

UDK004.413.2

DOI 10.52167/1609-1817-2023-128-5-325-332

A.F.Tsekhovoi¹, A.T.Ayapbergenova¹, Zh.B. Kalpeyeva¹,
A.S.Yerimbetova^{1,2}, Zh.M.Alibiyeva¹

¹Satbayev University, Almaty, Kazakhstan,

²Institute of Information and Computational Technologies CS MSHE RK, Almaty, Kazakhstan

E-mail: algerian@mail.ru

METHODS AND TOOLS OF PROJECT MANAGEMENT IN RELATION TO IS DEVELOPMENT PROCESSES

Abstract. The article discusses an information system that allows optimizing business processes and IT processes through automation using project management tools and designed to integrate existing subsystems. Special tools are used to design any technologically complex system. An architect draws up a project plan, an engineer draws up a detail drawing. A business is also a complex system with many connections, objects and interactions. To build a business architecture, special business modeling systems are used, one of which is the Fox Manager BPA program.

In order to solve problems systematically, rather than intuitively, it is necessary to design the architecture of the business, prescribe rules and standards of work, distribute responsibility for functions among the staff and monitor their implementation. An information system for decision support using heterogeneous spatial data to optimize the company's management process is presented. The methodology proposed for the verification of IP is used for the first time in the systems under study.

The article also presents studies of topical issues in the field of information technology in the field of telecommunications. In modern conditions, information technology (IT) in companies is present as a necessary attribute of technology for managing the process of production of goods and services, economic analysis and management decision-making. Currently, IT is used in many areas of management activity, and is increasingly becoming an important factor and means of solving numerous management tasks. Special tools are used to design any technologically complex system.

Keywords. Information system, IT infrastructure, digitalization, Database management system.

Introduction.

The purpose of experimental research is to develop and implement an information system to support management decision-making in the field of information technology in the field of telecommunications. The experimental research program provides for the collection of the necessary statistical information to solve the optimization problem, substantiate the optimal parameters of the technical means.

At the same time, the main tasks of experimental studies were:

- verification of theoretical principles and statements that determine the nature and structure of design processes;
- assessment of the adequacy of the developed models when optimizing the parameters of the proposed technical solutions and experimental confirmation of their effectiveness.

Regardless of the method of representing an object, the type and nature of its change, the main thing in system optimization is the choice of the most appropriate solution. To solve such complex problems, it is necessary to apply the methodology of a systematic approach, which is aimed at a comprehensive study of objects and processes. A characteristic feature of this methodology is the use of system modeling and replacement of a real object with a similar model

for the time of analysis. When designing models, it is necessary to adhere to certain principles, the observance of which will allow obtaining an adequate and accurate representation of the process under study [3].

Materials and methods.

A decision support information system using heterogeneous spatial data is presented to optimize the company management process. The methodology proposed for IS verification is used for the first time in the systems under study.

Existing business process modeling methods allow you to focus on certain aspects, determine the properties and relationships of components and present them both graphically and textually.

The integration of company subsystems is carried out in the following aspects:

- in the aspect of business processes (and, as a result, application integration);
- coordination of interaction processes with external entities in relation to the company;
- data integration;
- integration of system and technical infrastructure, including software, platform and communication architecture;
- in terms of various types of support (functional, informational, organizational, software, technical).

The integration of all information resources into a single information system of the company will achieve a synergy effect - obtaining an additional total effect from the implementation of an integrated system as a whole, exceeding the sum of the effects from the implementation of individual information subsystems.

This approach is especially relevant for information systems supporting the company's main production business processes.

The integration of all information resources into a single information system of the company will occur due to the optimization of the IT infrastructure.

What exactly gives the optimization of IT infrastructure:

- reduction of all types of expenses for maintaining the efficient operation of the company's computing systems;
- minimizing the consequences and risks, if necessary, reformatting, changing the scale and configuration of the IT infrastructure;
- a clear understanding of the capabilities of the structure, to draw up optimal plans for its further development;
- release of a part of the human resource involved in the administration environment, as a result of financial savings and an increase in infrastructure productivity;
- Improving cyber protection and improving the overall security of the company's networks.
- This service will allow both the customer and the supplier to perfectly study the nuances of the system being optimized, which subsequently will allow not to spend money on finding the causes of failures and third-party, unverified performers.

The following technology market segments most often need IT infrastructure optimization:

- organizations conducting archiving and accounting of various documentation;
- data storage and processing centers, "cloud" storage;
- branch enterprises and companies built on the basis of information networks [4].

Optimization of the information infrastructure is the key to a successful and competitive future for any modern company.

Kazakhtelecom JSC is the largest fixed-line telephone operator in Kazakhstan, a recognized leader in providing telephony services to rural populations, as well as the largest data transmission operator.

Kazakhtelecom provides services of an effective modern communication network on a national scale and covers most of the main target markets for consumers of infocommunication services.

The safety and range of the backbone network, as well as the increased effectiveness of the use of innovative technologies - this is what the company considers its most important competitive advantages.

The development of the activities of JSC «Kazakhtelecom», taking into account technological and consumer development trends, is shown in Figure 1.

Consumer trends dictate new directions for the development of the telecommunications sector, taking into account the increasing role of emotional perception, active socialization, simplifying the user interface and changing communication formats. As a leading infocomm operator, we understand that today the consumer prefers integrated mobile solutions, progressing along with technology.

Technological development trends also force us to move forward and develop new directions. The main trending areas in the field of infocommunication services include cloud storage of information, Internet of Things (IoT), big data, blockchain, etc. All of the above creates new vectors for the company's development, while making an undeniable contribution to a sustainable digital future.

The integration of sustainable development into the company's activities is based on an approach to ensuring transparency in its actions, to more operational cooperation with key stakeholders, becoming more individual and recognizable in the infocommunication services market, shifting the focus to improving the quality of services provided and reducing the negative impact on the environment, social and economic aspects.

The new transformation program gives us the opportunity to become more flexible, competitive, and more progressive. It should be borne in mind that the time at which we began to implement the program was very difficult. As the pandemic has shown, the bulk of our customers have switched to digital service channels, so digitalization has become a main part of our strategy. And you can already see how we are actively changing. Kazakhtelecom is developing towards the company of the future, we have all the prerequisites for the successful completion of the initiated changes.

Kazakhtelecom JSC faces a number of tasks. This is an improvement in the market position, ensuring better interaction with the client, optimal use of the company's resources. Of course, our company is the undisputed leader of the Kazakh telecommunications market. However, the market is changeable, and it is necessary to meet the needs of the client [6]. We understand this. In order to confidently hold positions and remain a leader, we need not only to improve product offerings and customer service, but also to develop infrastructure, which, in turn, will improve the company's operational efficiency.

Digitalization is a key development vector for Kazakhtelecom JSC. As part of the current digital transformation program, we are focused on priority tasks - a technological breakthrough, maintenance and support of IT infrastructure at the level of world standards, and the creation of a "Data Factory". The implementation of these tricks will significantly speed up internal processes, provide the necessary level of reliability and flexibility. Our ultimate goal is to increase the satisfaction of both our customers and employees. It is this goal that will provide the company with a leading position in the market.

This year, to meet new challenges within the framework of digital transformation, the IT Division was formed, which is one of the key divisions of the company. It is responsible for strategically important tasks, such as the development of ICT business, building a modern IT architecture and infrastructure, ensuring support and operation of IT resources at the level of world standards, strengthening the information security of systems and company resources. The list of tasks also includes Data and digitalization of services.

Currently, the IT Division faces an ambitious, but extremely time-critical task: modernization of the entire infrastructure of the company with an emphasis on the development of digital and online services. We want to provide customers with the opportunity to interact with the company on all services in the Full Digital self-service format. And we accept this challenge. In the near future, the Division will ensure the transformation of the company's infrastructure in order to meet the needs of customers in accordance with market demands (Fig.1).

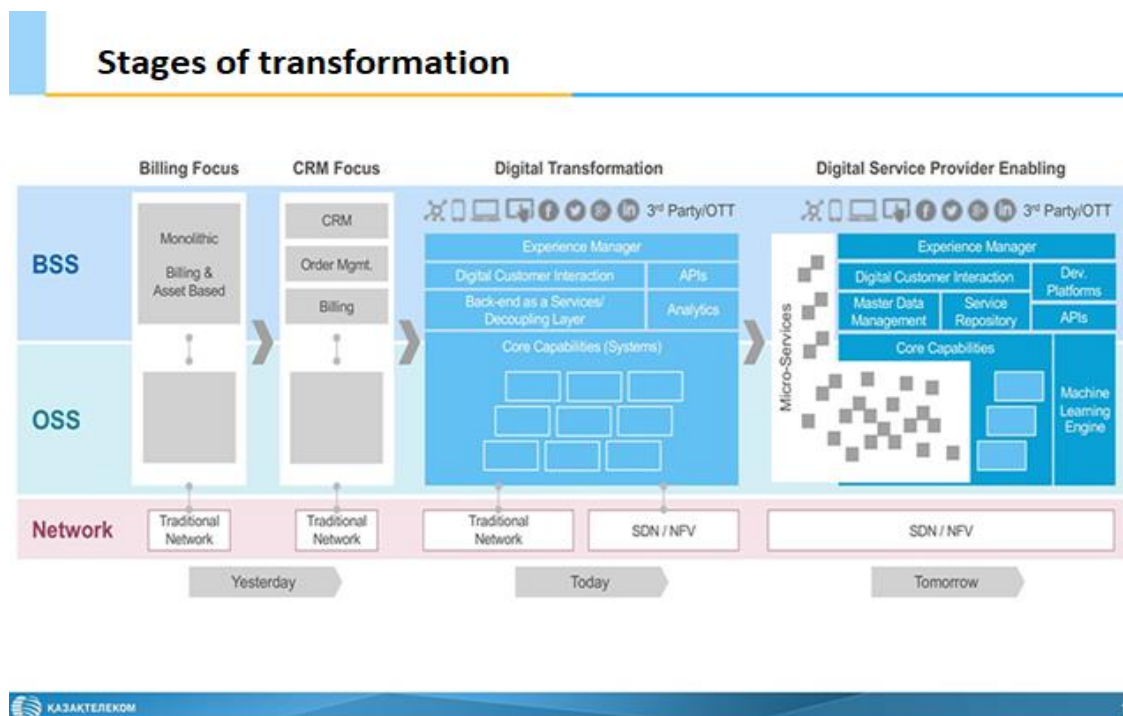


Figure 1 - Stages of transformation of JSC «Kazakhtelecom»

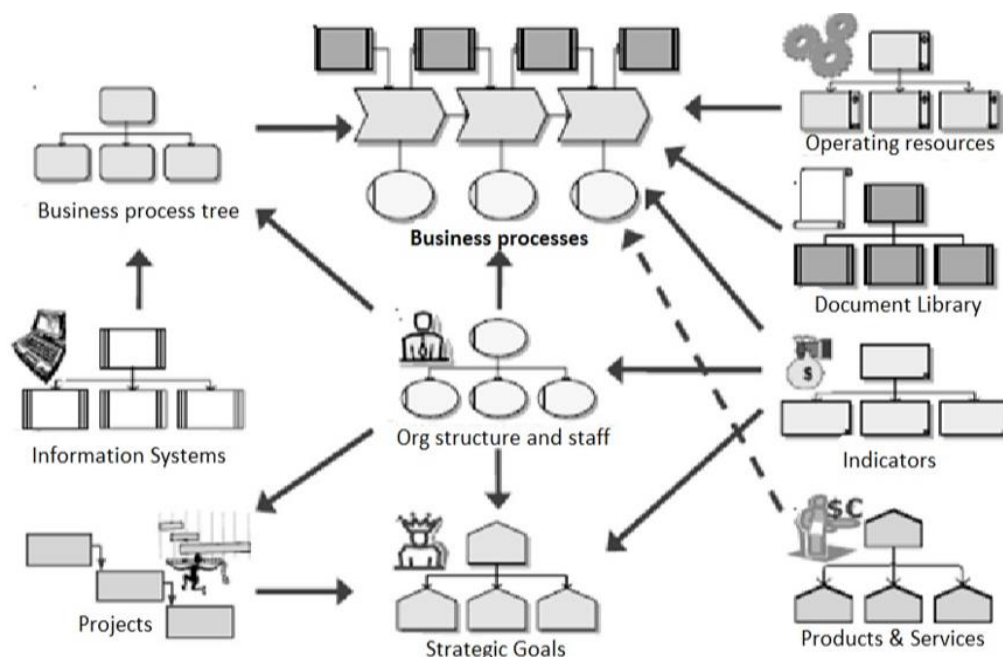


Figure 2 - Analysis of the organizational structure of JSC «Kazakhtelecom»

The main tasks of data consolidation:

- selection of data sources, determination of the type and methods of organizing access to them;
- development of a consolidation strategy;
- evaluation of data quality;
- enrichment;
- cleaning;
- transfer to the database.

The first step is to select sources containing data that could be relevant to the problem being solved. The next step is to determine the type of sources and the method of organizing access to them. In this regard, there are two main approaches to organizing the storage of data available to us.

1. Data stored in local files. The source can be any file (eg. TXT, CSV files).

2. Database of various DBMS (database management systems), such as Oracle MySQL, Microsoft SQL Server, Microsoft Access, Firebird and others. Since the type and properties of fields are hardcoded when tables are designed, database files better maintain the integrity of the data structure (Fig. 2).

At present, in such conditions, it is difficult to find a company that is not engaged in the development of information technology, but at the same time is successful and profitable. Consequently, the company is completely dependent on the fact that the level of development of IT technologies, the speed and quality of information processing, the validity and balance of decisions made are constantly growing.

Modeling and analysis of enterprise business processes is an effective tool for optimizing activities, increasing profits and successful development. But all these goals will be achieved under the condition of a competent description and consistent implementation.

Results and Discussions.

The importance of the research is determined by the need to study issues related to regulatory and technical documentation for the development, design, lifecycle management, architecture, implementation and maintenance of information systems, as well as obtaining practical skills in the development of basic project documents, modeling and analysis of business processes, the use of modern IT tools.

The relevance is determined by globalization in the current competitive struggle in the field of IT technologies. In order to remain competitive, companies invest in modern information systems that combine a variety of functional areas of the business and provide consistent data in real time. At the same time, the development of such companies in Kazakhstan dictates the transforming conditions for a high growth in the volume of changing information, which must be promptly analyzed and correct decisions made. The very transformation of management technologies leads to the rapid development of both computer technology and information technology itself.

Another important task that needs to be solved within the framework of consolidation is to assess the quality of data in terms of their suitability for processing using various analytical algorithms and methods. If in the process of quality assessment factors are identified that do not allow the correct application of certain methods to the data, it is necessary to perform an appropriate data cleanup.

Another important operation that may be needed when consolidating data is enrichment.

These issues are relevant for Kazakhstan as a whole. The introduction of any kind of information and communication technologies (ICT) should be linked to the state of technological maturity of the company and management processes. Very often, enterprises spend quite a lot of

resources on the introduction of ICT, which later, firstly, do not fully perform their intended functions or sometimes simply turn out to be not in demand on the market.

Therefore, today there is an urgent need to create structures that will advise on project management, assess the level of technological maturity and assist in the implementation of ICT in accordance with the achieved level of managerial maturity of the company [7].

A broad analysis of mechanisms, models and systems for processing distributed spatial information using information technologies has been carried out and it has been determined that no one presented tool can fully meet the requirements of processing heterogeneous data when creating information systems. A model of processing and management of heterogeneous spatial information based on data access technologies is constructed, a scheme of information flows is presented and a mechanism for effective data management is described. The algorithm of the data processing module is given, which allows access to any sources of information necessary for making a management decision. The methodology of designing an information system using a model of processing heterogeneous spatial information has been improved, taking into account the requirements for a decision support system. We have proposed requirements for the data management system being created. For the first time, the methodology of managing heterogeneous spatial data in an information system was applied on the example of the task of Kazakhtelecom JSC.

Conclusions.

Thus, the main conclusion is that today the requirements for the level and classes of implemented information systems, first of all, should be determined by the level of technological maturity of the company, as well as by how regularized the main supporting processes and management processes are. It is necessary to instill a culture of project, portfolio and program management at all levels of company management in order to obtain the most effective solutions in the development and implementation of modern ICT.

A broad analysis of the mechanisms, models and systems for processing distributed spatial information using information technologies has been carried out and it has been determined that none of the presented tools can fully satisfy the requirements for processing heterogeneous data when creating information systems. A model for processing and managing heterogeneous spatial information based on data access technologies is constructed, a diagram of information flows is presented, and a mechanism for effective data management is described. The algorithm of the data processing module is presented, which allows access to any sources of information necessary for making a management decision. The methodology for designing an information system has been improved using a model for processing heterogeneous spatial information, taking into account the requirements for a decision support system. We have proposed requirements for the created data management system.

REFERENCES

- [1] Konovalov, M. V. (2018). Review and comparative analysis of industrial data storages and databases. *Young scientist*, 24, 24-28. URL <https://moluch.ru/archive/210/51452/>
- [2] Beloshitsky, D.A. (2013). Data integration in information systems. *Youth Scientific and Technical Bulletin*. Publisher: FGBOU VPO "MSTU im. N. E. Bauman, el. no. FS77-51038, 1-17.
- [3] Grebeshkov, A.Yu. (2016). *Computing, networks, telecommunications.: Textbook for universities*. M.: GLT, 190.
- [4] Chukarin, A.V. (2016). *Business processes and information technologies in the management of a modern infocommunication company*. M.: Alpina Publisher, 512.

[5] Kock, A., Schulz, B., Gemünden, H.G. (2020). Project portfolio management information systems' positive influence on performance – the importance of process maturity, International Journal of Project Management, <https://doi.org/10.1016/j.ijproman.2020.05.001>

[6] Stankova, E. N., Petrov D.A. (2015) Integrated information system designed to generate input data for convective cloud models // Bulletin of St. Petersburg University. Applied Mathematics. Computer science. Management processes, 10(3), 83-95.

[7] Osama, Dr., Sheta, E., Eldeen, A.N. (2013). The Technology of Using a Data Warehouse to Support Decision-Making in Health Care. International Journal of Database Management Systems (IJDMS), 5(3), 75-86. DOI: 10.5121/ijdms.2013.5305

[8] Stankova E. N., Petrov D.A. (2015) Integrated information system designed to generate input data for convective cloud models. Bulletin of St. Petersburg University. Applied Mathematics. Computer science. Management processes. 10(3). 83-95.

Алексей Цеховой, т.ғ.д., профессор Satbayev University, Алматы, Қазақстан, a.tsekhovoy@satbayev.university

Әсем Аяпбергенова, магистр, Satbayev University, Алматы, Қазақстан, a.ayapbergenova@satbayev.university

Жұлдыз Кальпеева, PhD, қауымдастырылған профессор, Satbayev University, Алматы, Қазақстан, zh.kalpeyeva@satbayev.university

Айгерим Еримбетова, PhD, т.ғ.к., профессор, Satbayev University, ҚР ҒЖБМ ҒК Ақпараттық және есептеуіш технорлогиялар институты, Алматы, Қазақстан, aigerian@mail.ru

Жибек Алибиева, PhD, Satbayev University, Алматы, Қазақстан, zh.alibiyeva@satbayev.university

АЖ ӘЗІРЛЕУ ПРОЦЕСТЕРІНЕ ҚАТЫСТЫ ЖОБАЛАРДЫ БАСҚАРУ ӘДІСТЕРІ МЕН ҚҰРАЛДАРЫ

Аңдатпа. Мақалада жобалық басқару құралдарын қолдана отырып автоматтандыру арқылы бизнес-процестер мен IT-процестерді оңтайландыруға мүмкіндік беретін және қолданыстағы ішкі жүйелерді біріктіруге арналған ақпараттық жүйе қарастырылады. Кез-келген технологиялық күрделі жүйені жобалау үшін арнайы құралдар қолданылады. Сәулетші жоба жоспарын, инженер – бөлшектің сызбасын жасайды. Бизнес-бұл көптеген байланыстары, объектілері және өзара әрекеттесулері бар күрделі жүйе. Бизнес архитектурасын құру үшін бизнесті модельдеудің арнайы жүйелері қолданылады, олардың бірі-Fox Manager BPA бағдарламасы.

Мәселелерді интуитивті емес, жүйелі түрде шешу үшін бизнес архитектурасын жобалау, жұмыс ережелері мен стандарттарын белгілеу, қызметкерлер арасында функциялар үшін жауапкершілікті бөлу және олардың орындалуын бақылау қажет. Компанияны басқару процесін оңтайландыру үшін гетерогенді кеңістіктік деректерді қолдана отырып, шешімдерді қолдаудың ақпараттық жүйесі ұсынылған. АЖ тексеру үшін ұсынылған әдіс алғаш рет зерттелетін жүйелерде қолданылады.

Мақалада сонымен қатар телекоммуникация саласындағы ақпараттық технологиялар саласындағы өзекті міндеттерді зерттеу көрсетілген. Қазіргі жағдайда компаниялардағы Ақпараттық технологиялар (АТ) тауарлар мен қызметтерді өндіру, экономикалық талдау және басқару шешімдерін қабылдау процесін басқару технологиясының қажетті атрибуты ретінде қатысады. Қазіргі уақытта АТ басқарушылық қызметтің көптеген салаларында қолданылады, олар көптеген басқарушылық міндеттерді

шешудің маңызды факторы мен құралына айналуға. Кез-келген технологиялық күрделі жүйені жобалау үшін арнайы құралдар қолданылады.

Түйінді сөздер. Ақпараттық жүйе, АТ-инфрақұрылым, цифрландыру, деректер базасын басқару жүйесі

Алексей Цеховой, д.т.н., профессор Satbayev University, Алматы, Қазақстан, a.tsekhovoy@satbayev.university

Асем Аяпбергенова, магистр, Satbayev University, Алматы, Қазақстан, a.ayapbergenova@satbayev.university

Жұлдыз Кальпеева, PhD, ассоциированный профессор, Satbayev University, Алматы, Қазақстан, zh.kalpeyeva@satbayev.university

Айгерим Еримбетова, PhD, к.т.н., профессор, Satbayev University, Институт информационных и вычислительных технологий КН МНВО РК, Алматы, Қазақстан, aigerian@mail.ru

Жибек Алибиева, PhD, Satbayev University, Алматы, Қазақстан, zh.alibiyeva@satbayev.university

МЕТОДЫ И ИНСТРУМЕНТЫ УПРАВЛЕНИЯ ПРОЕКТАМИ ПРИМЕНИТЕЛЬНО К ПРОЦЕССАМ РАЗРАБОТКИ ИС

Аннотация. В статье рассматривается информационная система, позволяющая оптимизировать бизнес-процессы и ИТ-процессы за счет автоматизации с использованием инструментов проектного управления и предназначенная для интеграции существующих подсистем. Для проектирования любой технологически сложной системы используются специальные инструменты. Архитектор составляет план проекта, инженер – чертёж детали. Бизнес – это такая же сложная система с множеством связей, объектов и взаимодействий. Для построения архитектуры бизнеса используются специальные системы бизнес-моделирования, одной из которых является программа Fox Manager ВРА.

Для того, чтобы решать проблемы системно, а не интуитивно, необходимо спроектировать архитектуру бизнеса, прописать правила и стандарты работы, распределить ответственность за функции среди персонала и контролировать их выполнение. Представлена информационная система поддержки принятия решений с использованием разнородных пространственных данных для оптимизации процесса управления компанией. Методика, предложенная для верификации ИС впервые применяется в исследуемых системах.

В статье также приведены исследования актуальных задач в области информационных технологий в сфере телекоммуникаций. В современных условиях информационные технологии (ИТ) в компаниях присутствуют как необходимый атрибут технологии управления процессом производства товаров и услуг, экономического анализа и принятия управленческих решений. В настоящее время ИТ используются во многих сферах управленческой деятельности, все чаще становятся важным фактором и средством решения многочисленных управленческих задач. Для проектирования любой технологически сложной системы используются специальные инструменты.

Ключевые слова. Информационная система, ИТ-инфраструктура, цифровизация, СУБД.
