

Modelling and Managing Information Exchange Through DFDs Under Conditions of Organizational Change

Ivaylo Stoyanov¹

Abstract Throughout the world business is undergoing apparent changes. To a great extent this is due to the advanced approaches, methods and techniques for managing the business processes and under conditions of organizational change some of the priorities in this sphere are associated with their modeling. From this point of view, it is possible to integrate different techniques for designing business processes, including those referring to the data flow, i.e. Data Flow Diagrams (DFD). Thus, the aim of the publication is to present the possibilities for modeling and managing the information exchange under conditions of organizational change.

Keywords – business processes, organizational change, modeling, management.

JEL: M1; M21

I. INTRODUCTION

Over the last years the information technologies have been used more and more widely in the corporate practice of contemporary organizations [2,3]. The former are attempting to implement advanced instruments for modeling and managing of business processes. One of these instruments is connected to data flow, i.e. DFD (*Data Flow Diagram*). This is a modern methodology for structural description of information circulating in organizations and their business environment. Information exchange modeling is one of the main methods for determining the systems behavior. Initiatives for transforming the systems from one state into another are undertaken through symbol diagrams. This is an important element of organizational change because the system elements are visualized through information flow which reveals their current state.

Each of the system entities integrates in itself a different data flow which is analyzed according to its input-output parameters. What is more, the interaction of the separate processes is diagnosed. From a conceptual point of view, the DFD model involves three forms of business process modeling and management [1,2,4].

In addition to the diagrams describing the data flow, the diagrams for modeling the entities and the arising relationships, i.e. ERD (*Entity-Relationships Diagram*), are also important.

STDs (*State Transition Diagrams*) for modeling the behavior of the systems are key factors as well. They are used for the logical interpretation of data and the visualization of the entities that are subject to change.

II. THESIS

The processes of information exchange modeling and management under conditions of organizational change are characterized by certain requirements. The main ones are as follows:(Fig. 1) [4,5,6]:

- particular entity;
- process;
- data flow ;
- data store.

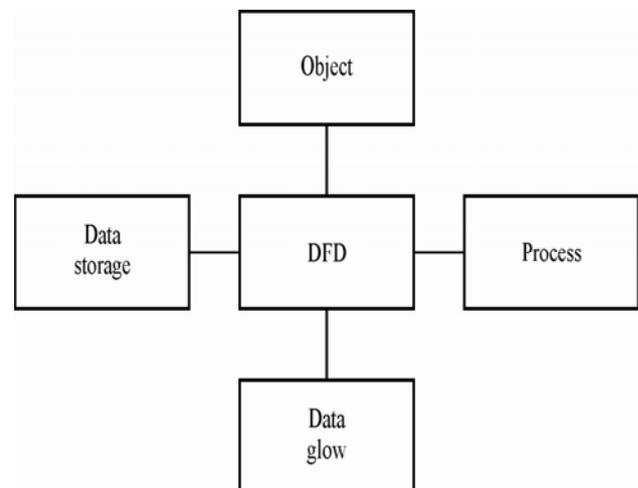


Fig. 1. Requirements for modeling and management information exchange to organizational change

The specificity of the outlined requirements for modeling and management of data exchange during organizational change can be interpreted in the following manner [4,5,6]:

¹ Ivaylo Stoyanov, Ph. D., “D. A. Tsenov” of Economics – Svishitov, Bulgaria

1. Particular entity

This is a source or matter outside the system boundaries (the studied entity) and its inner architecture. These components could be viewed as beneficiaries or recipients of the information. Their interrelation is shown in Fig. 2.



Fig. 2. The relationship between beneficiary and recipient of information

2. Process

The process presents the relation between the data flow and the sources for its management, i.e. the process forms a chain along which information circulates. Processes are grouped according to their characteristics and the manner of their occurrence. In the DFD methodology, they play the role of a catalyst which transforms the input information into an output equivalent. What is more, the separate processes should be clearly delineated. They are defined on three levels, thus there are top, middle and low-level processes. The outlined classification is arbitrary and its purpose is to grade the symbols in the process of changing business processes.

The first level is associated with the fact that each operation in the process requires a code differentiating it from the other operations along the chain. The particular code (cipher) is always positioned in the left part of the entity diagram (see Fig. 3). The acronym which determines its type is positioned on the right. This is the method for defining whether the diagram (and the information it contains) is formed on the basis of a common algorithm (interrelation of the system with the environment), a flow of data (data exchange in and outside the system), or there is a description of the processes (when there is lack of data flow). The second level contains a description of the nature of the process. It is important to provide details about its characteristics and also to determine the aspects of its application in the organization. The third level identifies the subject of management. This subject can include specific people (specialists) or the organization's structural units. The interrelations of the three levels are shown in Fig. 3.

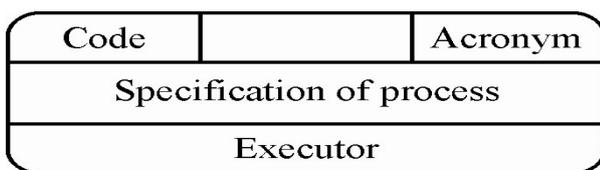


Fig. 3. Relationship between levels of identify processes

For example: Code: № 1

Acronym: Diagram to modeling data flow (DMDF); Diagram for complex modeling of information exchange (DCIE); Logical diagram to describing the processes for modeling to information exchange (LDDMIE).

Specification of process: Making the management decisions

Executor: Senior management

3. Data flow (flow of data)

It is possible to follow the typology of the information exchange on the basis of the particular entity. This process is based on a certain model for structuring and analysis of the data flow. The latter is a manifestation of the information which is transferred from the source to the signal receiver, which is the system to be modeled, in a direction determined by the two parties. The data flow within organizations has a discrete nature (it is transferred electronically; it is a particular signal; etc.) but its visualization is achieved through lines and arrows. They reveal the direction of the data flow in the entity. Each data flow has a specific number and label which denote the operation (or operations) in the system for a certain period of time. The operations can occur separately or in parallel to each other. The diagram shown in Fig.3 presents a model for taking managerial decisions under conditions of organizational change. This is done by the introduction of an automated system for information management.

Some external consultants are the source of information and they are responsible for realizing the change. The receiver of the information is the executive management of the organization who have also initiated the change. The information fed into the system is processed automatically and the obtained data is then checked. The DFD diagram is also used to determine the authenticity of the data. If the information does not correspond to the organizational change, the reasons, which have възпрепятствовали the process, are diagnosed. Thus, the executive management of the organization has two options.

First, they can correct the information along the chain and determine at which stage of the process there are deviations. Second, they can refuse to use the available information and require a new processing. When the information matches the objectives of the change, the next stage is associated with its effective application. This process can be presented in the following manner (Fig. 4):

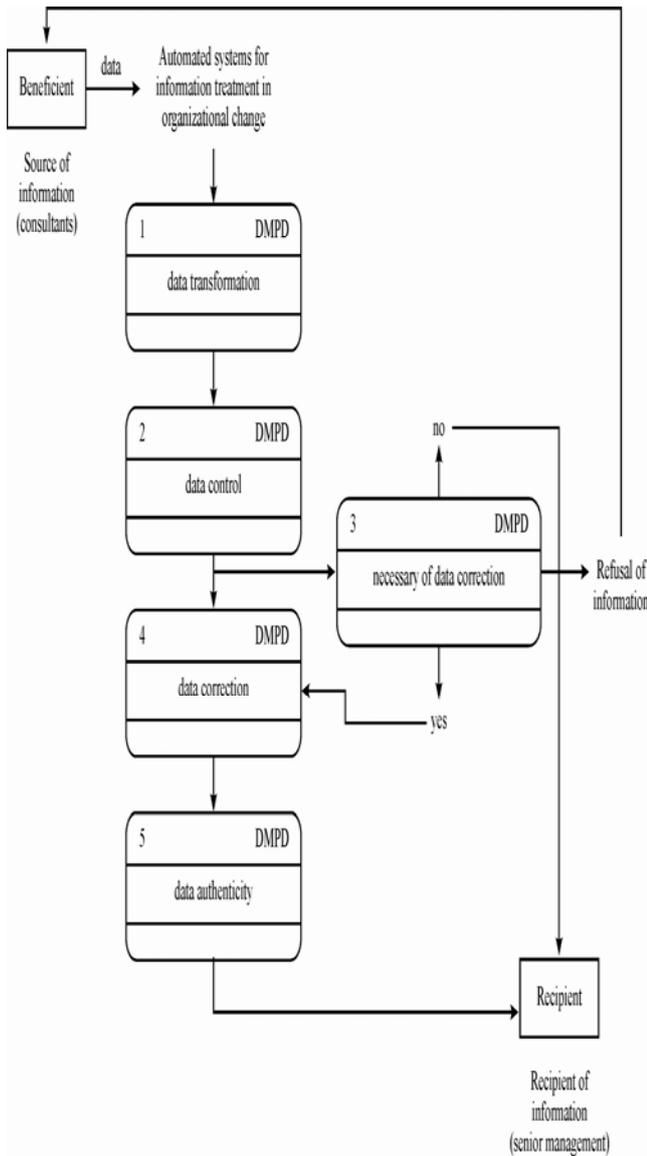


Fig. 4. Diagram of the stages which the data flow in decision making through automation the processes

4. Data store

This element of the DFD methodology allows determining what the condition of data is during the fulfillment of change and on this basis to secure the safety of its storage. The data identifier is a device which integrates it in a special directory. The information is available for use at any time while data is subdivided into separate categories. They can be found with the help of the acronym and the file of the particular diagram. During the graphical visualization of the process they are positioned in the left part of the diagram (Fig. 5a). When it is necessary to scan a bigger amount of information (or to copy similar information), the numbering is written under the acronym and the identifier (Fig. 5b).

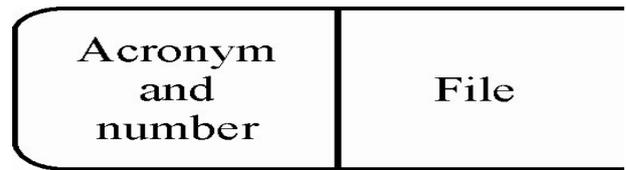


Fig. 5a. Acronym and number of file

For example: DB – data base; DB7 – data base number seven

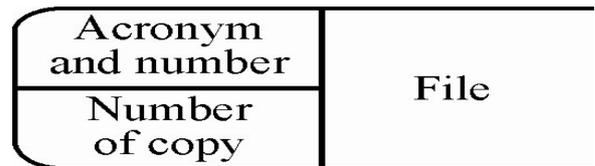


Fig. 5b. Acronym and number of file through scan or copy designation

For example: DB7 – data base number seven; № 23 – number of copy

In the DFD methodology the diagrams for the data modeling and the arising relationships – ERDs (Entity-Relationships Diagrams), are also an important instrument when organizational processes are being changed. The application of these diagrams is aimed at presenting the logical sequence of the data or the business processes. The scheme is as follows (Fig. 6):

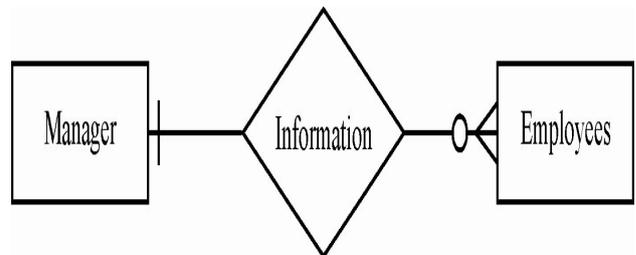


Fig. 6. Components of the charts presentation of the data in DFD methodology

A similar type of data flow modeling and managing under organizational change has a complex character for the visualization of data. It is considered to be universal since the ERDs can present any type of information and also make sure that the processes that have appeared as a result of its application are analyzed. The object of the ERD modeling can be presented as a process encompassing various activities which are directly related to each other.

As part of the DFD methodology, the state transition diagrams (STDs) are also an important element of the planned changes. They determine the behavior of the system and its equilibrium when there is a transformation of the separate entities that are due to be changed. These diagrams include two components – *a state and a transition* (Fig.7).

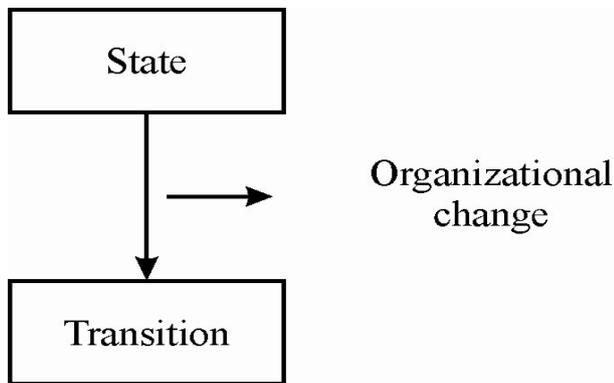


Fig. 7. State and transition of the system

The state of the system reveals its current development for a particular period of time. The input information allows the accumulation of data for diagnosing the problem areas of the process (processes) which slow down the development of the system. The State Transition Diagrams (STDs) secure the precise diagnosis of the system and therefore make sure the right measures for balancing the system's equilibrium are taken. The transition is a phase during which the system, which has been modeled, is transformed from one state to another. The new state is considered to be optimal under the particular conditions. The State Transition Diagrams (STDs) can also facilitate the study of the causes leading to the systems transition.

IV. CONCLUSIONS

Modeling and managing data flow through DFD during organizational change is a complex and responsible activity. In order to be effective, it has to meet certain requirements and adhere to particular rules. To a great extent, these rules are related to the sequential flow of data through the system and depend on the determining the system's behavior. Thus, the integration of the DFD methodology in the organizational change is a prerequisite for the rational modeling of the information processes, on one hand, and their effective managing, on the other hand. The DFDs are designed to scan the objects that are external to the organization as well as these that in its inner architecture. The DFDs are used to determine the logical sequence of the processes and their design. They

also present the elements of the system and the movement of the information flow. What is more, they allow for the secure storage of data.

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