

The Importance Of Business Process Modelling In Terms Of University Education

Marcela Kovalova, Lukas Turcok

Abstract: The process modelling can have a positive impact on the improvement of company performance. It is one of the ways, how to analyze, define and optimize business processes. The article focuses on the importance of the process modelling in an educational institution. How it is possible to model the processes, at what level and depth and what are the benefits of this approach to business success. To model processes of a university or faculty is relatively specific. In terms of the basic types of the processes we are talking about the service processes, thus education. This article doesn't analyze the process of education. We identify the selected system (managerial) processes for ensuring the process of providing this service. For the business process modelling are nowadays used various software tools. In the analysis of the selected process we will use specific software QPR ProcessGuide Xpress. It is a modelling programme, which provides a comprehensive, desktop process modelling. This tool is flexible, easy to use, powerful solution for documenting, analyzing and improving business processes.

Index Terms: Business Process, Modelling Method, University Education, Software Tool, Process Map, Internal Audit.

1 INTRODUCTION

The business performance is an object of interest in many companies aiming for prosperity. The performance and the competitiveness are very closely linked. Many authors use these two terms as synonyms. We use a system approach to business performance. We research contemporary situation in this issue, we define theoretical aspects of business performance and mention the approaches to business performance management. The main goal of this contribution is to point out the importance of process modelling in terms of university education (particularly at Matej Bel University) and to emphasize the possible influence of process modelling on increasing the quality of university education. Our objective is also to stimulate the discussion in this field of knowledge and to offer possible suggestions for the research. We suppose that universities in the Slovak Republic don't pay much attention to this field of knowledge. However the process modelling influences business performance. The business performance depends directly on performance of business processes. We can specify many aspects of business performance: good product, low price, interesting promotion, accessible place, quality of products and services, an approach to employees, added value, benefits for customers, acceptance of environmental directives etc. "Due to the crisis, many businesses were forced to waive a part of their business activities. They reduced or revoked investment plans and also searched the savings in operational resources. It led to redundancies, reducing the demands on product quality." [26] And this also had a negative impact on business performance.

Appropriately defined and executed business processes are one of assumptions for increasing business performance. Improving the efficiency and effectiveness of the business requires understanding the key drivers within the business and the practical approach to implementing processes that will optimize these key drivers. We could say, that "company is a hierarchical organization comprising strategic, administrative, and operational units. In many cases, the data within a company are structured in multilevel abstraction hierarchies, reflecting to some extent the company's organization and the different information needs of the various units" [19]. To understand the individual levels of an organization and to obtain the informational overview about processes in this case it is possible to use various tools and methods. The business process modelling at each level with the required depth and quality represents an interesting approach. "Business process modelling enables common understanding and analysis of the business process. A process model can provide a comprehensive understanding of the process. An enterprise can be analyzed and integrated through its business processes" [2]. Based on this fact it enables better understanding to processes in a company, but only if the process model is created properly and correctly. Process modelling provides some ways, how to operate with business processes with the aim to comprehend these processes, their importance and to ensure constant communication and information flow. According to Demiroz and Turetken [5] "we use process modelling in establishing quality manuals, assessing and identifying added value, establishing control mechanisms, and automating of workflow." Business process modelling can be used in many areas and sectors of particular economic activities. "Process modeling has been applied in diverse domains, such as manufacturing, the service industry, and healthcare, for the development of a range of business and IT systems" [10].

- *Marcela Kovalová is currently an assistant at The Matej Bel University, Faculty of Economics, Department of Corporate Economics and Management, Slovak Republic. E-mail: marcela.kovalova@umb.sk*
- *Lukáš Turčok is currently a Postdoctoral Researcher at Technical University of Liberec, Faculty of Economics, Business Administration Department, Czech Republic. E-mail: lukas.turcok@tul.cz*

2 Literature framework

The basis for the competitive benefit can be identification and understanding the business processes at various levels. "Successful system starts with comprehension of the business processes within an organization. Furthermore, business processes are the key factor when integrating an enterprise" [2]. The authors Mihalčová and Gavurová also point to the fact, that "the basis for the future success of a company is an implemented and developed system of business processes

and projects, associated with difficult and competitive business strategy" [14]. The business process is "a progression of tasks (activities, interactions, ...) that involve two or more entities, and create or add value to the organization's activities" [18]. Furthermore, "business processes are sets of activities that create value for a customer" [25]. The business process can be basically expressed as a set of activities, through which the inputs are changed into required outputs. This definition could be extended with the suppliers of the inputs and the customers (external or internal), as recipients of these outputs. The business process was similarly formulated by Abu Rub and Issa [1], who identified the business process "as a related sequence of work activities which are performed across time and place, with a beginning, an end, and clearly identified inputs and outputs (a structure of action)." Business processes can be divided in accordance to several criteria. The processes division and determining the types primarily depends on the type of activities performed, under which business processes are defined. In general, we know for example the core and support processes, manufacturing processes or service processes and administrative processes, etc. Reggio et al. [18] divided processes into sequential and parallel, while "in a sequential process, each step is dependent on occurrence of the previous step; in a parallel process, two or more steps can occur concurrently". Although the business processes are the internal matter of the company, "processes in individual organizations are typically based on collaboration with several other (partner) organizations" [7]. The area of business process management was neglected in the past and the functional model of management prevailed. The functional management focused on the consequence and in the view of the rapid economic development and the increasing competition at the market, this approach proved to be ineffective. "Even though it was 1960 when Levitt first mentioned the importance of business processes, it was not until the last decade that processes have acquired a real importance in enterprise design" [2]. The companies started to transform into controlled process, because the process management focuses on the cause. From another point of view, "the process approach allows organizations to eliminate the biggest disadvantages of the traditional functional approach that can not be considered as an approach appropriately flexible for changes in the corporate environment, variety of procedures, or excessive substitution of workers" [21]. We can say that "business process management (BPM) continues to be a top business priority and building business process capability is still a major challenge for senior executives. The interest in BPM has, inter alia, triggered substantial academic and commercial work aiming toward advanced business process management solutions" [17]. There are several ways, how to identify business processes. One of those possibilities is the business process modelling. "The practice of process modelling has emerged as a key instrument to enable decision making in the context of the analysis and design of process-aware information systems. Process models are designed using so-called process modelling grammars (sometimes called notations or techniques), i.e. sets of graphical constructs and rules how to combine these constructs" [4]. Using the business process modelling enables better understanding of the processes in order to identify weaknesses and mistakes and subsequently to optimize processes, eventually to implement business process reengineering. By the authors Mili et al. [15]

"business process modelling is useful for three basic reasons, which may in turn support several business goals:

1. describing a process,
2. analyzing a process,
3. enacting a process."

By describing the process we created a detailed information sheet, usually in a graphical form (process maps). Based on this fact it is possible to increase understanding of such a process and improve the conditions for the process analysis. The analysis of the process means the assessment and evaluation of individual features and characteristics. Enacting the process means to set this process for further work with this process (e.g. simulation, reengineering, etc.). "The Business Process Modeling (BPM) is a group of techniques that allow to model those business aspects necessary for a correct performance of the business process applications" [6]. The business process modelling is included into the area of the business process management. Further on, the authors also state that, the business process management "have helped in the last years to reduce the errors, cost, and to increase the productivity in several organizations, like manufacturing companies, telecommunication providers and governments" [6]. According to Kueng et al. [12] we distinguish four categories of the business process modelling approaches:

1. "activity-oriented approaches, which tend to define a business process as a specific ordering of activities (sometimes referred as tasks);
2. object-oriented approaches, which are associated with an object orientation, such as encapsulation, inheritance, and specialization;
3. role-oriented approaches, which focus on roles as sets of activities, carrying out particular responsibilities; and
4. speech act-oriented approaches, which are based on speech act theory or a language/action perspective."

It is possible to model business processes in several ways. We have identified three basic ways: manual drawing of process maps, flowcharts creation in simple programs, process mapping using the specific software tools. Currently, experts prefer to work with software, which has the number of functions for managing business processes and process maps. Business performance is the ability of company to achieve the goals which have been set by the management. Different groups (parties involved) within the company have different opinion on this term and the definition of the term "performance" is not definitely set. The image below shows the key drivers of business performance [3].

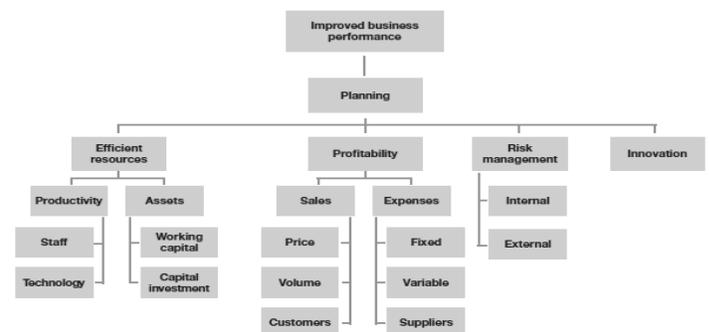


Fig. 1. Key indicators of improved business performance

It's no secret that the most successful companies are those ones that deliver the right products and services faster, more efficiently, more securely and more cost-effectively compared to their competitors. The key to that is practical (not haphazard) implementation of enterprise technology to improve business performance [23]. Management of business performance is designed to meet defined business targets within a particular time frame. The evaluation of performance management views the performance criteria and measures them against the targets. These metrics fall into broad categories that express how well the business meets its long-term goals. They include metrics from the marketplace as well as internal factors that affect success of the business [13]. What makes the difference between "performance" and "efficiency"? The accomplishment of a given task measured against preset known standards of accuracy, completeness, cost and speed is called "performance". Efficiency is defined as the input given and the work obtained from that input such as money, time, labour etc. It is the main factor of productivity [22]. The performance is one of the factors of business success together with innovative products or services, quality of products, low cost, promptness and flexibility of response to customer needs. Šiška [20] argues that many scientific journals dealing with issues from economics, management and entrepreneurship covering the term "business performance". The business performance is often bounded with competitiveness of the company. Many authors use these terms as synonyms. Rašner [16] claims that business performance and efficiency is related to long-term competitiveness. Performance is the attribute connected with the company which is reaching the preset goals, bringing the value for all involved parties and keeping up with its competitors. The result of this performance is satisfied customer and success of company within the market. To be the company of high performance, it is necessary to identify, observe and use the key strategic and competitive factors of future trends. The performance indicators help to provide dynamic and real vision about competitive position at the market and about the opportunities for improving the performance [11]. "Financial managers, owners and managers of small and medium-sized enterprises in evaluating the business performance, its financial health, decide about the future of the company, so as its future value." [8] Kassay [9] defines three pillars of competitiveness:

1. methods which are directed to lean management and to increase productivity,
2. people who are actively involved in processes of improvement and trained to know and use the best world production and managerial approaches,
3. processes or procedures which are simple, transparent, clearly set and belong to continual system of improvement.

Urban [24] mentions factors of performance which are set on three connected levels: factors of performance from global aspect (entire company), factors of performance based on process approach (level of business processes) and factors of performance based on job positions. These information are important as they accentuate on business processes and their influence on business performance. The global business performance is the performance of many parts: performance in financial indicators, performance in the field of customer satisfaction, performance of employees, etc.

3 RESEARCH METHODOLOGY

In this article we present an example of business process modelling in the service sector. It is particularly the identification and the analysis of selected administrative process that can eventually affect the continuous provision of services in the field of education. At first we present theoretical framework to the problem focused on the business process modelling, business performance and process performance. In the subsequent part we analyze specific processes. The object of this contribution is Matej Bel University and its business processes. The subject is the process model of selected processes. We focus namely on the system processes – Quality management system process and its sub-processes. We have chosen the specific modelling software QPR ProcessGuide Xpress as a modelling method. This software allows us to create detailed process map with the individual characteristics of each process. The summary and conclusions are final parts of the contribution. In the contribution we have used these main sources of information: internal directives and standards of The Matej Bel University and outcomes according to the project: "Increasing of quality in management and education at The Matej Bel University" (ITMS: 26110230021). We analyze the system of university processes which contains three categories: core processes (marked as category H), supporting processes (marked as category P) and system processes (marked as S). We focus on system (managerial) process called "the Quality Management System" and its sub-processes. We use modelling as the method of graphical representation of business processes and their sub-processes and activities. We have also used other scientific methods: analysis, synthesis. This article is based on the results of project of quality increasing in management and education at The Matej Bel University. The results of this project (which ended in July 2013) are in the form of process model published on the university intranet. To model the order (sequences) of activities belonging to selected system process (Internal audits) we have used the software tool QPR ProcessGuide Xpress 8.1.1.610. We have modelled the selected sub-process of "the Quality Management System" belonging to the university unit "Rector's office". It was namely the sub-process called Internal audits and its activities. We consider this programme to be a powerful and easy-to-use tool for business process modelling and analyzing. This software has been developed in co-operation with many companies and research institutes to guarantee its beneficial effect and usability in modelling and analyzing all kinds of business processes. This software has been purchased according to the project (as one of the basic resources for the project mentioned above).

4 MODELLING OF BUSINESS PROCESSES IN TERMS OF UNIVERSITY EDUCATION

In terms of university education it is very specific to model business processes. The process modelling can have a positive impact on the improvement of company performance. However, it is very important to model business processes at the university as well as in any other sectors. To model processes of the university or the faculty is rather specific. In terms of the basic types of the processes we touch upon the service processes in the field of education. Nowadays, various software tools are used for the business process modelling. In the analysis of the selected processes specific software QPR ProcessGuide Xpress will be used. QPR ProcessGuide

Xpress is a powerful modelling and analysis tool, aimed at business professionals who seek powerful means for managing business processes. Matej Bel University makes an important contribution to the European area of education and research (for which it is a part of), providing both high-quality university education as well as a wide spectrum of further education adequate to the needs of practical life. The University is developing new knowledge through the productive scientific and artistic research in order to form intelligent, moral, authentic, well rounded individuals and in this way creating a society of learning. Matej Bel University, which has proved to be a leader in the field of education in the Central Slovak region, will be perceived as a strong national university of the international importance in the year of 2013 due to its high quality of education, successful graduates on labour market, excellent international co-operation in particular areas of research and co-operation with the real-life business environment as well as thanks to sports and artistic performance for public. Within the years 2011 – 2013 the university was involved into the project financed from the European Union resources focused on increasing the quality in management and education at Matej Bel University. The aim of the project was to identify the bottlenecks of core processes and supporting processes happening at the university through the process analysis and to create an optimal process model, which will be certificated by using ISO 9001:2008. The project team achieved the project goal in June 2013 when the university obtained the certificate of quality (subordinating to ISO 9001). Three categories of processes at the university have been identified: the core processes, the supporting processes and the system (managerial) processes. These processes have been divided into seven organizational units - The rector's office, the Faculty of Economics, the Faculty of Law, the Faculty of Education, the Faculty of Humanities, the Faculty of Natural Sciences, the Faculty of Political Sciences and International Relations. The processes of Matej Bel University are as follows:

1. 1_H1 Education
2. 1_H2 Science and research
3. 1_H3 International affairs
4. 1_H4 Development and information processes
5. 1_P1 Operation and investment
6. 1_P2 Wages and human resources
7. 1_P3 Checking
8. 1_P4 Marketing communication
9. 1_P5 Civil defence, fire safety and work safety
10. 1_P6 Law services
11. 1_S1 Quality management system

The graphic scheme of core processes (marked as H), supporting (marked as P) and system processes (marked as S) at Matej Bel University is shown in the Image 2 below.

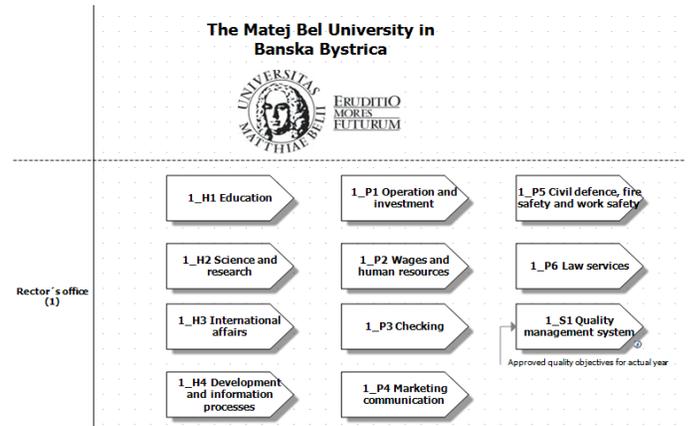


Fig. 2. The main process map of Matej Bel University

In this contribution we have to focus on system (managerial) process (the part of organizational unit Rector's office). There are processes of quality management system. We identified 6 managerial (quality management system) sub-processes:

1. 1_S1 – 1 Management of documentation and records,
2. 1_S1 – 5 Data analysis and improvement,
3. 1_S1 – 3 Internal audits,
4. 1_S1 – 2 University management responsibility,
5. 1_S1 – 4 Corrective and preventive actions,
6. 1_S1 – 6 Assessment of customer satisfaction.

The image of sub-processes of the process 1_S1 Quality management system is shown below.

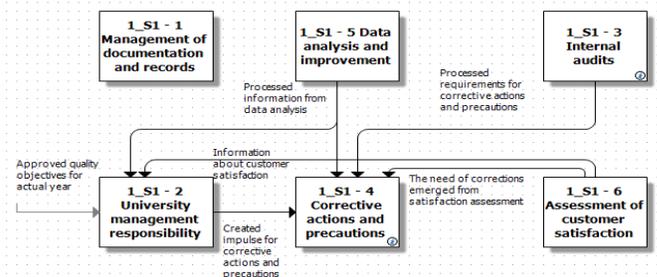


Fig. 3. The order of sub-processes in the system process "Quality management system" at the university

This image demonstrates how the sub-processes of "Quality management system" process influence each other. For example, the internal audits influence - or are influenced by - other "quality management system" sub-processes. The result from internal audit is processed as the requirement for consequential corrective actions and precautions. These actions are considered as inputs for management review and the status of proceeded actions is the base (source) for follow-up internal audit. Any of these sub-processes makes the area in which the internal auditor can find possible weaknesses or threats. The assessment of customer satisfaction is the groundwork for corrective and preventive measurements and also provides necessary information for the university management. Processed information coming from the data analysis is the input for corrective and preventive actions as well as corrective and preventive actions pull the data from sub-process "University management responsibility". In the

next part of this contribution we concentrate on selected university process, thus system sub-process: Internal audits. Internal audit is the very important part of system processes, because its performance has a very strong influence on the quality management system and its efficiency. The management or employees would perform internal audits before implementing the management system processes. The objective of internal audit is to determine whether the processes met the requirements of the standard, to enable to fulfil policies and objectives of the company and to produce the products or services of required quality. The order of activities that belong to this process is shown in the Image 4 (part 1), 5 (part 2), 6 (part 3).

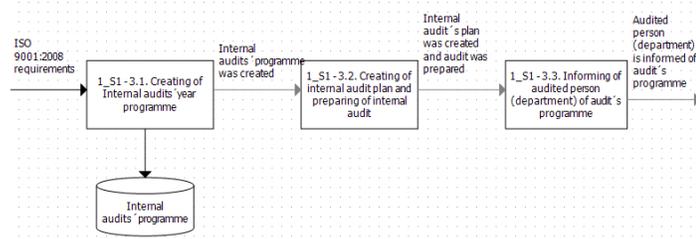


Fig. 4. The order of activities in the sub-process Internal audits – part 1

The Image 4 shows the first part of the activities order in the sub-process “Internal audits”. The input or impulse for creating the year programme of internal audits is the crucial requirement (or are the requirements) of ISO 9001. After the programme was created, the internal audit plan was made and the internal audit was prepared. The next activity is to inform people (employees) and the head of department being involved in this programme.

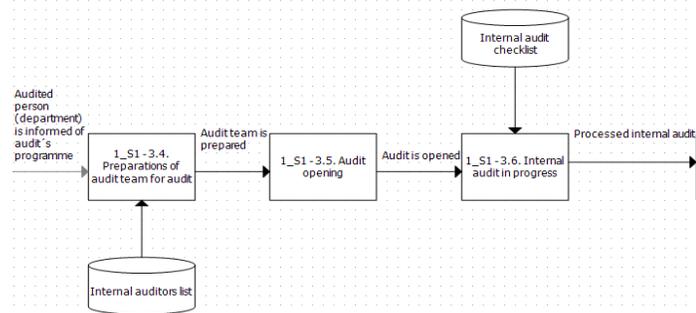


Fig. 5. The order of activities in the sub-process Internal audits – part 2

The image 5 depicts the consequential activities in this sub-process. Following activity is to do preliminaries for the internal audit. It means people who are auditing (internal auditors) have to prepare themselves. The head of the audit team is supposed to use an “Internal auditors list”, so that the appropriate structure of people (internal auditors) is chosen and pre-set objectives of audit can be achieved. After the preparations the audit is opened. Using an “Internal audit checklist” with supporting audit questions the auditors inspect the selected processes or departments and this is called as the internal audit is in progress.

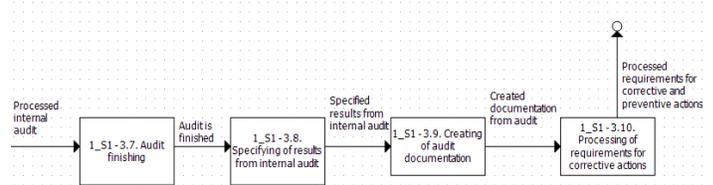


Fig. 6. The order of activities in the sub-process Internal audits – part 3

Thereafter the audit is finished and the results are specified. There are three options of specifying the results from the audit: recommendations for improvement, small failures in quality management system and system threaten failures. The head auditor has to create any required documentation in a specific time period (e. g. five or seven days), so the management could decide about corrective and preventive actions. The internal audit is the method of inspection and testing quality management system in the company. The purpose of the audit is to compare “the ISO 9001 requirements” to “the documentation outcome”. The next step is to compare “the issue as captured in our documentation” and “the real outcome”. This outlined order of activities has been modelled by using the tool QPR ProcessGuide Xpress and it is not the only way how to determine the system (or process) of internal audits.

5 DISCUSSION

The process identification and modelling can positively affect the business performance. Nowadays, many enterprises deal with this problem in the long term. The question is, to what extent and if in general to deal with the process identification at the educational institutions. In this article we present chosen example of modelling a particular process at Matej Bel University in Banská Bystrica. We focus on the process of quality management system (characterized as a system – managerial) at the Rector’s office. Using a graphical presentation of the process model, the process flow through activities, identified inputs and outputs is clearly shown.

5.1 The importance of process modelling at educational institution

Further issue is how and whether the process identification and modelling can ever affect the operation of an educational institution (colleges and universities). In this case, the process modelling at Matej Bel University has had a positive impact on increasing the overview of the individual processes as we assume that it is not possible to improve some issues we do not know. We also argue that the process identification may contribute to the effort to maximize the benefits to external customers (especially students). In this phase of the project we didn’t survey the benefits and the importance of process modelling at Matej Bel University. The surprising result is that the work can be organized in compliance to this model, especially in the area of quality. It means that the processes of quality management system were modelled as a basic pillar for the next work in this field. The detailed information table of processes was also created and it became a part of the University intranet also available for all the staff. We cannot relevantly comment on cost savings and identification of bottleneck at this stage of the project, because the processes were modelled for the first time (for the purpose of certification

of the University in accordance to ISO 9001). The feedback of the management and employees, who are operators of individual processes will, without any doubts, also bring interesting outcome.

5.2 Prerequisite for further research

On the basis of this article it is possible to outline a proposal for further research related to this topic. We consider an analysis of concrete benefits of process modelling and also the comparison with the benefits at Faculty of Economics, Matej Bel University, where the quality management system has been certified since 1999 as an interesting research. The second option of the research may be the research focused on fact-finding. The research is meant to be taken at universities and colleges, whether such type of the project was realized or planned or it is a novelty and also whether there is a potential interest for more information.

6 CONCLUSION

In this contribution we focused on business process modelling and its influence on business performance. We dealt with the ways of process modelling and their benefits. We defined business performance and the factors which influence the performance. In the third part of the article we dealt with modelling of business processes in terms of university education. We identified the processes at the university, especially the process of "quality management system". We sorted the selected process of QMS into 6 sub-processes and showed the order of activities in the process of "Internal audits". We chose a sub-process "Internal audit" as the model, because audit helps to uncover the areas that are in need of attention and/or are of opportunity to improvement. The good internal audit can reduce the stress of employees and management, because the management can uncover the emerged issues itself and resolve them before the external audit begins. The internal audit is the opportunity to help oneself, to identify and improve the bottlenecks in the processes, to test the efficiency of implemented quality management system. The outcome of the internal audit is the continual improvement and satisfaction of customer. To perform an efficient and well done internal audit there is essential to have a good working system of internal audits. One way how to deal with this is to model a process of internal audit in the company. The good performance of the internal audit depends on how well the process is modelled and the company goals are achieved.

ACKNOWLEDGMENT

This work was supported by ESF operational programme "Education for Competitiveness" in the Czech Republic in the framework of project "Support of engineering of excellent research and development teams at the Technical University of Liberec" No. CZ.1.07/2.3.00/30.0065.

REFERENCES

- [1] F.A. ABU RUB, A.A. ISSA, "A business process modeling-based approach to investigate complex processes. Software development case study." In Business Process Management Journal, Volume 18, 2012, Issue 1. ISSN 1463-7154, p. 122 – 137
- [2] R.S. AGUILAR-SAVÉN, "Business process modelling: Review and framework. In International Journal of Production Economics," vol. 90, 2004, Issue 2. ISSN 0925-5273, p. 129 – 149
- [3] J. BARNED, "Improving business performance" [online]. Southbank VIC: CPA Australia Ltd., 2011. 30 p. ISBN 978-1-921742-17-0. Available at: <<http://www.cpaustralia.com.au/~media/Corporate/AllFiles/Document/professional-resources/practice-management/improving-business-performance-brochure.pdf>>.
- [4] R. BROWN, J. RECKER, S. WEST, "Using virtual worlds for collaborative business process modeling." In Business Process Management Journal, Vol. 17, 2011, Issue 3. ISSN 1463-7154, p. 546 – 564.
- [5] O. DEMIRORS, O. TURETKEN, "Plural: A decentralized business process modelling method." In Information & management, Vol. 48, 2011, Issue 6. ISSN 0378-7206, p. 235 – 247.
- [6] H.F. FERNÁNDEZ, E.P. GONZÁLEZ, V.G. DÍAZ, B.C.P. G-BUSTELO, O.S. MARTÍNEZ, J.M.C. LOVELLE, "SBPMN – An easier business process modelling notation for business users." In Computer Standards & Interface, Vol. 32, 2010, Issue 1. ISSN 0920-5489, p. 18 – 28.
- [7] G. GRÖNER, M. BOŠKOVIĆ, F.S. PARREIRAS, D. GAŠEVIĆ, "Modelling and validation of business process families." In Information systems, Vol. 38, 2013, Issue 5. ISSN 0306-4379, p. 709 – 726.
- [8] J. JANIČKOVÁ, "Možnosti využitia metód finančného manažmentu pri hodnotení ekonomiky a riadenia podniku." In: Trendy v aplikovaní štatistických metód pri zlepšovaní kvality III. Bratislava: University of Economics in Bratislava, Faculty of Business Economy with seat in Košice, Department of Business Informatics and Mathematics, 2012. ISBN 978-80-225-3441-3, p. 17 – 26.
- [9] Š. KASSAY, "Podnik svetovej triedy." Nové Zámky: STRATEG, 2001. 372 p. ISBN 80-88988-06-3.
- [10] A. KOSCHMIDER, H.A. REIJERS, M.S. SONG, "Social software for business process modeling." In Journal of Information Technology, Vol. 25, 2010, Issue 3. ISSN 0268-3962, p. 308 – 322.
- [11] A. KRAUSZOVÁ, J. JANEKOVÁ, "Výkonnosť ako faktor konkurencieschopnosti a úspešnosti podniku." In Národná a regionálna ekonomika VII. Košice: EKf Technickej univerzity v Košiciach, 2008. ISBN 978-80-553-0084-9, p. 468 – 473.
- [12] P. KUENG, P. BICHLER, P. KAWALEK, M. SCHREFL, "How to compose an object-oriented business process model?" In Proceedings of the IFIP TC8, WG8.1/8.2 working conference on method engineering: principles of method construction and tool support. Atlanta, Georgia: Chapman & Hall, Ltd., 1996. ISBN 0-412-79750-X, p. 94 – 110.
- [13] B. MARKGRAF, "What are the important metrics of

- business performance management?" [online]. In Houston Chronicle. Houston : Hearst Newspapers, 2013. Available at: <<http://smallbusiness.chron.com/important-metrics-business-performance-management-42249.html>>.
- [14] B. MIHALČOVÁ, B. GAVUROVÁ, "Balanced scorecard a jej problémy pri implementácii v slovenských podnikoch." In *Ekonomika a Manažment Podniku*, Vol. 5, 2007, Issue 2. ISSN 1336-4103, p. 47 – 57.
- [15] H. MILI, G. TREMBLAY, G.B. JAOUDE, É. LEFEBVRE, L. ELABED, G.E. BOUSSAIDI, "Business Process Modelling Languages: Sorting Through the Alphabet Soup." In *ACM Computing Surveys*, Vol. 43, 2010, Issue 1. ISSN 0360-0300, p. 1 – 56.
- [16] J. RAŠNER, "Podnikový systém riadenia a jeho výkonnosť." In *Výkonnosť organizácie. Prístupy k jej meraniu a hodnoteniu*. Banská Bystrica : Ekonomická fakulta Univerzity Mateja Bela, 2005. ISBN 80-968080-5-2, p. 50 – 54.
- [17] J. RECKER, M. ROSEMAN, M. INDULSKA, P. GREEN, P, "Business Process Modelling- A Comparative Analysis." In *Journal of the Association for Information Systems*, Vol. 10, 2009, Issue 4. ISSN 1536-9323, p. 333 – 363.
- [18] G. REGGIO, M. LEOTTA, F. RICCA, E. ASTESIANO, "Business Process Modelling: Five Styles and a Method to Choose the Most Suitable One." In *Proceedings of the Second Edition of the International Workshop on experiences and empirical studies in software modelling*. New York : EESSMod '12, 2012. ISBN 978-1-4503-1811-2, p. 1 – 6.
- [19] CH. SCHÜTZ, M. SCHREFL, L. DELCAMBRE, "Multilevel Business Process Modelling: Motivation, Approach, Design Issues, and Applications." In *Proceedings of the 5th Ph.D. workshop on information and knowledge*. New York : PIKM '12, 2012. ISBN 987-1-4503-1719-1, p. 91 – 94.
- [20] L. ŠIŠKA, "Meření výkonnosti v podnikové praxi." In *Podnikanie a podnikateľské prostredie v SR - zborník z vedeckej konferencie*. Bratislava: Ekonóm, 2007. ISBN 978-80-225-2364-6, p. 172 – 175.
- [21] D. TUČEK, M. HÁJKOVÁ, Z. TUČKOVÁ, "Utilization level of business process management in Czech enterprises – objectives and factors." In *E+M Ekonomie a Management*, Volume 16, 2013, Issue 2. ISSN 1212-3609.
- [22] UNKNOWN, "Latest Mechanical Engineering Interview Questions" [online]. Available at: <<http://www.mechanicalengineeringblog.com/tag/performance-and-efficiency/>>.
- [23] UNKNOWN "Business performance" [online]. Available at: <<http://www.cio.com/documents/whitepapers/sunbusinessperformance.pdf>>.
- [24] J. URBAN, "Co zvyšuje výkonnosť podniku." In *Moderní řízení*, Vol. 34, 1999, Issue 5. ISSN 0026-8720, p. 30 - 33.
- [25] W. ZHONGWEI, Y. SAHADHAOWEN, H. GANG, X. GANG, "Rules Oriented Business Process Modeling." In *International Conference on Internet Technology and Applications*. Wuhan, 2011. ISBN 978-1-4244-7253-6, p. 1 – 4.
- [26] K. ZIMERMANOVÁ, "Možné riešenia negatívnych dôsledkov krízy v praxi vybraných malých a stredných podnikov." In *Management of organizations in real and virtual environment: Opportunities and challenges IV*. Banská Bystrica : EF UMB, 2012. ISBN 978-80-557-0477-7.