

**Моделирование поведения
хозяйствующих субъектов в условиях
изменяющейся рыночной среды**

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В монографии рассматриваются теоретико-методологические подходы к моделированию поведения хозяйствующих субъектов различного уровня, функционирующих в условиях изменяющейся рыночной среды.

Определены особенности формирования модельного базиса этих систем на основе методов оценки, анализа и прогнозирования, синергетики, антикризисного управления и интеллектуального анализа данных, что дает возможность повысить качество принимаемых решений, направленных на формирование системы управленческих инноваций на основе современных средств экономико-математического моделирования и информационных технологий.

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3.9. Business process as the main element of process management approach

The modern management concept has evolved during the last centuries passing several crucial stages. Two main management concepts are functional and process. They are the representatives of existing management approaches, which were specific at the concrete time of economic systems development. The first concept is a functional one. It is the basis for future appearing of the process concept, which is appealed to mitigate the disadvantages of predecessors.

The functional concept is based on managing a company by dividing it into several functional units. As for the process approach, it is founded on managing business processes – the sets of activities which turn some input parameters into valuable for customers outputs.

‘An Inquiry into the Nature and Causes of the Wealth of Nations’ by A. Smith [1] is considered as a beginning of separating management in a stand-alone research object. The necessity of labour division is proved in this tractate giving the example of a pin factory. Following A. Smith, a significant increasing of production volume could be reached by means of three main factors: the productivity level growth of each employee (it means dexterity improvement for factories based on manual work), time economy in case of switching between different activities (all employees perform a few functions only from the overall manufacturing process, so there is no need in switching between different activities), labour automation due to the scientific-technological advance.

The labour division principle was common for organizing manufacturing process in Europe in XIX century. The work of railway companies is the perfect example of that time. They used formal management procedures accordingly to their organizational structure and the conduct rules with clearly assigned dutyholders. H. Ford, A. Sloan, W. Durant and H. Geneen improved this approach in XX century with the help of launching assembly line production, using of which is based on wider labour

division: employees perform separate, usually isolated processes united for the eventual result.

The described bureaucratic model had been effective until the 70-s of XX century. Its usage is determined by rapid economic growth and low competition level. It allows corporations to fulfill a demand and continue growing without special quality control. Therefore, the management of that time did not require any changes, because the variety of goods was quite low, and customers were satisfied with the existing supply. However, the situation changed rapidly in 70-s, when new Japanese goods broke onto the market. Their quality was better comparing with the similar US and European goods [2].

The Japanese companies' success is based on using W. Deming's [3] research and his 14 principles [4]. Deming suggested using process concept as the foundation of quality management. Therefore, two management paradigms ran against each other in 70-s of XX century: functional (launched by A. Smith) and process (promoted by W. Deming).

The process approach appeared to solve specific functional concept's drawbacks:

- the absence of quick adaptation to market demands,
- rough, bureaucratic and vertical structure with functional divisions,
- low mobility of decision-making, a long negotiation process,
- low interest of employees in the eventual result (the main criterion of the labour effectiveness is satisfaction of managers, who are higher in the organizational hierarchy, not customers);
- the necessity of top-managers involvement in company operational activities.

The process approach is aimed to solve all the drawbacks above by its own advantages:

- all process are intended to satisfy internal and external consumers of the business process outputs;
- saving time for forwarding information to higher management levels;
- evaluating the process effectiveness as part of the overall effectiveness in general;

- concurrence of all process in the one target gives an opportunity to plan the company activity accordingly;
- higher level of adaptivity allows responding quickly to changes on the market and reorganizing inefficient business processes;
- motivation for employees when desirable results are achieved by business processes they are responsible for.

It is worth noticing that the process concept had appeared earlier than W. Deming ideas received recognition. One of the first researchers who paid attention to the process approach was H. Fayol [5]. He analyzed the management as the sequence of operations ('management means planning, organizing, leading, controlling, directing'). Following Fayol, the management is the part of a company performance as well as other activities. Moreover, a company existence would be chaotic and unpredictable without management, so such economic agent would not exist at all. Fayol emphasized the necessity of coordination connection between different functional units for reaching the main goal of its performance. This discovery is called 'Fayol's bridge'.

The idea of cross functional connections has been deepened by M. Follett [6], who proved the necessity of employee's recognition of all activities the employee is responsible for. Coordination of different jobs between employees and departments gives an opportunity to assure cross functioning and cumulative responsibility.

Apart from the Western scientist, the question of the process approach was also observed in Russian Empire and the USSR. A. Bohdanov [7] suggested to observe the organizational structure as the complex of organized and unorganized processes. Later in 30-s of XX century the decision on describing all production activities with 'orggrams' and documenting them was made. Using them the government could quickly cut down production in near-front zones and resume all required processes of factories' and plants' units interaction during the WWII [8].

Therefore, the process approach was launched long before, but it became widespread in 70–80-s of XX century when the market of sellers was transformed into the market of customers. The comparison analysis of functional and process approaches is introduced in table 1 [9, 10].

Table 1

The comparison analysis of functional and process approaches

Criteria	Functional approach	Process approach
Priority objective	Income	Quality of the activities and products, continuous improvement
Object management	Function	Process
Relationship between partners	Situational interaction	Strategic interaction
Result orientation	To management	To customer
Base concept	Mechanical bureaucracy	Quality management
Communications	Mostly vertical	Mostly horizontal
Reaction to changes	Reactive	Interactive
Management style	Authoritarian	Democratic
Adaptive capacity	Low	High

Therefore, the process approach solves issues which are specific for management in the second part of XX century. It is rather obvious that the central element of the process concept is a ‘process’ category.

This is no single point of view on a business process definition. It is worth noticing that ‘a process’ and ‘a business process’ terms are used as synonyms in many scientific papers taking into consideration a context [11]. Meanwhile, it is a common thing that ‘a procedure’ term is used as an equivalent of a process. However, it should be taken into consideration that a business process transforms inputs and outputs changing their conditions, and a procedure is the defined way of a process realization, so it is the method of processes recognition, generalization and implementation [12].

Following Merriam-Webster, a process is a series of actions that produce something or that lead to a particular result [13].

ISO 9000 standard [14] introduces a process as a set of activities that are inter-related or that interact with each other. Processes use resources to transform inputs into outputs. A major advantage of the process approach, comparing with other approaches, is in the management and control of the interactions between these processes and the interfaces between the functional hierarchies of the organization. Moreover, a process is conducted for adding a value.

J. Juran [15] defines a process as a systematic set of activities which is aimed to achieve a specific purpose. Therefore, activities, united into a process, are a system entity with a specific target.

A similar definition is introduced by J. Martin [16]: a process is ‘a value stream, a set of end-to-end activities which collectively create value for a customer’. Within the given context a process is defined as a set of interconnected activities which unity leads to producing user value goods.

M. Robson and P. Ullah [17] suggest to expand the process term, specifying its participants and constant structure: a process is a flow of work passing from one person to next, and for larger processes probably from one department to the next. Processes can be defined at a number of levels but they will always have a defined beginning, a number of steps in the middle and a defined end.

A business process should be defined after analysis of a process category.

A quite general definition is suggested by W. Deming [18]: a business process is any action in a company work. It is worth mentioning that an integral performance could be considered as a business process. In this case a business process is not a part of economic agent’s performance (e.g.. manufacturing or sales), but it is a separate category which specifies this activity. In overall, this definition is not full enough considering the absence of clear difference between a business process and whole company performance.

In Ukrainian ISO 9001-96 [19] a business process is defined as a set of interrelated resources and activities that transform inputs into outputs. In this case, another business process aspect is discovered: a business process requires specific resources for performing actions which are contained in it. Due to their usage a business process result is expected.

By M. Hammer and J. Champy [20], a business process is a collection of activities that takes one or more kinds of inputs and create an output that is of value to the customer. This definition unites several previous ones and highlights several business process features: a process combines specific actions which require resources and executing of which leads to creating a user value goods. Besides, a business process structure is also introduced: an input – a set of actions – an output.

A definition by T. Davenport [21] considers a business process is a specific ordering of work activities across time and place, with a beginning, an end, and clearly identified inputs, outputs and structure of actions, whose final aim is the production of a specific output for a particular customer or market. This definition contains restrictions on inputs and outputs as well as time constraints, which are also important: a business process could be being performed forever, because its result is expected by a particular time moment. Moreover, Davenport claims about necessity of developing the business process system taking into consideration the market demands. Business process is thus a unique thing for each separate company.

A business process by V. Repien [22] is a stable, purpose-oriented set of inter-related types of activities, which using a specific technology to transform inputs into valuable for customers outputs. This definition emphasizes that a business process is a part of a defined production method, not just the set of activities. Moreover, there is also a requirement on creating a value of products/services as business process outputs.

Following M. Porter and V. Millar [23], a business process is a set of activities that determined by input and output points, interfaces and organizational facilities to create valuable good/services for customers. This definition includes a business process structure (input – actions (considering the company's features) – output) and requirement regarding value growth during a business process execution.

Therefore, the business process definitions are not decisive, but they have some similar points. Taking into consideration definitions above and business process features suggested by L. Chernobay [24] and O. Duma [25], business process outstanding characteristics will be defined (fig. 1).

These characteristics will be deeply introduced below.

Basing on actions/activity [13 – 23]. Business processes are based on particular actions, required activity executed by employees, otherwise business process would be impossible.

Actions interrelationship [13 – 17], [19 – 23]. All actions which are contained in a business process shall be interrelated, untied in one set or flow. If this require-

ment is not met, these actions will be separated, and the business process will lose entirety and not lead to expected results.

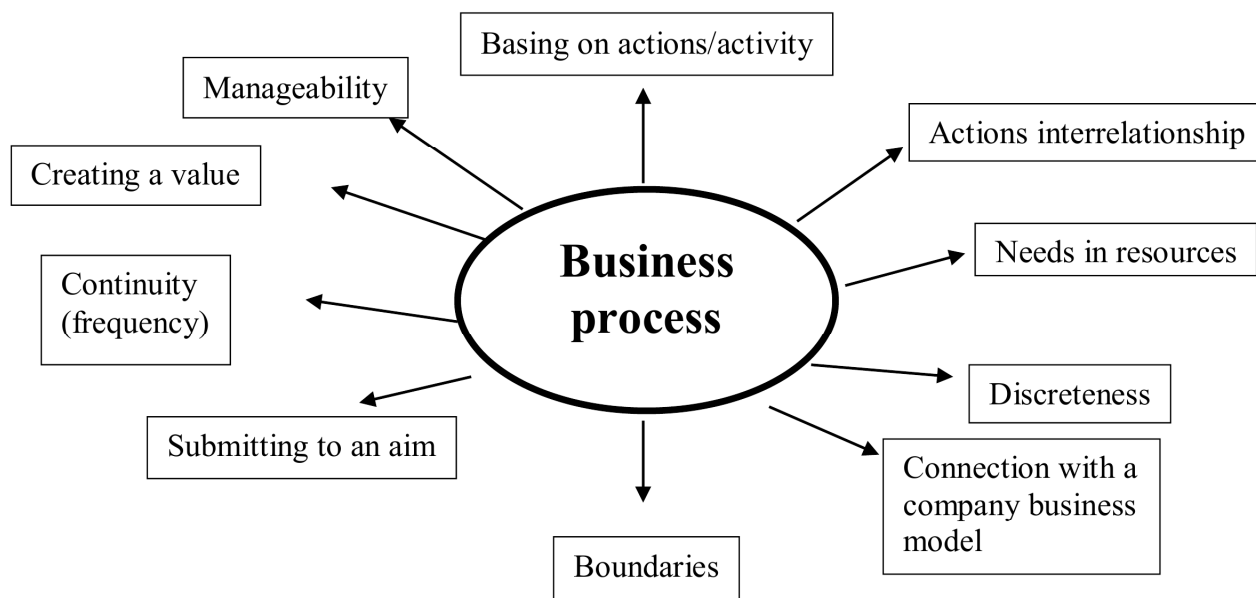


Figure 1. Business process outstanding characteristics

Needs in resources [20], [22]. [23]. Business process execution requires particular resources which are considered as obligatory requirements of its realization.

Discreteness [14], [17], [19 – 23]. Business processes are discrete: clearly defined inputs and outputs are presented, required actions for transforming inputs into desirable outputs are introduced. Therefore, a business process should have special evaluation criteria for different its stages and in general. Moreover, business process could be decomposed within a company for achieving its main goal.

Boundaries [14], [17], [19 – 23]. Business processes have their inputs and outputs that form their boundaries.

Submitting to an aim [14], [15] [17], [19 – 23]. Business process is subordinated to a specific purpose, accounting that every of them has an expected result. Besides, it is obvious that business processes are connected with each other and they have a synergetic effect as a whole for creating a value.

Creating a value [14], [16], [20 – 23]. Business processes create an added value, which is valuable for good and services consumers.

Connection with a company business model [24]. A company efficiency level directly depends on an integration scale of business process and an organizational business model. The absence of tight connection between executed business process and a business model brakes the bridge between an added value (outputs of manufacturing, sales) and its evaluation by customers (a user value).

Manageability [24]. Using organizational resources and business process execution with an aim of added value creation for achieving company's purposes require management. In the practical aspect, it means an occurrence of a manager who has a power and responsibilities to change a process configuration and resources required for its execution. On the other hand, this manager is responsible for a process effectiveness and efficiency.

Therefore, in the research a business process is defined as a system of managed, clearly defined, interrelated actions, which have known inputs and outputs, needs for resources and performing of which serves a method of purpose achieving.

This definition is based on several outstanding features:

Need for actions. Firstly, each business process is a set of particular actions. These actions are discrete entities which could be decomposed into some parts or stages.

Manageability. This property is one of the most important: business process exploration allows companies to adopt their performance to the internal and external needs; managers are responsible for creating a business process system as a regulatory mechanism of the company performance.

Clear definition. All actions contained in a business process should be acknowledged by performers and company management, otherwise company performance will be obscure and results – unpredictable.

Interrelation. Business processes make sense only in their aggregation and synergetic effect which generated as a result of their unity. Thus, business processes are the part of a company business model.

Known boundaries. Business processes are defined by their boundaries: inputs (accounting the required resources) and outputs (expected results). Without these characteristics, a business process loses its meaning because of impossibility of plan-

ning and managing a company performance. It is connected with a fact that business processes have a particular evaluation system at the inputs and outputs points, an expected result exists and it is the part of the whole process of purpose achievement.

A mean of achieving company goals. All business processes have to be subordinated to the particular company goals, in the other case they will be a time and resources waste. However, not every business process creates user value directly, because administrative and innovative business processes are designed for quality control, management and long-term development. Due to this reason, the suggested business process definition does not contain a point regarding creating a user value. A business process should be analyzed from another point of view – creating value for a company in the context of achieving some goals.

Different attributes are used for describing business process [25]:

Business process result – an entity specifying why a business process is executed, so an activity is always considered in line with organization purposes: receiving a result as an output which satisfies some defined requirements. The business process result is often mentioned as business process outputs.

Business process owner – a placeholder who is responsible for receiving a business process result and has authority to manage required for a project execution resources. It is a common practice when a process approach is implemented formally: a business process owner is assigned almost randomly, he/she does not receive enough power in, for example, managing staff for executing a particular business process. In this case, it is impossible to require any result from a formal business owner, and receiving a required result at all is at threat.

Business process performers are the team of specialists from different functional areas (cross-functional team) who perform the business process actions. Performers are more focused on the result comparing with separate functions executors within the functional concept, because the basis of a motivation scheme in the process approach is bonuses distribution in case of receiving the expected result only. Within the functional approach, performers are motivated by executed functions and not interested in receiving the result.

Business process input – transformed or used resources (physical, information, etc.) which are obligatory for business process execution to receive the business process result.

Except the described attributes business process also have properties: a process scale, a length and a level of detail [26].

A process scale defines its complexity and importance for a system in general. For example, if a cross-organizational process is considered, the process scale will be large. This process will include performance of several organizations, hundreds of inputs, require much resources and provide outputs which are crucial for many clients at the next stages of a product (service) manufacturing or consuming.

The process length is a subjective property of its duration which is defined by analysis and making decision on what exact actions/activity should belong to a particular process. There are three main business process types by their length:

- 1) a cross-organizational process: it goes through several companies until a product, which will be consumed by a customer, is received;
- 2) a cross-functional process: it goes through several departments from entering to the organization to receiving a product by a client;
- 3) a department process: the entire process is executed within one department.

A level of detail is defined by a degree of performance analysis detailization. A formal process description will be introduced by big blocks interrelated with physical and information flows. For example, to describe operations executed by separate employees within long cross-organizational processes, there will be required a formal description containing many different operations which are performed by staff and connected among each other with different rules. On the other hand, a level of detail could be not high, in this case cross-organizational process, which are performed at different organizational levels, will be described as large elements.

The research tasks should be accounted for choosing proper scale, length and a level of detail. It is worth noticing that process boundaries do not depend on these properties, but they are defined by its inputs and outputs.

To discover a business process structure and organization, its typical (picture 2 [25]) and structural (picture 3 [26]) schemes will be introduced below.

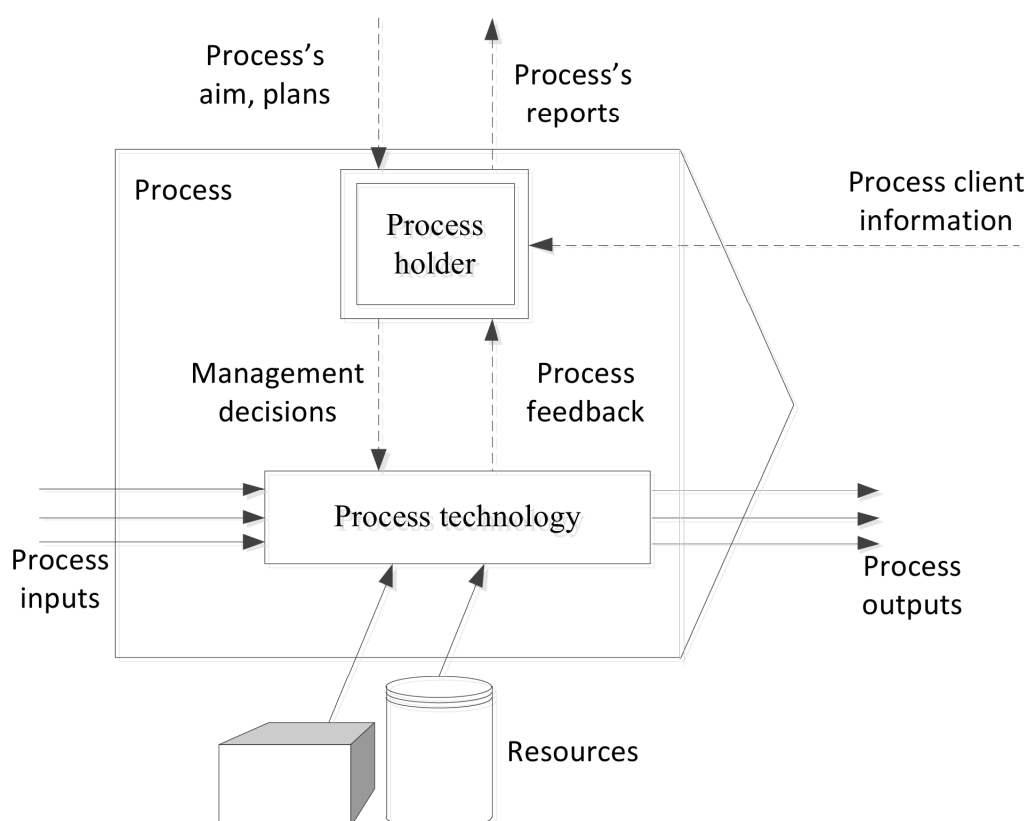


Figure 2. Business process's typical scheme

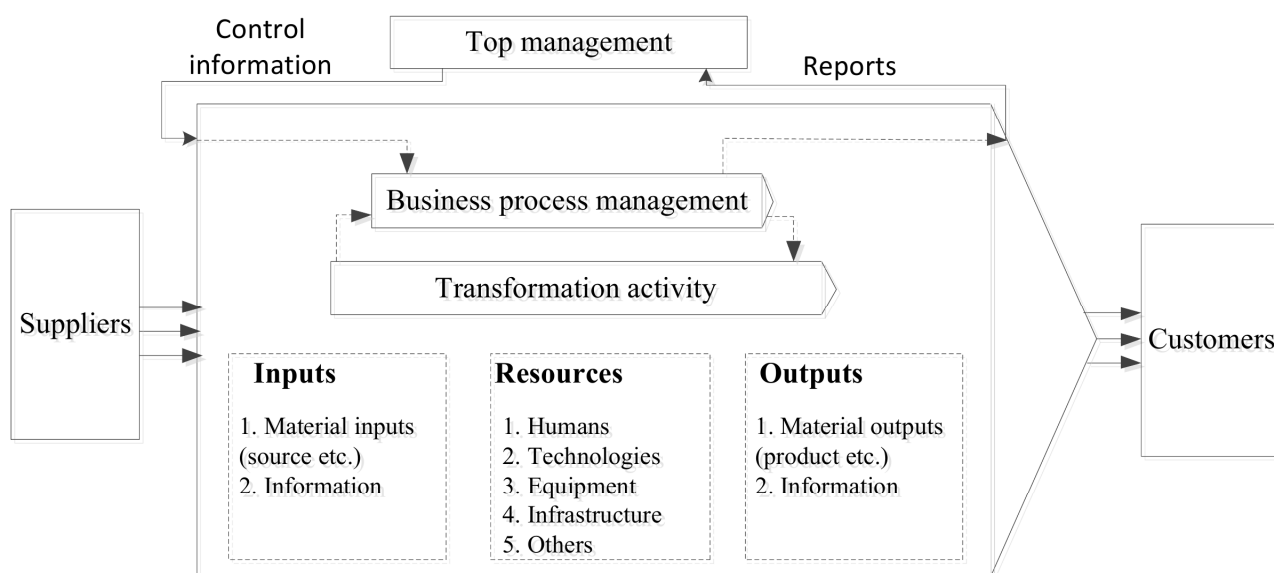


Figure 3. Business process's structural scheme

The main feature of the presented picture (pic. 2) is introducing a process as a 'black-box' model which uses inputs, outputs, resources, a feedback loop among process clients and its owner, who performs management functions. The picture contains

the flows of products, resources, information and managerial decisions, so a process includes flows that separate managerial decisions from the main process for receiving a product as a result of a company performance. It also demonstrates a correlation between vertical and horizontal flows, which thread its organizational structure.

It is worth noticing that the structural scheme (pic. 3) does not depend on a process scale, length and a level of detail. It could be used for any process description.

Therefore, business process is a complex economic category, which is characterized by unclear definitions and a number of common properties for different organizations. Moreover, the business process complexity is increased by its ramous classification. All described issues require deep and detailed analysis, because business process are the tool of achieving strategic company purposes. Only business processes unity in a well-balanced and integrated system allows organizations to manage their performance, adopt to customers' needs and achieve their own short- and long-term goals.

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