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DIGITAL TRANSFORMATION OF THE TRANSPORT
ACCOUNTING SYSTEM

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ABSTRACT. *The article deals with topical issues of the transformation of the accounting system in railway transport in the digital economy. The optimal criteria necessary to achieve the maximum performance of the information system with limited financial resources of the railway industry are determined. A scientific approach to the digital transformation of the accounting system in order to optimize a distributed corporate information system in railway transport is presented. The stages of digital transformation of the accounting system proposed by the author are developed from the need for digital transformation and budgeting of the accounting system in railway transport. In order to improve the management of the accounting system, automation of the control function is provided, the structure and functional responsibilities of the proposed treasury department and financial responsibility centers have been developed. For high-quality preparation of digital transformational financial plans, it is necessary to ensure balanced forecasting of volume and quality indicators of the work of structural divisions. Budgets of responsibility centers are developed based on the parameters of the approved financial plan and the forecast values of the enlarged budget parameters. The result of the work of the proposed responsibility center is that the top management of the transport enterprise will be able to conduct real-time monitoring with simultaneous receipt of current operational information to control any sources of income and*

expenses in electronic form. When developing the terms of reference of the proposed Treasury department, the software platform of the special software product "1C: Enterprise". The calculations of optimality criteria have shown that the application of the proposed approach makes it possible to increase the efficiency of the accounting information system. The economic effect of the introduction of financial responsibility centers is calculated, the average values (in percentage terms) for stocks, working capital, labor costs and the formation of financial statements are calculated.

Key words: *accounting system, railway transport, financial responsibility centers, corporate information system, treasury, efficiency, optimality criteria, financial resources, reporting, terms of reference, software product, digital transformation, budgeting, financial plan.*

АННОТАЦИЯ. *В статье рассматриваются актуальные вопросы трансформации системы бухгалтерского учёта на железнодорожном транспорте в условиях цифровой экономики. Определены оптимальные критерии, необходимые для достижения максимальной производительности информационной системы при ограниченности финансовых ресурсов железнодорожной отрасли. Изложен научный подход к цифровой трансформации системы учёта с целью оптимизации распределённой корпоративной информационной системы на железнодорожном транспорте. Предлагаемые автором этапы цифровой трансформации системы учёта разработаны из необходимости цифровой трансформации и бюджетирования системы учёта на железнодорожном транспорте. С целью совершенствования ведения системы учёта предусмотрена автоматизация функции контроля, разработана структура и функциональные обязанности предлагаемого отдела казначейства и центров финансовой ответственности. Для качественной подготовки цифровых трансформационных финансовых планов необходимо обеспечить сбалансированное прогнозирование объёмных и качественных показателей работы структурных подразделений. На основе параметров утверждённого финансового плана и прогнозных значений укрупнённых бюджетных параметров разрабатываются бюджеты центров ответственности. Результат работы предлагаемого центра ответственности заключается в том, что высший менеджмент транспортного предприятия получит возможность проведения мониторинга в реальном времени с одновременным получением текущей оперативной информации для контроля любых источников возникновения доходов и расходов в электронном виде. При разработке технического задания предлагаемого отдела казначейства использована программная платформа специального программного продукта «1С: Предприятие». Проведённые расчёты критериев оптимальности показали,*

что применение предложенного подхода позволяет повысить эффективность информационной системы учёта. Рассчитан экономический эффект от внедрения центров финансовой ответственности, рассчитаны средние значения (в процентном выражении) по запасам, оборотным средствам, трудозатратам и формированию финансовой отчётности.

Ключевые слова: система учёта, железнодорожный транспорт, центры финансовой ответственности, корпоративная информационная система, казначейство, эффективность, критерии оптимальности, финансовые ресурсы, отчётность, техническое задание, программный продукт, цифровая трансформация, бюджетирование, финансовый план.

ANNOTATSIYA. Maqolada raqamli iqtisodiyot sharoitida temir yo'l transportida buxgalteriya hisobi tizimini transformatsiyaning dolzarb masalalari ko'rib chiqildi. Temir yo'l transporti sohaning moliyaviy resurslari cheklangan holda axborot tizimining maksimal samaradorligiga erishish uchun zarur bo'lgan maqbul mezonlar aniqlandi. Temir yo'l transportida taqsimlangan korporativ axborot tizimini optimallashtirish maqsadida buxgalteriya tizimining raqamli transformatsiyasiga ilmiy yondashuvlari belgilangan. Mualliflar tomonidan taklif qilingan buxgalteriya tizimini raqamli transformatsiya qilish bosqichlari raqamli transformatsiya va temir yo'l transportida buxgalteriya tizimini byudjetlashtirish zaruriyatidan kelib chiqqan holda ishlab chiqilgan. Buxgalteriya hisobini yuritish tizimini takomillashtirish maqsadida nazorat funksiyasini avtomatlashtirish ko'zda tutilgan, taklif etilayotgan g'aznachilik bo'limi va moliyaviy javobgarlik markazlarining tuzilishi va funksional majburiyatlari ishlab chiqilgan. Raqamli transformatsion moliyaviy rejalarni sifatli tayyorlash uchun tarkibiy bo'linmalar ishining hajm va sifat ko'rsatkichlarini muvozanatli prognozlashni ta'minlash kerak. Tasdiqlangan moliyaviy rejaning parametrlari va kengaytirilgan byudjet parametrlarining prognoz qiymatlari asosida javobgarlik markazlari byudjetlari ishlab chiqiladi. Taklif etilayotgan moliyaviy javobgarlik markazining natijasi shundan iboratki, transport korxonasining yuqori menejmenti real vaqt rejimida monitoring o'tkazish imkoniyatiga ega bo'ladi va shu bilan birga daromad va xarajatlarning har qanday manbalarini elektron shaklda nazorat qilish uchun joriy tezkor ma'lumotlarni oladi. Taklif etilayotgan moliyaviy g'aznachilik bo'limining texnik topshirig'ini ishlab chiqishda "1C: Predpriyatie" maxsus dasturiy mahsulotining dasturiy platformasidan foydalanilgan. Optimallik mezonlarining hisob-kitoblari shuni ko'rsatdiki, taklif qilingan yondashuvni qo'llash buxgalteriya hisobi axborot tizimining samaradorligini oshirishga imkon beradi. Moliyaviy javobgarlik markazlarini joriy etishning iqtisodiy samarasi hisoblab chiqilgan, zaxiralar, aylanma mablag'lar, mehnat xarajatlari va moliyaviy hisobotlarni shakllantirish bo'yicha o'rtacha qiymatlar (foizda) hisoblab chiqilgan.

***Kalit so'zlar:** buxgalteriya tizimi, temir yo'l transporti, moliyaviy javobgarlik markazlari, korporativ axborot tizimi, g'aznachilik, samaradorlik, maqbullik mezonlari, moliyaviy resurslar, hisobot, texnik topshiriq, dasturiy mahsulot, raqamli transformatsiya, byudjetlashtirish, moliyaviy reja.*

INTRODUCTION

Digital transformation as applied to the information corporate accounting system of railway transport in today's world of rapid development of information and communication technologies is designed to solve not only information problems, but also the problems of managing the industry. The development of digital transformation in all sectors of the economy has created unique challenges and opportunities [1].

Today, railway transport in the Republic of Uzbekistan is an integral part of production and business processes, and the transport component is involved in many technological processes, performing the tasks of the logistics system [2, 3].

The most important influencing factor in this logistics process is the provision of operational information to maximize the efficiency of the industry in the introduction of digital technology. The information system of the railway transport represented by the «O'zbekiston temir yo'llari» Joint-stock company (JSC "Uzbek railways") is enlarged into two interrelated levels: the information support environment and the application level, which includes modern information technologies.

The task of determination of the optimal criteria necessary to achieve maximum performance of the information system under the limited financial resources of the industry in a digital economy is relevant and requires scientific research and calculation of expected economic efficiency. This task is proposed to be solved by digital transformation of the accounting process, which will transform the current intra-industry management reporting.

RELATED LITERATURE ANALYSIS

In the studies conducted by a number of authors such as: Zemlyanskaya S.Yu. [2], Bunova E.V., Busalaeva O.S. [3], Kazmina I.V., Safin A.M., Shchegoleva T.V. [6], Klimenkov G.V. [7] and many others, general issues of building information systems were mainly considered accounting systems, and to optimize information systems, traditional methods of financial resources operations research were used, local models of information systems were formed based on traditional accounting processes: collection and processing of information system data in paper form [1].

The purpose of this work is to justify the tools and methods to ensure the process of digital transformation of the accounting process and the current

intra-industry management reporting. The basis of the digital transformation of the enterprise is the end-to-end application of digital technologies at all levels and areas of the enterprise.

In order to achieve this goal, the following tasks were solved:

- the traditional methods of research of accounting operations with financial resources were reviewed;
- the structure of the proposed Treasury Department and Financial Responsibility Centers (FRCs) was developed;
- the economic effect of the implementation of the FRC was calculated.

The hypothesis of the study is the possibility of integrated application of digital technologies in the process of digital transformation of management decision-making for «O'zbekiston temir yo'llari» JSC [5, 6].

Scientific novelty involves the development of methods of adaptive management of the current monitoring of the use of railway company financial resources, the calculation of economic efficiency of the proposed structure of the treasury department.

The practical value involves the reasonable application of the developed structure of financial responsibility departments.

RESEARCH METHODS

The development of information technology and information and communication tools now provide a practical implementation of the provisions of situational modeling and situational management. The application of these methods for the digital transformation of the accounting process is limited by the large dimensionality, heterogeneity of the existing structure of the corporate accounting system of railway transport, as well as the computational complexity of calculations [6, 7].

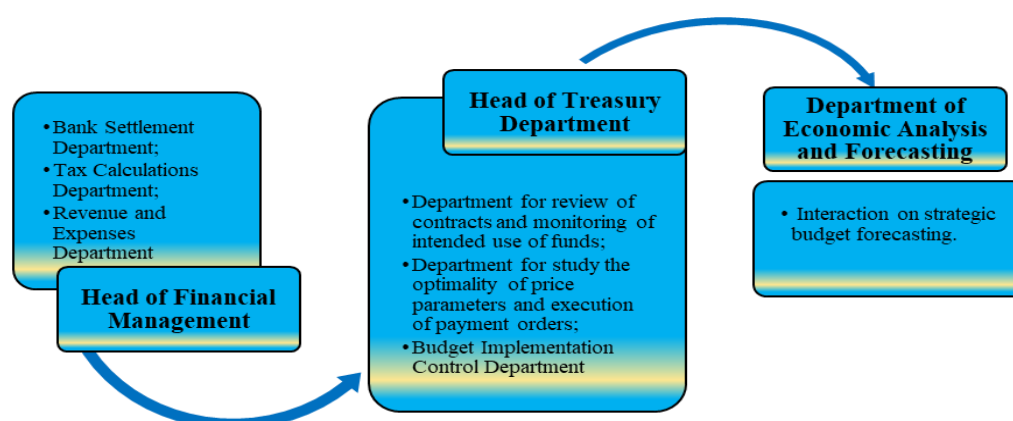


Figure 1. Proposed structure of the treasury department of JSC «Uzbek railways»¹

¹ Developed by the authors.

These stages of the organization of accounting and budgeting system in JSC “Uzbek railways” directly depend on the type, volume and effective budgeting of indicators of transportation activities, as well as the main source of income and expenses [7, 8].

The proposed management structure of the digital transformation system of accounting and budgeting of JSC “Uzbek railways” is shown in Figure 1.

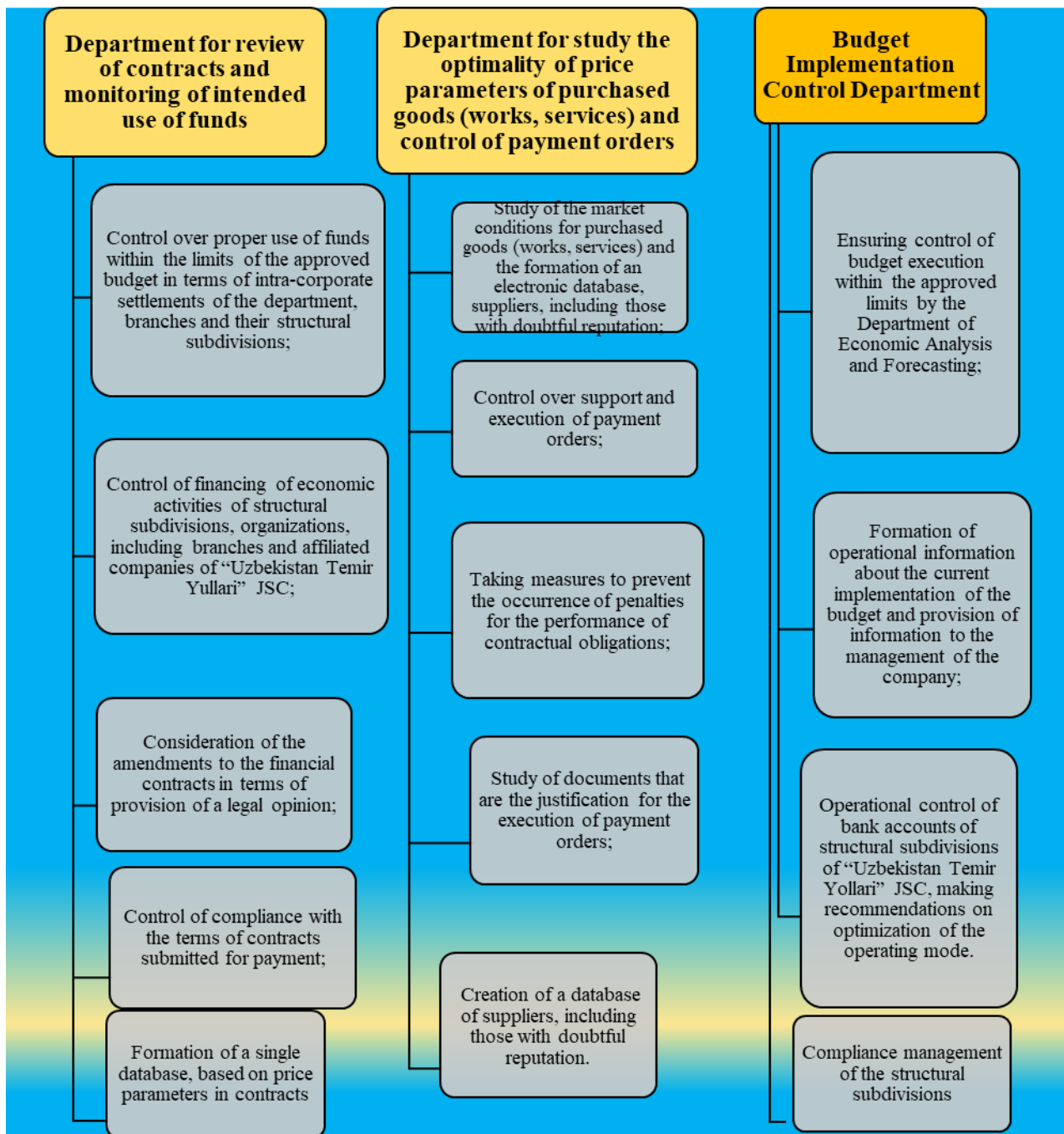


Figure 2. Main functional duties of the Treasury Department of JSC «UTY»²

² Developed by the authors.

According to the proposed structure, close interaction with the department of economic analysis and forecasting will allow to quickly identify trends in the effective use of financial resources of the railway company JSC “Uzbek railways”, which will allow to redirect the financial resources of the railway company in a timely manner.

The proposed structure of the treasury department (Fig. 1) will allow to form operative current control over the intended expenditure of financial resources of the company. At the same time, the use of digital technologies in the current operational mode will improve the efficiency of income and expense management at all levels of the railway company on an ongoing basis.

Figure 2 shows the main functional responsibilities of the treasury department of JSC “Uzbek railways”.

The digital system of accounting and budgetary management includes financial responsibility centers - structural subdivisions of JSC “UTY”, the functional responsibilities of which include control over the preparation of the subdivision activity plan, consisting of a set of business tasks, as well as over the movement of material and technical resources for the items assigned to them during the stage of actual implementation of the planned activities [8,14].

Financial responsibility centers include:

- structural subdivisions of JSC “Uzbek railways”;
- structural subdivisions of regional railway hubs (RRWH);
- the Department of Finance of JSC “Uzbek railways”.

ANALYSES AND RESULTS

Medium-term financial plans of JSC “Uzbek railways” are formed according to aggregated budget indicators on the basis of forecast data. For the qualitative preparation of digital transformational financial plans, it is necessary to provide a balanced forecasting of volumetric and qualitative indicators of the work of structural units. Based on the parameters of the approved financial plan and projected values of consolidated budget parameters, budgets of responsibility centers are developed.

The optimal structure of the digital accounting system can be chosen with one of the approaches of the scientific direction of Natural Computing, based on the principles of natural decision-making mechanisms. Studies of the existing accounting system in JSC “Uzbek railways” showed the need for digital transformation of budgeting system of accounting in the railway transport, which includes 4 main stages and they can be schematically presented in Figure 3.

The digital transformation provides that the accounting and budget indicators of the JSC “Uzbek railways” for the fiscal year correspond to the medium-term financial plan.

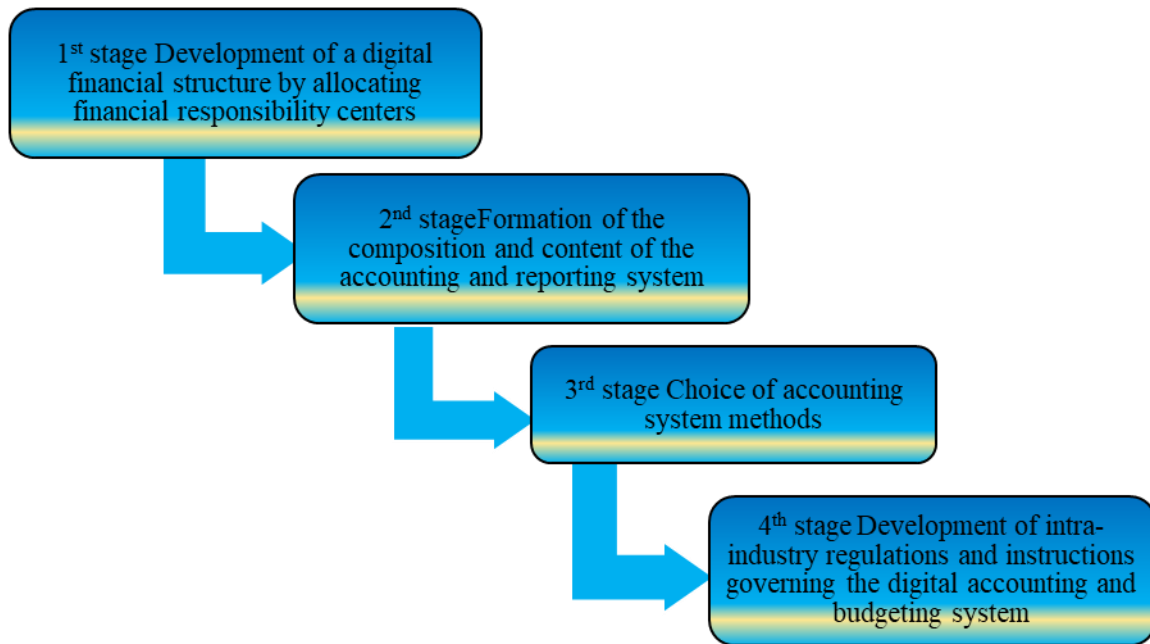


Figure 3. Stages of digital transformation of the accounting system of JSC “Uzbek railways”³

As the main accumulating unit of digital transformation we propose to establish Financial Responsibility Centers (FRCs). According to the authors, such decentralization of financial management will not only increase the efficiency of individual departments and the company in the digital transformation system, but also improve the transparency of business performance. At the same time, the top management of JSC “Uzbek railways” will be able to monitor in real time with the simultaneous receipt of current operational information to control any sources of income and expenses in electronic form [12, 13].

Table 1.

Types of FRCs and their characteristics⁴

Type of FRC	Brief description
1. Profit center	The division in which the profit is formed. And the manager is responsible for both expenses and income, and all these transactions are reflected in management accounting. Any production structure operating on the principle of self-sufficiency can be such a unit
2. Cost center	A unit that serves other FRCs. Funded by profit centers. This can include target costs centers (e.g., production shops) and management costs (e.g., accounting, administrative department, information security service).
3. Revenue center	Division, the head of which is responsible only for generating revenue, that is, at the same time there is control over the rates applied and the volume of services rendered

³ Summarized by the author on the basis of scientific literature.

⁴ Summarized by the author on the basis of scientific literature.

For each FRC, according to the proposed structure, a planned budget of revenues and expenditures is formed. And then the effectiveness of their work is assessed by comparing the planned and actual indicators again in real time [15].

We suggest to identify the optimal types of FRCs for JSC, the characteristics of which are shown in Table 1.

In developing the terms of reference for the proposed treasury department the software platform of the special software product “1C: Predpriyatie” was used.

The result of the digital transformation is that the list of potential customers will be generated automatically by analyzing big data, forecasting, self-registration of counterparties. If digitization and digitalization enable to move to the mass use of digital technology, then digital transformation will enable to build such information system that connects real physical objects, information technology, and virtual reality through the Internet.

Using almost any computer program as in our study of ERP-system - is a kind of optimization, because it allows you to perform only those operations that are initially laid down in the algorithm of the work. Nevertheless, business processes still take precedence over applications and data [16].

Table 2.

Features of the stages of transition to digital transformation⁵

Stage of transition	Elements of the digital enterprise architecture
1 st stage Digital conversion	Business processes remain virtually unchanged, data management software is used
2 nd stage Digitalization	Improvement of business processes, application of complex ERP applications, centralized data maintenance
3 rd stage Digital transformation	Continuous interconnection of business processes, specialized applications and data

The specific character of digital transformation is that it completely changes the understanding of the relationships between business processes, applications and data. In the digital conversion and digitalization phases, processes dominate, while successful completion of the transformation phase requires the equality of all three components of the company’s architecture. The boundaries between processes, programs and data are erased, from now on they become whole entity.

ERP-system, as seen in the table above, is synonymous with digitalization, but it is almost never presented at the stage of digital conversion and is mentioned indirectly in the transformation. Digital conversion predominantly requires the rebuilding of database management systems, while transformation

⁵developed by the authors

requires more flexible and cheaper solutions, including ERP systems. Digital transformation is, by definition, focused on the variability of the external environment.

Table 3.

Economic effect of the implementation of the FRC⁶

Type	Indicators	Average
1. Inventory and production	Decrease in inventories	21%
	Reduction of the cost of material resources	15%
	Reduction of manufacturing expenses	15%
	Reducing the cost of production	9%
	Increasing the volume of output	32%
	Growth of labor productivity in production	27%
2. Working assets	Increase of inventory turnover	23%
	Reduction of accounts receivable	20%
3. Efficiency and responsiveness	Speeding up of order processing	75%
	Reduction of lead time	23%
	Reduced operating and administrative costs	16%
	Profit improvement	13%
4. Labor costs and accounting	Reducing labor costs in various departments	26%
	Speeding up the receipt of management reports	twofold
	Speeding up the preparation of regulated reporting	twofold

In order to improve efficiency and optimization of management decision-making, we take into account the main factor - the digitalization of the accounting system, i.e. the process of maximization of effectiveness criteria of the proposed solutions. Digitalization of the information system must meet:

1 - to what extent this system corresponds to specific characteristics, i.e. whether it contains objective, analytical and operational information;

2 - to what extent the organization of the information system corresponds to the digital transformation of the accounting process;

When choosing a way to optimize the information system, attention should be paid to management informational support. In order to improve the accounting system automation of the control function, as well as coordination of contracts and payment documents of structural units and enterprises in the operational mode is provided [9,10].

In general, the calculated economic effect from the introduction of FRCs at JSC “Uzbek railways” is presented in Table 3.

As can be seen from the calculations of the efficiency coefficients in Table 2, there is a positive economic effect for all indicators. Acceleration of obtaining of management information and preparation of management accounting is projected in more than twice.

⁶ Authors’ calculations, Data for 2021 on 185 published implementation projects with customer-validated economical indicators

CONCLUSION AND RECOMMENDATIONS

The paper considers the tasks associated with the process of digitalization, as well as their relationship with corporate information systems. Digital transition of enterprise is sequential, from digital conversion of data and digitalization of business processes to a radical transformation of the business model.

Digital transformation involves a comprehensive transformation of the company operations and a transition to completely new business models, implemented products and services, business and production processes, and ways of engaging suppliers and customers that are built on fundamentally new approaches to data management using digital technologies. The prerequisites for the transformation are the digital conversion and digitalization of company processes and data.

Formation of the Treasury Department and introduction of digital FRCs at "Uzbekiston Temir Yullari" JSC will allow:

- the top and line managers to obtain complete current digital information about the financial situation of resources used in their division to make the best operational management decision;
- to increase control over the use of financial resources, which will automatically increase the profitability of the company;
- employees will become more interested and proactive in the results of their work.

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