



Improvement of Business Process Management Supported by Information System

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Abstract

The current market environment requires businesses to pay continuous attention, mainly because of competitiveness. It is very important to continuously develop and adapt management system as external conditions and strategy, which they decided to apply. Business process management is the indisputable successor of the classic functional line and staff management that had been developed and improved for decades. Based on the issue of interest defined by the paper we solve the practical problem focused on the evaluation and improvement of process control in a selected enterprise. The objective of our paper is to improve business process management supported by information system. Adequate scientific methods and approaches have been used to solve the problem, resulting in the presented theoretical and practical proposals. We focused on a specific process, particularly on its activities as well as the related costs. We identified the activities considered to be cost-inefficient by managers. Consequently, it was inevitable to identify the reasons behind the situation and to articulate the proposals affecting the costs of individual activities of selected process, processed by the information system of the enterprise.

Keywords: business process management, costs, customer, information system

Introduction

Currently, enterprises have to fight permanent uncertainty in order to survive the tough competition on the global market. Therefore, they aim to reduce the

uncertainty. Each successful enterprise approaches the issue differently, with help of different strategies. However, there is one feature all these efforts have in common. It is permanent development of management systems and their adoption to

external conditions and the applied strategy.

Process control, or business process management, is the indisputable successor of the classic functional line and staff management that had been developed and improved for decades. Managers and management scholars of modern times understand process control as one of the most suitable, complex and efficient approaches. The approach results in a unique value for customers, an outcome of efficiently configured processes.

The goal of our paper is to improve business process management supported by information system. We solved this problem in selected enterprise. This subject is part of our research (Increasing effectiveness of decision making of managers with support of information systems and accounting, VEGA number: 1/0489/15), which is solved in Department of Accounting, Faculty of Economics and Management, Slovak University of Agriculture in Nitra.

Specification of the solved problem

From the economic point of view, costs inform a producer whether to take the responsibility or give it up, i.e. what is the relation between economic costs and the overall income of the producer. Thus, the economic view on costs includes several entries, irrespective of whether they represent monetary transactions or not. Therefore, economic costs also represent costs resulting from the alternative use of production factors. The costs appearing under any selected alternative are called sunk costs (Zalai, 2013).

Costs represent a summary indicator creating the quality of overall activities in an enterprise. The level of costs reflects all aspects of the activities, especially production, use of working time, work efficiency, use of production capacity, modernisation etc. Therefore, the basic task of cost exploration is to evaluate the achieved efficiency and assess if it is adequate to the possibilities and the funds spent. It is crucial to:

- monitor the level of costs in relation with the production,
- analyse the structure of costs through evaluation of indicators affecting their level,
- monitor the cost development. (Bielik, 2013).

Costs can also be classified according to the place of origin, as enterprises carry out and perform their activities through diverse operations. From the viewpoint of their relation to the main business purpose, the operations can be divided into main operations, auxiliary operations and administration. The operations are allocated to individual internal departments. When corporate costs are divided into individual departments (according to the corporation structure), this classification of costs is applied. (Táncošová et al 2013).

According to Zalai et al (2013), cost analysis requires understanding of the differences in various approaches to costs. The necessity to plan, control and manage pushes the cost analysis to the following areas divided according to the necessary information sources:

- based on financial statements, it is possible to analyse the overall costs of the enterprise's operations,
- based on internal information, it is possible to analyse solutions for specific decision-making processes and to evaluate the level of fixed costs when analysing the amount and structure of operations.
- based on the management information system data, it is possible to analyse the costs of internal departments and products,

Majtán (2009) understands information systems on two levels. In a narrow, more technical and programming sense, it is a set of programs used for data processing. In a wider sense, it is a system providing information necessary for management. On the first level, the main task of the system is to process the data coming from a given

enterprise. The second level is not only focused on data processing; it also deals with data collection, transfer, storage, selection and distribution, serving the needs of a managing subject.

Závodný (2006) emphasises the fact that information system is a sub-system of management and high-quality information is inevitable to reach high-quality management. In cooperation with supportive methods, such information objectivises the decisions of managers while the decisions and related responsibilities are performed by managers who decide how to deal with the information.

Bolek (2016) claims that managers of various organisations need relevant information for effective management. Such information is essential for correct decision-making. In all organisations of the public, cooperative or private sector, the managers are active in these categories: operational, tactical and top managers. They all have an important mission - to affect the organisations and their results.

Gála et al (2009) define process as a set of mutually related or acting activities transforming inputs into outputs. The activities make use of resources (people, instruments, materials, etc.). A process may use several inputs as well as several outputs. A process is launched by a pre-defined action. Such actions can vary in practice.

Research design and methodology

Business process management is the indisputable successor of the classic functional line and staff management that had been developed and improved for decades. We solve in this paper the practical problem focused on the evaluation and improvement of process control in a selected enterprise which provide services. The enterprise applies process-oriented management.

We solved a demand of managers for costs reduction in the process of providing services. We focused on a specific process

of providing services, particularly on its activities as well as the related costs. The objective of the given paper is to improve business process management in selected enterprise.

When approaching the researched problem, we use two types of data, primary and secondary. It was our greatest concern to gain enough primary data. The primary data were obtained from the enterprise materials. Secondary data were obtained from the webpages and papers published in scientific and professional magazines.

Within solution of the selected issue we used the basic methods of scientific research: analysis, synthesis, comparison and deduction. In the paper we also used methods of monitoring, managed interview and modelling. The methods of formal logic are also applied in the paper. Analysis enabled us to learn about the structure of the service provision process in the IS as well as the relations among individual activities within the process. On the other hand, synthesis connected partial activities into one unit, e.g. when calculating the total costs of the service provision process. We were able to compare the results of individual operational units that provided us with data. The aim of the activity was to identify the phenomena affecting individual activities in the service provision process. Using the comparison method, we were able to compare the results.

The model of process costs is an important part of the methodological approach to the given issue. It is a modern and rational model based on the knowledge on the costs of processes, not services (the outputs of processes). The model documents process costs, i.e. the transformation of inputs into outputs. Process costs represent the total amount of resources spent on the implementation of a single process. According to the British norm BS 6143 (BS 6143 Guide to the economics of quality), they are classified into the following groups:

1. conformance costs – total costs of the transformation of inputs into outputs

- in a certain process conducted in the most efficient way,
2. non-conformance costs – losses caused by waste of time, material and other capacities connected with a discord within the process. Non-conformance costs represent pointlessly wasted resources.

Conformance costs can be considered a temporary ideal of a given time, while the real costs always take into consideration the non-conformance costs. Certain reserves in decreasing the total process costs can still exist in conformance costs, as each process can be further simplified and rationalised. Regarding the Model of process costs, the following indicators will be used in the paper:

- a) Total costs of the process – N_p :

$$N_p = N_{sp} + N_{np} \quad [\text{EUR}] \quad (1)$$

where: N_{sp} – conformance costs in the process,
 N_{np} – non-conformance costs in the process.

- b) Efficient use of costs – V_{efn} :

$$V_{efn} = \frac{N_{sp}}{N_p} \times 100 \quad [\%] \quad (2)$$

- c) Share of non-conformance in the process – P_n :

$$P_n = \frac{O_n}{O_c} \times 100 \quad [\%] \quad (3)$$

where:

O_n – total non-conformance identified during the evaluation of conformance in the process,
 O_c – total amount of inputs entering the process in a certain time period.

The source of these indicators (1), (2), (3) is Cienciala, J. et al (2011) Procesne řízená organizace.

Our main goal is to improve business process management supported by information system. The conclusion summarizes the results and offers proposals for costs reduction. The main research question is: Is it possible to reduce costs by improving selected process?

Results and Discussion

Information system (IS) of selected enterprise consists of different modules which manage different kinds of processes. We focused on the module which is responsible for the service provision process. The process is composed of activities with different statuses. We are focused on:

- I. *Analysis of service provision process,*
- II. *Actual problems.*

Analysis of service provision process

The order from a customer is gradually being processed after registering in the IS. Its processing is recorded by various statuses changing according to the activities that are currently being carried out. The statuses are divided into three basic groups:

1. positive statuses,
2. negative statuses,
3. final statuses.

Positive and negative statuses are considered temporary, as they change according to the current activities. Final statuses conclude the whole process.

Positive statuses

Positive statuses define activities performed in relation to a specific service provision order, leading to the final status – executed order. The following issue

includes concise characteristics of the said statuses. Order status "Preliminary" means that none of the data in the order was confirmed by a check and transferred to the follow-up systems, i.e. fields in the order can still be adjusted, corrected, updated or rewritten according to the expressed needs. This status is set by the system when an order is placed; the order can later be transferred to the statuses "Checked" or "To be processed". Any employee processing the order can leave it in the "Preliminary" status if there is a relevant reason to do so, e.g. online, phone-based or external sale and a consequent order that is to be signed by the customer. Order status "Checked" means that the order was already checked in the system. All order data were correctly inserted, meaning that they passed all integrated checks. However, the system itself cannot check if there is an error in the details, addresses, etc. The order can then be transferred to the status "To be processed" or "Back to be corrected". If an order is labelled by this order status "To be processed", it was already checked by the system. It means that all order data were correctly inserted and passed all checks including confirmation by the employee responsible. The order is then passed to further processing. In extraordinary cases, this status can automatically be changed back to "Checked" – it means the system evaluated the order as unsuitable for automatic processing. The order status can be changed to "Waiting to be confirmed", "Back to be corrected", and in extraordinary cases to "Checked". If an order is labelled by this order status "Waiting to be confirmed", it means that it was accepted and recorded in the system. The order can be cancelled in specific cases only. It can be changed to "Accepted" or "Waiting to be cancelled". This order status: "Accepted" means that the order was accepted by semantic control of the system and its physical execution was started. It can only change to "Technical investigation issued". This order status "Technical investigation issued" means that technical investigation (TI) by the system automatically started. It means distant investigation if it is possible to provide the required services and/or if there are

free ports or sufficient network quality. If necessary, technical investigation is performed on site by a technician in the given location. Positive results of the investigation enable the enterprise to move on to logistics, finalise the ordered service and deliver the terminal. If the results are negative, the order is refused. Customers can also refuse the terminal delivery or service provision. In this case, the order is cancelled and the status is changed to "Cancellation proposal". Its status can be changed to "Technical investigation performed", "Cancellation proposal" or "Refused". This order status "Technical investigation performed" means that the technical investigation was successful; it is not possible to perform any other operations with the order. Technical investigation finally confirmed that the required service could be provided. The order status can be changed to "Clearing sheet issued". This order status "Clearing sheet issued" means that the required services started to be installed by a technician. It is not possible to make any changes to the order. A technician was given a written order to perform physical installation of the ordered service. The order status can be changed to "Clearing sheet performed" or "Installation unsuccessful". This order status "Clearing sheet performed" means that installation of the service was successful. The service was physically installed and all other actions are to be conducted by the system. The order status can be changed to "Finished", "Installation unsuccessful" or "Executed". This order status "Finished" means the installation of service in the related systems. Certain part of the order executed in a related system is waiting for another part of the service to be processed by the IS. It is necessary to finish the order, correct its parameters and dates and pass it to execution. In this moment, the status can be changed to "Executed" only.

Negative statuses

Temporary negative statuses label orders leading to a final status where they end up unexecuted. These are so-called unimplemented orders. The temporary negative statuses are as follows.

Order which is labelled by order status "Waiting to be cancelled" is waiting to be cancelled by the customer. It is not possible to perform any changes to the order. The order status can be changed to "Cancelled – customer". This order status "Cancellation proposal" means that the customer asked for cancellation during the technical investigation and this fact was recorded by the IS. It can change its status to "Cancelled – customer". This order status "Back to be corrected" means that an order recorded in the IS needs to be corrected, as there are errors – incorrectly input data. Therefore, the responsible person passes the order back to the vendor who is responsible for the correction of errors. The order status can be changed to "Cancelled – correction". The order status "Installation unsuccessful" means that a customer refused to accept the delivery from a delivery agency. The order with the status "Clearing sheet performed" is cancelled and its status is changed to "Cancelled – customer". It is not possible to perform any further operation with the order.

Final statuses

It is not possible to perform any more operations or status changes with orders labelled by final statuses. Final statuses represent outputs of the service provision process. The final statuses "Cancelled – correction", "Cancelled – customer" and "Refused" represent negative outputs of the service provision process. On the other hand, the final status "Executed" represents a positive output of the service provision process. In the IS, the following types of final statuses can be identified. This order status "Cancelled – correction" means the order was cancelled because of necessary corrections. This could happen to an order in the status "Back to correction". This status is used if the responsible person placed an order incorrectly or identified an

error in the order. This status is designed for cancelled orders followed up by new or identical orders. This order status "Cancelled – customer" means that the order was cancelled by the customer. It can be used if the outcome of the technical investigation is "Cancellation", "Not accepted" or "Undelivered terminal". This final status can be assigned to orders in the statuses "Waiting for cancellation" or "Installation unsuccessful". This order status "Refused" means that enterprise refused an order because the technical investigation turned out to be negative. This status expresses the information that the required service is unavailable in the given region because of technical reasons. The customer always receives a written refusal. This can happen to orders with the status "Technical investigation issued". Order status "Executed" means that an order must also be checked before execution because the data coming from the IS to the follow-up systems must be complete and correct. The process of invoicing and charging customers for the provided services follows after this status.

The following Model of the service provision process describes the journey of a service provision order in the IS – through individual statuses and corresponding activities leading to the service provision or cancellation, i.e. finished process of provision service.

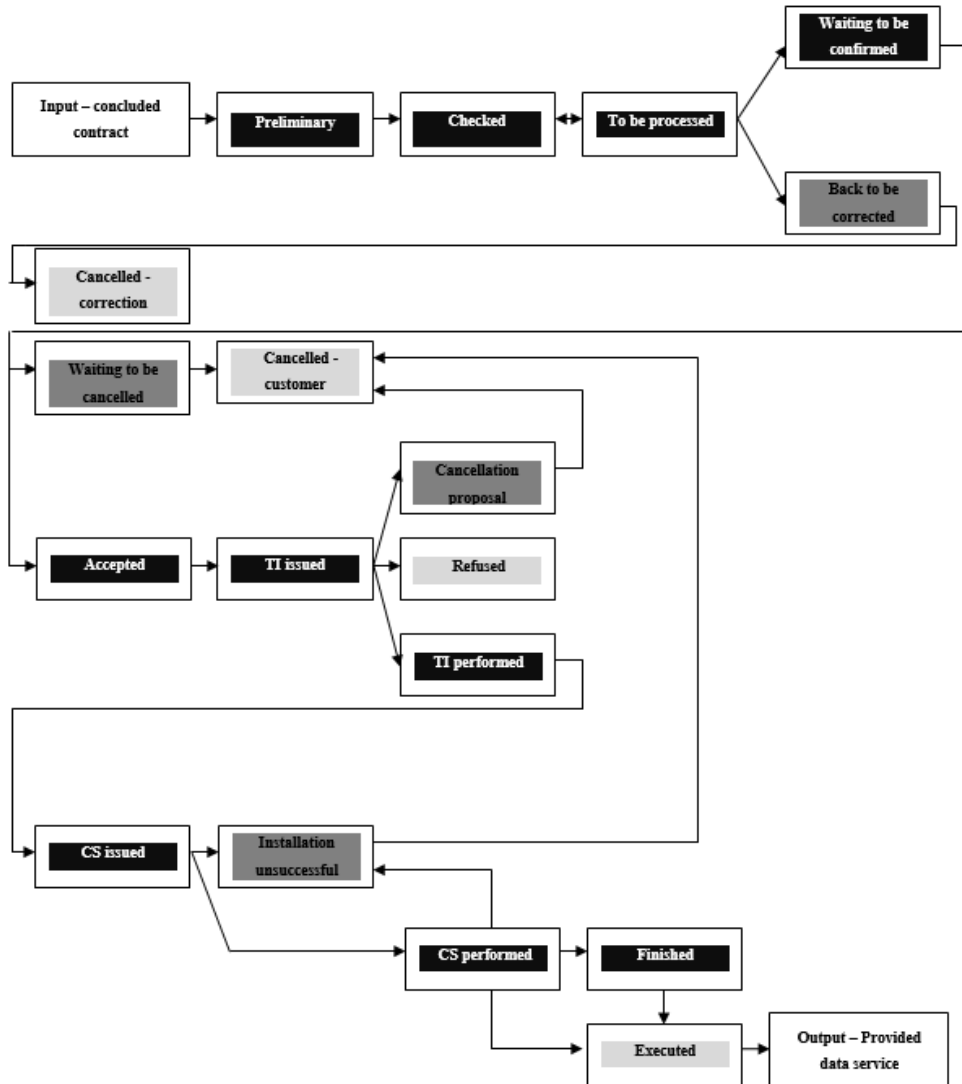


Fig. 1: Model of the service provision process

Source: Lateckova and Stuchly (2017)

- Positive statuses
- Negative statuses
- Final statuses
- Direction of activities within the service provision process

- TI issued - Technical investigation issued
- TI performed - Technical investigation performed
- CS issued - Clearing sheet issued
- CS performed - Clearing sheet performed
- Refused - Refused by the enterprise

Actual problems

Based on analysis of service provision process, we identified a problem with a large number of canceled orders from the customers, which increase the enterprise's costs. The following premise is applied: "Less cancellations mean less non-conformance costs and costs spent on unexecuted orders."

When looking for solutions of this problem, we are interested in the cancellation reasons that can be affected by salesmen:

- a) the customer waited for service provision for more than 30 days and finally refused the service,
- b) the customer was given wrong information regarding the price or some other property of the required service.

In order to look for ways of decreasing the amount of customer cancellations, we need to know the current conditions on both sides.

The customer:

- a) the customer waiting for service to be provided for more than 30 days can withdraw from the contract with no sanctions. This also applies if the customer has not accepted the terminal equipment, even if the above-mentioned time period has not expired yet. This right ceases to apply when the customer accepts the terminal,
- b) if the customer has been misled in an important issue, they have the right to withdraw from the contract if it is proclaimed before

the start or in the course of service provision (the status "TI issued"),

If the salesmen misled the customer in an important issue during the service presentation or sale, they will be reprimanded, and in case of repeated misleading, they can be financially sanctioned and even dismissed.

In order to decrease the amount of customer cancellations, we propose the following change of conditions:

The customer

- a) if the customer has waited for a service to be provided for more than 30 days, they can withdraw from the contract with no applicable sanctions,
- b) if the customer has been misled in an important issue, they have the right to withdraw from the contract if it is proclaimed before the start of service provision,
- c) if the customer asks for order cancellation for any other reason, they are liable to pay the sanction of 50 EUR (the proposed measure aims to limit the cancellations based on other reasons).

The salesman

- a) if the salesman has misled a customer in an important issue while presenting or selling service, they will be sanctioned to the level of the enterprise's incurred costs (the proposed measure tries to encourage salesmen to improve their knowledge of the product and not to give customers wrong or incomplete information),
- b) the salesmen will be obliged to check the entered order statuses based on the contracts concluded by them in the IS. We suggest that the salesmen check the statuses once every three days for each order according to order codes until the orders are executed. If the salesman finds out that an

order is labelled with one status longer than usual, they will contact the responsible person or another authority. This way, salesmen will thoroughly check their orders and identify the ones that are "stuck" or in need of further attention. This way, they strive to eliminate the risk of cancellation due to the prolonged time of order execution. This measure will decrease the time an order spends under each status if longer procedure is not necessary. Thus, it is possible to eliminate the reason for cancellations based on "waiting for service provision for more than 30 days".

While analysing the situation, we identified further imperfections leading to the prolonged process of service provision and consequent customer cancellations:

- a) no technician is assigned to the order and the order stays under the status "Technical investigation" for too long, thus contributing to the prolonged waiting period,
- b) the order stops for no obvious reason and is not passed to further processing,
- c) waiting too long for terminal delivery.

As checking the orders would be compulsory once every three days, more imperfections may appear influencing the service provision period and transfers of orders to various statuses in the IS. It would be crucial to identify the problems early on and eliminate them.

If we only take into consideration the reason "the customer waited for provision for more than 30 days", we assume the proposed solution would have the following influence:

- a) decrease in costs related to the status "Cancellation proposal" from 1,095 EUR to 730 EUR (by 33.30%). The decrease is connected to the 10 orders that would not be transferred to the status "Cancellation proposal" due to the new measure. The pursued effect would be visible in the costs decrease of 365 EUR and the revenue increase of 3,024 EUR (counting the 24-month long commitment and the average monthly revenue of 12.60 EUR),
- b) decrease in costs related to the status "Waiting to be cancelled" from 502.50 EUR to 375 EUR (by 25.37%). The decrease is connected to the 17 orders that would not be transferred to the status „Cancellation proposal“ due to the new measure. The pursued effect would be visible in the costs decrease of 127.50 EUR and the revenue increase of 5,140.80 EUR (counting the 24-month long commitment and the average monthly revenue of 12.60 EUR).

The difference in incurred costs can be reached by the introduction of the proposed solution, as it has direct impact on orders labelled by statuses that suggest customer cancellation.

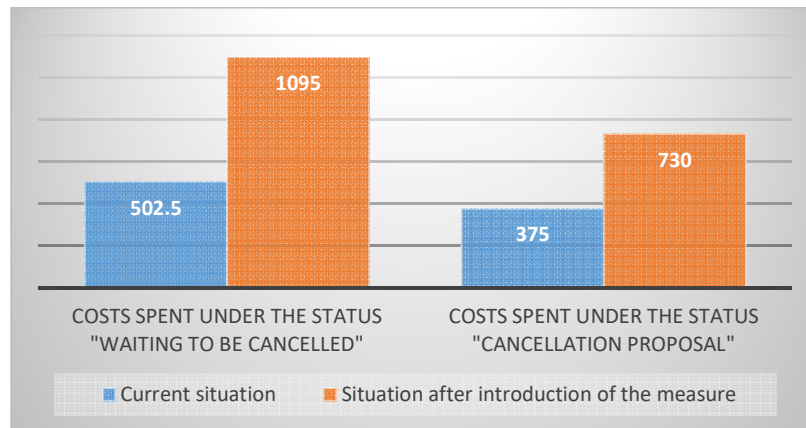


Fig. 2: Impact of the proposed solution on costs (EUR)

Source: own processing

Conclusion

Finally, we have come to the conclusion that each process, as complicated as it may turn out to be, can be mapped, its troublesome areas can be identified and solutions for the problems can be proposed. Selected enterprise applies process-oriented management. Its managers identified the problem of relatively high costs of service provision process and submitted the request to solve the situation. The service provision process was selected as the subject of research, detail evaluation as well as quantification and rationalisation of incurred costs. This problem was indicated as a problematic by managers. On the basis of the analysis we identified the problem in the services provision process, a large number of cancelled orders from the customers. We introduced a solution that contributes to reducing costs and more effective of process management in the enterprise.

In our opinion, incorporating a module into the IS serving both salesmen and responsible persons can eliminate the identified problem. The IS will automatically read all orders with data that are relevant to the signed-up salesman after they log in. At the same time, the module would assign actual statuses to individual orders. The task of the IS would be to administer the activities and make sure that salesmen check orders at the

proper time. In conclusion, we note that the model of process costs is able to identify the problematic activities in terms of utilization costs. In our opinion, the current period is very needed for enterprises to search the ways of reducing costs, respectively finding problem areas and there it is possible to apply the model of process costs, which can help to ensure long-term competitiveness. The paper contributes to the theoretical and practical research of costs from the viewpoint of allocation evaluation.

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References

1. Bielik, P. and Turčeková, N. (2013) Podnikové hospodárstvo, ISBN 978-80-552-1028-5, SPU Nitra.
2. Bolek, V. (2016) Information literacy models in managerial education, ISBN 978-80-7552-292-4, Wolters Kluwer, Praha.
3. Cienciala, J. et al (2011) Procesne řízená organizace, ISBN 978-80-7431-044-7, PBtisk Příbram, Příbram.
4. Gála, L. - Pour, J. - Šedivá, Z. (2009) Podniková informatika, ISBN 978-80-247-2615-1, Grada Publishing, Praha.
5. Látečková, A. and Stuchlý, P. (2017) Cost reduction in business management supported by management information systems and accounting, ISBN 978-80-7552-722-6, Wolters Kluwer, Praha.
6. Majtán, M. et al (2009) Manažment, ISBN 978-80-893393-07-7, Sprint vfra, Bratislava.
7. Norm, (1992) BS 6143 Guide to the economics of quality, Part 1: Process cost model, BSI, London.
8. Táncošová, J. et al (2013) Ekonomia, ISBN 978-80807-859-87, IURA Edition, Bratislava.
9. Zalai, K. et al (2013) Finančno-ekonomická analýza podniku, ISBN 978-80893-938-00, Sprint dva, Bratislava.
10. Závodný, P. (2006) Riadenie projektov informačných systémov, ISBN 80-225-2230-9, Iura Edition, Bratislava.