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Business processes optimization in e-commerce

Abdul-Azalova Makhina Yashnarovna

Computer Engineering department, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi (TUIT), Tashkent, Uzbekistan

ABSTRACT: Today, the issue of optimizing business processes in e-commerce is actual. This article proposes the use of blockchain technology to solve this issue. Block chain is a technology of distributed data storage that contains information about all transactions of system participants in the form of a “block chain”. Block chain offers a way to reliably execute processes, ensures stable operation, eliminate the possibility of duplication of information, and reduce costs. Promising technology is rapidly gaining popularity and is being implemented in various fields, including in the management of business processes. However, despite the fact that block chain technology appeared several years ago, many company executives are still not familiar with it due to the small amount of information available and while block chain technology in the infrastructure of the enterprise has not found wide application. Therefore, the issue of introducing block chain technology for managing business processes remains relevant, because it is impossible not to note the significant advantages of this technology in improving business efficiency. Thus, this article will discuss the main features of using block chain technology in business process management. The main advantages of introducing the technology and its shortcomings are also given, problems that business leaders may encounter are considered. In addition, important aspects of using block chain technology in business process management are analyzed.

KEYWORDS*:* blockchain, business process structure, business process management

I. INTRODUCTION

Business Process Management (BPM) is associated with the design, implementation, monitoring and improvement of business processes. Process support systems are widely used by companies to optimize and automate internal organizational process. However, with the emergence of inter-organizational processes, a number of problems rise , associated primarily with joint design and the lack of mutual trust. The block chain technology that appeared not so long ago can radically change the environment in which processes can operate. Block chain offers a way to reliably execute processes.

In process management, the type of activity characterizes the direction of the business in which the enterprise operates. For example, what activities does the bank carry out? If credit, then it is commercial, and if it provides services in trading financial instruments - investment. A process is one of the ways to carry out activities; it is always associated with the processing of some material orin formation object,which is fed to the input and after the conversion forms the output. The result of process execution must be individually identifying - by direct and calculable, whereas the result of the activity may be not with the chi tang. For example, we can accurately answer the question - how many brand - reports released this week, but is unable to determine how many marketing activities carried out during the same period. [1]

If we consider the Processes and technology as an example, let artisan aims to perform a unique customer order. The result of his work will not be similar to previous orders, which is why some of his products become masterpieces, while others remain crafts. The technologist brings to the manufacture a recipe or method that guarantees reproducibility of the result. If the organization produces goods, then it wants all products manufactured by technology to be identical. To do this, it requires workers to do their work in a certain standard way. If the organization provides services, it expects the product to be manufactured to meet regulatory requirements. To do this, it requires employees to perform work in accordance with certain regulations.

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II. LITERATURE REVIEW

Business Process Management (BPM) is associated with the design, implementation, monitoring and improvement of business processes. Process support systems are widely used by companies to optimize and automate internal organizational process. However, with the emergence of inter-organizational processes, a number of problems rise, associated primarily with joint design and the lack of mutual trust. The block chain technology that appeared not so long ago can radically change the environment in which processes can operate. Block chain offers a way to reliably execute processes.[2]

According to A. Osterwalder, the concepts of "business process model", "business model" and "strategic planning" should not be confused. Although all three solve similar problem, they show a different level of abstraction in achieving the goals of the enterprise. In his opinion, the activities of the enterprise should be considered at three levels:

1. Strategic planning in market conditions - determines the goals of the enterprise, its mission and values that the company is able to offer its customers.

2. Business model - describes the ways to achieve the goal of the enterprise by monetizing the value that is defined at the top level;

Business process model - determines the implementation of the business model developed above and describes the organizational and economic relations existing between the employees of the enterprise. The object of this study is business processes that reflect stable organizational and economic relations rising in enterprises that implement process

management using SMS. The term business process today has a broad interpretation, so it becomes necessary to clarify this concept, to classify business processes, which will clarify the direction of the study.

Number of possible definitions of the term business process expand - indicates, they are based on different, often mutually contradictory concepts. Let us analyze the well-known definitions of the concept of a business process. For example, the process is:

1. "The totality of various types of activities in which one or more types of resources are used "at the entrance", and as a result of this activity,"products"are created that are of value to the consumer at the exit" (M. Hammer, J.Champi);

2. "Any kind of activity in the organization's work" (E. Deming);

3. "The totality of interconnected resources and activities that transforms input elements into output";

4. "A stable, focused set of interrelated activities that, according to a certain technology, converts inputs to outputs according to certain rules using certain mechanisms."

5. "Many internal steps(types) of activity, starting with one or more inputs and ending with the creation of products necessary for the client (just a client or a process that takes place in the external environment of the company) and satisfying it in terms of cost,durability,service and quality"(E.
G. Oykhman, E.V. Popov);

6. "A set of logically interconnected actions performed to achieve a certain exit of business activity" (T. Davenport, J. Short);

7. "A set of dynamically coordinated, jointly executed, transactional actions that provide value to customers" (H. Smith and P.Fingar).

8. "Structured finite set of actions will design for the production of specific services to specific customer or market" (T.Davenport);

9. "A specifically ordered set of works, tasks in time and space, indicating the beginning and end of the exact definition of inputs and outputs" (T.Davenport);

10. "A structured, measurable set of actions created to produce a specific exit for a particular client or market" (T. Davenport);

11. "An entity defined through entry and exit points, interfaces and organizational devices, partially including devices of a consumer of services / goods, in which there is an increase in the cost of the service/product"(M.Porter);

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12. “A logical series of interdependent actions that use the resources of an enterprise to create or obtain, in the foreseeable or measurably predictable future,a customer-friendly wayout, such as a product or service” (E. Z.Zinder);

13. “An action that translates the input of a system object into an output” (S. P.Nikanorov);

1 4. “The horizontal hierarchy of internal and interdependent functional actions, the ultimate goal of whichis the production of products or its individual components” (Vernikov);

15. "Structured sequential execution of functional - governmental operations that bring specific results" (Tele Management Forum).

Note that some authors define the concept of a business process through the term activity, and others through the terms work or operation, for example, definition 13 uses the term activity, definitions 4-5 are used both, finally, definitions 5-14 are based on the term operation or action. We state that most definitions don’t separate the concepts of activity and work; sustainability refers repeatable action (although regularity does not guarantee reproducibility - result); they talk about the transformation of inputs into outputs (although not every process work is associated with conversion); mention the created value for the consumer (although auxiliary processes do not create value for the customer). This makes it necessary to redefine the term in Processes or activities? The concepts of “process” and “activity” are lexically identical, which leads to confusion and recursive definitions. Let us compare the definition of E. Deming that has become classic - “a process is any kind of activity in the organization’s work” and, taken from the explanatory dictionary, the definition of the term “activity is a process of active interaction of the subject with the world, during which the subject satisfies any of his needs”. There is recursion - the term "process" is defined through the concept of "activity", and the term activity is through a process. We draw attention to the fact that the term business is broadly interpreted as “activity in general, and not only economic, but also business life, business circles, and entrepreneurship.” The circle is finally closed.

III. RESEARCHMETHODOLOGY

A business process is a technology for achieving a planned result. Technology in the broad sense refers to the totality of methods, processes ,tools and materials used in any industry, as well as a scientific description of the methods of technical production. Technology "in the narrow sense, it is a set of organizational measures, operations and techniques aimed at the manufacture, maintenance, repair and / or operation of a product with nominal quality and optimal costs, and due to the current level of development of science, technology and society as a whole." For this, the technology offers to decompose the work into elementary components, to fix and regulate them. Thus, the requirement of reproducibility of the result determines the repeatability of the actions performed by employees, and not vice versa. Repeatability is a necessary but not sufficient condition. Incorrectly interpret the process as a sequence - repetitive work, because it does not guarantee reproducible results.[3]

A business process is a technology for the production of goods and services, in contrast to material production, they do not always have material embodiment. BU demassume that the reproducibility of the result is the most important criterion by which to distinguish the business processes of other activities. The term business process can be understood as a set of interrelated operations aimed at obtaining a reproducible and repeatable result. In this definition, emphasis is placed on the repeatability of the properties of the product of the process, rather than the indicators of the process, this simultaneously means that each instance of the result can be uniquely identified, and the number of products obtained over a certain time interval can be calculated.

Process and design ways of organizing work defines the project as a unique set of processes, consisting of coordinated and managed tasks with start and finish dates, undertaken to achieve. It turns out that the project consists of a process, but this is not so. The project - a set of works related to the achievement of the Tentative - bathroom target which has a unique character. The uniqueness of the goal means that the subject may initially have a fuzzy idea of the intended result and how to achieve it, therefore, careful preliminary planning is required. If the method of performing the work included in the project has proved to be effective, the organization may try to repeat these steps in order to start reproducing the result. The project smoothly turns into a process, and not vice versa. The confusion of the concepts of project and process is unacceptable. They often talk about the project approach, but they mean the process one. For example, enterprises that seek to reduce their costs want to perform work in a uniform, optimal way, rather than looking for the right solution every time. The proposed definition allows us to clearly separate the project and the process, using reproducibility of the result as a criterion. The above gives reason to talk about the existence of significant similarities between technological and business processes, both describe a sequence of operations that transform the input into a result with specified characteristics, so non-industrial companies that seek to implement

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production-specific methods of organization for industry can rely on achievement of high production indicators of productivity and labor efficiency.[4]

At the same time, business processes have a number of features that should be considered when moving to process management. The order of execution of operations of a business process is not linear; it contains complex control transfer logic, including returning for reprocessing or overtaking forward transitions, by passing some operations.

The logic of decision making in a business process is difficult to formalize since often contains conflicting criteria, includes handling exceptions and non-standard situations. The business process is cross-functional in nature, it describes the interaction of several structural units and is aimed at overcoming the disconnectedness of their work. The technological process, usually characterizes the activity of one, albeit a large production unit, it is more focused on the rhythm of work. The description of the technological process captures the sequence of operations performed by the participants transforming the entrance to the exit. Description of the business - the process further includes the organizational actions that route assignments. In the technological process, there is no complex organizational interaction aimed at coordinating the efforts of participants. The business processes of organizational interaction allow for organizational - practices used by the company.

Technological processes are usually much better formalized than business processes. Formalization of a business process does not mean that all tasks will be processed according to one technological process, as on a conveyor, but for each possible product, the processing scenario is well known and formalized in advance. A business process often changes following a change in the business environment, while changes in the process occur much less frequently.

Technological processes are usually classified according to the technology that they use. Business processes have a developed classification system, which should be considered in more detail.In addition to these differences, business processes are characterized by an extensive classification system, which should be considered when choosing a process for automation.

Processes of the company can be organized in different classification featured. It considers:

- Internal and inter-organizational processes;
- The main, auxiliary and supporting processes;
- End-to-end processes;
- Good and poorly formalized processes;
- Automated and automatic processes;
- Organizational processes and inter-organizational interaction;
- Internal organization processes describe the interaction carried out within the same organization. They are divided into main, auxiliary and management processes.

Inter-organizational processes are responsible for the interaction of several enterprises related to the tasks of a common business. This may be the interaction of the company with its client or cooperation partner. Such processes have increased complexity, because first you need to standardize the execution of work within each of the enterprises, and then move on to standardize their interaction.

Implementation of processes of inter-organizational interaction usually occurs in two stages. At the first stage, organizations “agree” on the format of the documents used in the exchange. At the second stage, they agree on the sequence of operations for sending these documents. To solve the first problem, organizations establish a common terminology for determining business concepts that are included in documents sent between trading partners. For example, the Rosetta Net Consortium, which unites more than 500 leading IT companies, has created the industry standard of the same name for B2B communications. Rosetta Net dictionaries establish a common terminology for defining business transactions between trading partners, products and services. On the basis of common dictionaries, electronic documents are built that are “understandable” to all participants in the exchange and can “electronically” interface with the corporate systems of each of the participants. To solve the second problem, organizations standardize the sequence of actions for the exchange of electronic documents.[5]

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The activities of any organization are aimed, first of all, at creating products or providing services that have real value for its external environment. The main process is aimed at achieving the main goal of the company; in the course of its implementation, a product or service that is valuable to the consumer is formed. Management processes - a set of individual types of activities aimed at maintaining the functioning and development of the organizational system in the interests of achieving its goals. These processes do not create a result that is valuable to the consumer, but without them the normal existence and development of the enterprise is impossible. Finally, the organization must purchase products and goods necessary for the core business, hire personnel, and carry out business operations. Support processes do not create the value of the product offered by the enterprise. They supply resources to all activities of the organization and ensure the operation of the main and auxiliary processes.[6]

Through process (end to end) or process scale enterprise LY Grigoriev and D.V. Kudryavtsev is called a business process, closed at the entrance and exit to the customer, executed by several functional units. Cross-cutting business processes permeate the entire organization, crossing the boundaries of many functional units. For example, a client contacted an organization for a product or service. He marked up the order in the customer department. Further, the order goes through various internal units. Economic service determines its value. The production department executes the order. Accounting records the payment. The expedition is responsible for delivery. Finally, again the customer department, which signs a document with the customer on the success of the provision of goods or services. In an organization where process control is implemented, the customer sees only the client department, and the entire internal kitchen for order execution is hidden from him in the “black box”. Cross-cutting processes seem to be monolithic, but in practice they often breakup into a network of interacting sub - processes. There are several reasons for dividing the end- to-end process into sub - processes. Firstly, it is desirable to identify reusable components, which will simplify the development and maintenance of the process system. Secondly, a model that does not fit on a standard sheet seems incomprehensible and complex, so analysts group operations into sub - processes. Good and poorly formalized processes. According to the degree of formalization, processes are divided into well and poorly structured. However, currently there are no generally accepted criteria for classifying business processes according to the degree of formalization, which makes it difficult to choose tools that can be recommended for automating a certain type of business processes. We offer criteria that will determine the degree of formalization of the business process: Select the next artist. In a formalized process, the next participant is known in advance and his choice is standardized. For example, with a product cost of up to 1000 rubles, an order is checked by an economist, and if its price is higher, then an employee with higher authority. If the choice of the contractor is not formalized, we can say that the contractor is not known in advance. Select the next operation. In a formalized process, the following operation is known in advance. But there are situations when the next action can be determined only after the previous one is completed.

For example, in legal activity, the choice of the continuation option is possible only after the completion of the current trial, and there are several alternatives for the continuation, the choice between which is ambiguous and cannot be formalized, therefore, each time an expert in the subject field.

Usually, a control object is associated with each process, for example, a document whose movement along the process determines the execution status. For example, a loan begins with filling out a document called an application ,its movement between the participants determines the course of consideration, the participants put their visa on the application. An application information object is formalized if it is divided into fields, each of them has a unique identifier name, allows you to store data of a certain type. Formalized documents are convenient for machine processing. But there are informal documents, for example, the same application can be described in simple written form without a template and special rules, so it’s clear where the customer is in the application and where the delivery address cannot be.

For well-formalized processes, where the next participant and his action are known in advance, and the document is formalized, SMS tools are most suitable. In another extreme situation, when the participant and his actions are unknown, and the document is not formalized, the means of collective work are best suited. The use of SMS systems for weakly and poorly formalized processes is possible, but in this case they will not fully reveal their potential and capabilities of SMS.

Business processes can be distinguished by the degree of human involvement in production activities. Automated processes occur with the participation of a person in the control loop. Automatic processes are carried out without his participation. The former is interactive; they are based on a two-way dialogue between the human executor and the

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central executing node, which perceives input of commands and data from the user during operation. The second are executed without human intervention, the machine does all the work. The differences are as follows: the operation of the machine is possible when the task is fully formalized, all the criteria for making a decision are precisely known. Moreover, each operation is considered to be a service. Having submitted the required data to the input, we are entitled to expect the expected result at the output. In an automated process, decisions may be less formalized. It is assumed that a person can make a decision using personal experience and skills. But this brings a certain subjectivity to the execution of the process, a person often performs work in accordance with personal views, interests or tastes, as a result, there is a variability in the execution of the process.

In the industrial sphere, the main processes are technological, they are automated using industrial automation tools that use specialized industrial IT systems. In industry, the implementation of IT occurs, most often, in auxiliary, servicing processes (procurement, warehouse, accounting), which do not contain production know-how, so companies are easier to agree to borrow other people's best practices. On the contrary, in the non-industrial sphere, the basic processes are often automated, so the question of copying other people's practices is much more complicated.[7]

The analysis allows us to conclude that there are no fundamental differences between technological and business processes, so non-industrial companies that strive to introduce production organization methods specific to industry can count on achieving high production indicators of productivity and labor efficiency. At the same time, business processes have a number of features that should be considered when moving to process management.

Business processes have a more complex execution logic, which will inevitably affect the costs of identifying, modeling and regulating these processes. This raises the question, to what extent are the methods for identifying, modelling and regulating models developed in relation to production processes applicable to automate business processes in an enterprise?

Technological processes are less focused on the description of the interaction of participants in the execution. In contrast, organizational interaction of participants of business - process is an essential component of achieving synergies from the coordination of their work. This poses the task of finding new methods for identifying and describing the organizational interaction of participants in the business process. Business processes are much more likely to change after changing business conditions than technological processes. If each change will lead to the need to modify models, the costs of their updating will be unacceptably large. The question arises of creating models that turn out to be invariant of at least part of the changes in the external environment.

Business processes have a more developed classification system, but the main factor that has a significant impact on the choice of automation tools is the degree of formalization of the business process. A set of criteria is proposed that allow you to determine the degree of formalization of a business process model, help you choose the most suitable automation tool. [8]

We define an information system based on processes (process aware) as a system in the design of which a business process model was used. For example, the implementation of most enterprise resource management systems (ERP) begins with process modeling, but can we say that these ERP systems were created to implement the process approach? In such a situation, modeling, as a rule, is performed once for the purpose of writing technical specifications, the scheme quickly loses relevance. It becomes difficult to change the process scheme once embedded in such a system.

Process-oriented systems (process oriented), organize the interaction of participants with each other and within formation systems in such a way that tasks, including information and documents, are transferred between participants (people and systems) in accordance with formalized procedural rules. This class should include workflow execution systems. Process- oriented systems play an active guiding role, determining the order and time of operations, and a person is subordinate, his participation is reduced to the execution of tasks.

Practice shows that the inconsistent activity of highly qualified specialists is less effective than the well-organized work of ordinary workers. The effect of coordination of interaction is manifested in the fact that the procedures are getting shorter, their implementation is less costly, and the

quality improves. Process-oriented systems are aimed at obtaining a synergistic effect from the coordinated actions of the organizational units of the company. We can say that process-oriented systems are created to implement the process approach.

A business process model is a formalized (graphical, tabular, textual, symbolic) description that reflects the actual or proposed activities of the enterprise. This is the template on the basis of which the system creates business process

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instances. Notation (modeling language) is a system of conventions adopted in models of a particular type. Thus, the model can be considered as a collection of symbols (belonging to the notation) that adequately describe the work that forms the process and the relationship between them. Researchers and software developers have long sought to create abstractions that help to develop information systems in terms of the goals of their project, rather than the computer environment used. At first, programming languages were created that hid the details of operating systems; now we are talking about developing business applications in terms of the concepts of the subject area. Thus, the developer is protected from the complexity of the computer environment, reduced the amount of manual labor for coding, debugging and transferring programs. Computer systems, the development of which is conducted in terms of subject area, which is subject to automation, called model oriented (model driven).

An executable model of a business process is a subject- oriented description of the participants in the process: people and machines, as well as the order and time they perform operations and actions, which can be used to automate the interaction of participants with each other and machines without additional coding and programming. The executable model describes the dynamics of the behavior of the organizational system. It can be assumed that it is significantly more complex and more voluminous than the business process diagram used to analytically describe the business process. An executable process model includes several projections (layers), each of which describes individual aspects of the organizational system, and together they describe the dynamics of its behavior. Model-oriented development of IT systems based on SMS The essence of model -oriented development of process-oriented systems is that directly from a visual, graphical model of a business process created in the industry standard BPMN notation for modeling business processes, executable program code is generated. Due to the fact that the visual model of the business process is taken, the center of gravity in the development moves from the programmer to the business analyst.

BPMN (Business Process Model and Notation) is a standard graphical representation of elements for describing business processes (BP) in BPM (Business Process Management) - process management. Traditionally, BPM is considered an internal organization system. In other words, large organizations create BPs to optimize management processes that are used internally. Sometimes BPs are used between two organizations when there is a high level of trust. BPs can be very, very large, do not fit in a monitor, paper, etc., consist of many sub processes, decision tables and much more. [9]

An example of a simple business process:

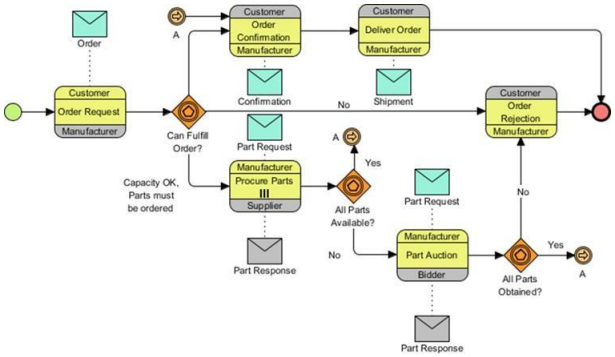

Fig. 1. A Simple business process

IV. RESULTS

After analyzing the above, come to conclusion that the algorithm block chain could find application in the optimization of business processes between organizations. In this case, organizations involved in the business process receive a reliable source of data that cannot be falsified; Analysts - the ability to create BP in a familiar way. [10]

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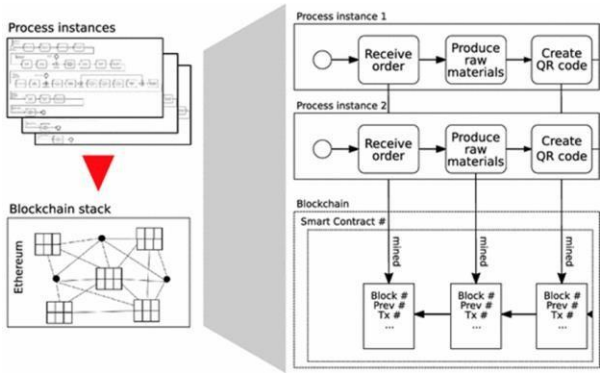

Fig. 2. BPMN

The block chain BP looks like this:

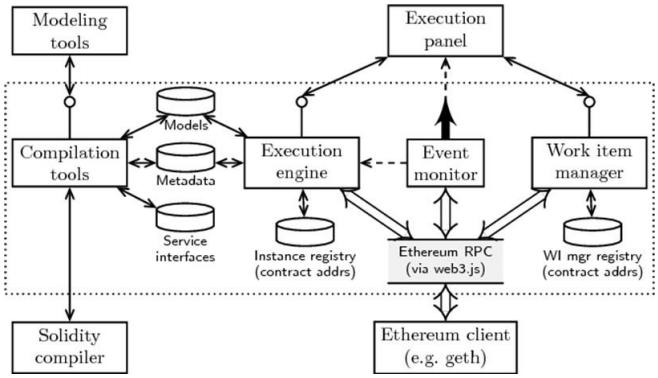

Fig. 3. Block chain BP

This approach will make it possible in the future, significantly optimizing - Rowan business processes. We would like to assume that one day all organizations (both large and medium) will interact in this way in order to reduce their costs and automate processes, while making them transparent.

V. CONCLUSION

Thus, the block chain technology for managing business processes combines a number of important advantages (reliability, stability and autonomy) and disadvantages (for example, resource consumption). At the same time, the block chain is applied at each stage of the BPM life cycle. Using block chain technology to manage business processes implies great opportunities. In the first place, greatly expanding interaction between different organizations, as cross- organizational processes using technology block chain mean safe and transparent cooperation. The ability to use smart contracts simplifies the transaction process by automatically fulfilling obligations. At different stages of the life cycle, the block chain solves pre-existing problems. In combination with existing technologies, blockchainis becoming an effective tool for managing business processes.

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