

Modelling Knowledge in Business Processes: a Case Study of Croatian Banks

Vesna Bosilj Vuksic

University of Zagreb, Graduate School of Economics and Business
Department of Information Science and Business Computing
10000 Zagreb, Croatia
vbosilj@efzg.hr

Abstract. *Knowledge management is the systematic approach to controlling set up processes, distribution and applying knowledge and creating the necessary framework conditions for this. Organisational knowledge as an important element of the entire business knowledge could be systemized, documented and retrieved in business process repository developed by business process modelling tools, within business process change projects. This paper describes an approach that aims to combine business process modelling and knowledge management, portraying the interactions between processes and organisational knowledge. Furthermore, it examines the case study of two Croatian leading banks, analyzing and discussing its practical experience in conducting business process modelling projects as the basis for knowledge management system development.*

Keywords. Knowledge, knowledge management, business process modelling, Croatian banks, ARIS

1. Introduction

Knowledge and knowledge management (KM) are concepts debated by academics and managers over the past ten years since business organizations are becoming aware of the need for innovative approaches to responding more effectively to market requirements. KM enables the creation, communication, and application of knowledge of all kinds to achieve business goals [13] and it is increasingly recognized as an integral part of an organization's strategy to improve business performance [3,14]. It could be defined as the set of professional practices that improves an organization's human resources and enhances the organization's ability to share the employees' knowledge [2].

Davenport and Prusak [4] have defined knowledge as a fluid mix of framed experiences, values, contextual information, and expert insight. Knowledge could be classified into various types, but it has become an accepted convention to divide knowledge into two major types: tacit and explicit knowledge. Tacit knowledge originates and is applied in the minds of the owners of knowledge. It is the most powerful form of knowledge, grown from the employees' experience and business practice. This type of knowledge is difficult to present formally, as well as difficult to communicate and share. Explicit knowledge in organizations often becomes embedded in documents, repositories, organizational routines, processes, practices and norms. It could be articulated formally, could be shared, transmitted, processed and stored easily. Organizational knowledge is a mixture of explicit and tacit knowledge and the role of KM is to make it available as an organizational asset. Organizational knowledge integrates a company's experiences, company-specific knowledge, culture, communications, decision-making procedures, as well as the detail of business processes [12].

Business processes are made up of a series of activities and transactions that together achieve some business objective. In order to continuously analyse, change and improve their business processes, companies use business process modelling techniques and tools, conducting business process change projects and developing business process repositories. Business process modelling as an approach focuses on understanding the underlying business processes where business rules are one of the most important elements for the detailed and formalised description of all facts (knowledge) which are to be implemented during IS development [7]. Business process model builds up a company-wide knowledge base and is the

starting point for the constant adaptation of organizational structures to the dynamic company environment.

This paper presents an approach for integrating business process modelling and KM and investigates how organizational knowledge embedded in business process repository is (or could be) utilised within leading Croatian banks. The paper is structured as follows. The ability to use business process modelling as a tool for knowledge management is discussed in Section 2. Section 3 examines the case studies of BPM projects in two Croatian leading banks. According to the experiences from the case studies, the results of BPM projects in the context of knowledge management are discussed in Section 4. Finally, the Section 5 outlines the conclusions and discusses some directions for further research.

2. Business Process Modelling as a Tool for Knowledge Management

Very complex and process-oriented nature of business has led organizations to use process modelling methods and tools as a means of managing the complexity of these systems, and to aid in achieving business goals. Business process modelling (BPM) has now been in the public domain for four decades, but it is only in the late 1990s that integrated business process modelling tools have been developed. Process modelling tools must be capable of showing interconnections between the activities and conducting a decomposition of the processes. These tools must help users to conduct “what-if” analyses and to identify and map no-value steps, costs, and process performance (bottleneck analysis). They should be able to develop AS-IS and TO-BE models of business processes, which represent both existing and alternative processes. They can be used to predict characteristics that cannot be directly measured, and can also predict economic and performance data that would otherwise be too expensive or impossible to acquire. Each BPM software application is defined by a mix of several components. The most important components of BPM tools are: (1) process modelling and design; (2) process monitoring; (3) process operation (automation and integration); (4) technology platforms and interfaces. It could be considered that above stated elements would weight heavily in the selection criteria of BPM for the next few years [5]. However, the common characteristic of BPM

tools is the ability to develop, use and maintain the business process repository.

Business process repository contains existing process knowledge documented in the form of business rules: policies and procedures, job descriptions, business forms and application code, relational data-base management system rules (tables, constraints, and triggers). Business rules could be considered a subset of our knowledge, or a statement describing a business policy or decision procedure [6]. Business rules are explicit statements that regulate how a business operates and how it is structured. Besides being important as an organisational asset, they are also significant for the IS and workflow management systems (WMFS) that support the business [1,8]. Business rules support business policies that are formulated in response to an organization’s mission, vision, objectives, and goals. They are usually embedded in technology or documents, providing guidance to business processes [2]. By developing business process repository, it becomes possible to classify existing knowledge and make it transparent, to identify knowledge carriers and knowledge users and to define them in specific roles. This structuring of knowledge or knowledge processes creates the conditions for configuring, administering and if necessary modifying a knowledge management system efficiently and effectively.

However, the approaches that focus on knowledge management within the business process level, are limited [9,10]. Moreover, although business process modelling tools and/or WMFS support in an adequate manner the modelling and enactment of business processes, they still do not provide the required support for knowledge-related activities. From the above, it becomes clear that an approach that explicitly integrates knowledge management activities into the business process environment is missing.

3. Business Process Modelling Practice in Croatian banks: a Foundation for KM

The key objective of the research has been to examine the goals and characteristics of BPM projects in Croatian banks, as well as the level of their integration with KM projects. A survey was conducted on a sample of 41 banks operating in Croatia on 31 December 2003. The survey resulted in 23 responses representing a strong response rate of 56%. One of the questions posed in the survey was “Is the project of business

process modelling (reengineering) ongoing or already completed in your bank?" A positive response was given by 10 banks (25% of the total number of surveyed banks). This percentage indicates that there is awareness in the management of the surveyed banks of the need for restructuring and improvement of business processes, as well as the existence of a relatively high percentage of banks which are still not paying sufficient attention to the improvement of business processes, and therefore business operations as a whole. This result is in line with the survey results received by the members of the Department for Business Computing (Faculty of Economics, University of Zagreb) in the spring of 2002 [11]. This survey included the largest Croatian companies according to 2001 revenues, and the results indicated that 6.4% of companies had already completed, while 22.6% of companies were carrying out reengineering projects at that time.

In order to obtain better insight into the actual standing, objectives, methods, tools and success of reengineering projects, or rather the business process modelling in Croatian banks, the two leading Croatian banks were selected as a representative sample: Privredna Banka Zagreb and Zagrebacka Banka. In the period June-September 2004, interviews were conducted with management staff dealing with this area. The questions posed to participants were grouped into three logical entities:

- (1) questions on the company in general (structure, size, financial strength of the company),
- (2) questions on BPM projects in the company (start of project implementation, who initiated the project, what are the objectives, who implements the project, which methods and tools are used, what are project results, what is employee reaction to project, does the project help in improving knowledge management, how the results of BPM project are, or could be used in KM projects), and
- (3) a short description of the project the interview participants consider to be representative and/or successful and the quantitative and qualitative results of the project (which is not the focus of this paper).

Interview results were analysed, verified by the interview participants and shown in the case studies that follow.

3.1. Case Study: Privredna Banka Zagreb

Privredna Banka Zagreb is under ownership of the company GRUPPO BANCA INTESA. Its headquarters are in Zagreb, and the company employs about 2800 staff. The organizational structure is comprised of the following units: bank management, commercial banking, personal banking, finance, operations, payment clearance, informatics, organization, accounting, human resources, general operations and risks. The bank's revenue in 2004 (to 30 July 2004) was about 97 million Euros.

Since 1998, the bank has been continually implementing projects of varying objectives and scope:

- In 1998, the project of implementation and application of best practices was initiated according to the experience of BANK OF IRELAND TWINNING, and this program was introduced to all segments of the bank.
- In 1999, the consulting company ERNST AND YOUNG analyzed the existing procurement process and proposed changes to improve the efficiency of this process.
- In 1999, the German consulting company IDS SCHEER assessed the existing commercial and personal banking operations, as the foundation for implementing changes.
- In 2004, parallel to the implementation of the new software solution Navision, the reengineering process of planning, procurement and cost monitoring was also carried out.

A series of organizational changes were also implemented: a subgroup for information technology was created in order to improve the manageability of information technology, a group for risk management was created for better risk control, and regionalization of operative tasks was carried out with the objective of reducing the number of executors and the costs of operations.

On average, the projects lasted for one year; all were completed and considered to be successful. Though the project objectives varied, a common factor in all the projects was business process modelling. Information system development and business process modelling projects were frequently carried out simultaneously, as a joint project, however there were also cases in which the IS implementation project followed the completion of the business process modelling project, and vice versa (the

business process modelling project was carried out following completion of the implementation of software solutions).

Projects were proposed by managers, who directly addressed the bank Management, which approved and initiated the project and defined the project manager. The project manager then formed a team of representatives of all the organizational units covered by the project. Within the bank, there is also the Sector for organization of business processes, which in the organizational map is one step below the Board Member responsible for informatics, operations and payment clearance. Members of this sector participate in all business change projects. Today, an integral model of the bank's business processes has been developed using ARIS software tool (covering about 80% of the business), and this is regularly maintained and used in business change projects. At the current time, the business process repository is not available on the intranet, and cannot be used by bank employees as a repository of organizational knowledge. Bank employees still do not show an adequate level of understanding for the objectives and aims of business process modelling projects, and offer resistance when such projects result in significant changes.

3.2. Case Study: Zagrebacka banka

Since March 2002 Zagrebacka banka has been a member of the UniCredito Italiano Group. The bank employs 3879 staff. It is organized into 12 Sectors and 2 independent Directives. The existing organization of the bank can be divided into two types of organizational units: organizational units with a commercial aspect (having the clients and sales as the primary focus), and the organizational units providing support functions. In 2003, Zagrebacka banka achieved total revenue of 320 million Euros.

Since 1998, the bank has been continually initiated, running and implementing business change processes of varying objectives and scope:

- In 1998-2000, the "Business processes" project was initiated with the objective of assessing analyzing the existing business processes, as well as for proposing the improvement of existing business processes. Results were presented to top management and a plan for improving business processes in the coming period was drafted

- Since 2000, employees of the Directive for Improving Operations, in the status of project team members, have had the task of continually working at the systematic improvement of existing business processes.
- In 2001, the ARIS tool was implemented for business process modelling.
- In 2001, the new methodology was introduced for measuring the performance (time and costs) of business processes. This methodology was provided by the world renowned consulting company WD Scott.
- In 2000-2002, the project "Analysis of bank business processes" was implemented. The analysis results were presented to the management of all the organizational segments of the bank, and therefore represent the foundation for further work on the improvement of business processes and efficiency of overall operations.

The bank also has a special organizational unit which deals with the improvement of business processes – the Directive for Operations Improvement, as a part of the Sector for Operations Support. This has the following primary business domain: (1) business process modelling; (2) analysis of business processes; (3) drafting proposals to improve and assessing benefit of implementing improvements for the bank, (4) giving the support for other organizational units in the bank, with the objective of defining optimal business processes and monitoring process efficacy; (5) participation in all large bank projects and proposing improvements ("to-be" solutions).

Assessing business processes with the ARIS tool resulted in the creation of a dynamic image of the processes in the bank, which thereby formed the foundation for transparency and flexibility of changes in business processes. Furthermore, the application of the mentioned methodology for measuring the duration of business processes (WD Scott) permitted the calculation of financial justification of implementing business changes, as well as a continued analysis of the success of implemented changes. In the Directive for Operations Improvement, business processes are systematically modelled and analysed, their performance measured, changes proposed, processes standardized and analysis carried out following implementation. The process begins with the definition of a series of selected indicators of process efficiency, the most common of which are: duration of the process,

the degree of internal errors, the number of complaints, efficiency of the use of human resources, and waiting time for the client. Measurement of performance and their analysis follow, based upon which the design of future business processes can be proposed. To date, the system of process management covers about 85% of all the processes in the bank. In the implementation of change, employee resistance is frequently noted; however, the projects are successfully realized with the support of top management.

4. Discussion and Analysis

The results of this study carried out in Croatian banks showed the existence of awareness among management on the need for conducting BPM projects and for improving operations. However, there is still a relatively high number of companies in the Croatian financial sector that should focus on improving operations. Presenting the case studies showed the existence of the following common features of the BPM projects:

- The leading banks in Croatia use the same tool (ARIS) for business process modelling. This fact is not surprising, considering that the consulting company Gartner rated this tool as the best in its category. This tool is also the most represented on the Croatian market.
- Companies do not approach changes as a one-time project, but instead treat them as a continuous process, one in which company employees participate as users who possess knowledge on the operations of the company, as well as in-house experts – employees specialized for organizational and business improvement tasks.
- The primary objective for the companies was the development of an integral business process repository (the business process model covered about 80% of all processes in the companies).
- The business process repository is continually maintained, changed and supplemented.
- The company position on the need for continuous implementation of BPM projects is evident in the decision to form special organizational units (directives, offices, divisions), with the task of improving operations.

- Companies use the developed repository as a foundation for the development of new IS, as well as for changes to the existing IS, to the extent possible due to existing limitations (problems in the transformation of the process model into the data model).
- The business process repository is used for continuous improvements. Process models are enhanced with attributes necessary for analysis, measuring process performance and creating proposals for improving processes.
- The business process repository is not available on the company intranet; however, this possibility is defined as a future objective.
- The possibilities the business process repository offers as a basis for knowledge management system development are still insufficiently used. However, management has accepted the idea of the need of launching KM projects, in which one of the basic strategies will be the use of organizational knowledge built into and structured in the process repository.

The use of tools for business process modelling and the many years of implementing reengineering projects suggest advantages and positive impacts, as well as highlighting certain problems and shortcomings. The most significant advantages for the companies included in the study were:

- The development of the process repository was presented to managers and employees for the first time as an all-encompassing, clear and detailed overview of all the key processes and their participants, thereby allowing for better understanding of the existing way of doing business, as well as insight into shortcomings, as well as the possibility for improvement.
- The process repository permits for the documentation and standardization of the process (procedure, routine, business rules), and with it the implementation of ISO standards. In this way, the quality of operations is improved, which results in a positive impact on the satisfaction and efficiency of employees, as well as users and business partners.
- Detailed analysis and measurement of process performance allows for the creation of alternative scenarios and proposals for improvement. With the implementation of

the selected solutions and measurement of results of the conducted changes, significant positive impacts are visible. Qualitative impact are shown (greater efficiency, savings in time and human resources, shorter life cycle for products/services) while those of a qualitative nature are described (better quality products/services, greater satisfaction and trust on the part of the user).

The following problems were noted in the implementation of the project and the use of business process modelling tools:

- BPM projects are relatively long-lived (1-3 years). The most time-demanding were those conducted first, and their objective was to develop a model of all the key processes in the company. After spending much time, human resources and financial resources, these projects results in a large number of models, the true value of which was noted and used only in later projects of a narrower scope, and directed at analyses, performance measurements and improvements to individual processes, or their segments (subprocesses).
- Though the selected processes, or their segments, were analysed and measured in detail, the possibility of describing the process at the level of business rules was not fully taken advantage of, although this would create an appropriate foundation for the development of WFM system and KM system. There are two basic reasons why this was not carried out. This approach requires additional time and resources, and the existing software interfaces does not prove an automatic, reliable and secure transformation of generated business rules in the appropriate IS model and KM model.
- The implemented projects were met with resistance from the employees, most frequently due to the fear of change and a lack of understanding of the true project objectives. Despite this, the projects were successfully completed, thanks primarily to the continued and strong support by top management.

5. Conclusions

Based on the conducted interviews, it can be concluded that the approach of Croatian banks towards initiating BPM projects is positive, and the implementation of modern methods and tools for business process modelling creates a high

quality foundation for improving operations. The management of these companies accepted the fact of the need for a knowledge management strategy. Since nowadays, the majority of Croatian banks are involved in the projects of business process change this research could serve to adopt an integrated “business process and knowledge management centric” approach. This framework will be based on integration of business process rules with the organizational knowledge documented and stored in the business process repository. The continued development of BPM and KM software tools should enable the transformation of the integral business processes model into the knowledge repository. The analysis of expected changes and positive impacts will be an integral part of future research on KM as a part of business process change projects in other Croatian companies and abroad.

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