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ANALYSIS OF BUSINESS PROCESSES OF A PRINTING ENTERPRISE AND MODELING THE MANAGEMENT SYSTEM

Currently, information technology intensively covers all spheres of society and makes significant changes in society. Of course, there are many different views of information technology in the world. However, there are many benefits that information systems can bring to both individuals and businesses.

The goal of any company is to get ahead of its competitors and take a leading position in the market. He has many ways. One of them is digitalization, the introduction of information management system in the enterprise using computer technology. The article analyzes management information systems for the printing company. In addition, structural models of business processes of the printing company were demonstrated based on IDEF0 notation. Analyzing business processes, using a unified modeling language UML described the work of business processes printing company in an information management system.

***Keywords**: management information system, printing company, UML, IDEF0, business process, ERP.*

Introduction. One of the professions that has contributed greatly to the field of global production in general is printing. Mankind is in close contact with printing products on a daily basis. Printing is not a product, it is an industry that produces that product. A print shop is a printing company. That is, printing is an industry, a printing house is an enterprise of an industry, and printed products are the products made at this enterprise. Products made in the printing house:

- books;
- albums;
- journals;
- newspapers;
- visiting cards;
- booklets;
- flyers;
- posters, etc.

Accordingly, one of the important problems is to automate the business process at the printing company with information technology, because the work of this industry brings a huge benefit to humanity and the great demand for printed products.

Management information systems is an information system used to analyze, monitor, visualize information in an enterprise, organization, or institution, and to make effective decisions from the information obtained. Management information systems include people, processes, and technology. In addition, management information systems are focused on a

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specific business or organization and are characterized by the use of information technology to improve efficiency and business value. The achievement of good results by the enterprise lies in the close interaction of man and the information system. Enterprise management information system allows the head of the organization to obtain important and reliable information about the work of the company.

Using modern software products is a way to effectively manage an enterprise and increase its competitiveness [1].

Various studies show that the financial performance of the enterprise is directly related to the use of digital technology and management methods:

1. Enterprises that actively use information technology and new management methods are on average 26% more efficient than their competitors;

2. The financial performance of organizations that actively invest in digital technology, but3. Other businesses that are constantly improving management methods and processes make up to 9% of profits, but can increase profits by using modern digital technology;

4. Given the conditions of digital transformation, the financial performance of enterprises that are not focused on the development strategy is poor [2].

Experimental. Information systems for business management is a modular, hardware-software complex. A large number of different modules in the information management system opens the way to the effective functioning of the processes of the printing company. Modules can be called elements that perform a specific function in the system.

Competition in the printing market is increasing every year, so increasing efficiency through the introduction of production management systems is becoming one of the most important issues. The creation and implementation of such systems allows to solve the following tasks:

1. Registration and Order Calculation;
2. Preparation of production documentation;
3. Production planning;
4. Production accounting;
5. Calculation of planned and actual costs;
6. Material consumption planning;
7. Accounting for papers and materials;
8. Calculation of finished products;
9. Analysis of results achieved;
10. Online control of the order progress [3].

For example, it is much more effective to implement an information management system and automatically get access to the financial statistics of the enterprise at once, than to calculate financial statistics separately. So we see that the function alone saves a lot of time. And now an information management system that includes several of these features can make a business more efficient and save time. Table 1 presents the function of the information management system of the printing enterprise and its characteristics.

Table 1 – Functions and their description

Function	Description
Management of production processes	Management information systems can manage all phases of production, from planning to shipment of finished products. This will increase production efficiency and reduce turnaround time.
Financial management	Systems simplify the accounting of financial transactions, automatically generate invoices and reports, and control the costs and income of the company.
Management of production statistics	Systems can track production statistics
Human Resources Management	Systems can control employees' working hours, create work schedules. This improves performance.
Management of material resources	Systems can monitor the availability of necessary materials and automatically display missing materials and allows you to control their use. In turn, this avoids unnecessary delays and loss of time.

Currently, each management system for a printing company includes various functions. The more useful functions in the system, the greater the benefit the system can bring to the company.

Today, since the beginning of the period of the 3rd industrial revolution, the importance of computerization of business sectors has increased, many solutions have been formed to optimize and improve the efficiency of business processes by using digital technology. For example: enterprise resource planning (ERP), customer relationship management (CRM), etc.

Enterprise Resource Planning (ERP) is defined as follows: «a set of business applications or modules that link various business units of an organization, such as financial, accounting, manufacturing, and human resources, into a single system tightly integrated with a common information sharing platform across the business» [4].

To modify the business processes of any enterprise by implementing management information systems, you must first model the business process.

Result and discussion. The execution of services in the company is carried out by operators. The task of operators is the quality of the order and the correct calculation of the cost of services performed. The cost is calculated according to the internal document of the organization with the name «Price List». Wages for the operators of the copy center are based on the amount of completed orders.

In the copying and printing department there is also a manager, who appoints the person responsible for taking the order and its implementation, as well as the manager issues the necessary products on the memo, if the service is performed for the needs of the enterprise.

The department provides the following range of services:

– Color and black and white photocopying;

– Scanning;

– Emailing files;

– Typesetting and printing of texts, drawings, diagrams;

– Color large-format printing of photos, posters, posters;
– Binding of documents, abstracts, thesis projects, etc. (traditional method and MetalBind equipment);
– Lamination;
– Foiling;
– Receiving and sending faxes for customers;
– Development of embroidery schemes on A3, A4 formats;
– Web searching;
– Stapling;
– Recording of information on data carriers;
– Cutting;
– Framing an image;
– Eyelet insertion.

Consider the model of the main business process of the department (Figure 1). Inputs to the process are order and cash, outputs are: completed order, proceeds and proceeds report. The mechanisms of the process are: the copy center operator, the cashier and the calculator, which calculates the cost of the order. The process is managed by the manager, the cost of orders is calculated according to the price list.

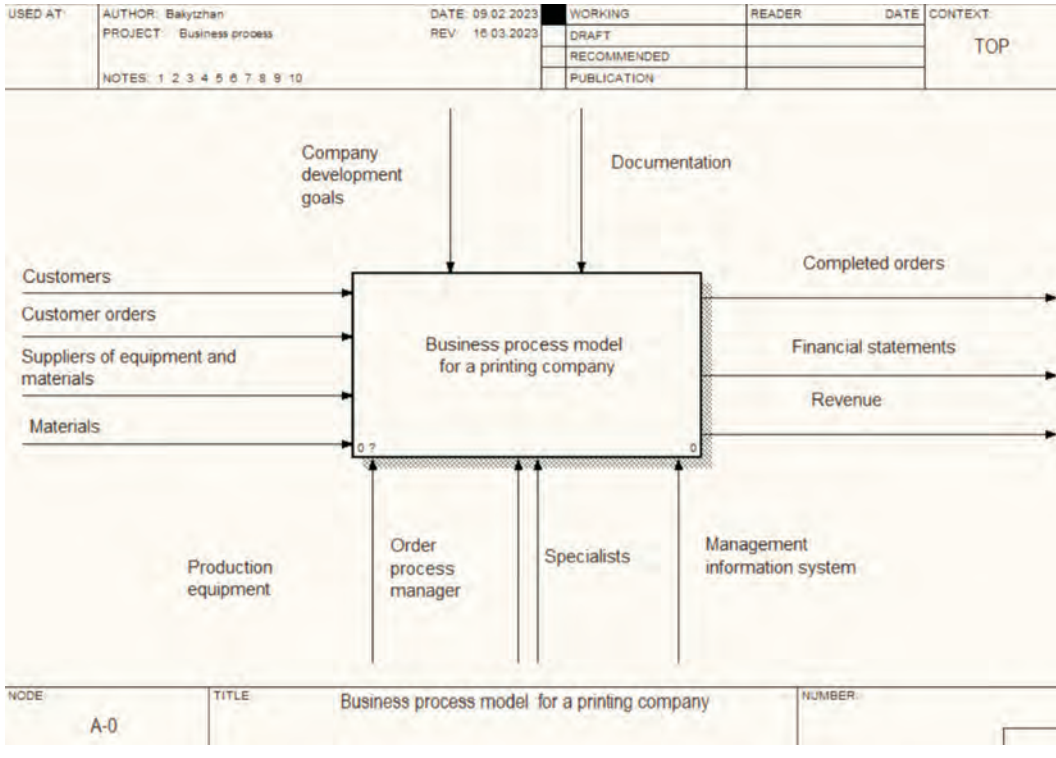

Figure 1 – Business process model for a printing company

To gain a deeper understanding of how a printing company works, we can divide the structural model shown in Figure 1 into several processes by decomposition and see the

input and output information of each process, as well as the controls and mechanisms. The order is accepted by the operator of the copy center. Depending on the required services, the operator calculates the cost of the order using a calculator according to the price list for the services of the department and gives the customer a receipt for payment. The client pays for the receipt at the cashier, and the receipt is marked for payment, and gives the receipt to the operator. The operator fulfills the order and gives it to the customer. At the end of each shift, operators generate a revenue report based on paid receipts. Figure 2 shows the business process model for calculating the cost of the order. It is this business process that is the bottleneck of the department.

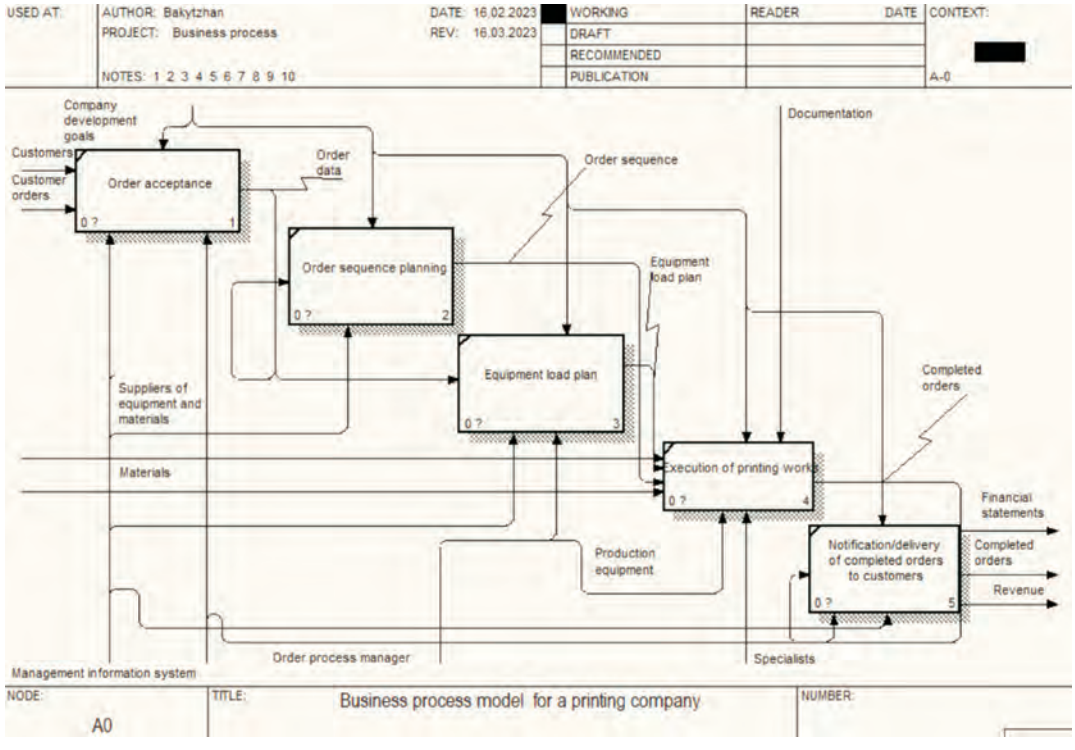

Figure 2 – Management model for the order fulfillment process

When calculating the cost of the order the operator, according to the price list, calculates the cost of. The cost of the order is fixed only in the receipt, the parameters (printing format, type of paper, etc.).

During the analysis of business processes in the subject area the following shortcomings were identified:

1. No control over the cost of the order.
2. Lack of control over consumables.
3. The possibility of errors in the calculation of the cost of the order.
4. Inaccurate data in the revenue report.

Due to the identified deficiencies, the business process has low efficiency [5].

By studying the business processes of a printing company and analyzing the processes in IDEF0 notation, you can develop an effective system for the company process. Figure 3 shows user access at various levels to functions in the information management system for the printing company based on the use case diagram in the UML environment and the operations they can perform in the system. The model has 5 users: manager, production manager, warehouse manager, personnel and director. There are also 9 operations that can be performed in the system: order processing and calculation, access to the customer database, view stages of production, view financial statistics, view and edit personnel data, view statistics on material costs, planning equipment and personnel load, materials management, confirmation of work performed.

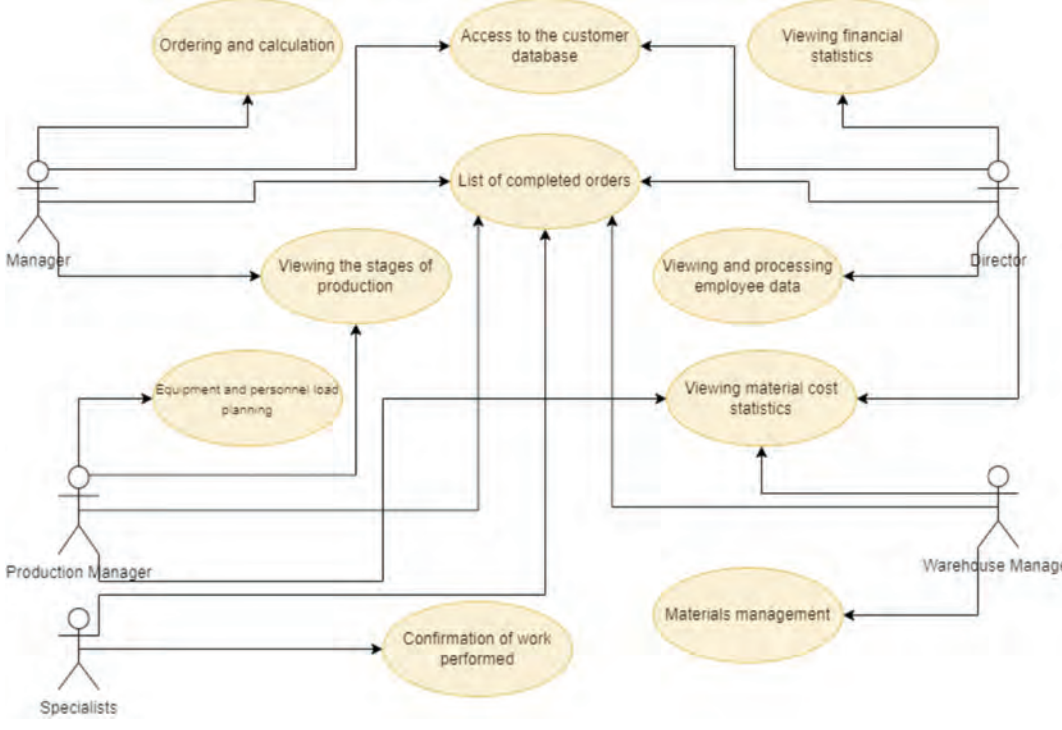

Figure 3 – Use case diagram

If we consider the manager as a bridge between the client and the company, then one of the functions of this employee in the management system is access to the client base. The client base is a part of the ERP-system, which contains information about the company's clients. It contains customer name, contact information, history of interaction with the company, information about orders, payments and much more. The manager can also calculate the customer's order simultaneously in the system. Another function of the manager is to follow the stages of production in an online format to inform the customer.

The warehouse manager has access to statistics on material management and material costs. Similarly, the production manager can see statistics related to materials. It also controls the stages of production, distributing the work of production planning and ordering

among employees in the system. Workers view their allotted work from the system and its conditions, deadlines, and press the confirmation button in the system when the work is done.

The head of the company has access to many functions in the system. For example, viewing financial statistics. In this case, the head of the company will know exactly the financial condition of the organization. Also has access to the client base. The head of the organization can view employee data and view statistics on the cost of materials in the enterprise [6].

In addition, any user registered in the system can view a list of completed orders in the company after authorization.

Conclusions. As a result of this work, the theoretical foundations of information systems, their nature and necessity.

Today, all companies, regardless of their field of activity, use information systems in their work, this also applies to printing companies. Information systems for printing enterprises must have certain properties that are inherent to printing enterprises or be able to adapt to them. Today there is a large list of information systems used by printers, each of which has its own advantages and disadvantages.

The article analyzes the structure and business processes of a printing company. In BPWIN, based on IDEF0 notation, the overall business process of the company was modeled. Also in the IDEF0 notation was decomposed structural model, and the work of the printing facility was analyzed from receipt of an order from the customer to the implementation of the order. Based on the analyzed information, users and functions of the information system of the printing enterprise were modeled on the use case diagram in the environment of the unified modeling language UML. On the basis of this model, the main function of the information management system has been demonstrated.

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[1]Қазақстан Республикасы Ғылым және жоғары білім министрлігі Ақпараттық және есептеуіш технологиялар институты,
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ПОЛИГРАФИЯЛЫҚ КӘСІПОРЫННЫҢ БИЗНЕС-ПРОЦЕСТЕРІН ТАЛДАУ ЖӘНЕ БАСҚАРУ ЖҮЙЕСІН МОДЕЛЬДЕУ

Қазіргі таңда ақпараттық технологиялар қоғамның барлық секторларын қарқынды түрде қамтып, қоғам өміріне елеулі өзгерістер алып келуде. Әрине, әлемде ақпараттық технологиялар туралы сан-түрлі көзқарастар қалыптасты. Дегенмен, ақпараттық жүйелердің жеке адамдарға да, бизнеске де әкелетін көптеген артықшылықтары бар.

Кез келген кәсіпорынның мақсаты бәсекелестік қабілетіне ие бола отырып, нарықта оза шауып жоғары деңгейге жету болып табылады. Оның көптеген жолдары бар. Олардың бірі цифрландыру, яғни компьютерлік технологияларды пайдалана отырып кәсіпорында ақпараттық басқару жүйесін енгізу болып табылады. Мақалада баспа кәсіпорны үшін ақпараттық басқару жүйелері талданады. Сонымен қатар, IDEF0 нотациясы негізінде полиграфиялық кәсіпорынның бизнес-процестерінің құрылымдық модельдері көрсетілетін болады. Бизнес-процестерді талдай отырып, UML унифицирленген модельдеу тілінде ақпараттық басқару жүйесіндегі полиграфиялық кәсіпорынның бизнес-процестерінің жұмысы сипатталды.

***Түйін сөздер**: ақпараттық басқару жүйесі, полиграфиялық кәсіпорын, UML, IDEF0, бизнес-процесс, ERP.*

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АНАЛИЗ БИЗНЕС-ПРОЦЕССОВ ПОЛИГРАФИЧЕСКОГО ПРЕДПРИЯТИЯ И МОДЕЛИРОВАНИЕ СИСТЕМЫ УПРАВЛЕНИЯ

В настоящее время информационные технологии интенсивно охватывают все сферы жизни общества и вносят существенные изменения в жизнь общества. Конечно, в мире существует множество различных взглядов на информационные технологии. Однако существует и множество преимуществ, которые информационные системы могут принести как отдельным лицам, так и предприятиям.

Цель любого предприятия – опередить своих конкурентов и занять лидирующие позиции на рынке. У него много способов. Одним из них является цифровизация, внедрение системы информационного управления на предприятии с использованием компьютерных технологий. В статье проанализированы информационные системы управления для полиграфического предприятия.

Кроме того, были продемонстрированы структурные модели бизнес-процессов полиграфического предприятия на основе нотации IDEF0. Анализируя бизнес-процессы, на унифицированном языке моделирования UML была описана работа бизнес-процессов полиграфического предприятия в информационной системе управления.

***Ключевые слова**: информационная система управления, полиграфическое предприятие, UML, IDEF0, бизнес-процесс, ERP.*