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Modeling mechanisms for managing efficiency of business processes in construction companies

Abstract. *Due to sustainable competition in the last 5 years happening in the market, companies in order to self-develop search for new directions, ways for the growth of effectiveness on the market. In the conditions of modern development company's business processes are the subject of firstly digitalization and to new technologies.*

Business process effectiveness is achieved with help of accomplishing and doing goals in relation to increasing competitiveness, then that goal is achieved through perfecting the business processes as the element of the development of the digitization process (digital technologies).

The given article reveals the features of modeling mechanisms for managing the productivity of business processes in construction companies using the case example of BI Group in the context of the development and improvement of digital technologies. Today the development of modern technologies in the real sector of the economy is especially topical for developed and developing countries too.

Keywords: *business processes, modern technologies, construction industry, modeling, digitalization, effectiveness.*

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Introduction

The construction industry was considered to be the most conservative and resistant to technological transformation industry for a long time. However, nowadays new technologies in

construction are being developed more rapidly than ever. The confirmation of the fact is the growing number of investments in construction technologies (Construction Tech) [1].

According to Finprom.kz, ICT expenses of the construction industry in 2017–2019, reached 61.7

billion tenge, which is 31% more than in 2014–2016. In 2020, the amount spent on ICT counted to 13.2 billion tenge. Generally, investments' positive dynamics are demonstrated in the construction sphere of the Republic of Kazakhstan. At the end of four months of 2021, capital investments in the industry increased by 73.1% over the year and amounted to 27.4 billion tenge [2].

Dozens of innovative technologies in the modern construction industry is already operated, including BIM (Building Information Modeling), mobile technologies and cloud services, Internet of Things (IoT), virtual and augmented reality, artificial intelligence, robotization and exoskeletons, 3D modeling, Big Data, digital doubles, Blockchain and more.

Methodology

The methods used general scientific and special, such as a system analysis and synthesis method, observation method, comparison method, description method, economic modeling method, economic and statistical methods.

Discussion

The conceptual definition's importance of a business process is determined based on the fact that it is possible to build any management system only on the basis of unambiguously defined objects that are included in this system. In the company's process management system, the object of research is business processes [3].

The concept of «business process» has been widely applied in modern conditions, both in the theory of economics and management and in its practice [3].

In turn, it is currently in the field of this term that different numbers of definitions were created. A large number of researchers and students assume that the term «business process» is based on an organization's process. The functional-hierarchical management model originates from the end of the XIX century and has extended its development since the beginning of the XX century in developed countries. Based on this model, an approach on the division of efforts in

the scientific works of A. Smit is being developed. As the most important merits in the application and the practices considered the ideas of such administrators as G. Ford, F. Taylor, A. Sloan. [4].

The conducted research has demonstrated that a single interpretation of the category of business processes excludes coexistence, therefore, copulating approaches are evaluated to identify the essence of this category with the exploitation of the works of swollen and foreign scientists and economists [5].

The «process orientation» concept was primarily applied by M. Porter [6], in his point of view, complementary between the links of the chain is the main principle of the effectiveness of the organization, accordingly during that value is created. E. Deming [7] introduced the process orientation, which reflected the relationship inside the enterprise, also from the supplier to the buyer.

Author of the concept of business process reengineering, scientist M. Hammer defines «business process» and in his point of view, presented as an organized complex of interrelated actions. Moreover, M. Hammer and D. Champi [8] concentrate attention on the appearance of one or several resources «at the entrance» of the product (service), which represent the price for the consumer.

Nowadays, business processes in the conditions of active development of digitalization can be interpreted as follows: a set of actions and operations that are performed by competent specialists with the mandatory use of digital technologies (software, websites, cloud information technologies, mobile technologies of devices and attachments, chatbots, etc.) with all the acceptance of competent decisions, speed of operations, automation of processes, as well as improving the competitiveness of the company with the training of existing innovations and trends in the development of the industry.

These operations and actions may be related not only to existing processes (for instance, their restructuring) but also to the formation of new directions for the development of the company's business (for instance, a new type of company's activity introduction in the market).

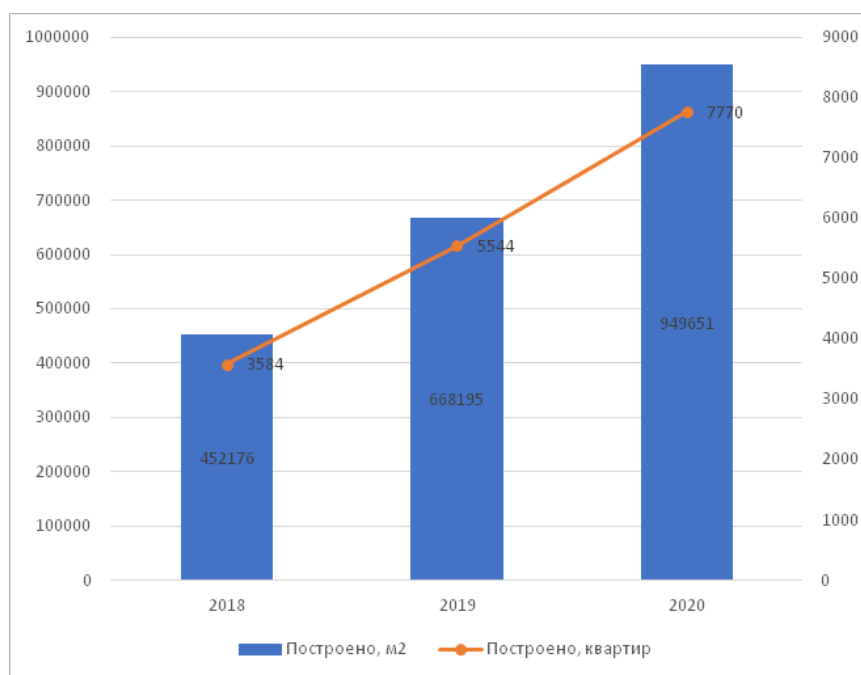


Figure 1 – Dynamics of construction volumes of the Group for 2018-2020

Note – developed on the basis of data from the source [9]

Thereby, the scientific novelty of the concept of «business processes» interpreted by the author of the work lies in its isolation from the position of using modern technologies, in particular, the use of digital tools. In recent years, increasing the efficiency of business processes in modern companies has been associated with digitalization, digital technologies and joint tools. The multiplicity of business processes of entrepreneurial structures in terms of numbers has a diverse focus. For example, the marketing orientation of business processes of business communication structures with the active use of information technologies, new means of communication, customer-oriented processes.

To determine the level of strategic development of the enterprise, it is proposed to conduct a comprehensive assessment of the system of its business processes.

The objectives of the methodology of complex analysis of business processes of the enterprise include:

- selection and description of all existing business processes of the enterprise;
- determination of the economic efficiency of labor, material, financial and other resources;

- determination of a comprehensive indicator of the effectiveness of business processes;

- comparison of the efficiency of business processes with similar business processes of other enterprises (benchmarking);

- identification of shortcomings in the existing system of business processes.

The object of the study is the system of business processes of an enterprise as a set of inputs, outputs of processes, as well as their participants and owners.

BI Group is the largest construction and investment holding of the Republic of Kazakhstan, founded in 1995.

The main activities of the holding:

- construction of multi-storey residential complexes;
- individual housing construction;
- commercial real estate (construction and management);
- construction of industrial facilities,
- construction of roads of regional and transnational importance;
- construction of bridge crossings;
- production of building materials;
- after-sales customer service [9].

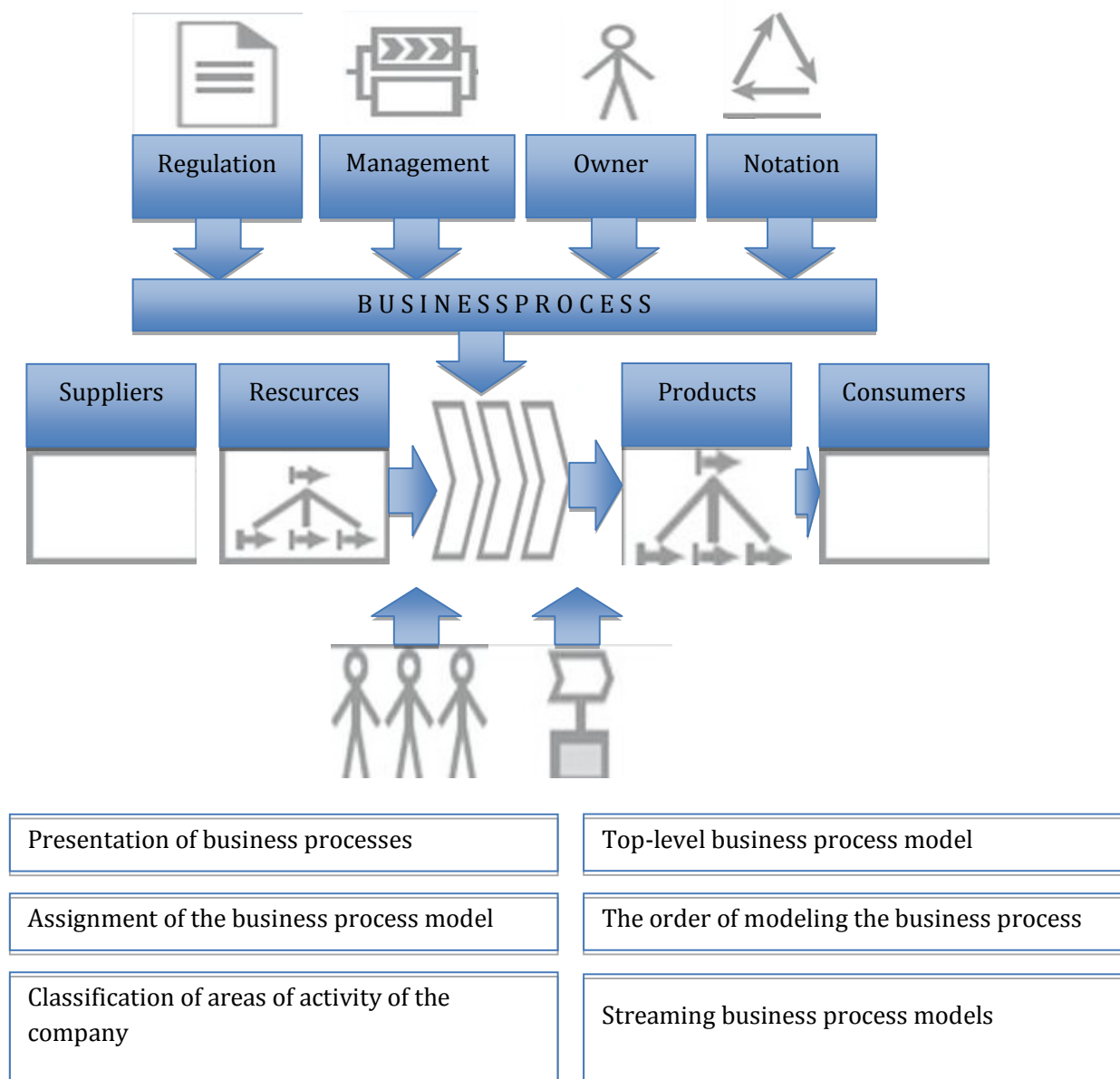


Figure 2 – Business Process Model
 Note – compiled from the source [10]

An important indicator characterizing the scale of a construction company and the results of its activities is the indicator of the volume of construction work. At the same time, this value must be considered not only in value terms but also in kind. Below is information on the volume of construction of the holding «BI Group – Development» in-kind for 2018-2020 (Fig. 1).

The business process as an object of research is characterized by the presence of basic and auxiliary elements that form the model (Fig. 2). The business process model in companies

is characterized by many elements, including suppliers, resources, consumers, performers, etc. All these elements together create a single interaction scheme, where the input is: raw materials, materials, documentation, information, personnel, company services, etc. And the output in the business process is a certain result: object, service, project, value.

Achievements in the field of modern information and digital technologies, which create a model, as a result, have contributed to the management of business processes. Therefore,

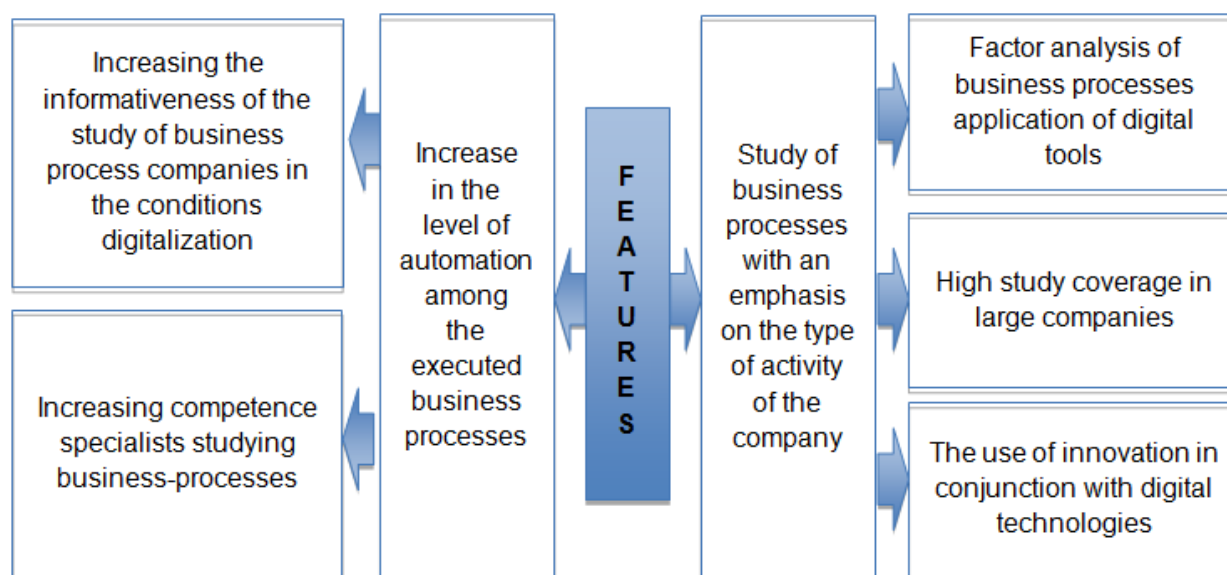


Figure 3 – Features of modeling business processes of a company in the context of digitalization
Note - compiled by the authors

one of the tools of business development today is modeling. The vastness and versatility of business process modeling depend on the size of the organization: the larger it is, the more detailed business processes are modeled.

In the process of modeling, the following tasks are solved:

- provide an understanding of the structure of the organization and the dynamics of the business processes taking place in it;
- to form an assessment of the current problems of the organization and options for their solution.

Business process modeling allows you to evaluate not only how an organization works, but also how it interacts with external sources (suppliers, customers, competitors) at each individual workplace.

In the last 3-5 years, companies have massively implemented a quality system, digital technologies are used, so the study of business processes is gaining sufficient popularity in all spheres of activity.

Business processes are being developed and implemented in enterprises of any industry, considering the service industry, the success of which depends on internal and external factors. The index of digitalization of business processes

in the service sector is increasing every year, as can be seen in Figure 2:

Internal factors that directly affect the implementation and organization of business processes in service enterprises should include:

- the current state of affairs in the company;
- resources involved (how effective are they);
- the level of competitiveness in the market (including the presence of competitive advantages and disadvantages)
- digitalization of business (digital technologies and tools used).

External factors that directly affect the implementation and organization of business processes in service enterprises include:

- the state of the industry (including its digitalization index)–
- the digital technology market;
- the level of informatization of processes;
- a socio-economic situation in the country;
- the level of digitalization of this sector in foreign countries, among competitors.

Results

The use of modern digital technologies provides limitless opportunities for improving

business processes with the use of special systems that immediately change and improve them. This fact greatly simplifies management methods, reduces the cost of optimizing the necessary business processes in companies.

The conducted research has shown that the features of modeling the company's business processes in the conditions of digitalization are in the following aspects (Fig.3).

1. Increasing the informativeness of the study of business processes in the companies in the conditions of digitalization.
2. Increasing the competence of specialists studying business processes.
3. Increase in the level of automation among the executed business processes.
4. Features
5. Study of business processes with an emphasis on the type of activity of the company.
6. Factor analysis of business processes application of digital tools.
7. High coverage of studies in large companies.
8. The use of innovation in conjunction with digital technologies

Thus, digital technologies (software, websites, cloud data storage, mobile applications, devices, etc.) allow all participants of business processes to communicate, thereby ensuring the objectivity of the submission, processing, and structuring of information as one of the main components in improving the efficiency of business process modeling. The features of modeling the company's business processes in the conditions of digitalization are to increase the coverage of the activities of specialists in this field, in the variety of digital tools and technologies used, in the increase in the degree of automation of the processes under consideration, and other nuances.

Conclusion

The use of digital tools and technologies in modeling business processes of companies will allow them to reach a new, higher level of their development, competitiveness in a certain industry, which as a result will affect the efficiency of decisions made, in the formation of really competent ideas and directions of the company, regardless of its type of activity.

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Құрылыс компанияларындағы бизнес-процестердің тиімділігін басқару механизмдерін модельдеу

Аннотация. Соңғы бес жылда нарықта тұрақты бәсекелестіктің пайда болуы жағдайында компаниялар өз дамуы үшін нарықта өзінің өмір сүруінің тиімділігін арттырудың жаңа жолдарын, бағыттарын іздестіруде. Заманауи даму жағдайында компаниялардың бизнес-үдерістері жаңа технологияларға, ең алдымен цифрландыруға бағытталып отыр.

Бизнес процестердің тиімділігі бәсекеге қабілеттілікті арттыруға қатысты мақсатты іске асыру және оған қол жеткізу арқылы жүзеге асырылады. Бұл мақсатқа оның дамуының элементі ретінде цифрландыру процесі (цифрлық технологиялар) осы процестерді жетілдіру арқылы жолға қойлады.

Мақала цифрлық технологияларды дамыту контекстінде ВІ Group компаниясының мәліметтері мысалында құрылыс компанияларындағы бизнес-процестердің тиімділігін басқару механизмдерін модельдеу ерекшеліктерін ашады. Экономиканың нақты секторындағы заманауи технологияларды дамыту бүгінгі таңда дамыған елдер үшін де, дамушы елдер үшін де өзекті болып табылады.

Түйін сөздер: бизнес-процестер, заманауи технологиялар, құрылыс саласы, модельдеу, цифрландыру, тиімділік.

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Моделирование механизмов управления эффективностью бизнес-процессами в строительных компаниях

Аннотация. За последние пять лет в условиях появления устойчивой конкуренции на рынке компании в целях собственного развития ищут новые пути, направления по росту эффективности существования на рынке. Бизнес-процессы компаний в условиях современного развития подвержены новым технологиям и в первую очередь цифровизации.

Эффективность бизнес-процессов достигается при помощи выполнения и достижения цели в отношении повышения конкурентоспособности, затем эта цель достигается за счет совершенствования бизнес-процессов как элемента развития процесса цифровизации (цифровых технологий).

В представленной статье раскрываются особенности моделирования механизмов управления эффективностью бизнес-процессами в строительных компаниях на примере ВІ Group в условиях развития цифровых технологий. Развитие современных технологий в реальном секторе экономики на сегодняшний день особенно актуально как в развитых, так и в развивающихся странах.

Ключевые слова: бизнес-процессы, современные технологии, строительная отрасль, моделирование, цифровизация, эффективность.

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