nature.

The specific thing is that such systems of service are effective only when they meet the basic expectations of visitors, as to their service as quickly as possible. Therefore, management and administration of retail outlets in the network should be jointly oriented to support rapid customer service by changing the operating modes of the selected mass servicing system for which special "mode" tools are applied, according to the type of objects of the network retail and their loading changes the process of servicing clients in such systems at all its levels.

The operating modes are defined by us as the main link, which is common for the systems of management and administration of objects of the network retail. Depending on the type of objects of the network retail and the specificity of loading of mass service systems, the modes of its work can be as follows [3]:

1) single-channel (with failures);
2) multi-channel (with failures);
3) single-channel, limited queue;
4) multi-channel (with the limited queue);
5) single-channel (with the unlimited queue);
6) multi-channel (with the unlimited queue).

At the same time, the peculiarities of customer service in such systems differ depending on the state of parameters of loading or m (availability and length of queue) and n (number of channels — number of cashiers, apparatus of self-service of clients, etc.). Thus, the mode of customer service in systems of mass service of the objects of the network retail is not constant.

The outlined working hours are chosen depending on the information about attendance and the intensity of the flow of buyers for a specific period. There are two possible ways of working systems of mass service [3]:

1) from the channels with the refusals or limited queue. The outlined mode is applied in the objects of the network retail with significant traffic of buyers and/or limited mode of operation. In particular, some customers may be refused service at limited working hours, due to the end of the operating cycle or overloads of the cashier rejected from service those applications of clients, at the moment of arrival which all places in turn accidentally turned out to be occupied (if m =0); additional channels of service may be introduced;

2) with channels with an unlimited waiting line (used in the objects of the network retail with little traffic of buyers, if the object of the network retail works at night or if the reserve for a limit of turn is exhausted). In such systems of mass service, the client's application, in the absence of the possibility of immediate service, expects (regardless of the length of waiting time and queue).

According to the above, the modes of customer service in the objects of the network retail are divided into [5; 3]: modes of service with failures (at that parameter m is not used); modes of service with the unlimited queue (at that parameter m is used); modes of service with a limited queue or limited waiting time.

Thus, the modes of service with failures (at that the parameter m is not used). In single-channel systems of mass service such a mode envisions 2-a stations:

— Free service channel (S0);
— The service channel is busy (S1).

Under this regime, there is one service channel, which receives application streams λ. At the same time, the flow of service has intensity $\mu 1$. If necessary, systems of mass service with failures can be converted into systems of mass service multichannel with failures, within which the mode provides acceleration of channel unloading. At the same time, there are such states — S0, S1, S2, ..., Sk (in the service channels there are from 0 to k applications). Under this mode, there are always n channels of service, where a distributed stream of applications with constant intensity is received λ.

Specific is the fact that within the limits of such operating mode it is possible to service failures, the reasons for which are:

— completion of the working time of the objects of the network retail;
— an interruption in the operation of the cashier;
— temporary closure of the objects of the network retail in connection with air alarm, etc.

Maintenance modes with unlimited queues are oriented on the parameter m. In single-channel CO, such a regime provides for the following conditions:

— Free service channel (S0);
— The service channel is occupied without applications in the queue (S1);
— The service channel is busy, 1-th application in the queue (S2);
— The service channel is busy, (k-1) applications in the queue (Sk).

Under this mode, there is one service channel, which receives application streams λ with intensity $\mu 1$. For the introduction of the limit on the length of the turn, single-channel systems of mass service can be transformed into multi-channel. Such a regime provides for similar conditions:

— there are no applications in the system and all service channels are free (S0);
— busy one service channel, and other free (S1);
— busy two service channels, other free (S2);
— busy k service channels, other free (Sk);
— busy all n service channels, but there are no queues (Sn);
— busy all n service channels, but one application in the queue (Sn+1);
— busy all n service channels, but r application in the queue (Sn+r).

The outlined mode provides that if at the time of the application the service channel is busy, then this application becomes in queue and waits for the beginning of service (if the system is multichannel, then the client can choose the channel with the lowest queue).

Under such a mode there is always one or n channels of service, where a single or distributed stream of applications with an unstable intensity λ comes. The

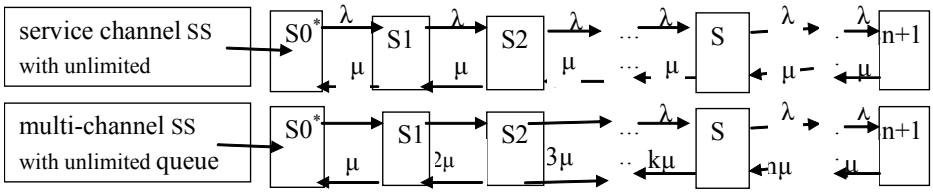

Fig.1. The general logic of the mass service systems activity of the objects of the network retail in the mode of service with an unlimited queue

Source: created by the author based on [2; 3].

general logic of the mass service systems activity of the network retail objects in the mode of service with the unlimited queue is given in fig. 1.

The special character of the outlined operating mode of mass systems service with the unlimited queue is that for $r < 1$ any application in the system will be serviced (thus parameter m is used). Within the limits of a considerable load of mass service systems, this mode is the least effective, because when it's applied it maximizes economic damage and expenses for clients who do not want to be in an unlimited queue or refuse to buy at the cash register.

According to research [3; 5] the introduction of unlimited lines of organization with different disciplines can slow down the growth of economic damage and expenses from the loss of clients. If the load is reduced, it is possible to enter the limit of the queue (input of the parameter m).

Service modes with limited queues or time-limited expectations are the most specific. In single-channel systems of mass service such operating mode form such conditions:

— service channels are free (S0);

— the service channel is busy, but there is no queue (S1);

— the service channel is busy, and from one to n — 1 application in the queue (S2...n);

— the service channel is busy, and y N application is in the queue (to the waiting time tn) (SN).

The specific feature of such an operating or N— application with a long waiting time tn (naturally, clients who have not got into N applications or with a long time of service move to another channel (which should be entered additionally)).

If an additional service channel is entered, then multichannel systems of mass service with limited queues are formed, within which the mode provides such states - S0, S1, S2, ..., SN (in the service channels there are from 0 to N-applications). The general logic of activity systems of mass service of the objects of the network retail in the mode of service with limited queue consists in that channel serve up to N applications or to N applications with waiting time to t N (fig. 2). It is specific that within such mode, restrictions are imposed on multichannel CO:

1) for the number of applications in the queue (which may not exceed the specified m);

2) for the time that the application may be in the queue (this is random, distributed according to the indicative law with the parameter υ).

For single-channel mass service systems, restrictions are introduced for the number of applications in the queue. The above restrictions are required for objects with a huge number of "non-performing" applications, namely, those that can go out of line if the waiting time or queue length exceeds a certain optimal value, in particular, for large discounters, classical supermarkets, and hypermarkets, hypermarkets discounters. Each mode tool of management and administration of objects of the network retail (as a set of tools) is oriented on flexible adjustment of loading systems of maintenance of objects of the network retail at all its levels. At the same time, a set of tools to adjust the loading systems of mass service differs by basic types of modes of customer service in objects of network retail.

SUMMARY RESEARCH SUMMARY AND PROSPECTS FOR FURTHER TASKS IN THIS AREA

Within the framework of the research, it's proved that processes of management and administration of systems of mass servicing of objects of network retail should be formed based on the content of methods of mass service theory. The expediency of the choice of the outlined methods is conditioned by the general feature of the tasks connected with the mass servicing of clients in retail, as well as by the casual nature of the processes of service. According to the results of the study the following conclusions were made:

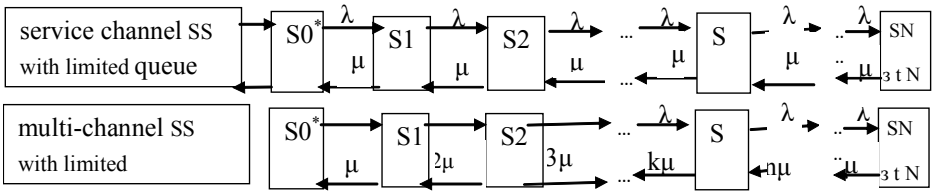

Fig. 2. The general logic of the mass service systems activity of the objects of the network retail in the mode of service with limited queue

Source: created by the author based on [2; 3].

1. The systems of service of the network retail objects are effective only when the basic expectations of the visitors are met, as to their service as quickly as possible. Taking into account the above-mentioned management and administration of such objects should be jointly oriented on the support of fast customer service by changing the operating modes of the redrawn system of mass servicing.

2. The operating modes are defined by us as the main link, which is common for the systems of management and administration of objects of the network retail. Depending on the type of objects of the network retail and peculiarities of loading systems of mass service, the modes of its work can be the following: single-channel (with failures); multi-channel (with failures); single-channel, with limited queue; multi-channel (with the limited queue); single-channel (with the unlimited queue); multi-channel (with the unlimited queue).

3. It is important to ensure the change of the operating modes of the system of mass servicing of the objects of the network retail, for which it is necessary to orient on a special "mode" tool, which accordingly transforms the process of servicing clients in such systems at all its levels, by changing the number of available service channels.

The prospects for further developments related to the development of algorithms of flexible adjustment of loading systems of service of objects of network retail.

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Стаття надійшла до редакції 12.12.2022 р.