

Identification of Business Processes in Integrated Structures

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Abstract

The article describes the historical development of the concept of business process, the views of scientists and economists who have studied the issue is analyzed. Key characteristics of the categories of business processes were analyzed, and the typology concept definitions by different authors were researched. The prospects for further research are shown. Structure of the business process and its typical components are described. The classification of business processes, the potential contents and design of processes are given. The business process life cycle of a typical enterprise is analyzed.

Keywords: enterprise, business process, firm life cycle

Introduction

The process of development, standardization and improvement of the efficiency of business processes has come a long way. It has seen a long path of growth and improvement. Many scientists and economists have devoted their work to this issue and have contributed to the development of the concept of the business process.

1 Historical view of the establishment of business processes in the global economy

A first description of business process modeling can be traced to the ideas of Adam Smith's division of labor in production, in the book *The Wealth of Nations* (Smith, Campbell, and Skinner 1976, 232). First, one person performed the production process from the beginning to the end. When there were factories, the norm became a division of labour into processes carried out by many people. Adam Smith argued that the disruption of work involving all participants in the production and creation of specialized tasks would simplify and speed up the whole process. He showed that when different tasks at different stages of production will be performed by different people in the chain of production, the result would be more effective. This is how the business process works.

American engineer Frederick Winslow Taylor published his scientific study *The Principles of Scientific Management* which focuses on optimizing the management of certain phases of the production process in 1911 (Taylor 1947, 4). The theory that was presented in his book was called *Taylorism*, although the author himself called it the theory of "process management." In 1921, Frank Gilbreth offered a graphical representation of business process in the book *Graphic Processes. The First Steps in Finding a Better Way*. On the basis of this book, Henry Ford created the idea of a clear chain of production specialization for each employee. Works of William Edwards Deming, Joseph M. Juran and Philip Crosby Bayard became the basis of the business process concept in the United States in the 1950s. In 1980, TQM (Total Quality Management) was a widespread theory of business process management, by the American scientists William Deming and Joseph Juran (Deming 1986, 58). This theory was used initially in engineering and technology,

based on the Japanese philosophy of Kaizen, which is based on continuous improvement. The aim of this theory was to achieve incremental improvements in the processes of value, quality, service and the speed of the business processes.

In the early 1990s, a component of reengineering business processes appeared and began to spread rapidly in the global economy. While the theory of money was a progressive improvement of business, process reengineering meant radical changes in business processes and performance. In 1993, an American professor of computer science Michael Hammer and a successful head of corporate CEO consulting company Perot Systems James Champy developed the concept of reengineering in a book *Reengineering the Corporation* (Hammer and Champy 1993, 134). Hammer and Champy argued that business processes were revolutionary, high-speed and abrupt rather than gradual and evolutionary. There are many definitions and interpretations of the concept of business process. Thoughts of domestic and foreign authors on this subject are numerous and often they do not match. Here are some basic interpretations of the concept of business process (tab. 1).

Tab. 1. Comparative characteristics of the definition of a business process

Author	Determination	Characteristic
M. Porter and V. E. Millar	A set of activities that are determined by points "input" and "output" and use organizational resources to create value goods/services for consumers (Porter and Millar 1985, 149).	In this approach, the boundaries of business processes are business procedures that generate added value. Each company is a set of business processes that form additional cost. Entry and exit points are different value added, which increases the cost of organizational resources.
W. Deming	Any kind of action in the functioning of organization (Deming 1986, 58).	This definition is too general and not correct, as not every action in the organization is a business process.
T. Davenport and J. Short	Discrete set of actions designed and structured to produce a certain product (goods/works/services) for a specific customer or market (Davenport 1993, 223).	Definition describes the business process as a set of activities designed to meet the needs of consumers. The author emphasizes that the enterprise processes are designed and pre-planned actions that lead to the final result, which is the production of goods or services.
J. Harrington and K Esseling	Logical, sequential, interrelated set of activities that consume resources of which the provider creates value and the buyer gives the result (Harrington, Esseling, and Nimwegen 1997, 193).	Defining the structure is common and reflects its hierarchy. The authors summarize the previous definition, pointing to the stages of production, the main components of business processes.
E. Zinder	Logical sequence of interrelated actions which use the company's resources to create and obtain measurable results in the future (Zinder 1996, 56).	The author describes the business process as a sequence of logical operations, thereby drawing attention to planned processes, which has a length of time and ends meet specific customer needs.
B. Anderson	A sequence of logically related, repetitive actions that result in the company's resources and are used to convert the object (physical or virtual) for the purpose of achievement of measurable results or products to meet the needs of internal and external customers (Andersen 2003, 145).	In defining for the first time author, comparing with the previous definition, states that a business process is a process of repetitive actions. This allows us to understand the nature and completeness of the business process.

Tab. 1. (continued)

Author	Determination	Characteristic
M. Hammer and J.. Champy	A set of different activities within which “input” is used one or more types of resources, resulting in the “output” creating a product that is valuable to the consumer (Hammer and Champy 1993, 134).	According to the definition business processes are the mechanisms that transform inputs into output results. This definition does not give us an understanding of process flow.
H. Binner	A system of interconnected and interacting actions which are ultimate goals of the implementation of which is to create products/services that are of value to internal and external customers (Binner 2010, 201).	The definition draws attention to the interconnectedness of action to get the result, without indicating the gradual implementation of processes and specifying the initial phase.
Tele management forum	Systematic and consistent implementation of functional operations that generate a predetermined result (Telecom Operations Map (Телеком-модель операций). [GB910] [Evaluation Version 2.1, March 2000] 2000).	Definition is limited because it does not indicate the scope of the business processes.
E. Oykhman and E Popov	A set of internal activities, beginning with one or more “inputs” and ending with the creation of products that customers need, satisfying its vision of cost, durability, and quality of service (Oykhman and Popov 1997, 186).	The definition focuses on internal activities taking place in the enterprise, the excluded part of external entities and activities that are components of a business process.
ISO	A series of interrelated activities that transform inputs and outputs in the process (Оценка и аттестация...) 2001, 167).	Quite a narrow understanding of the concept, which mentions the entry and exit process, without specifying its components and the final output.
A. Scheer	Linked set of repetitive actions (functions) that convert incoming material and/or information in the final product (service) in accordance with pre-established rules (Sheer 1999, 87).	The definition shows new aspects, previously referred by scientists part as information. Singled out material and immaterial components. The downside can be considered as an indication repetition action. Not all business processes are cyclical and some are performed only once.
O. Roskoshna	A number of interrelated activities that transform inputs into outputs (Roskoshna 2010, 341).	A limited definition that does not reflect the general essence of business processes.
Ukrainian State Standard ICO 9001-96	Set of interrelated resources and activities that transform input elements.	A definition that formed the basis for determining the ISO on clarifying extended input elements.

Note: All definition combines an emphasis on the fact that business processes are continuous, with inputs, outputs, eventually creating a new product

Source: Own elaboration based on works of authors quoted in the table

2 Structure of business process

Analyzing the given definitions one can draw conclusions and summarize the information submitted in a proper interpretation of the concept. The business process is a process occurring at different levels of the production process with a beginning, a certain number of transactions and a clearly defined end. There is no standard list of processes and their numbers, they have their sequence and duration. The beginning of the next process is expiration of the previous process. A process can take place sequentially or in parallel, leading to the final result, which is to meet the specific needs of the consumer. Participants in the production process may be one person or group

of people. At the entrance to the manufacturing process come tangible and intangible elements that are converted during the production process, creating surplus value. The business process can be represented in the next figure 1. It shows that the customer submits an order to the executor and expects output in the final result in the form of goods produced or services rendered. The executor of the order provides tangible and intangible components that may be logistical, energy, human, or information based. Added value is produced in the output, which is the main objective of the executing the order. There can be received a significant number of secondary inputs, in addition to the primary input after the start of the process. This can be additional information or materials that were needed in the business process. Just as there are secondary inputs, there are secondary outputs that occur as by-products of the process.

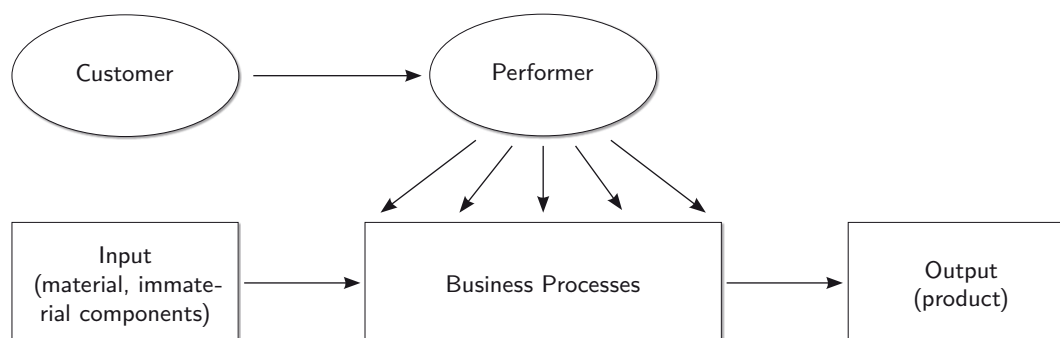


Fig. 1. Structure of the business process

Source: Own elaboration based on Zinder (1996, 56), Oykhan and Popov (1997, 186), and Roskoshna (2010, 341)

The business process is managed and implemented by a specific agent or group of agents. At the input stage of the business process is an agent of the supplier or the customer inputs, providing information. The business process is managed and implemented by managers executing the order. The number of agents involved in the business process execution depends on the order or undertaking. The main purpose of a business process is to meet customers' requirements. They can be divided into five groups (Jennings 1996, 45):

- primary clients who receive primary output of the business process
- secondary clients that are not part of the business process and receive secondary outputs
- indirect clients who are not direct beneficiaries of the initial output, but of a following a chain after primary customers
- external customers (distributors, retailers, agents and other organizations) receiving the output of the process, and distributing it with the consumer
- indirect external customers (fifth type)

There are quantitative and qualitative parameters of the business process. Quality parameters of the process are considered to be efficiency, adaptability and effectiveness. Efficiency describes a ratio of the result and of customer expectations. Efficiency can be increased by improving the quality of goods or service output. Efficiency can be improved by redesigning business processes or products and services. Adaptability indicates how well the process is able to respond to changes in the environment, and the ability to adapt to these changes. Effectiveness shows how well executed are the business processes. Key indicators that evaluate the effectiveness of business processes are its detection in quantitative characteristics of business processes. Quantitative business process parameters include: the number of customers, sales for the period specified product quality, typical operations to be performed in production for a certain period of time; the duration of the typical operations; costs of production; and investment in production.

3 Classifications of business processes

There are many different approaches to the classification of business processes. Economists considered many classifications which cannot be combined into one. The following summarizes the classification of business processes (tab. 2). The summary given in table 2 shows that business

Tab. 2. Classification of business processes of organizations

Classification criteria	Type of business processes	Characteristic
On the basis of its conclusions	Main	processes focused on the main task performed
	Supporting:	
	Servicing business processes	processes that are designed to ensure the implementation of key business processes and operation of the production process
	Business process management	processes that span the full range of management functions at the level of each business process and business system as a whole
	Business development processes	processes that ensure the development and improvement of primary and secondary processes
The nature of the product	Productive	processes in which products are goods and services
	Administrative	processes associated with coordinating concerted action in organizational structure and business processes of the organization
Related to a customer	External	processes with input and output for customers outside the business process
	Internal	processes ordered by the executors of the business process
The level of detail	Top-level	a set of common functions of a business process without their detailing by type
	Detailed	part of the business process of the upper level performed a specific task as part of the final result
	Elementary	components of which do not have the ability to create the final result, require more detailed description and includes the only one function
By integration of structures	Horizontal	integrated set of interrelated processes that are consistent chain processes of several functional horizontal units
	Vertical	integrated set of interrelated processes that reflect the activities of the company vertically
Depending on the direction of work	Typical	typical for any company regardless of industry and workers
	Specific	specific to the object of study business processes that reflect the work
The degree of difficulty	Simple	processes that require no additional effort into performance
	Sophisticated	processes that require special skills and extra effort when performing specific tasks
The degree of influence on the success of the organization	Key	processes that mostly affect achievement of the main objectives of the enterprise
	Critical	processes, inadequate performance of which may represent an actual or potential danger to ensure product quality
As the degree of coherence of individual parts	Local	processes that are characteristic of traditional companies with narrow specialization
	Integration	processes aimed at linking process differentiated parts and functions into one

Source: Own elaboration based on Zinder (1996, 56), Oykman and Popov (1997, 186), and Roskoshna (2010, 341)

process should be understood as a structured, measured set of activities performed cyclically within different structural divisions, which is a holistic act organized to achieve results and meet the needs of customers.

Management and planning of business processes is troublesome and requires special attention in order to avoid failures and downtime in production. The goal of management is adapting to customer needs and coverage of the interrelated stages of production, through the identification,

analysis, modeling, simulation, implementation, and commissioning, monitoring and optimization, which are fundamental elements of the life cycle of business processes. An important component is a continuous process of improvement that provides relevantly the ability to better achieve the goals and ensure higher competitiveness.

The information base is an important part of effective management of business processes. If the information we collect is sufficient and complies with the legislation and the laws of physics, the organization of the flow of the business process can be achieved successfully. The obtained information should be thoroughly studied and maximally used in the business process flow. For qualitative analysis, information can be divided into normative reference (laws, rules, regulations, limits and other aspects), routine information (that includes the company performing the typical business process), accounting and reporting information (records companies, financial and statistical reports) and outside accounting information (information received from customers and other external sources).

4 Lifecycle of business processes

Overall, the typical enterprise life cycle of a business process is shown in figure 2. All approaches are similar and include a similar sequence to get the same effects and products in typical business processes. Different stages of the life cycle of a business process include group activities required to implement them.

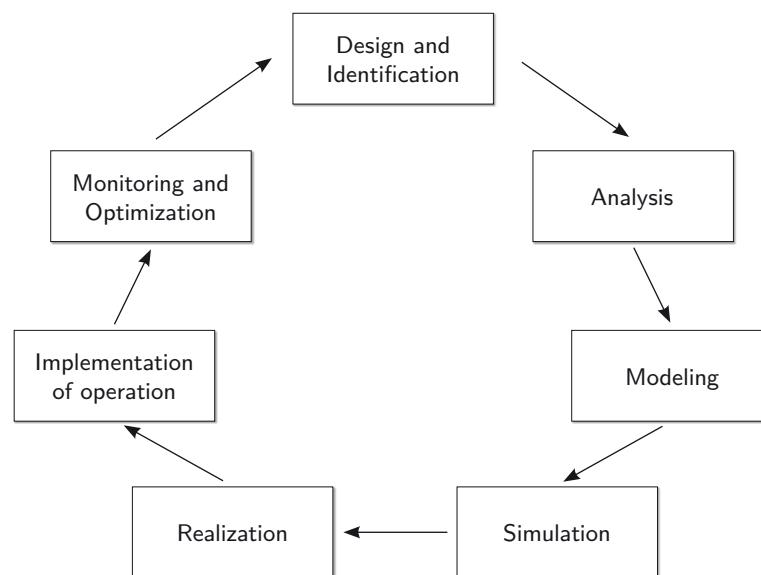


Fig. 2. The stages of the life cycle of a business process

Source: Own elaboration based on Zinder (1996, 56), Oykhman and Popov (1997, 186), and Roskoshna (2010, 341)

- Design and identification—at this stage, studies to determine the extent of the project, or whether it has previously been implemented by a business process, defined by its function as a whole (the sequence of events, the relationship between them, information transfer) and documentation process through various tools and methodologies.
- Analysis—at this stage is a detailed analysis of all the possible components of a new business process or improvement done by studying previously implemented business process.
- Modeling—after a detailed analysis a potential layout of the business process is created due to requirements specified by the customer.
- Simulation—a stage of the business process, which tests the created model taking into account the requirements and submitted customer information. At this point, you can identify potential problems and eliminate them before implementation.
- Realization—this stage is the order of taking into account all customer requirements, technical regulations and amendments made after the simulation.

- Implementation of operation—a ready to use business process with supporting technical solutions can be activated and transferred to the final customer. This phase includes measures to ensure the functioning of business processes based on technical solutions prepared in advance.
- Monitoring and Optimization—working in the time range, a business process loses its flexibility and becomes imperfect. Over time, there are problems associated with the advent of a more perfect product. These problems cannot be taken into account in advance in modeling this project, so the next simulation or similar project can be carried out or adjustment and optimization.

The most important element of business process management is its high quality and multilateral analysis and modeling. These processes should include the largest possible number of specialists (analysts, experts) that directly or indirectly affect the process. Taking into account the needs, possibilities and limitations for business process modeling, those people closest to the customer will design the next project.

There are four basic strategies for modeling business processes:

- From top to bottom (from general to specific)—specification of a business process starts with the definition of common elements and leads to more details. The advantage of this approach is to focus on customer needs and create an effective solution, but it requires more knowledge as well as minor errors globally can create big problems on the detailed characteristics of the structure of the process.
- From the bottom up (the specific to the general)—this approach is the opposite to the previous one and its specificity is to combine and compose parts of the business process and compile it in the end result. Thus, we can design a system with a focus on specific tasks and products, but there is a risk that the task will be too detailed and will complicate the formation of the final task.
- Inside-out—this compromise approach is based on focusing on key processes that are based on primary and basic structures of the support elements and which create problems. The problem may be in the right selection key and support processes. If an error occurs, the business process model must be changed or done from the beginning if the project is moving in the wrong direction
- Mixed—uses all the above listed strategies in order to achieve the best results to optimize business process modeling, and at the same time minimizing the influence of defects in a separate annex of strategies described above.

In order to understand the structure of the business process better we should illustrate it (fig. 3). The structure of business processes shows the components of a business process throughout the duration of its life cycle. Input in business process consists of two components: IP1—Inventory of existing enterprise resources, and IP2—Information received from outside. The process begins with the realization of the basic elements of the business process: BP1—Study customer request and provided by him information.

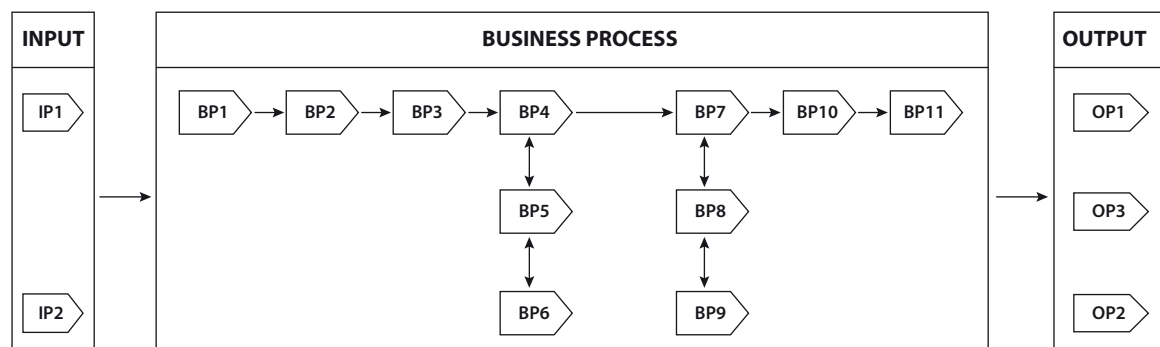


Fig. 3. Matrix of Business Process

Source: Own elaboration based on Deming (1986, 58), Jennings (1996, 45), Davenport (1993, 223), and Porter and Millar (1985, 149)

After receiving the order the agent divides all the information on the components to analyse it. Also, the ability of the enterprise with existing resources is made. Then the estimate is made and price agreed upon with the customer. After achieving satisfactory pricing, the order is executed. The next steps are fulfilment of the order: PB2—approval of the necessary material and non-material resources to fulfill the order, and PB3—the development of production process. The result of the approval of necessary resources is the decision to start production. This process is preceded by sending a sample of the product to the customer and approving the product documentation. Then, the approval of the budget, schedules for the order and its implementation. The implementation of the business plan according to budget constraints concludes with a report on the implementation.

The following three main stages of the business process are: BP4—production planning, BP5—technical and organizational preparation of production, and BP6—planning of product quality. These three steps are interrelated. These are bilateral relationships, which means that one result of the process depends on the implementation of the previous and/or next.

The process begins with a study of the annual production forecast. Accordingly, acquisition of materials and components needed for production are planned. At the same time the product assortment is projected. The next steps are: BP7—control of production, BP8—compliance of safety and environmental protection, and BP9—response in emergency and unforeseen situations. All three phases are in direct control of the production process. To secure the flow of the production process all the rules of safety and environmental protection must be followed, regardless of the type of activity performed. In the case of unforeseen situations or accidents at work, the business must comply with its developed plans for such situations.

The last final stages of creating added value in the implementation of products are: BP10—testing order, and BP11—transfer order to the customer. After completion of the production process the product is tested to avoid errors or defects. Then request is transferred to the customer. After the implementation of production come the final stages of release: OP1—measurement of productivity and efficiency, OP2—accounting, and OP3—research of satisfaction survey of customer orders received. This view has the typical structure of the business process of production of goods or services.

5 Improvement of business processes

A successful and efficient flow of business process requires continuous improvement according to the needs and level of technological development. The historical process of improving business processes can be divided into three waves of improvement. The first wave of improvement and quality began in the 1980s. It developed programs aimed at addressing the gaps and errors in the constant improvement of the quality and training of personnel for assignments to create additional value. The essence of the program was to conduct *brainstorming* to identify problems, employee engagement to address them; construction diagrams to assist in identifying sources of problems; regular monitoring of the processes used to determine the causes of deviations; and efforts to minimize costs through continuous production.

Programs to improve were very effective, but had drawbacks, as most problems can be solved only with the participation of management; the local optimization solution to the problems within the organization; and costs for the program are high. These shortcomings led to a second wave of improvements. The new methodology was known as Business Process Improvement. The concept of improvement based on four different approaches is shown in figure 4.

Approaches are aimed at increasing the productivity, efficiency and adaptability of business processes to improve product quality and speed. Under these new approaches a company made significant progress in improving the performance by analyzing the various activities and tasks in order to optimize the overall performance of a relatively short period of time. For the first time in this second wave of improving performance James Harrington turned in his paper “Business Process Improvement,” which defined the basic methodology for improving business processes (Harrington, Esseling, and Nimwegen 1997).

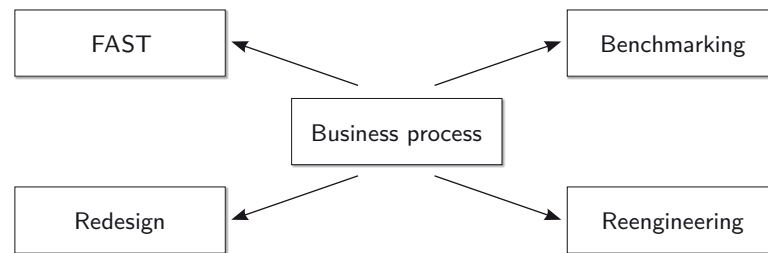


Fig. 4. Improving of business processes.

Source: Own elaboration based on Oykhman and Popov (1997, 186), and Roskoshna (2010, 341)

- FAST is a method of rapid analysis solution that focuses on a specific process in the one-day or two-day meeting of experts to improve business processes. This helps to reduce costs, shorten the duration of the business process, and reduce errors.
- Benchmarking is based on a comparative analysis of typical business processes that take place in this or other businesses to improve current benchmarking in the enterprise. Key processes are identified, interpreted and compared with the best equivalent processes for determining adverse deviations.
- Business process redesign focuses on improving the existing process for which a simulation model developed its current state. This makes it possible to reduce the time and complexity of work by reducing the number of employees in the performance of tasks.
- Reengineering is the fundamental rethinking and radical redesign of business processes to achieve significant improvement in the quality of operation (Davenport 1993). Reengineering applied by the need to introduce radical changes involves the creation of new, more efficient business processes in the enterprise with the exception of the old organization.

Today there is a growing popularity of the third wave of improvements. It is entitled “Improving business systems.” The concept involves the evaluation of integration of business processes to support key operating systems within an enterprise (Weske 2012). Among the typical business systems one can distinguish the quality management system, environmental protection, finance, securities, information, and resource support projects.

There are various public and private standardization systems, such as the international standard quality management system (ISO 9000), and environmental protection systems (ISO 14000). In modern terms the business environment’s main objective is of rapid response to changes taking place and the same rapid implementation of changes in business processes. Business process optimization is one of the main objectives of the company, determining its future performance.

Methods of optimization of business processes can be divided into three groups:

- formalized universal fundamental techniques that are successful in applying expertise and effective principles for building effective business processes; these methods are universal and they are suitable for optimizing any business process for any company in the performance of any work
- methods based on the study, analysis and borrowing elements of business processes of successful companies engaged in similar activities; in the first study and analysis are exposed competitors that are leaders in the industry; recently, many companies have effectively implemented technological know-how borrowed from other companies
- methods of group work; this combines different methods of technology teamwork, the brainstorming method, the method of group problem solving and more. their use allows us to develop new effective solutions using group intelligence

Optimization of business processes has the following advantages:

- formation by personnel and administration of a clear understanding of the achievement of objectives
- reducing the cost, duration and number of errors in each of the analyzed processes
- opportunity to prepare for successful, thoughtful and effective implementation of IT
- better interaction between employees and departments of the company
- approach to certification standards ISO: 9000
- increase investment attractiveness

Summary

Thus, the business process is a process occurring at different levels of the production process, has a beginning, a certain number of transactions and clearly defined end. In the beginning is obtained information (input) needed for the whole business process, and at the end of the business process (output) creates additional costs and the need for monitoring the quality of the task. Upon training on the performance of specific tasks, to the availability of necessary equipment and technology are largely dependent the success and customer satisfaction of the work done. It is important to monitor the status of resources, new technologies in the market and qualifications.

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