

HOW DOES MANAGEMENT ACCOUNTING CHANGE UNDER THE INFLUENCE OF ERP?

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Abstract

Given the intensive application of Enterprise Resource Planning Systems (ERP), the focus of this study was to assess the ERP influence on management accounting of industrial enterprises. That is, the objectives are the identification and analysis of the ERP impact on the management accounting and management accountants. In order to realize these goals, nine Serbian companies of different industry, which use SAP as a leading ERP software, have been surveyed. The conclusions are that SAP reduces the time required for the traditional tasks of management accounting, while increasing the time required for the activities of data analysis, performance measurement and subtle strategic reporting. Also, there is a significant change in the role of management accountants.

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1 INTRODUCTION

The management of industrial enterprises expects from modern management accounting to provide the answer to the challenges of constant changes. Having in mind the requirements set for the management accounting system, there are continuous efforts for improving its information support to the management. The application of new concepts, cost accounting systems and cost management techniques provides significant opportunities in that domain, and especially in the domain of managing the objectives, strategies and performances of a modern industrial enterprise. Apart from general approaches of improving management accounting system, the evolutionary path of management accounting was especially contributed by the development of ERP system. Due to the mentioned efforts modern management accounting becomes able to create various informations in order to meet various needs of numerous users. Having in mind the objectives set out by this paper, the attention will be dedicated to considering the effects of ERP (*in this paper we will analyse SAP, as one of the ERP software*) to management accounting system, which primarily requires the reference to the essence and characteristics of these systems “Mauldin and Richtermeyer (2004)”, “Koch (2007)”, “Sutton (2000)”, “Nicolaou (2004)” and then the identification, assessment and analysis of its impacts “Bredford and Florin (2003)”, “Poston and Grabski (2001)”, “Hanton *et al.* (2003)”, “Moldin and Rihtermajer (2004)”, “Hivonen (2003)”, “Granlund and Malmi (2002)”, “Scapens and Jazayeri (2003)”, “Caglio (2003)”, “Kihn *et al.* (2011)”. The remainder of this paper is organized as follows. Section 2 reviews the literature. Section 3 describes the research objectives, reviews the developed hypotheses and presents the results of the empirical analysis. Finally, Section 4 discusses the conclusions.

2 BACKGROUND LITERATURE

Modern era of networked computing is characterized, in software sense, by the domination of client-server architecture. Key software elements of this configuration are network software and management database system. By their

technical characteristics and performances, they provide, as service providers, for the users (clients) to access and use the data and information from databases in network environment. On the bases of client-software architecture, business information or integrated information system (*ERP*) was developed. This software for enterprise resource planning has emerged as an answer to continuously growing information needs of management, in terms of market globalization, internationalization of business, intensive development of modern production and communication technologies “Bradford and Florin (2003)”. The acronym ERP should not represent a dilemma in understanding the essence of integrated information systems, although it can point out to “planning” and “resources” and thus lead to wrong conclusions. The real focus and ambition of ERP is integration of all the departments and functions of enterprise into one information system, which can meet specific needs of various users.

Although it is structured of modules, ERP represents a highly integrated system based on the best business practice, which implies data archiving in a single base, by which the enterprise is provided with an efficient control of basic business functions, as well as the planning of strategic actions “Koch (2007)”. Additionally, data entry is provided at the sources or the nearest places, multi-user operating mode, e-business and communication over the Internet, shaping ad hoc and reports in the real time for various needs of users. As a result of extreme flexibility and adaptability, the rapid information flow, minimal response time to the requirements of buyers and suppliers, better interactions with business partners, higher quality of provided services and increased satisfaction of clients are achieved. Decision-making at lower levels, as a result of reliable and timely informing and possibility of simulating the real business processes, leads to the reduction of costs and inventories and flexibility in managing the transactions and shorter duration of production cycles provides higher efficiency and better performances of enterprise “Nicolaou (2004)”.

Having in mind that incentives for ERP implementation mostly come from the accounting (even more than 45%), and then from management (approximately 35%), the issue of its effects on organization and functioning of the overall AIS, and especially management accounting system, becomes logical “Hyvo-

nen (2003)". It is undeniable that this influence is multiple "Sutton (2000)". Numerous research studies deal with this issue.

All studies, according to their character, can generally be classified into two groups, structural and procedural. *Structural* research studies start from the basic assumption that the information systems (*IS*) are the cause of organizational changes in the enterprise. Concretization of that assumption in the domain of management accounting implies that ERP is the factor of improving organizational performances "Bredford and Florin (2003)", "Poston and Grabski (2001)", "Hanton *et al.* (2003)", "Moldin and Rihtermajer (2004)", "Hivonen (2003)". TABLE 1 testifies about the most interesting results and studies conducted.

Interesting results were obtained by "Hyvonen (2003)", whose research included precisely the large industrial enterprises in Finland, chosen in a controlled way from the list of 500 the largest, so that all the industries are involved. Subject of analysis were the effects of transition from non-integrated software applications to ERP, as well as the consideration management accounting functioning and practice in both system types. It was determined that out of the total number of respondents, 27% implemented the Activity Based Costing (*ABC*) as a modern cost accounting system. Out of that number, more than 65% has implemented ERP. Balanced Scorecard (*BSC*) was implemented by 24% of respondents (62% of them uses ERP). It is interesting that besides the modern ones, the traditional techniques and tools of management accounting are simultaneously being used. Although it exists, there is no particularly significant impact of ERP on the practice of management accounting, i.e. ERP does not significantly encourage the implementation of new accounting techniques.

TABLE 1 - Overview of the results of structural empirical studies

Poston, Robin and Grabski, Severin (2001), Financial impact of enterprise resource planning implementations	
Focus	Whether the implementation of ERP has a positive or negative impact on the performance of enterprise?
Sample	Sample consisted of 54 enterprises, which have officially announced that they have implemented ERP in the period from 1980 - 1997 (PR Newswire press releases in Lexis-Nexus and in The Wall Street Journal): These enterprises were observed in a five-year period.
Conclusion	It was determined that there are no direct significant improvements of organizational performances (expressed by financial indicators) immediately during the period (three years) after ERP implementation, as well as that there is no significant reduction of operating costs, except for the costs of final product in whose case a decline was recorded. The existence of time gap between the moment of system implementation and achieving of the first positive effects was identified
Hyvonen Timo (2003), Management accounting and information: ERP versus BOB	
Focus	The effects of transition from non-integrated software application to ERP, as well as the consideration of functioning and practice of management accounting in both systems types are analyzed.
Sample	The study has included 300 large industrial enterprises in Finland, chosen in a controlled way from the list of 500 the largest, so that all the industries are involved.
Conclusion	There is no particular significant impact of ERP to the practice of management accounting, i.e. The ERP does not significantly encourage the implementation of innovative techniques in industrial enterprises.

Source: Authors calculation.

In the focus of research studies based on the *process* approach, there are two

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key issues – acceptance and application of new accounting practice in organization and functioning of the accounting department. The conclusions are that basic logic of accounting is not changing under the influence of ERP and that there are no dramatic changes in the accounting itself, but that, in most cases, there are changes in the work of accountants. Their work becomes more complex and broader and more demanding, although some of the traditional accounting tasks are transferred to the other employees in the enterprise. The most significant results were obtained by “Granlund and Malmi (2002)”, “Scapens and Jazayeri (2003)” and “Caglio (2003)”. In addition to the mentioned, there were other studies with different approach to the problem. Namely, “Quattrone and Hopper (2004)” have paid a special attention to the impact of ERP on management control, while “Nicolaou (2004)” has observed post-implementation phase of ERP and its peculiarities. TABLE 2 testifies about the results of these studies.

TABLE 2 - Overview of the results of process empirical studies

Granlund, Markus and Maimi, Teemu (2002), Moderate impact of ERPS on management accounting: a lag or permanent outcome?	
Focus	The objective was to evaluate whether the ERP adds the value to the system of management accounting for the needs of decision-making and control, as well as whether the new system influences the budgeting process and performances measurement.
Sample	Sample consisted of the large companies from Finland, mostly users of SAP R/3 software, 16 workers from 10 companies were interviewed.
Conclusion	ERP has a stabilizing effect on the management accounting, i.e. Does not lead to the adoption of new accounting techniques. It was observed that the time necessary for analysis is being prolonged and the time necessary for routine tasks is being reduced.
Scapens, W. Robert and Jazayeri, Mostafa (2003), ERP systems and management accounting change: oportunities or impact? A reserach note.	
Focus	The objective was to observe the process of SAP implementation and identify the changes in management accounting.
Sample	A case study was conducted on the example of Italian multinational company. The data were obtained by interviewing the accountants and other employees.
Conclusion	Results indicate that ERP increases the level or routine tasks, and thus there are more evolutionary than revolutionary changes in management accounting. Additionally the responsibility of managers is being increased, since they need to posses a much higher level of accounting knowledge. Finally, although ERP encourages team work and cooperation, the changes that occur under its impact are incremental.
Caglio, Ariela (2003), Enterprise Resource Planning systems and accountants: towards hybridiyation?	
Focus	The study considers the impact of ERP on the accountatns.
Sample	Case study was conducted on the example of Italian company from Milan. The date were obtained by interviewing all the key participants of ERP implementation process and on the basis of internal documents
Conclusion	The results show that accountants spend less time on reporting because these tasks are mostly automated., which leaves more room for complex business analysis. The job of accountants becomes hybrid, especially from the aspect of the need for possessing multidisiplinaty knowledge of the management accountants.

Source: Authors calculation.

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The results of all these studies are not completely consistent. Analyses of ERP impact on management accounting depend on the perception and understanding of ERP. Poor or inadequate understanding of ERP causes poor comprehension of its impact on accounting. There are also other reasons for fragmented results, for example high level of data aggregation, use of various research methods, research coverage, whether it is conducted on the level of divisions or enterprises etc. However, it needs to be pointed out once again that the characteristics of integrated applications, facilitate already initiated changes in enterprises conditioned by their changes, but they also open new possibilities, especially in the domain of management accounting system. The observed changes are incremental, with minimal disruption of the existing policies and procedures, more focused on rebuilding and modification of the existing system.

However, for a more detailed discussion of ERP impacts on management accounting practice, apart from the review of the results of empirical research, the peculiarities of ERP should firstly be pointed out and then it is necessary to attempt to develop a particular theoretical framework, which will serve for an additional analysis.

3 IDENTIFICATION AND ANALYSIS OF SAP EFFECTS ON MANAGEMENT ACCOUNTING SYSTEM OF INDUSTRIAL ENTERPRISES

There are not a large number of serious studies and analyses concerning the ERP impact on management accounting of industrial enterprises. Such a situation can be explained by the fact that the tasks, techniques and organization of management accounting almost the same to the all enterprises, even industrial ones “Fullerton and McWatters (2004)“. Having in mind that industrial enterprises today face the changes in their operating mode, then their specificities whose reflection is obvious in the field of management accounting, as well as

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the requirements of industrial management, the attention should be focused on some specific issues. Identification and analysis of ERP impact on management accounting of industrial enterprises are largely conditioned by organizational structuring of accounting department itself. The results of considering the relation between ERP and management accounting will largely depend on the organizational options, which should be conceived primarily in the interest of meeting information needs of numerous users. However, we should have in mind the broader dimension of ERP implementation and building of information platform for the level of enterprise, in which AIS module represents only one segment.

Research Objectives. – The subject and focus of research is the impact of SAP (as one of the leading and one of the most common ERP software) on management accounting and management accountants of the large industrial enterprises in Serbia. The objective can be defined as the determination of the effect of SAP on management accounting system, i.e. the answer to the question whether there was an improvement of management accounting performances after SAP implementation. The focus of research is the application of the new accounting techniques, increasing the work efficiency and reduction of the time necessary for performing the tasks of management accountants, as well as the reconsideration of the possible revitalization of their role and significance. For this purpose will serve a model, ie. theoretical framework developed by “Rom and Rohde (2007)” and which is applied by “Yu Ho Tin (2006)”. This model will be partially modified in order to meet the specifics of the concrete research. Modification of the model includes the research only of the following relevant areas, namely: the relation between SAP and tasks and techniques of management accounting, changed roles of management accountants and changes in the organization and functioning of AIS and management accounting system. With respecting the possibility of existence and different approach to observing the relation between ERP and management accounting system, and based on the research of the relevant literature, the FIGURE 1 shows this framework for the analysis.

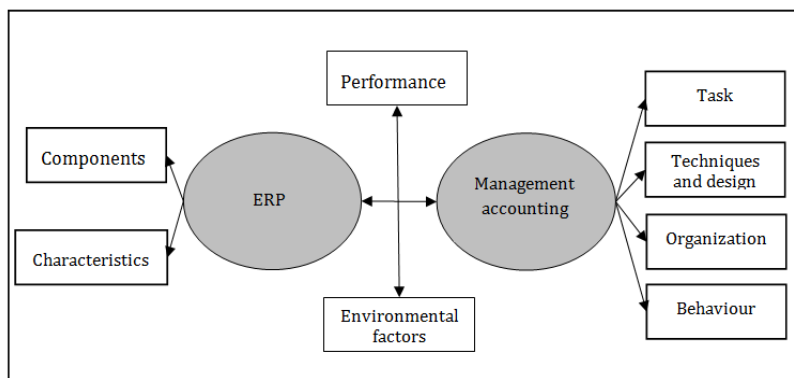


FIGURE 1 - Theoretical framework for investigating the relationship between ERP and management accounting *Source: Author calculation*

Hypothesis Development. – Bearing in mind the abovementioned, three basic research hypotheses are identified.

Hypothesis 1: After the SAP implementation there are changes in the organization of management accounting and SAP contributes to the introduction of new advanced management accounting techniques.

Our key variables (The advanced management accounting techniques) are the ABC, BSC, Benchmarking, Customer Satisfaction Surveys, Financial Key Performance indicators, Non-financial key performance indicators, Target Costing (*TC*) and Lifecycle costing. Numerous researchers have identified only minimal effects of different ERP software on the management accounting practice in terms of introducing new management accounting techniques “Booth (2000)”, “Granlund and Malmi (2002)”, “Scapens and Jayazeri (2003)”.

Hypothesis 2: After the implementation of SAP there is the change in the role of management accountants and their tasks.

In the function of testing *Hypothesis 2* we will analyze the following management accountants skills: reporting skills, knowledge of information systems, teamwork and possessing interfunctional knowledge. Our aim is to conclude

whether the change in the role of management accountants occurred after the SAP implementation. Also we will give assessment of the changes in the management accountants tasks. We will examine the time needed for management accounting activities (budgeting, reporting, data analysis, cost accounting and performance measurement) before and after the implementation of SAP. In this regard, some authors “Granlund and Malmi (2002)” emphasise that SAP provides more time for sophisticated analyses and the changes in the processes of budgeting and planning after the implementation of SAP were identified as minimal, while other “Scapens and Jayazeri (2003)” suggest more expressed role of management accountants as analysts and the reduction of time necessary for routine accounting tasks and indicate that the budgeting process becomes increasingly directed towards the future.

Hypothesis 3: The length of using SAP determines the level of customer satisfaction with SAP.

The assumption is that with the passage of time of use, due to better understanding of the functioning and seeing all the benefits, the level of satisfaction using SAP increases. At the beginning of use of any ERP software problems occur due to inexperience and insufficient knowledge of employees. Over time, these problems are overcome. This is consistent with the conclusions of researchers who claim that the full effects of the SAP implementation become visible and apparent only after prolonged use “Poston and Grabski (2001)”, “Hunton *et al.* (2003)”.

4 EMPIRICAL METHOD

In methodological sense, the interviewing includes large industrial enterprises in Serbia, which use SAP. It is about leading business software, which is used by more than 105.000 different economic entities in 120 countries of the world. More than 2/3 companies from Forbs list -TOP 500 use SAP. Since the most common software in Serbian market is SAP only those industrial enterprises that are the SAP users were interviewed, as in the case of “Hivonen (2003)”. Additionally, it needs to be pointed out that the users of SAP in Serbia contribute with

more than 1/3 to the gross domestic product of the country. In addition, the enterprises in various industries were considered due to the equal presence of all industries. During the formation of the sample, the attention was paid on the length of period of SAP use. In above-mentioned enterprises, the accounting, finance, plan and analysis, i.e. controlling managers were involved. The survey was conducted by direct surveys, e-mail or telephone.

In our country were no similar studies. The authors have in mind only studies which test SAP effect on management accounting and management accountant in Serbia. The authors are aware of all possible limiting factors. Disputing may be small sample size, which consists of nine large industrial companies, users of SAP. The authors used firm size criteria defined by the applicable regulations of Serbia (Law on accounting and auditing). We decided to choose nine enterprises because our research had a feature of multiple case methods. The multiple case method is suited to researching unknown subjects, i.e., for getting in-depth and first-hand understanding of a particular situation "Yin (2004)". Unlike single case studies, multiple case studies permit replication and extension between individual cases, which helps researchers to understand patterns more easily, to eliminate chance associations, and to form better theoretical structure. While there is no ideal number of cases, a number between four and ten usually works. So we choose nine. Small and medium enterprises were not taken into consideration, which is compatible with similar research studies in the world "Hivonen (2003)". Specifically, the assumption is that in the case of small and medium enterprises, the very size of the enterprise may be a limiting factor in identification SAP effect on management accounting. The company size is not a limiting factor in implementing SAP solutions. About 75% SAP users are small and medium companies. Also, the survey included only companies of Serbia, which can also be noted as a potential limitation. However, during the entire work and in presenting the conclusions, we were guided by a similar research in the world and accordingly we did some comparisons. Despite all this, the authors are confident in the reliability of the results obtained, particularly because the obtained conclusions largely coincide with the findings of similar surveys carried out in the world.

5 *EMPIRICAL RESULTS*

For the purposes of describing the sample, basic *descriptive* statistical measures will be used. TABLE 3 provides a descriptive analysis of variable *time* of using SAP in months. The above sample includes nine units tested with a range of results 72, the minimum score is 21 month and maximum is 93 months. The mean is 51.89 months of using SAP. Standard deviation as the most precise measure of the variability of occurrence is 23.961, and shows deviations from the distribution of its mean, while the most frequent time of use is 58.00 months. TABLE 3 - Descriptive statistic for the time of using SAP

N	Min	Max	Mean	Median	σ
9	21	93	51.89	58.00	23.961

Source: Authors calculations.

Bearing in mind the presented theoretical model, established goals and hypotheses, the following relevant issues should be considered.

The relation between SAP and management accounting techniques. – The analysis that follows will be directed to two already mentioned management accounting techniques ABC and BSC. The mentioned techniques, although available and useful, they are not widespread due to the numerous barriers “Rom and Rohde (2007)”. With the emergence of the advanced IS, it is expected that their application will be increased. This is supported by ABC and BSC softwares, which are much more efficient and flexible in terms of analysis and reporting “Baxendale (2003)”.

The survey shows that before the implementation of SAP in four companies in Serbia ABC was implemented. Results obtained for the period after SAP implementation, are not promising (FIGURE 2). About, 60% of respondents use some form of ABC within the framework of SAP. It is important to emphasize that the usage of ABC was identified only in two companies more than before the SAP implementation. Specificity reflects in that the ABC is not entirely implemented and that it is used almost in all cases as an additional system of cost accounting and cost management, i.e as a system complementary to the

existing one “Knežević and Mizdraković (2010)”.

The application of TC is recorded in about 40% of industrial enterprises included in the survey, and BSC in about 20% of cases. It is significant the use of financial key performance indicators in about 30% of the surveyed companies after the implementation of SAP. In more than 20% of cases, there was no implementation of new innovative techniques and tools of management accounting.

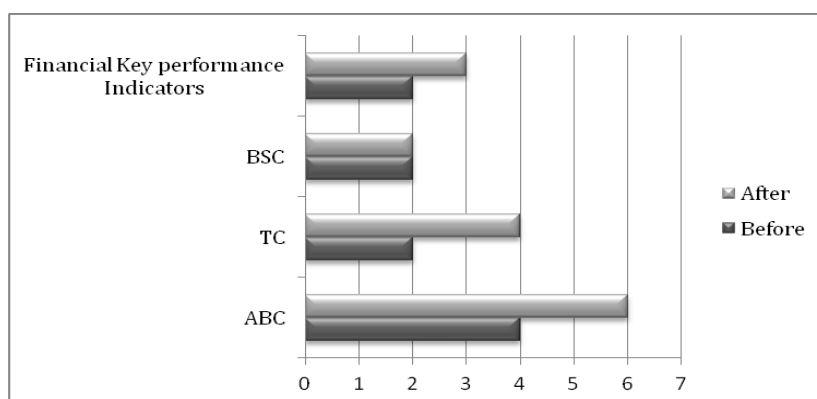


FIGURE 2 - The application of management accounting techniques before and after SAP

Source: Authors calculation

In order to answer the first hypothesis, it can be concluded that management accounting techniques have not been drastically changed under the influence of SAP. However, SAP represents an important source of support to the new accounting practice, i.e. it provides the initiative to the implementation of some new accounting techniques, primarily ABC, TC and BSC, which were not so widespread before the SAP „Kaplan (1998)“. It is realistic to expect that in the future the SAP will influence the advent of the new ones and support the changes in the existing techniques of management accounting.

The relation between SAP and the management accounting tasks. – Drawing conclusions on the mentioned relation requires the decomposition of management accounting system into segments of transaction processing, reporting and support to decision-making. In relevant literature, it is claimed that SAP per-

forms the tasks more successfully in the domain of transaction processing and producing operational information. This is evidenced by the example of production module, i.e. cost accounting, which confirms the statement on the high efficiency of SAP in the domain of processing and reporting for operational purposes. Operational activities of this module are very efficiently implemented by SAP, providing the high quality of processing, much better and flexible information, as well as more accurate and coherent financial flows. The reports produced from such a system, with a large scope of extremely detailed information, are the most useful for operational management. The information produced in this way are generally similar to the information produced by previous systems, but in SAP environment, they are more available, with the possibility of the management to access them directly, without waiting for their shaping into various reports. Also, it is pointed out that there is much lower level of SAP efficiency in the support decision-making process, i.e. that its information support for the needs of strategic decision-making is limited.

The question of informational support for the needs of middle and top management remains open “Ribeiro and Scapens (2004)”, „Scapens *et al.* (1998)“. Our aim was to conduct a detailed analysis of SAP reporting potential. This especially having in mind that the first association to the SAP is „more and better information“, “Booth *et al.* (2000)”. The potential dilemma can only be resolved by the analysis of details and aggregation of information, determination of the management levels towards which they are directed, as well as which is their purpose. Exceptional orientation on operational activities and operational management, as well as the high level of information details, indeed make the SAP information support in some cases inadequate for the needs of strategic business decision-making (the survey results). But the company SAP Inc. has developed the solution SAP Strategic Enterprise Management, especially for these purposes. Also, the SAP potential is enormous. SAP reports are well known for their precision and reliability.

The fact is that SAP improves and standardizes information flows, but at the same time it centralizes them. Although it is very successful in the domain of transaction processing and efficient in the creation of numerous financial,

manufacturing, statistical and management information, sometimes it does not provide all the necessary information for a long-term and strategic decision-making or does not provide information directly. Hence, can the SAP really meet these needs in an adequate way? The answer is affirmative, but conditional as well. Yes, only with the support of management accountants, who remain irreplaceable for the needs of support to this decision-making. Management accountants prepare the necessary information and reports by their extraction from the system and analysis for the needs of middle and top management. Also in this research we did not interested in technical aspect or aspect of different SAP modules. We were interested in different data and information from whole SAP software.

An example is the budgeting process, as one of the tasks of management accounting. Instead of being statistical or fixed plan for the entire enterprise for the whole year, the budget becomes dynamic and flexible. In addition, it is possible to make good predictions on a monthly basis, so that the comparison with the achievements can be made on monthly basis. Hence, the reports of management accountants for the needs of management are less focused on comparison with the budget and more on the comparison with predictions. Although it is more extensive, this task of management accountants requires less time after SAP implementation, as evidenced by the figure 3.

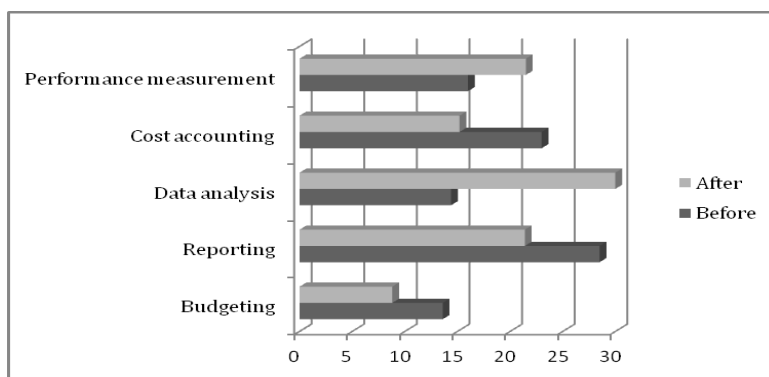


FIGURE 3 - Time required for the tasks of management accounting before

and after the SAP implementation

Source: Authors calculation

TABLE 4 shows descriptive statistics for the variables *types of tasks* for management accountants, and the time required for the realization of these tasks before and after the implementation of SAP.

TABLE 4 - - Descriptive statistics for the variables types of tasks for management accountants

	N	Me an	σ	Media n	Min	M a x
Time for budgeting before SAP	9	14. 00	10.51 2	15.00	0	3 0
Time for reporting before SAP	9	27. 22	11.21 1	30.00	10	4 0
Time for analysis before SAP	9	14. 33	5.500	15.00	4	2 0
Time for cost accounting before SAP	9	24. 44	9.167	25.00	10	4 0
Time for performance measurement before SAP	9	15. 00	8.660	15.00	5	3 0
Time for budgeting after SAP	9	9.2 2	6.553	10.00	0	2 0
Time for reporting after SAP	9	20. 44	13.98 3	20.00	5	4 9
Time for analysis after SAP	9	30. 00	8.660	30.00	20	5 0
Time for cost accounting after SAP	9	15. 78	6.553	15.00	10	3 0
Time for performance measurement after SAP	9	21. 11	9.280	20.00	5	3 5

Source: own calculations.

The average time for budgeting expressed in percent before the implementation is 14.00% and after the implementation of SAP is 9.22%. In 6 cases time for budgeting after the implementation of SAP is less than the required time before implementation, in only one case, the time required for budgeting is greater after the implementation and in 2 cases there was no change in the time required for budgeting (*Ties*). Since the $p = 0.09$ we can conclude that the time needed for budgeting is significantly shorter after the implementation of SAP, based on Nonparametric Test/2 Related Samples or Wilcoxon signed

rank. The Wilcoxon signed-rank test is a non-parametric statistical hypothesis test used when comparing two related samples, matched samples, or repeated measurements on a single sample to assess whether their population means ranks differ. It is used as alternative non-parametric methods of paired sample t-test. When the normality assumption is not satisfied or the sample size is too small parametric t-test is not valid and we should use non-parametric test.

Similarly, for reporting the conclusion is that the time required for the reporting activities is less than the required time before SAP implementation, but results is not significant. However, we must not neglect the fact that the respondents made ??a difference between the operational and strategic reporting. In this sense, according the respondents the time required for operational reporting is shorter, and for the needs of strategic reporting is longer. Furthermore, results for the task of data analysis shows a significant increase in time required for these jobs after the implementation of SAP. The time required for the activities of the performance measurement is longer than the required time before SAP implementation, but results also is not significant. In terms of activities of cost accounting, there was recorded a significant reduction of required time after the implementation.

As an answer to the second hypothesis, it can be concluded that it is obvious that after the implementation of SAP, the time necessary for budgeting, cost accounting and reporting is reduced, but simultaneously the requirements in the domain of analysis and performance measurement are increased. SAP directly provides a lot of information for the needs of operational decision-making "Caglio (2003)", but for the needs of medium-term and long-term decision-making, it is necessary to use additional tools for the creation of information (the survey results are largely consistent with the results obtained by "Yu Ho Tin (2006)". The role of Excel is enormous, as well as the role of tools for business intelligence (*BI*). Strengthening the information sources is contributed by the applications for connecting the companies with strategic partners, known as the applications for partner relationship management (*PRM*), by which better communication with business partners is provided, especially in the creation of information in the real time.

Changing the role and satisfaction level of management accountants under the influence of SAP. – Today, management accountants perform a wide range of tasks. Apart from the traditional, management accountants perform the tasks from the domain of general management and tasks of the maintenance of IS. Also, the tasks of management accounting are mostly done by the managers at all levels. Our research was focused on four basic types of management accountants knowledge (skills) and those are the following: understanding the financial and management accounting, possessing the knowledge from other functional fields (manufacturing, sale and marketing), knowing and using information systems and the necessity of team work.

The survey found that the implementation of SAP sets higher requirements for each type of knowledge, i.e. skills mentioned, which shows TABLE 5. The leading position still occupies possessing basic knowledge from the domain of accounting. More significant becomes the knowledge from various functional fields. The results on the necessary decentralization of accounting knowledge towards operational managers, primarily the managers of production functional area, are particularly interesting. Namely, the specificity of ERP software generally is entering the data only once, which makes the entry itself more demanding, complex and responsible. The role of the manager of production functional area is particularly increasing, having in mind the scope and significance of entered information for which they are directly responsible. The increasing of significance and necessity of teamwork is logical with the previous. The requirements for the possession of IT knowledge of management accountants are at the lowest level and that time is the same. Namely, in about 60% of the interviewed enterprises, it was pointed out that the employed already possessed the sufficient level of basic IT knowledge, so the transition to SAP did not require any additional training of this type. Of course, it was necessary to get to know the peculiarities of this software package and its procedures.

TABLE 5 - The importance of skills before and after SAP

	Mean Before SAP	Mean After SAP
The importance of knowing IS	2.33	2.33
The importance of having functional knowledge	2.56	2.89
The importance of team work	3.33	3.67
The importance of reporting skill	3.67	3.78

Source: own calculations.

However, for all four cases statistical significant changes can not be identified after the implementation of SAP, based on Nonparametric Test/2 Related Samples. It is obvious that on average the greatest importance after the implementation of SAP has the skills of reporting, also on average the importance of all these skills is increasing, except the importance of knowing and using IS. But these increase is not statistical significant.

It is very interesting to point out the partial reduction of management accountants responsibility under the ERP influence. On the other side, there is the trend of increasing the responsibility of management for financial aspects of activity. Owing to the computer technology, which integrates managing systems with the systems of operational control, management has on line access to all the information, especially those necessary for controlling the costs. In the period before ERP that work was carried out by accountants "Cooper and Kaplan (1998)". Consequently it is possible that management accountant will loss simple and basic skill, i.e. their transformation into mere analysts of the system. They are not engaged in simple measuring and reporting on performances anymore. More than 50% of the respondents pointed out: „*the accountants turn into operators and supervisors*“. Management accountant still remains irreplaceable in the jobs of interpreting various indicators of performances and analysing their mutual relations. It is expected from them to be internal consultants, who will not only assist the managers in the creation of strategies and decision-making, but also actively participate in those processes through integral approach to the analysis and understanding operational and financial performances. Providing such a support is possible only on the basis of possession of the new skills and knowledge, more precisely, the consulting,

communication and interpersonal skills, broader knowing of the entire business, adopting new way of thinking and behaving and development of new business culture in accordance with the requirements of changes “Ribeiro and Scapens (2004)”.

Finally, retaining the role of the creator, consultant, supervisor and analyst of the cost accounting and management accounting, AIS and IS of enterprises, management accountants become irreplaceable managers at all levels of management, with the actual ability to support the management of a modern enterprise and to actively participate in corporative management, to participate in planning, control and decision-making, to help in the adaptation to the changes and their creation, to contribute to the formulation of strategies and tactics, increase of efficiency and improvement of performances, and all of that for the purpose of a successful market, competitive and strategic orientation of the enterprise.

In connection with this directly follows the answer to the third hypothesis, that the period of using SAP determines the level of customer satisfaction. The satisfaction level, as a key variable, was tested on a scale of 1 to 5. The obtained results are shown in TABLE 6 and they are very interesting.

TABLE 6 - Descriptive Statistics for Satisfaction level

	N	Min	Max	Mean	Std. Deviation
Satisfaction level	9	2	5	3.89	1.269
Valid N	9				

Source: own calculation.

The average satisfaction level of SAP users is 3.89. To determine the correlation between period (TABLE 7.), that is to say the length of use, and satisfaction level of respondents, rank correlation coefficient will be used (*Analyze / Correlate / Bivariate / Spearman*).

TABLE 7 – Correlations

			The length of use in months	The level of customer satisfaction
Spear	The length	Correlation	1,000	.791*
man's	of use in	Coefficient		
rho	months	Sig. (2-tailed)		.011
	The level of	Correlation	.791*	1.000
	customer	Coefficient		
	satisfaction	Sig. (2-tailed)	.011	.
*Correlation is significant at the 0.05 level (2-tailed).				

Source: own calculations.

It can be concluded that the correlation between the length of using SAP and the level of customer satisfaction is 0.791 and that it is statistically significant at the level 0.05. The obtained conclusion is entirely logical, since with the time of use the level of familiarity with the system increases, as well as the methods and specifics of how it works. In addition, the benefits of using SAP become more apparent.

Changes in organization and functioning of AIS and management accounting system. – AIS development has going upwards in the direction of a continuous improvement of the quality of their information potential, in its all segments (financial accounting and management accounting). Both segments of AIS are significantly influenced by IS and IT “Sutton (2000)”. There are a number of essential aspects of improvement in the domain of management accounting, as traditionally the most reliable information support of the management. The most important is the issue of adequate, high-quality information support to the management.

Owing to the ERP, a large part of routine accounting tasks is done centrally and automatically, while the coordination and preparation of various operational reports is trusted to the ERP. On the basis of advanced information technology, the so-called centers of excellence arise, i.e. the teams of specialists who perform more demanding tasks, such as statutory (financial) and tax reporting, but also the internal audit “Nicolaou (2004)”. Both, the information generated by the specialists and computer system become easily accessible and they are rapidly shared at all the levels of organizational hierarchy of the enterprise.

Another systemic change in accounting is already mentioned decentralization of accounting knowledge towards management structures. The progress, due to the sharing of knowledge and information, as the only resource which is increased by dividing, has been made only in the direction of more efficient and better decision-making of the management.

In modern era of networked computing the application of ERP has contributed to numerous changes in accounting information and management accounting system “Ribeiro and Scapens (2004)”. The most significant are:

1. Elimination of routine tasks of the accountants, since the tasks that were once performed by accountants are now performed by the computers. On the contrary, they are aimed at much serious tasks of analyzing and performance measurement.
2. Although it can imply the loss of some basic, traditional accounting skills, the requirements that are set before the accountants are not of the reduced scope and complexity.
3. Operational management possesses a lot more accounting knowledge, which confirms the necessary decentralization of that knowledge. Additionally, the management is responsible for the financial aspects of its own activities.
4. The management accountants are required to have a much higher level of knowledge multidisciplinary and fulfillment of a wide range of tasks. Broader and more demanding role of management accountants implies the high analyticity and ability of data interpretation, then a broad knowledge of the business and information technology, willingness for the teamwork and strategic thinking, communication and interpersonal skills, as well as the ability of ethical evaluation and decision-making.

Contemporary accounting is facing many challenges. Some of them are significant presence of IT, then new altered roles of accounting and managerial profession with new specific tasks, increased respect for the international professional regulations, code of professional ethics are the fields of big changes

with a direct impact on the accounting, AIS and accounting profession. These dynamics changes set the more requirements for a more uniform and quality accounting report, especially having in mind the unbreakable connection between such a reporting and efficient management.

6 CONCLUSIONS

This is the one of the first studies according the SAP effect on management accounting in Serbian industrial enterprises. We study nine enterprises from different industry to explore the relationship between SAP, as only one of the ERP software and management accounting changes. Although we conclude that there is the impact of SAP on the management accounting, that impact is relatively modest in relation to the expectations “Granlund and Malmi (2002)”. Also, can be concluded that there is no strong causal relationship between the implementation of SAP and changes in practice of management accounting, i.e. the stabilizing effect on management accounting is more widespread “Scapens and Jazayeri (2003)“, „Hyvonen (2003)”. SAP is one of the best, the most popular and the most widely accepted ERP software in Serbia. That was the main reason for choosing SAP for our research. Our results show the following:

1. The process of the implementation of SAP is complex and in its initial phases, more attention is devoted to configuring the basic modules. The mentioned complexity of the system can be hindered by the advanced development of accounting.
2. Long time necessary for the full implementation of SAP can condition a subsequent appearance of the expected effects. In one of the enterprises included in the survey, the implementation process itself has lasted for more than 18 months, it is still not ended and both SAP and the old software solution are simultaneously used. Such a situation greatly complicates the work of accountants.
3. There is a time gap identified between the moment of the implementation of the system and the first positive effects. Can be to expected that the

enormous potential of SAP will be more completely used in the later phases of functioning, with the maturing of the idea of its significance and effects (*the attitude of one of the interviewed managers is that abbreviation **SAP** means „Slowly And Painfully“*).

4. The replacement of the existing system by the new one causes a larger number of problems, such as: information transfer from a several different existing applications to the new system for the purpose of integration, complex technical and operational, but also the social questions, especially the organizational resistance to the changes and specificities of corporative culture. Orientation of the system towards the whole of the business, and not the individual functions, can cause rigidity as well. This is supported by the attitude of one of the interviewed managers *“too much specialization and the lack of flexibility”*.
5. The reason for the limited impact of SAP, as the ERP software, should also be looked for in the area of failures and errors in its implementation. Most frequently, it is the wrong choice of implementation strategy, choosing the wrong ERP, selection of bad consultants, due to the reengineering of business processes etc. In one of the respondent enterprises, the comment of the finance manager was *“good consultants can save you, but they can destroy you, as well”*.
6. SAP reduces the time required for the traditional tasks and increase of the time required for the needs of analysis and performance measurement. The time necessary for a more subtle managerial reporting is particularly extended (numerous information can be obtained by using Excel, BI or other tools, which additionally increases the significance of management accountants).

Finally, the fact is that the new information technology causes changes in the system of management accounting. The future of management accounting cannot be predicted with certainty, but it is certain that the future will be characterized by the change in reporting system, conditioned by the emergence

and implementation of ERP. It contributes to the increase of flexibility of the information of management accounting, saves time and money, and thus the interest for its implementation increases significantly.

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KAKO SE UPRAVLJAČKO RAČUNOVODSTVO MIJENJA POD UTJECAJEM ERP-a?

Sažetak

S obzirom na intenzivnu primjenu sustava planiranja resursa poduzeća (ERP), posebno u industrijskom poduzetništvu, cilj ovog istraživanja je bio utvrditi utjecaj ERP-a na upravljačko računovodstvo u industrijskim poduzećima. Dakle, ciljevi su identifikacija, evaluacija i analiza utjecaja ERP-a (u ovom radu analiziramo SAP kao ERP software) na upravljačko računovodstvo i upravljačke računovode. Kako bi se ti ciljevi ostvarili, promatrano je deset tvrtki različitih proizvodnih aktivnosti. Zaključeno je da SAP umanjuje vrijeme potrebno za implementaciju tradicionalnih zadataka upravljačkog računovodstva, dok produljuje vrijeme potrebno za analizu podataka, mjerenje performanse i potanko strateško izvješćivanje. Isto tako, dolazi do značajne promjene uloge upravljačkih računovođa.

Ključne riječi: ERP, AIS, upravljačko računovodstvo, upravljački računovođa, inovativna računovodstvena praksa