INFORMATION PROCESS REENGINEERING: WHERE TO START BUSINESS AND HOW TO DECIDE?

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ABSTRACT

Organizations periodically start their information system reengineering projects because they start new business, want to replace an old information system with modern information technology or support their business strategy. Some organizations start with business process reengineering projects and then upgrade it with information system reengineering projects. Others start with information system strategic planning project or combinations. Several organizations do not use any of the listed approaches. Thus managers usually ask IT experts: Which approach is the best for their organizations? How do they decide on the right way of information system development? Answers are often very confused or at least not simple enough to be practical. This article tries to answer some of the questions with a focus on successful early decisions about information system reengineering.

Keywords: Business Processes Reengineering, Information Processes Reengineering, Strategic Planning for Information Systems, Information Systems Development

INTRODUCTION

Projects of business information systems reengineering are a common business practice in contemporary companies and are based on the assumption that information systems can be both bought on the market as well as replaced. Such assumptions are very misleading, because information systems cannot be bought on the market. Only certain components can be bought, leased or developed by ourselves, e.g., hardware, software, end-user computer applications, databases and services regarding their implementation—like, for instance, installation, testing, education, data transcription, advisory services, organisation, etc. Often, new users of the information system are being employed as well as different IT experts. Still, the fact is that an information system is set up in a company within the implementation project, when individual parts of the information system have to be incorporated into the everyday business operations of the company. What is needed is individualization of the components of IT with regard to the needs of the company. Thus the information system is a synthesis of all components, especially data, users and business processes of an organisation.

Adapting the information system to the business needs of a company is never a finite process; thus informatization has to be looked at as a dynamic, gradual process and not as a process of periodical transitions from the old to the new information system. The inappropriateness of the concept of information system replacement, recognised by many companies and authors can be summarised as follows [5, 7]:

- The replacement of complete hardware and software does not represent the replacement of the whole information system, as this is understood in a wider context as a part of the company. As all parts of the information system are never replaced, the informatization of the company is gradual and thus we can only speak about the partial replacement of the system.
- The company can choose from among suitable computer applications available on the market, but it cannot replace its data. It can stop monitoring certain data or, on the other hand, start monitoring new data, but it cannot replace past data about its business activities.
- The company can only replace a part of its workforce—users of the information system, whereas the majority of users usually remain the same.
- Contemporary computer solutions have integrated support for business processes and frequently carry out parts of business processes. As they are not easily replaced, it is sensible that they are gradually modernised or only partly replaced.
- Companies also co-operate with their environment; thus the system change would lead to additional workload and would lead to business problems.

Contemporary approaches to informatization should thus be based on the reengineering and not on the replacement of the information system, which stems

from the following findings revealed by many companies and authors [3]:

- With the replacement of a part of computer hardware and system software, a partial or integrated upgrade of computer infrastructure is being carried out in the company.
- The renewal of end-user computer applications can be based on the replacement of some applications or on implementing changes or upgrading the existing applications. The goal set by the company is to ensure future business operations.
- The renewal of information system means that a company's important business information remain untouched. Past data can be archived in ordinary archives or, even better, in data warehouses. Past data can also be partly or entirely entered into the reengineered information system.
- The key success factor of the reengineered information system is user education. Users should not only be trained to be able to use the new information system, but are also given the up-to-date knowledge from the field of their profession and used information technology.
- The most important success factor is information support for the reengineered business processes, which makes successful business operations of the company possible and also supports its strategic goals [1].

KEY ISSUES IN DECIDING WHERE TO BEGIN BUSINESS AND INFORMATION PROCESS REENGINEERING

Business processes in many organisations are poorly organised, tasks are carried out too slowly, customers are dissatisfied, and the expenses for the implementation of business processes are high. The reasons for such a situation lie not only in the information system or poor work of the employees, but, most often, in the poor organisation of business processes. Thus managers often decide for the renewal of business processes by upgrading them with a suitable computer support. Once this decision has been taken, the majority of current information projects are terminated until decisions are taken about how business processes will be carried out in the future. Many companies make decisions for the business processes reengineering after the introduction of new computer applications or during the project of their implementation. Of course, business loss increases in this case as a lot of money and efforts have been invested for the implementation of the information project that was not properly

planned. Both cases of company informatization share the common decision that business processes should be reengineered before the informatization starts.

In companies where the company's strategic directions and the consequent information strategies are not clearly defined, projects are started in a completely different way. On the market, such a situation is likely to lead to the eventual loss of customers and lagging behind the competition with regard to business activities and development. Thus managers are likely o decide to define their company's strategic directions first and build up-to-date information technology in their implementation. Such an approach requires the implementation of the project of strategic information system planning, most often for the period of 3 to 5 years [2].

Both approaches (reengineering of business and information processes and strategic information system planning) make the informatization of company's business activities possible. Both approaches deal with business and informatization processes. The result of both approaches is the renewed information system of the company. But there are large differences between the two approaches, which have a substantial influence on the long-term effectiveness of a company's informatization and business activities.

The approach in business and informatization process reengineering is »centre outward«, whereas the strategic information system planning approach is »top down«. With regard to the past research, both approaches are extremely well connected and supplemented. Thus managers rarely decide on which approach to use, but more often take into consideration the time schedule for the implementation of both approaches [4].

A company usually becomes aware of the problems regarding the implementation of business processes. In such circumstances managers usually decide for the adaptation of the existing business and information processes according to the changed business needs. Timely and correct measures taken by the managers are the key success factor in making early decisions about the renewal of information system in the company. They have to be aware that

- Radical changes regarding business and information processes are needed as well as a global analysis of the suitability of the existing business and information processes in accordance with the changed business

requirements, together with the analysis of the strategic position of the company on the market.

- If a substantial reengineering of business and information processes is needed in order to solve the analysed problems, it is sensible to carry out strategic information system planning first or simultaneously.
- The most efficient decision made by the managers will unite approaches, i.e., strategic information system planning and business and information processes reengineering.

In order to increase the effectiveness of early decision making regarding the reengineering of the information system of the company, we have to understand the key differences between the two approaches. The emphasis should be placed on the initial phases of the implementation of such projects,

by stressing the importance of decisions made with regard to the chosen approach and the order of their implementation, i.e., whether they should be carried out simultaneously, successively or with a time lag.

BUSINESS PROCESS REENGINEERING

Business processes reengineering is usually started with the analysis of the existing business processes, both from the economic point of view (value chain analysis) and in the sense of operational implementation of business processes. The analysis is rather detailed because of owners, service providers, key activities, documents and different implementations of the existing business process. A typical case of such analysis is shown in Figure 1, where the business process for orders is shown [2].
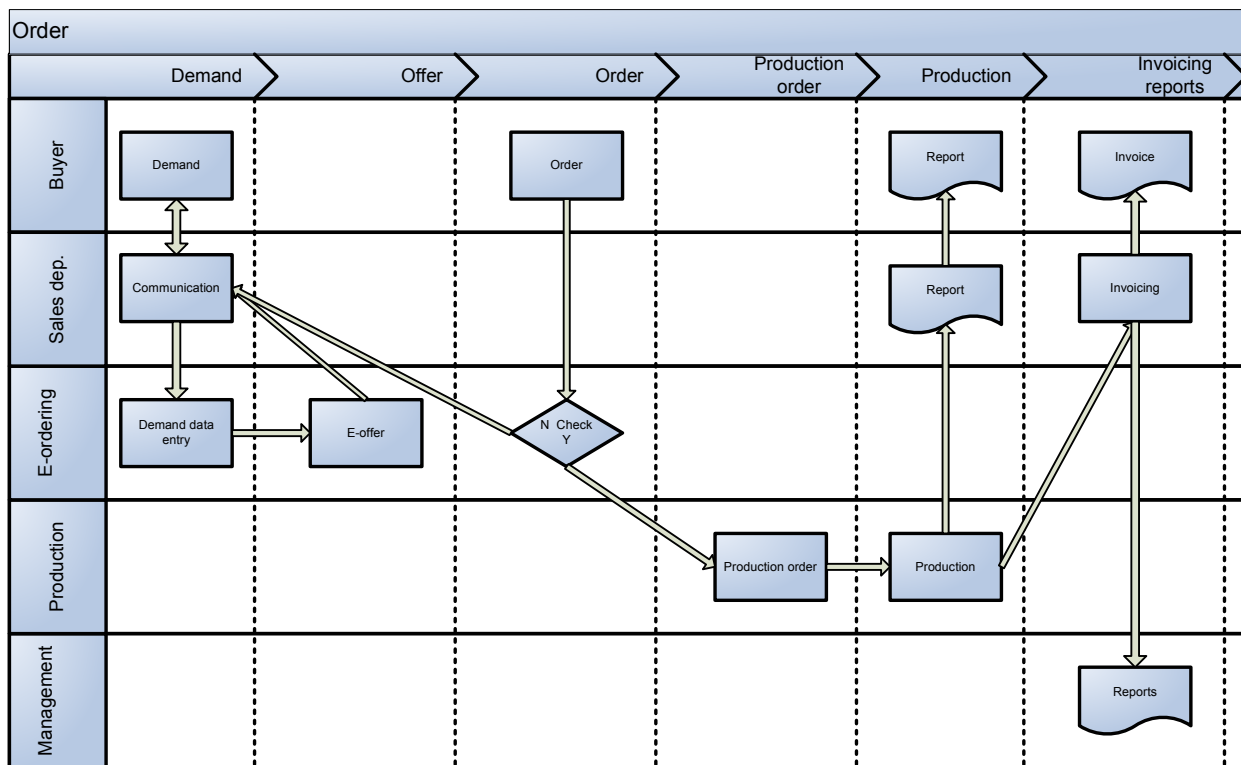

Figure 1. Business Process Flowchart

Processes are carried out by buyers, the sales department, the production unit and the management. A part of the business and information process is carried out directly within the computer module of e-ordering. The flowchart in Figure 1 shows the phases of the business process: sales demand, sales offer, sales order, production order, production, invoicing and reports. From the described graph, seasoned experts in the field of business processes easily find their shortcomings. They can set ambitious objectives

for the renewal of business processes and prepare their own flowchart for the targeted processes. In this approach, it is of key importance to understand operational business and information processes from the very start of their reengineering. Strategic aspects of business activities represent the framework for the analysis and are not directly involved in the planning of the reengineered information system. Thus this approach will not directly support strategic directions of the company.

INFORMATION SYSTEM
STRATEGIC PLANNING

Information system strategic planning is completely different. First, the strategic orientation of the company is analysed. This represents the basis from which strategic information needs (as target results of the future information system of the company) are derived. Finally, the architecture of the information system is formed and represented with the chosen information models [6].

First, the global process model of the company is defined. The best way for this to be made is with the so-called context diagram of business process data flows, which reflects the global process model of the company [8]. Figure 2 shows the business process of the whole company in the form of a black box without internal data flows.
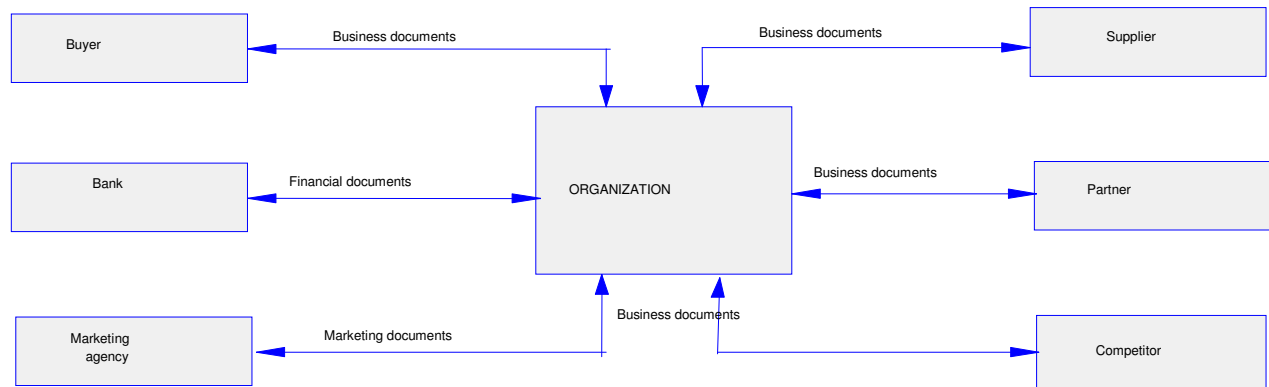

Figure 2. Context Diagram

We are focused only on the data flows related to the business environment of the company. The complexity of the information system of the organisation can be derived from the complexity of these connections from an early stage. The greater the number of the data flows, which will be computer supported, the more ambitious the information system is likely to be, which is also connected with the size of the investment. The diagram is, of course, completely different from flowchart illustrated in Figure 1, because here we represent only the global picture of the business process of the company and are focused on the processes, which relate to the business activities carried out by the company with its business environment. Therefore, the approach used here is top bottom and out inward.

In order to carry on the strategic planning of the information system, a strategic data model has to be made. The basic aim is not to show the global picture of the database, but to reveal the chosen strategic orientations, which are directly reflected in the changes made in the database component of the information system [9]. Figure 3 shows an example of a global data model, in which new "strategic" entities are put in the foreground, above all markets and competitors. Although the majority of connections in global models belong, due to the nature of data modelling, to the group of more : more

(non-specific connections, which have not yet been solved into more concrete connected presented by the type more : 1, which is the subject of a more detailed data modelling), there are also three strong connections of the type more : 1. The entities of competitor, buyer and product are connected with the entity market. These connections emphasise strategic orientations of the company, aimed at the diversification of its products on competitive markets (connection 1). The company does not treat its buyers and competitors as global buyers and competitors, but as buyers and competitors on each market separately. Such focus on individual markets is a part of a strongly expressed business strategy, which is also reflected in information strategy, and in the strategic data model, which is an important part of strategic information system planning. The future information system will be planned in such a way as to enable such treatment of products, competitors and buyers. In accordance with the importance, the information system will provide a huge set of appropriate data and include the above-mentioned strategic business rules in the data and functional part of the future applications. The described strategic data model speaks in favour of a global and above all strategic approach to the informatization of business activities; thus it differs considerably from the described approach of business processes reengineering.
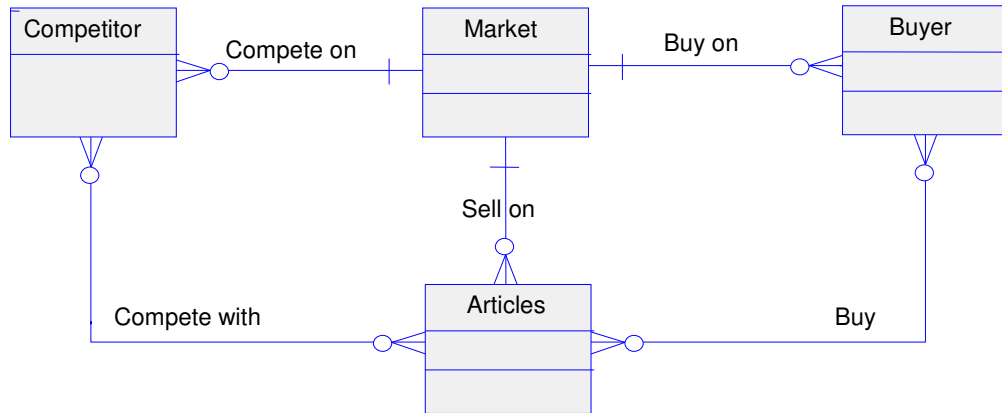
Figure 3. Strategic Data Model

In information system strategic planning, we also have to define the target architecture of computer applications, which determine the contents and functionality of the future information system of the company. This is usually done by describing modules of computer applications and by constructing a model representing their interconnectedness. The architecture is finished with the model of a computer infrastructure, which illustrates the future computer and communication equipment and system computer applications.

This is followed by the analysis of the gap between the planned and existing information system and the consequent project programme. The business processes reengineering is frequently the most important project within this programme.

The described approach of strategic information system planning does not deal with the details, with which the business and information processes reengineering usually deals, but ensures that the future information system supports strategic orientations of the company.

CONCLUSION

So far, it was demonstrated that the approach of business and information processes reengineering and strategic information system planning are both extremely useful in the attempts to renew the information system of a company. It can be concluded from the described key differences that they have to be combined, because they are, by their nature, supplementary and not exclusive. It is up to the management to decide which approach will be

used in order to start the projects of information system reengineering. The criteria upon which to base their decisions can be summarised as follows:

- It is reasonable to start business and information processes reengineering by the renewal of the information system of the company only in the case of limited business objectives of operational business and information processes reengineering.
- If through the information system reengineering the organisation wishes to ensure support for its strategic orientations, it is necessary to start by strategic planning of its information system.
- If the organisation would like to start business processes reengineering as soon as possible and is not likely to be faced with large strategic changes, the business and information processes reengineering can be carried out as a parallel project, included in the strategic information system planning, above all in connection with the analysis of the gap between the existing and targeted information system and the definition of business objectives of the business processes reengineering.
- The most successful approach requires that the strategic information system planning of the company is carried out first. In the project programme, which is the final stage in the strategic information system planning, the priority project in the business and information processes reengineering has to be defined as one of the projects which will ensure the implementation of the strategic information system plan and, consequently, the strategic orientations of the company.

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