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IMPROVING THE EFFICIENCY OF FREIGHT FORWARDING SERVICES BY A LOGISTICS COMPANY IN THE ORGANIZATION OF INTERNATIONAL ROAD TRANSPORT

KRAVCHENYA I. N.

(Belarusian State University of Transport; Gomel, Republic of Belarus)

To increase the efficiency of providing freight forwarding services by optimizing the structure of a logistics company in the organization of international road freight transportation, it is proposed to use simulation modeling. This paper presents a simulation model of freight forwarding services developed in GPSS World simulation system to determine the average processing time of incoming requests depending on the type of clients; research and comparison of the efficiency of two directions of requests depending on transportation; determine the total customer service time depending on the department; explore and improve the efficiency of logistics company by optimizing the construction of transport and logistics services. The developed simulation model can be used to determine the optimal structure of the organization of the work of a logistics company in the organization of international road freight transportation.

Keywords: *freight forwarding services, queuing system, service request, simulation modeling.*

Introduction. A freight forwarding company`s performance is analyzed according to indicators characterizing its activity areas where the company`s performance before and after the implementation of specific measures is compared. Each of the company`s goals requires the analysis of a number of indicators that allows making managerial decisions on the economic feasibility of the proposed actions, their benefits, and risks [1].

The most common aspects that are usually subject to constant reforms in freight forwarding companies` operation are workforce and material-and-technical capacity management. Potential measures that are considered to optimize the staffing level in order to provide complex and timely freight forwarding service provision, as well as derive economic benefits from the operation are the assessment of costs, revenues, and profits generated from the activity [1].

Statement of basic materials. The most important factor is the duration and quality of service provision. To plan this business process, we consider it appropriate to rationally organize freight forwarding services rendered by an international logistics company.

The aim of the work is to develop a simulation model of freight forwarding services developed in GPSS World simulation system [2–4] to

– determine the average processing time of incoming requests depending on the type of clients (VIP client, client, one-time application);

– research and comparison of the efficiency of two directions of requests depending on transportation (export, import);

– determine the total customer service time depending on the department;

– explore and improve the efficiency of logistics company by optimizing the construction of the workflow for provision of transport and logistics services.

To justify the choice of the optimal structure of an international logistics company and optimize the processing of incoming requests, a mathematical model of queuing system is proposed.

The proposed queuing model is implemented in GPSS World simulation system [2; 3].

As a result of the simulation, the average service time of an incoming request is shown in Table 1.

Histogram of the average service time of incoming requests from customers for forwarding services is shown in Figures 1.

Table 1. – Results of modeling the processing of incoming requests from customers

Operations for processing incoming requests	Average maintenance time, min (MEAN)	Mean square deviation, min (STD.DEV.)
VIP client (export)	109,3	11,1
Regular client (export)	250,4	33,9
One-time client (export)	534,7	212,3
VIP client (import)	145,8	17,8
Regular client (import)	289,5	55,4
One-time client (import)	545,8	194,5

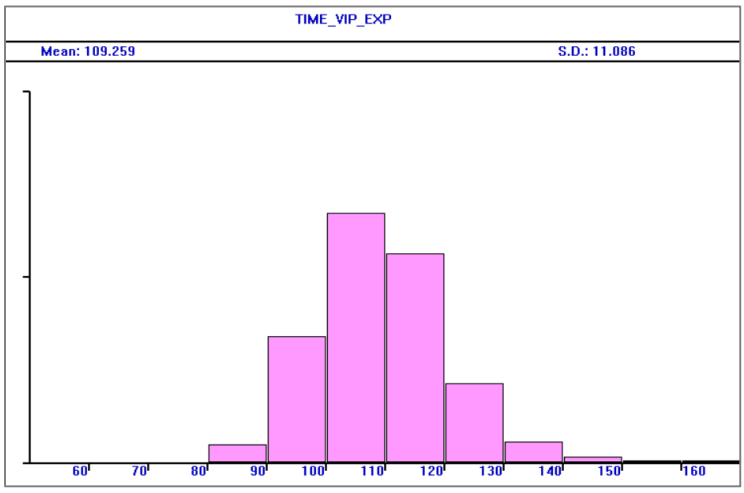

Fig. 1. – Distribution of application service time for VIP client (export)

According to the reports obtained as a result of modeling the processing of incoming requests, the main indicators of the simulation results are determined and the amount of time loss of requests for service requests in queues is calculated (Table 2, Table 3). Histogram of waiting time in queues for processing incoming requests from customers for forwarding services is shown in Figure 2.

Table 2. – Main indicators of simulation results (export)

Output parameters	Client Manager	Lawyer	Planning Department	Transport Department
Average work completion time (min)	102,5	29,4	63,7	113,9
Average queue lengths for request processing (request)	2,5	0,03	0,55	3,1
The number of requests served without downtime in the queue (%)	14,8	66,5	53,4	19,1
Waiting time of the client in the queue (min)	23,4	14,7	8,6	31,4
Load factor	0,89	0,37	0,81	0,95
Number of employees to process the request (people)	3,56	0,37	4,86	6,65
Number of employees in departments (people)	4	1	6	7

Table 3. – Main indicators of simulation results (import)

Output parameters	Client Manager	Lawyer	Planning Department	Transport Department
Average work completion time (min)	78,6	27,5	73,8	102,7
Average queue lengths for request processing (request)	0,15	0,23	1,3	3,5
The number of requests served without downtime in the queue (%)	83,4	53,5	47,6	18,7
Waiting time of the client in the queue (min)	2,7	5,4	8,3	19,8
Load factor	0,58	0,39	0,81	0,91
Number of employees to process the request (people)	2,9	0,39	4,86	6,37
Number of employees in departments (people)	5	1	6	7

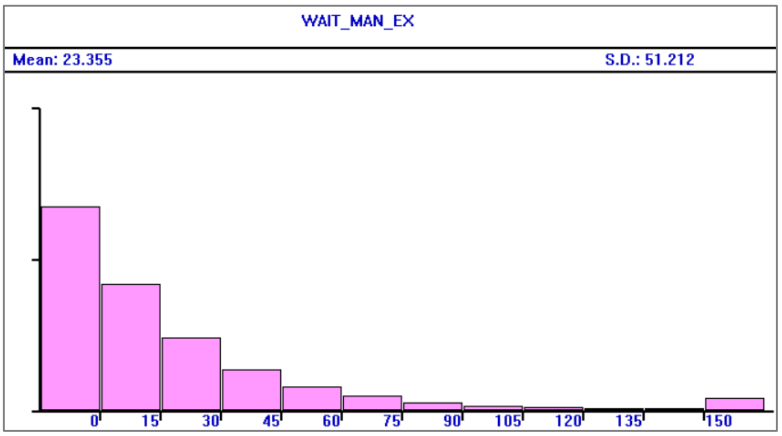

Fig. 2. – Distribution of waiting time in the queue of the export request to client manager

Having analyzed the calculation results, we can see that the "bottleneck" for this flow of requests is the number of client managers in the export department and the number of employees in the transport department, the increase of which will increase the throughput and reduce the time of customer service and request processing. While the number of jobs for client managers in the import department can be reduced.

Conclusions. The developed simulation model can be used to determine the optimal structure of a logistics company in the provision of forwarding services.

In determining the optimal number of employees to work with service consumers, a company's management should take into account the quantitative and qualitative indicators of their activities, but the most important aspect of any logistics organization`s operation is, of course, financial indicators.

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