BUSINESS PROCESS MODEL DEVELOPMENT IN QUALITY IMPROVEMENT*

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Abstract: This paper emphasizes the importance of developing information systems aimed at improving quality of operations. It is presented the basic and most important steps which are the basis for the formation of information systems. An example which is illustrated in this paper refers to the modeling of business processes and relational databases. The importance of proper and documented business process model is reflected in the consistency of the flow of information, data models and activities and their clear perception. It can be considered that the present step is the basis for the further implementation of information technology. In line with this consideration, this paper aims to highlight the importance of the problem presented in the function of improving quality of operations. The presented methodological framework can be universally applied as a starting point for the design of information systems relating to the segment of building permits issuing.

Key Words: Business processes modeling, Information system development, Quality of business.

1. INTRODUCTION

Information system project is specific to each business system, or the project should be adapted to each business system. In process of projecting should be included all the important resources of enterprises, especially the leadership at all levels of management.

The first phase of the project implementation of the information system is a clear formulation of goals and tasks that it should meet. The objectives are usually set by top management that explicitly state what the new information system is, where it will be used and what resources are required for the project. Also then are defined the boundaries and limitations that must be taken into account in the implementation of the project.

Business process modeling is certainly one of the key segments in the design of information systems [1] - [5]. In this sense a large number of authors gave a theoretical contribution by analyzing this issue from different aspects:
- Identification of business processes and creation of information model by applying UML (Unified Modeling Language) [6]
- Computer simulation of business processes [7]
- Analysis of all aspects of business process modeling [8]
- Analysis of Action Patterns in the process of business processes modeling [9]
- The use of different methods of analysis in the process of business processes modeling [10]

Information system development requires the analysis of this issue from different aspects of science and technology: Systems Theory [11], modeling of business processes and data, as well as practical knowledge in programming languages [12], the theory of information systems [13], economy [14] and etc.

But the final result of the development of information systems is certainly a quality improvement of the entire business, which is reflected in all aspects of specified [15] - [20]. Improving the quality of business in this respect are related primarily to:
- A clear and transparent definition of the business processes
- Accurate documentation of the information flow
- Reducing and eliminating possible errors in them
- Facilitated business process reengineering
- Automation of information flow with the application of software solutions, etc.

In this paper an attempt is made to be on a practical case displayed the most important elements in the design of information systems as the ultimate aim to improve the quality of the overall business. Methodologically are illustrated the basic concepts and steps in the development of a segment of the information system, which refers to the function of issuing approvals for construction permits. The presented concepts and example allow universal use in the development of this segment of the information system and can be applied in a number of companies in the initial considerations in the development of information systems for this purpose.

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2. A BUSINESS PROCESS MODELING APPROACH

The function of issuing approvals for building permits is oriented to the outside, i.e., according to its users. In it are carried out processes and activities aimed to issue the approval of the company for the construction from different aspects.

The user requests approval. Based on this request goes to the city to determine the actual situation. If the allegations in the application are identical to the actual situation, brings the decision on approval. At the beginning is forming the subject - a file of requesting that after the issuance of the necessary solutions archives.

In this function are the following processes:
- processing requests approval
- the process of issuing the decision on approval

The processing of requests approval consists of the following activities:
- activity of receipt and filing of request
- billing activity of costs for application processing

The process of issuing the decision on compliance has the following activities:
- the activity of the actual condition
- billing activity costs for issuing the order
- activity of issuance solutions

![Figure 1. Context diagram for the function of issuing approvals for permits](image1)

In the process of claims processing, activities are carried of receiving the request and collection of costs. The entrance to this process constitute of the user’s request and a generic document - users payment. The output of this process is a document - account on the resolution of request, which specify the essential elements for the decision and gives a assessment at the end of the request, i.e., whether it is well founded, unfounded or request additional processing. The control is done via a generic documents - law, the decision of local governments and document - rule book. The mechanism consists of transport referent and officer.

In the process of the formation of solutions are implemented activities of forming a document - decision on approval. The entrance to this process becomes a document - account on the resolution of request, and the generic document - realized payment users for the costs of processing and issuance of solutions. The output from this process is a document - decision on the approval. Control is performed via the document - rule book. The mechanism consists of transport referent and officer. Referent of traffic determines the professional and technical elements for the decision while the official performs duties of administrative and technical nature.

![Figure 2. Decomposition diagram for the function of issuing approvals for permits](image2)
Activity - receipt of requests, is a collection of procedures and steps that are used for the receipt of requests from users. The entrance to the activity is a document - user request. Output is completed requirement. The control is done via generic documents - laws. The mechanism makes the officer at the reception and request.

Activity - collection of payments, is a collection of procedures and steps that are billed to the customer due to the cost of processing and issuance of solutions. The entrance to this activity makes the generic payments and user request for consent on a basis of a seduction of a direct payment or billing. The output of this activity is the - account of the resolution of request, which represents a written evidence that administrative procedures are carried out. The control is done via generic documents - laws, decisions of local government as via document - rule book. The mechanism makes traffic referent.

Activity - determining the condition, is a set of procedures and steps which determine the facts in relation to the requirements of users for approval. The entrance to this activity makes an order for the the resolution of request. Output makes generic background information that is forwarded to activities - Issuance of Certificate. Control is performed via the document - rule book. The mechanism makes traffic referent.

Activity - charges for the solution, is a set of procedures and steps that are being billed for cost of issuing the final decision. The entrance to this activity makes the generic payments. Output makes receipt. Control is performed via the document - rule book. The mechanism makes Administrative Officer.

Activity - issuance of solution, is a collection of procedures and steps which finally form approvals. The entrance to this activity makes receipts and generic information about the state of the elements. Output makes - a solution. Control is performed via the document - rule book. The mechanism makes Administrative Officer.

3. MODEL OF RELATIONAL DATABASE

The tables that appear in the relational model for this function are presented in Figure 5:
- USER_REQUIREMENTS
- SOLUTION
- REQUIREMENTS/PAYMENT
- PAYMENT BY SOLUTIONS
- PHOTOS

Tables of codebooks are: USER_REQUIREMENTS. Other tables maintain information about the documents that are in this position.

The independent entity is USER_REQUIREMENTS. Dependent entities are: SOLUTION, PAYMENT BY SOLUTIONS, PHOTOS. Derivative entity is REQUIREMENTS/PAYMENT.

All independent entities are candidates for the codebook table in the database. Dependent entities are candidates for table documents. Derivative entities are potential candidates for database tables.

Table USER_REQUIREMENTS is a starting table for the physical design of the database in which are specified user requirements for the approval of the building permit. This is a basic table where there is a relation of 1: 1 between the record and the actual request. Each request is uniquely identified via its ID number. The structure of the physical table is a copied from logical model.
REQUIREMENTS/PAYMENT table is a table that keeps all payments relating to an individual user request. When submitting the request by the user, the user is required to make the payment due to the cost of processing requests. Each payment are clearly identified by their ID number with a foreign key in the table attached to the primary key from the table USER_REQUIREMENTS. This is because the user can make multiple payments.

SOLUTION table is a table in which are recorded all the issued decisions, whether they are resolved positively or negatively. Also here every solution uniquely is identified by its ID number, and the relationship with the table USER_REQUIREMENTS made via an external key in this table.

PHOTOS table is a table that is used to store all the photos taken in the process of solving the user’s request. Photos are generated by the officers and they relating to the actual state of the essential elements that influence the adoption of a positive or negative decision. Each photo has its own ID number, and the path to the actual location of the photos on a hard drive or system. Connection of the table solution is achieved an external key in this table.

Table PAYMENT BY SOLUTIONS is a table where the registered users on the basis of payment of the decisions, whether that they were resolved positively or negatively. According to the structure is the same as REQUIREMENTS/PAYMENT. Each payment has its own unique ID number, except that the connection to the table solutions achieved through external key in this table.

4. DISCUSSION

Recording situation is aimed to create a general picture of the system, through looking at its organizational structure, activities, processes that occur in a real system, documentation as well as other information.

Recording depends on several factors, namely:
- The size and complexity of the organization itself
- Experience and knowledge of the organization of the team members
- Goals and objectives of the new system

The analyst personally has to set boundaries of system recording, depending on the size of the real system, complexity, production process, the internal structure of organizational culture, business goals, etc.

By introduction to the methods and procedures enables the consideration of the functioning of the real system. Under the method means the execution of an operation and the sub-procedure means a collection of steps which performs some work.

Within the system recording of business activities it should be noted which operations are represented and which are size. Volume of operations defines the limits of activities. It should be noted groups of jobs and make their grouping by generalizing of the core business.

It is necessary also shall be familiar with the system of codes. What is seen is the name of a code, where it is used code, the number of characters in the code and number of elements that are coded.
The requirements in the future are important because it is needed in the project information system to incorporate the possibility of extension, so that it can respond to the changes that occur in real system and reflects the working environment and internal changes.

In the phase of recording we come to data representing the basic elements of the information system, and then performs its analysis. In the stage of the analysis is done analysis and documentation of all the data involved in an area. So, analysis means extract of all necessary elements that will participate in the further development of the information system. It consists of two different types of elements such as data and methods, procedures and activities. The data are the basis for the formation of data model procedures, processes and activities starting point for the formation of process models and their grouping in functions.

In this phase is making formalization of the perceived situation by certain methods, techniques and tools. They are formed primarily graphical representations of elements and relationships that have been established at the stage of recording. These graphical elements can be various charts, tables, matrices.

The output of the analysis phase are, in addition to formalized listing of all the essential elements of the business, and also the guidelines for further development of the project in which are indicated the main points of interest, the critical points, etc.

Model of processes is the output of the analysis phase of the system. After the recording phase leads to the analysis phase of that can simultaneously performed on two tracks - process modeling and data modeling. A model of process is very important because it means an understanding of the performance of all functions and the associated process and that is important both for the simultaneous acquisition of data models, as well as to optimize the development of the process by removing redundant processes and activities, documents, etc. In addition at the exit from this phase receives a very important information formalized in the project documentation of information system that can serve as a basis for future changing of business activities.

In the design phase is performed modeling process and modeling of data from the data or formalized presentation from the analysis phase.

By grouping the recorded procedures and steps are formed activities, by grouping activities are forming processes and by grouping process forming the functions of a business system which will be made information system design. Such grouping is performed because it is based solely on the performance of the core activities and that actions are not tied to specific organizational units that are subject to change. It should be noted that the functions or subordinated actions are subject to changes over time, but not much. Changes in functions take place primarily at the level of data or the structure and quantity but not the very processes that are executed over the data.

In the modeling process it is necessary to set the limits of the system, which are reflected in the choice of procedures, activities, processes and functions of which will be designed information system. It should also be exempted redundant processes or summarize them in a single process (this also applies to the activities and procedures and processes).

The second stage is an analysis of the current real system with all elements (of the real system environment, the existing information systems, etc.). The next stage is the stage of design. It can be divided into two sub-phases sub-phases of logic design and physical design of sub-phases. The last phase is the introduction and development of information systems.

The phase of implementation and development of information system is the next. The initial step in this phase is to make the programming task to create software and databases on a particular system for managing databases. Thereafter, the access to the realization of software and databases. After creating application modules is accessed testing the entire system. The observed errors are eliminated. If the project is very complex it can be to draw up a prototype on which will test the critical data processing variants. After successful testing information system shall be submitted for use. Any system, including information systems, is subject to the demands for change so that the circumstances of the use of information system require continuous improvement of the existing information system.

5. CONCLUSION

The subject of this study was the analysis of business activities that the company carries out on a daily basis, in order to remove redundancy in the processes and data services in order to consolidate the company so as to prevent data inconsistencies and incorrect execution of the process, what is needed for the successful management of business activities, as consolidate business activities in an integrated information system.

The above questions are the generator of choice of the research subject. The research topic is the issue regarding obtaining information at the right time in the right place with the facilitation of decision-making especially in the obscure and risky conditions.

The specific objective is the creation and analysis of business process models as an integral part of the company information system that will enable the integration of the company's business activities and improve the quality of operations at all levels. In this sense it is necessary to emphasize the importance of observing and supporting the goals of the company as a whole and not individual goals of individual organizational units. In addition, the task is to implement the process of drafting the initial project information system which will be, depending on the needs and opportunities, develop and expand.
However, the mere existence of information system is not a guarantee of a successful information management, because, as already mentioned above, the conditions are such that they produce large amounts of information. Therefore, the existing information system to be installed colloquially put a mechanism that will allow the analyst to obtain relevant information. The importance of information is an variable category in terms of time, because at some point of information may be of importance in the next moment it becomes irrelevant because the need for it is in line with the context of the decision. Also, the value of information depends on the relationship between information and other information, such as it has another meaning in the context of relations with the other information different meaning in another context.

The development of a consistent information system represents a significant improvement of the quality of business in this respect, allowing for a clear and transparent definition of the business processes and information flow, as well as the automation of information flow with the application of software solutions. An example displayed in this paper is aimed to illustrate the methodology most important concepts of one segment of the information system which allows universal application in this segment.

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REFERENCE