Scientific Critique of the Paper „ERP and Management Accounting Changes of Industrial Enterprises in Serbia” published in the Journal INDUSTRIJA, April-June 2012 Vol. 30(2)*

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Summary:
SAP software solutions are one of the most significant representatives of ERP software solutions. With its software solution SAP ERP, the company SAP Inc. is also present in the business practice of Serbia’s industry enterprises. In the last fourteen years, a considerable number of companies in Serbia have implemented this software solution, because it provides a high level of transparency in financial accounting, cost accounting and production planning reports, which considerably facilitates the decision-making process. SAP software solutions are modularly structured, which gives the customers a possibility to focus their attention on specific business areas, of their own interest. However, the cohesion of a system is not threatened, because SAP software solutions ensure that the information can be processed in all modules in real time.

Key words:
SAP, ERP, production planning, management accounting

Rezime:
SAP softverska rešenja su jedna od najznačajnijih predstavnika ERP softverskih rešenja. Sasvojim rešenjem pod nazivom SAP ERP, kompanija SAP AD je prisutna i u poslovnoj praksi industrijskih preduzeća u Srbiji. U poslednjih četrnaest godina, značajan broj kompanija u Srbiji se opredelio za primenu ovakvog softverskog rešenja, pošto ono obezbeduje značajnu preglednost izveštaja bilo u finansijskom računovodstvu, obračunu troškova ili proizvodnji, čime se olakšava donošenje poslovnih odluka. SAP softverska rešenja su modularno strukturirana, što korisnicima omogućava da usredsrede pažnju na određena poslovna područja, koja su od njihovog poslovnog interesa. Međutim, time se ne ugrožava kohezija sistema, pošto SAP softverska rešenja omogućavaju pravovremenu obradu podataka, u svim modulima.

Ključne reči:
SAP, ERP, planiranje proizvodnje, upravljačko računovodstvo
1. INTRODUCTION

This critical review examines the paper „ERP and Management Accounting Changes of Industrial Enterprises in Serbia“ (referred to herein as the “MTJ paper” or “MTJ thesis”) by the authors: Malinić Slobodan, Todorović Mirjana and Jovanović Dejan, published in the April-June 2012 (Vol. 10(2), pp. 189-208) issue of the Economic Institute’s journal INDUSTRIJA. The focus of the MTJ paper is to assess the amount of influence that SAP software solutions had over the management accounting system in Serbia’s industrial enterprises. The importance of the MTJ paper lies in its attempt to come to conclusions about the impact of SAP software solutions on the management accounting system using the results of empirical research. Therefore, the MTJ paper should undergo a detailed and careful evaluation by those who have experience in SAP software solutions. Since I have educational qualifications and work experience in SAP software solutions (list of these qualifications is submitted to the editor-in-chief and the managing editor of the journal INDUSTRIJA), I have decided to undertake the task of providing such an evaluation and to present the main results. This evaluation has no hidden intention whatsoever to scientifically discredit the authors of the MTJ paper, to dispute the gist of their research, or to diminish their contribution to understanding of how SAP software solutions make impact on the management accounting system. However, following a thorough revision, I tried to make out a case to show that the MTJ paper contains inconsistent statements as well as unproved conclusions based on an insufficient number of samples. The most significant aspects of my critical review are discussed in the following text. In an attempt to scientifically prove these aspects, I gave an overview of the relevant literature on SAP modules production planning (PP) and controlling (CO). Furthermore, I showed some application-oriented examples in SAP ERP system, which was based on the GBI dataset (In other to better contribute to the understanding of SAP software solutions as well as to facilitate its applicability in university curricula, the company SAP Inc. has developed a virtual company under the name IDES (Internet Demonstration and Evaluation System). Additionally, the SAP University Alliances Community (UAC) has developed their own dataset, which was called GBI (Global Bike International)).
2. THE PROBLEM OF IDENTIFYING ERP SYSTEM WITH SAP SOFTWARE APPLICATIONS

The MTJ paper carries the title: “ERP and Management Accounting Changes of Industrial Enterprises in Serbia”. In contrast to this, the summary of the paper clearly specified: “The focus of this study is to assess the influence of SAP as ERP software in management accounting system of industrial enterprises”. SAP (Systems, Applications and Products in Data Processing) is one of the leading ERP (Enterprise Resource Planning) software solutions in today’s business activities, which represents “a combination of components that integrate people, information and processes comprehensively and flexibly” ([11, p. 2]). Despite this, the influence that an ERP system has on management accounting cannot be defined by considering only SAP applications, because there are other ERP software systems (such as Oracle e-Business Suite, PeopleSoft, JD Edwards, Microsoft Dynamics NAV 2009, etc.), that have different software architecture than SAP applications. Therefore, the title of the paper is too generalized and pretentiously formulated.

3. THE PROBLEM OF RELIABILITY OF THE STATISTICAL SAMPLE

The following statement was also made in the summary of the MTJ paper: “In order to realize these goals in addition to considering the conceptual basis of ERP systems and review of previous research in this field, to identify and analyze the effect of SAP on the management accounting system and management accountants, ten enterprises of different industrial sectors of Serbia, that use SAP, a leading business ERP software, will be observed”. The statistical sample consisting of only ten examined enterprises is not in the least representative and reliable conclusions about the impact of SAP software on management accounting could not be reached. According to the information I received from SAP West Balkans LLC, which is the official representative of the company SAP Inc. in the Western Balkan countries, there are 51 domestic enterprises and 57 subsidiaries of international companies in Serbia (as of November 2011) from different sectors using one of SAP software applications. Hence, more companies should have been included in the research.
4. THE PROBLEM OF IDENTIFYING SAP R/3 ENTERPRISE WITH SAP ERP

The section “Background Literature”, of the MTJ paper (p 192) reads as follows: “The sample consisted of the employees in the 10 large companies from Finland (users of SAP R/3)”. This refers to research results by Granlund and Malmi, published in the 2002 issue (Vol. 13(3) pp. 292-321) of the Journal of Management Accounting Research. The authors carried out a research so as to evaluate the impact of ERP on the management accounting processes in 10 large companies which have implemented SAP R/3 Enterprise software solution. However, SAP R/3 Enterprise has been replaced in 2004 by SAP ERP solution as a part of SAP Business Suite, which is still in use today. SAP Business Suite is a complete package of enterprise solutions that link people, information, and processes, and therefore improve the effectiveness of business relationships. Other solutions of SAP Business Suite are:

- SAP CRM SAP-Customer Relationship Management
- SAP PLM SAP-Product Lifecycle Management
- SAP SRM SAP-Supplier Relationship Management
- SAP SCM SAP-Supply Chain Management

SAP ERP is powered by SAP NetWeaver, which represents “a Web-based, open integration and application platform that serves as the foundation for service-oriented architecture (SOA)” ([11, p. 13]). Moreover, SAP ERP offers additional capabilities compared with SAP R/3 Enterprise, such as new general ledger in financials and e-recruiting. Following information from SAP West Balkans LLC, all enterprises in Serbia have upgraded their old SAP R/3 Enterprise system to SAP ERP system by 2010. Therefore, the MTJ paper is not up-to-date, because the authors came to conclusions considering obsolete SAP applications. Similarly, if we neglect differences between SAP ERP and SAP R/3 Enterprise, all previous studies on the impact of old SAP systems (RF or R/2) on management accounting system during the seventies and eighties should be also taken into consideration as actual research, which would be unacceptable from a purely practical point of view.
5. THE PROBLEM OF EXPLANATION OF THE SAP SOFTWARE SOLUTIONS’ IMPACT ON INDUSTRIAL ENTERPRISES

In the section “Theoretical and Empirical Research Framework for Serbian Industrial Enterprises” the authors made the following general statements: “Apart from already mentioned study (Granlund and Malmi, annotation V.M), conducted on the example of industrial enterprises in Finland, there are not a large number of serious studies and analyses considering the topic. Such a situation can be explained by a statement that the conclusions, made in relation to the impact of ERP to management accounting system, especially its tasks, techniques and organization, equally refer to all the enterprises, even industrial ones”. The company SAP Inc. has developed numerous software applications for different types of industries, since its foundation in 1972. As can be seen in the Figure 1, which is a screenshot of the SAP’s official community network website, this software producer from Walldorf has released a range of various applications also for manufacturing companies, such as: aerospace & defense, automotive, chemicals, industrial machinery and components, mill products & mining, oil and gas, etc. Hence, it cannot be said that SAP ERP equally refers to all industrial or manufacturing companies. All these different industry-oriented software applications have also been followed by a range of insightful analyses, quick facts and customer testimonials. Some of these industry-oriented analyses are given in the list as follows:

Automotive industry:
- BorgWarner. Automotive supplier steps up product data management with SAP® PLM,
- Carnation. Turbo charging India’s automobile service market,
- Fahrzeug-WerkeLueg. Vehicle dealership shifts up a gear with carbon, based on SAP® dealer business management,
- Piaggio. Vespa maker uses SAP® enterprise support to evade obstacles and keep moving,
- Proton Edar. SAP® ERP helps car manufacturer steer toward profitable growth.

Chemicals:
- SAP Transportation Management: What is in it for the Chemical Industries?
- Ashland. Creating a global view of product recipes,
- Braskem. Increases sales forecast accuracy and reduces logistics costs by optimizing supply chain,
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- FMC Corporation. Integrating shop-floor control and business systems with SAP® solutions,
- Henkel. Sharing product information safely and efficiently,
- Nova Chemicals. Improve plant maintenance and reduce repair costs with SAP® software,
- Woongjin Group: SAP® solutions help realize integrated environmental management and global compliance.

**Mining:**
- De Beers Group. Optimizing arctic mining operations with SAP®.

![Figure 1: Industry-oriented SAP solutions ([2])](image)

**Industrial machinery and components:**
- Nord Drive systems Group. 55+ million configuration at customers’ fingertips,
- SAP® Portfolio and Project. Management plan well and manage efficiently,
- Sauer-Danfoss. Transforming a components supplier to a highly configured.

**Oil and gas:**
- Tesoro. Managing capital projects from inception to final decisions.
This list represents a very small part of all analyses that can be found and downloaded at the official SAP Community Network website ([6]), in the section for all users, without any additional login or registration.

6. THE PROBLEM OF EMPIRICAL RESEARCH

In the section “Research Objectives and Empirical Method”, the authors gave the explanation of the applied research methodology in the paper. After setting up two working hypotheses, it is stated as follows: “The survey was conducted by direct surveys, e-mail or telephone. In the realization of the research there was a lot of difficulty, since there were no similar studies in our country”. Being a very complex and comprehensive ERP software solution, SAP could not be implemented and examined in any company without carrying out previous thorough market and industry-specific research. At the moment, there are seven channel SAP partners ([9]) in Serbia (Atos doo, B4B Srbija doo, S&T Srbija doo, Energosoft doo, MK IT Business Solutions doo, Asseco SEE doo and Prointer doo) and two global SAP partners (IBM Srbija doo and Hewlett-Packard doo), which have carried out a number of studies in this field. Upon a personal request, these research results can be obtained and used for scientific purposes. Moreover, all practical studies on SAP software solutions should present used questionnaire and interviews in the appendix. Since the MTJ paper primarily engages with two SAP ERP modules (CO-Controlling and PP-Production Planning) in industry enterprises, the survey should at least contain multiple-choice questions or free questions that are given in the appendix of this paper. Taking into account my previous experience, I consider that these questions might be essential when conducting research on SAP modules CO and PP and might also considerably contribute to the suggestion of appropriate research hypotheses.

7. The problem of SAP’s company size criterion

At the top of page 196 the text reads as follows: “However, according to SAP’s size criteria only four Serbian companies would meet the criteria of a large company. Hence, for the sake of greater reliability of results, we used firm size criteria defined by the applicable regulations of Serbia. Small and medium enterprises were not taken into consideration, which is compatible with similar research studies in the world. 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 implementing SAP”. This
text does not give any information about the company size, on which the above mentioned SAP’s criteria was based. The company SAP Inc. has developed many software solutions for different company sizes. The solution SAP Business Suite is suitable for big-sized companies, while the solution SAP All-in-One is suitable for mid-sized ones ([8, p. 21]). Moreover, there is also SAP Business One, a solution for small and medium-sized enterprises, as well as divisions and subsidiaries of larger companies ([5]). This SAP solution must be taken into consideration because it has been the subject of many significant studies related to SAP. Furthermore, there are small-sized manufacturing companies in Serbia which have implemented SAP software solutions. For example, the company Peštan DOO Bukovik is classified as a small-sized company according to the Serbian Business Registers Agency ([10]), and yet has implemented one of the SAP solutions. For this reason it cannot be generally said that the company size may be a limiting factor in implementing SAP solutions.

8. THE PROBLEM OF STRATEGY ORIENTATION AND UNCLEAR DISTINCTION BETWEEN SAP MODULES

The first paragraph on page 198 in the section states the following: “The relation between SAP and the task of management accounting systems” reads as follows: “Exceptional orientation on operational activities and operational management, as well as the high level of details of numerous information, indeed make the SAP information support inadequate for the needs of strategic business decision-making (the survey results). This is evidenced by the sample 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”. In this paragraph, the authors of the MTJ paper claim that SAP information is inadequate strategic decision-making. However, the company SAP Inc. has developed the solution SAP Strategic Enterprise Management (SAP-SEM), that “supplies the functions needed for strategic decision making” ([4, p. 77]) and which has already been embedded in old SAP R/3 software solution. This solution “extends the principles of integration vertically to support strategic management processes such as strategic planning, risk management, performance monitoring, and value communication” ([7, p. 20]) and comprises five application components:

1. Business planning and simulation,
2. Business information collection,
3. Business consolidation,
4. Corporate performance monitor,
5. Stakeholder relationship management.
For strategic planning and specific operational problems, business planning and simulation component “provides facilities for dynamic simulations based on special tools and functions. Thus it is possible for example, to model and simulate the complex, nonlinear relationships between markets, competitors, and your own enterprise”. ([7, P. 22]) Furthermore, this solution also “integrates different planning levels and, therefore, lets you build an integrated planning model from the strategic level to the resource allocation level” ([7, p. 22]).

The above-quoted citation in the MTJ paper also proves that the authors identify SAP module production planning with the module controlling. Although these modules sometimes overlap, there is a clear difference in basic functions between them. The following figures give an overview of the major processes between the modules production planning (PP), materials management (MM) and controlling (CO).

**Figure 2**: Process overview in completion of the production in SAP ERP

![Figure 2](image2)

**Figure 3**: Process overview in the estimation of costs in SAP ERP

![Figure 3](image3)
As can be seen in the figure 1, the module controlling is included in the overall production process only in its last steps, when the completeness of the production was confirmed and produced goods were received into the storage location. The transaction code CO03 allows us to display and review the actual costs that have been assigned to the production order (figure 4).

![Figure 4: Example of a report on comparison of target and actual costs for a production order in SAP ERP (t-code: CO03)](image)

After reception of the goods into the storage location, the costs are temporarily captured in the production ordered and they need to be assigned to an appropriate cost object. The transaction code KO88 allows us to settle costs of the production order and to compare the actual costs to the planned costs, as well as to identify any deviations or potential problems in this regard (figure 5).
Figure 5: Example of a report on comparison of actual and planned costs after assignment to a cost object in SAP ERP (t-code KO88)

Figure 3 provides us with the information on major activities between the SAP modules production planning and controlling in the cost estimate process. It also displays a clear distinction between these SAP modules. As can be seen in this figure, controlling activities in product cost accounting are as follows:

1. Create cost estimate (t-code: CK11N),
2. Mark price update (t-code: CK24),
3. View price changes (t-code: MM03),
4. Release price updates (t-code: CK24),
5. View prices (t-code: MM03)

The cost estimate with quantity structure for a material can be created for a material with the help of a costing lot size and already specified costing variant (Figure 6). The price update function is used to transfer the calculated product costs as a cost estimate to the material master record for a posting period. The cost is transferred in two steps: marking and release (Figure 7). After marking, a new standard price is updated in the material master record. The market future price is displayed in the left costing column “Future” (Figure 8).
Figure 6: Example of a cost estimate with quantity structure in SAP ERP (t-code: CK11N)

Figure 7: Example of a mark and release standard price in SAP ERP (t-code: CK24)
After releasing a new standard price is also updated in the material master record. The planned price that has been released is displayed in the middle column “Current” as a planned and standard price for the current period (Figure 9).

Figure 8: Example of a market future price in the SAP ERP

Figure 9: Example of a market current price in the SAP ERP
The future market price becomes zero and the current market price remains unchanged until the price release for a next posting period.

9. THE PROBLEM OF BUDGET FLEXIBILITY

In the section “Theoretical and Empirical Research Framework for Serbian Industrial Enterprises” the text on page 199 reads as follows: “Management accountants prepare the necessary information and reports by their extraction from the system and analysis, since the quality of the report of SAP in the real time is not sufficient for the needs of middle and top management. The proof is an example of budgeting process, as one of the tasks of management accounting. Instead of being statistical and fixed plan for the entire enterprise for the whole year, the budget becomes dynamic and flexible, i.e. it can easily be revised, modified or changed during the time”.

The authors of the MTJ paper did not specify which SAP reports do not possess the sufficient quality level for the needs of middle and top management. SAP reports are well known for their precision, comprehensiveness, as well as real-time updating. Considering management accounting, SAP software solutions have considerably contributed to the creation of useful cost accounting reports such as marginal planned cost accounting reports, segment reports as well cost centre accounting reports ([2, pp. 160-200]). Furthermore, according to Brück and Raps ([1]) SAP reports shows high quality level in overhead management, internal orders accounting, profit centre accounting as well as activity-based costing. As for production planning in industry companies, SAP software solutions have successfully been used in project management, production planning, as well as prototype design, especially in the automotive industry ([3, pp. 443-473]).

In the same section the authors of the MTJ paper also claim that budgets are not based on fixed plans and can easily be changed. In an attempt to prove the opposite, the cost estimate process with quantity structure (t-code: CK11N) will be analyzed again. Estimation of the costs is one significant part of budgeting, because it determines cost of goods manufactured and sold, that are eventually involved in the overall budget report. This process can be started only one time in a period i.e. month, for the same material. Once this process has been completed, it is not possible to restart it in the same period. If we attempt to execute this transaction again for the same material, the warning message will appear that the cost estimate has already been released. Figure 9 shows that the cost estimate has been released for the period six (June). On June 27th there was an
attempt to restart this process (Figure 10), which produced the above-mentioned warning message. This small example clearly shows that the cost estimate cannot easily be changed even for shorter periods such as months.

![Image of SAP ERP interface](image)

**Figure 10: Example of a repeated material cost estimate in the same period in the SAP ERP (t-code: CK11N)**

### 10. CONCLUSIONS

The MTJ paper assessed the influence of SAP software solutions on management accounting system in industrial enterprises in Serbia. In order to realize their goals, the authors examined ten enterprises of different industrial sectors, in which one of the SAP software solutions had already been implemented. The main objective of this scientific critique was not to diminish the essence of the author's research idea, because SAP is one of leading ERP software solutions, but prove that the MTJ paper contains several flaws, which necessarily leads to inconsistent conclusions. This critique paid special attention to the following aspects of the MTJ paper: identifying SAP ERP with ERP as well as SAP ERP with SAP R/3, reliability of statistical example, explanation of SAP software solutions’ impact on industry enterprises, empirical research, SAP’s company size criterion, distinction between SAP modules, as well as budget flexibility. The research
in the MTJ paper was deficient in a number of surveyed enterprises, which is the major obstacle to reaching valid conclusions on complex ERP software solutions such as SAP ERP. Next, there is a lack of practical evidence as well examples in SAP ERP. In order to provide sufficient evidence for my claims, I gave the overview of some SAP transaction codes in the SAP modules production planning and controlling, which was also followed by the appropriate screenshots.

However, the exchange on this subject will not be the last, nor should it be, because the MTJ paper was published in the English language and indexed in the EBSCO base of scientific papers. Furthermore, as SAP software solutions become more dominant in Serbia’s companies, there will be more points of agreements and disagreements.
Appendix: Example of a questionnaire for a research in SAP modules CO and PP

1. What type of manufacturing execution does exist in your enterprise?
   a) Discrete manufacturing
   b) Repetitive manufacturing
   c) KANBAN

2. What do work centers represent in your enterprise?
   a) People or groups of people
   b) Machines or groups of machines
   c) Assembly lines

3. What type of capacities do the work centers represent in your enterprise?
   a) Labor
   b) Machine
   c) Output
   d) Emissions

4. Where are capacities mainly used in your enterprise?
   a) In capacity requirements planning (CRP)
   b) In detailed scheduling
   c) In costing

5. What type of forecasting models is used in your enterprise (t-code: MM03, view: forecasting)?
   a) Trend
   b) Seasonal
   c) Trend and seasonal
   d) Constant

6. Which values are used for forecast parameters (t-code: MM03, view: forecasting)?
   a) Alpha factor:________
   b) Beta factor:________
   c) Gamma factor:_____
   d) Periods per season:____

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1 To some questions useful SAP transaction codes (t-codes) are added. These transaction codes should help those who fill in the questionnaire by starting the appropriate SAP transactions where answers might be found.
7. What period intervals are used when creating sales and operation plan-SOP (t-code for product group: MC82, t-code for material: MC88)?
   a) Forecast: from:___________ to ___________
   
   b) Historical data: from:___________ to ___________

8. What types of planning strategy make-to-stock are used when running master production scheduling-MPS (t-code: MD40)? Skip this question strategy make-to-stock is not used.
   a) Net requirements planning (10)
   b) Gross requirements planning (11)
   c) Production by lot size (30)
   d) Planning with final assembly (40)

9. What types of planning strategy make-to-order are used when running master production scheduling-MPS (t-code: MD40)? Skip this question strategy make-to-order is not used.
   a) Make to order production (20)
   b) Planning without final assembly (50)
   c) Planning with planning material (60)

10. What is the average number of operations maintained in one working centre in routing? (t-code: CA03)
    
    Average number of operations:_______

11. What is the average number of raw materials and semi-finished components in bill of materials-BOM? (t-code: CS03)
    
    Average number of raw materials:  
    Average number of semi-finished components:  

12. What is the number of cost centers in your enterprise? (t-code: KS03)
    
    Average number of cost centers:_______

13. What is the number of primary cost elements in your enterprise? (t-code: KA03)
    
    Average number of primary cost elements:_______
14. What is the number of secondary cost elements in your enterprise? (t-code: KA03)

Average number of secondary cost elements:________

15. Do you differentiate between fixed and variable costs:
   a) Yes
   b) No

16. Do you use marginal planned cost accounting?
   a) Yes
   b) No

17. What is mostly used statistical key figure as the allocation base for cost assessment? (t-code: KK03)

Mostly used statistical key figure:________

18. According to authorization rights given by IT sector, what is the average number of SAP transaction codes that employees in controlling and production area can access to? (t-codes: STAD, PFCG)

   a) Average number of t-codes in controlling area:_____

   b) Average number of t-codes in production area:_____

REFERENCES:


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