

UDC 658

PULLING AND PUSHING LOGISTICS SYSTEMS EFFICIENCY ANALYSIS

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Logistics deals with the management of material and information flows. Production logistics aims at optimizing logistics processes by reducing costs and improving product quality within the production process. The main task of production logistics is to increase the production efficiency and company competitiveness.

In production logistics there are two main systems for managing material flows:

– pulling system in which resources are fed to the next technological operation from the previous one as needed (KANBAN);

– pushing system is the material flow organization in which resources are transferred from the previous operation to the next one in accordance with a pre-formed rigid schedule (DRP, MRP) [1].

The purpose of this work: to consider the comparative characteristics of the pulling and pushing systems.

To understand which of the systems is the most profitable in production, we calculate the efficiency of the pulling and pushing systems [2]:

$$\Theta = \frac{\sum_i \sum_j \sum_k \Theta_{ijk}}{\sum 3},$$

where Θ is a generalizing indicator that expresses an assessment of logistics systems efficiency; 3 is expenditure; Θ_{ijk} is the effect of performing logistics services for the i -th operation of the j -th function of the k -th order (or net profit).

We will carry out an assessment on specific examples.

A prominent representative of the enterprise with a pulling logistics system is Toyota (Toyota Motor Corporation) – a Japanese automobile company that is part of the financial and industrial group «Toyota» (Table 1). The table shows the values of the performance indicator of Toyota pulling logistics system for four time periods.

Table 1. Financial and economic indicators of Toyota company [3]

Period Indicator	March 2016 – March 2017	March 2017 – March 2018	March 2018 – March 2019	March 2019 – March 2020
Net profit, mln. JPY	1 831 109	2 493 983	1 882 873	2 076 183
Cost, mln. JPY	25 602 821	26 979 648	27 758 136	27 487 123
Efficiency of logistics systems (Θ), %	7,2	9,2	6,8	7,6

As can be seen from the calculations, the highest efficiency was in the second analyzed period, the lowest – in the third. However, it is possible to increase the efficiency of the company. To do this, we recommend the following:

- to strengthen quality control on the production lines of existing models;
- to improve qualification level of the staff and increase its number.

Examples of production with a push system include Coca-Cola (Table 2).

As you can see, the performance indicators of a company with a pushing system are higher than those of a company with a pulling logistics system. The lowest efficiency was observed in 2017. To increase the company's efficiency, the following measures can be offered:

- to search for new customers from among wholesale and retail companies;
- to launch new flavors on the market, purchase additional brands to expand the range.

Table 2. Initial data of Coca-Cola company [3]

Period Indicator	2016	2017	2018	2019
Net profit, mln. JPY	6 527	1 248	6 434	8 920
Cost, mln. JPY	34 494	30 163	26 817	28 062
Efficiency of logistics systems (Э), %	18,9	4,1	23,9	31,9

At the present stage of Russian economy development, the issues of increasing company efficiency by means of modern management tools, the concept of «lean production», in particular, are becoming important. This fact determined the relevance of the choice of the topic. A comparative study of logistics systems was conducted using specific examples and it turned out that the pushing system is more effective than the pulling one. The economic indicators were much higher. Various ways of improving the efficiency of organization's activities were considered: improving the professionalism, skill level, personal and business qualities of the manager, or changing the company's strategy, its structure, production technologies, working and leisure conditions, etc. The company also independently chooses ways and methods to improve the effectiveness of management, based on the specifics of its activities, the established management structure, economic and social performance, financial resources, and much more.

References

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3. Financial portal «Investing.com». Moscow, 2020. URL: <https://ru.investing.com> (accessed: 02.12.2020).