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# THE INFLUENCE OF BUSINESS INFORMATION SYSTEMS ON SERBIAN COMPANIES' BUSINESS PERFORMANCES

***Saša Spasojević[1], Boško Vojnović[2], Aleksandra Nikolić[3]***

## Summary

*Industrial era has been replaced with the information era of development. Under such influences of surroundings, all the companies have been forced to introduce information systems in their organizations in order to be competitive. Since Serbia technologically tags along the developed part of Europe and bearing in mind that adjusting to changes is the condition of success, this paper aims at answering the question: how many companies in Serbia have an information system, when and how was it introduced and which fields of business were integrated in that way? We came to the conclusion that all the interviewed business subjects use the information system to a greater or lesser extent and mostly for the needs of accounting, sales and supply and that in most cases all fields of business were integrated into a unique IS, which led to the notable savings in business.*

***Key words:*** *organization, integration, IS classes, planning, implementation.*

**JEL**: *O32*

## Introduction

What one gains from installing ERP is reflected a great deal in the effects which are difficult to quantify. To that purpose, we have conducted research based on the sample of 73 companies of all sizes, from micro to the big ones, registered and operating on the territory of the following municipalities: Macva region, Vojvodina and Belgrade.

All significant elements that can possibly help the research on the influence of business information systems on the companies' performances have been comprised. The results have been shown in the form of tables and explained on the basis of logical conclusions.

1 Master of Technical Sciences, Assistant, Agricultural high schools, Šabac, phone: +381-15–344-580, E-mail: sasaspasojevic@open.telekom.rs

2 Ph.D., Professor, Agricultural high schools, Šabac, phone: +381-015–344-580, E-mail: bosko_v@open.telekom.rs

3 Ph.D., The Faculty of Economics and Engineering Management, University Business Academy, Novi Sad, E-mail: aleksandranikolic.fimek@gmail.com

**Research method -** A survey has been used in this research, as the most frequent research method in practice. The method is based on questioning business subjects through direct contact in companies, i.e. in the realistic environment. While choosing the companies, we made sure to include companies of all sizes. The type of research is a stratified sample, homogenous data having been obtained out of the non-structured mass and processed as such. The following methods were also applied: analyses, abstractions, syntheses and logical concluding. Quantitive method, which is mostly based on sciences such as statistics and mathematics, was used for data processing. The data were obtained through personal research. The software **Microsoft Office Excel** was used for calculating and making graphs.

**The aim of the paper** is to indicate the significance of software solution application in all segments of organization with a special reference to Serbian companies. Our aim was also to realize the impact of integrated management systems on creating the conditions for faster and better growth and development of companies. The mere search for new developmental possibilities was conditioned by new civilization trends which carry big changes with them. Consequently, we wanted to find out exactly that: to what extent are our companies adjusted to the existing changes and ready for the new ones, since the adjustment to changes is the condition of success.

**Sources -** The demonstration of the elements of organization is mostly based on the book *The Structuring of Organizations*. The part which refers to the emphasis of the significance of integrated management systems is based on the source *Surprising Facts about Implementing ERP* and *Business Information Systems*. The rest of the sources also had an important role and contributed to the paper, and the research conducted by the authors is especially important. To the authors' knowledge, similar research was never before conducted in Serbia, so there is no possibility of comparing the results.

## The influence and support of information technologies to certain parts of organization

The deterioration of the conditions of business dealings in Serbian companies during the crisis was mostly influenced by external factors or external factors joined with internal ones. The most influential external factors are the deterioration of business conditions and the reduction of purchase power in entire economy, whereas the most important internal factors are mistakes in management.[4]

The role of information technology in a company makes a business system able to react quickly and adequately on the influences from the surroundings. A company with a well-structured information technology can react efficiently and change its relation towards the surroundings promptly, when a reason to do so appears. Observing Minzberg's organizational structure defined in late 1980s, the following conclusion can be drawn:

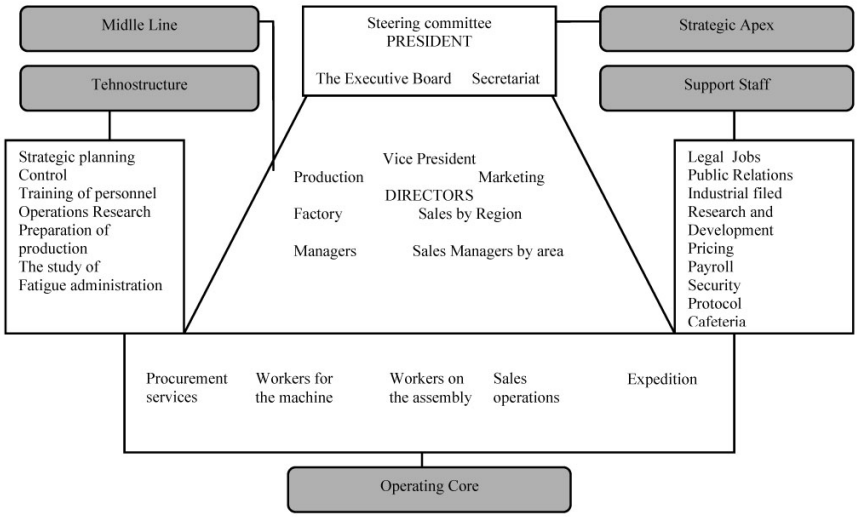
4 Vojnović, B., Cvijanović, D., Veselinović, P. (2011): *Istraživanje uticaja krize na poslovanje domaćih preduzeća*, Ekonomika poljoprivrede, Institut za ekonomiku poljoprivrede, str. 749.

generally, organizational structure established at that time is acceptable today provided it has a good information technology support.

If we analyze the activities of almost every business function, we can notice that 90% of all activities in the majority of business functions come down to collecting, processing and analyzing certain data.[5]

The process of performance measurement enables the company to identify economic resources that it has at its disposal, to realize what the key factors that influence its performances are, and to find the best flow of action.[6]

**Figure 1.** Basic parts of organization




*Source:* Minzberg, H. (1979): *Tree Structuring of Organizations*, p. 20-23.

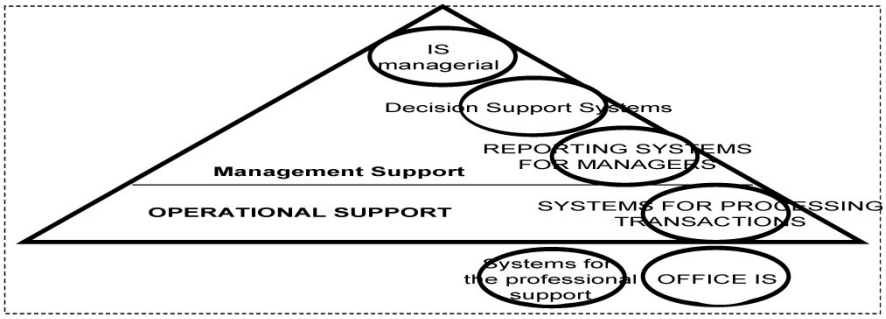
According to professor Jokanović[7] the basic categories of IS in companies can be grouped into three categories: IS for intellectual work support; IS for operative support; IS for management support.

5 Minić, T., Ilić, O. (2011): *Planiranje i analiza procesa proizvodnje pomoću integralnog informacionog sistema,* Industrija 1/2011, Ekonomski institut, Beograd, str. 186.

6 Bešlić I., Bešlić D. (2010): *Merenje performansi u proizvodnom preduzeću kao izvor konkurentske prednosti*, Ekonomika poljoprivrede, br. 2, IEP, Beograd, str. 314.

7 Jokanović, D. (2001): *Poslovni informacioni sistemi,* Megatrend, Beograd, p. 6.

**Figure 2.** IS classes



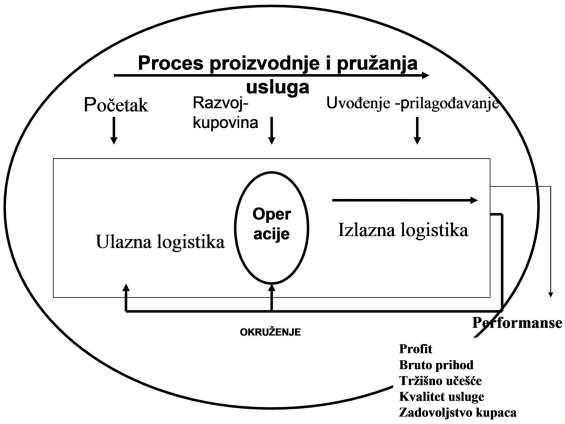

*Source:* Jokanović, D. (2001): *Poslovni informacioni sistemi,* Megatrend, Beograd, p. 6.

*IS for professional support* mainly refer to clerical information systems and systems for professional support (lawyer, clerical and similar work). *Operative support IS* is mainly used for the operative support during transaction processing. Information technologies have a significant application in the following fields: information systems for the management of finances, information systems for the management of work processes in the company (e.g. production), internet and intranet technology, applications of diverse digital technologies in business organizing and in company management. *IS for management support* consists of the using of information systems as a help tool during reporting and making decisions.

Information systems for business and other organizational systems can be introduced by developing one's own information system or by purchasing a suitable software program. Both ways have their advantages and disadvantages. The advantage of the developing one's own information system is that the generated program can be not only used by the company but also sold to other companies, but the disadvantage is the loss of time necessary for developing an IS. Purchasing a suitable software program saves time, but that too has its price.[8]

8 Vojnović, B. (2011): *Osnovi upravljanja*, NBS, Beograd, str. 166.

**Figure 3.** The model of IS and company interaction




*Source:* Jokanović, D. (2001): *Poslovni informacioni sistemi,* Megatrend, Beograd, p. 4.

IS application leads to the improvement in the following: profit, enlarged income, market participation increase, quality and other business performances. In addition to all this, an adaptive subsystem is essential in order to remove unpredictable mistakes (see figure 3).

Multidimensionality of business information system and its harmony with the ever more complex system of business operating are necessary for maintaining and, possibly, the acceleration of production technology progress and exploitation. In fact, general progress of material world i.e. the ever higher level of entire material and non-material processes are the essential originators of the development of all human and scientific activities, and even the originators of business information system and organization science development.[9]

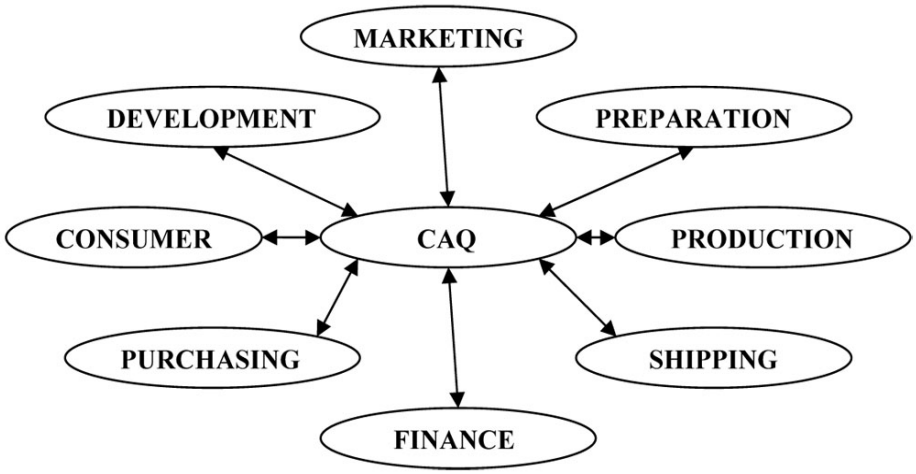
## Computer aided quality assurance (CAQ)

Familiarizing oneself with the basic and new quality tools may lead one to the conclusion that they assist in the analysis, anticipation and problem solving processes which may have appeared during the planning phase, designing phase or any other process tied to the production, service of the firm, or the like. Their help is significant, but often slow. The basic quality tools become automated in that way since the information systems continually follow each process and are naturally designated in such a way that they may be analyzed. CAQ (Computer Aided Quality) is the planning and executing of the process, related to the quality system which supports information technology in the firm. CAQ enables the tying in of the following elements: manufacture, sales, terms of agreement, quality tools, manufacture warrantee and complaints. CAQ may integrate:

9 Lazić, J., Cvijanović, J., Zeremski, A. (2009): *Infrastrukturna podrška QMS*, Industrija 3/2009, Ekonomski institut, Beograd, p.44.

- QFM-Quality Function Deployment (house of quality),
- FMEA- Failure Module and Effects Analysis,
- Inter-analysis,
- Tracking of stock,
- Evaluating value of results obtained via analysis,
- Defining area of quality systems,
- Examining instruments for experimentation,
- Lifetime guarantee of manufacture,
- Quality system, documentation, control and improvement, etc.

**Picture 1.** The CAQ system and its relationship with the remaining




*Source:* Werner, B. (2001): *Dasgrosse Handbuch Producktion*, Verlag Modeme Industrie, München.

**The system for planning business resources**

Management information systems are an organized collection of components for collecting, transferring, storing and processing data with the objective of providing information necessary for a certain action. Companies need the information in order to support the basic occupational activities and the process of management. The majority of contemporary information systems are formed on the grounds of information technology and telecommunications. IS consists of five basic components: hardware, software, data and information, employees and procedures.

One of the most meaningful characteristics in the business data field in the last 5 to 10 years is the appearance and rapid economic growth in sales of the so-called ERP software solutions (Enterprise Resource Planning).

The systems for business planning resources (Enterprise Planning Systems) represent software solutions which cover all business aspects. In the beginning, these solutions encompassed only a segment of production management and were recognized under the name of MRP (Manufacturing Resource Planning or Materials Requirements

Planning). Other business processes were later granted support so that today the ERP packages support financial accounting, expense tracking, register transactions, investment management, quality management, project systems, sales, business staffing and individual industrial solutions which develop in order to meet the needs of specific activities.

One must have in mind that the acronym, "ERP" instantly asserts to the conclusion that what is being referred to here is software for the utilization and planning of business resources which is entirely incorrect. This may best be understood by examining the contents of any kind of ERP package (SAP, Oracle, People Soft Baan…). These all contain modules which cover individual business processes. They actually have to do with the realization of the concept of integrated information systems in use, so consequently this software solution is better observed in that context.[10]

Recently, some other terms are being used along with the ERP term which includes for example, enterprise applications, enterprise systems, enterprise management systems and all in the context of one general term: business-critical applications or mission-critical applications. They are utilized in IT (information technology) literature and practice with the designated goal of computer support for basic business functions and processes.

Some additional applications such as CRM have been developed as elements of ERP solutions. The systemization of customer relations (Customer Relationship Management) and BI - Decision Support (Business Intelligence) are installed as an extension of standard ERP packages.

The Basic characteristic of ERP systems lies in the covering of the electronic adaptation of data of all business processes, combined with the efficient management of data (minimal redundancy). The software is developed according to a modular principle of the following basic divisions of functionality of business systems for business processes: purchasing, sales, production, human resources, financing, accounting, and so forth.

## Advantages and Disadvantages of ERP systems

Basic advantages which ERP systems offer are based on:

- Efficient production management and material flow.
- The opportunity for the integration of several manufacturing locations from the aspect of data application.
- Efficient management of consumer-supplier relations.
- Support from all aspects of a firm's accounting systems.

10 Spasojević, S., Šutuljić, B. (2008): *Integrisani poslovni informacioni sistemi*, Međunarodni naučno-stručni skup „Energetske tehnologije 2008", 23-24 maj, Vrnjačka Banja, Srbija, E-Zbornik, ET-43.

- Support of more efficient financial management.
- Elimination of redundant operations and data.
- Localized software versions, not only in view of language but in the sense of legal solutions.
- Efficient system reporting on all levels of management and so forth.

Disadvantages include:

- Expensive and lengthy process of implementation.
- Maintenance and upgrade of software which also carry high overhead
- Business systems which depend entirely on one IT provider

## Methods of Implementation of the ERP system

Generally speaking, two approaches exist for the application of ERP solutions. The first is the development of its own solution and the second assumes the purchasing of the standard solution. The decision regarding the solution of choice must be made by keeping the following facts in mind:[11]

- A high level of risk exists regarding the success of the project. Self-developed projects in most cases are not concurrent within the firm because they aren't given the proper attention and they have no functional support.
- All of the expenses of self-development are not evaluated while experience dictates that expenses are up to 2.5 times greater than the sum of expenses for the implementation of standard solutions.
- The time for implementation completion is never final. During the course of development new moments are "uncovered", i.e., variations of the existing process and so forth.
- Maintenance of the developed information systems often depends on a small number of individuals, who as a rule are extremely pre-occupied with everyday operation activities, while the reliability of support depends on their physical presence in the firm.

## Implementation of standard ERP solutions

Two most recognized approaches in the implementation of standard ERP solutions include[12]: "In-house" implementation and ASP (Application Service Provider) model, i.e., renting of the ERP from the side of the so-called ASP provider.

Other options exist – depending on the individual ERP providers.

When discussing the "in-house" approaches two models generally coincide:

11 Ibidem.

12 Werner, B. (2001): *Dasgrosse Handbuch Producktion*, Verlag Modeme Industrie, München.

The first is the familiar higher level adaptability of the ERP solution and encompasses all modules (business processes) all at once. The project is more expensive, lasts longer, but the advantage of this approach is that the solution "tailors" itself to the needs of the firm.

The other is related to the implementation without virtually any need for adaptability of the ERP package. The basic advantage of this approach is that the implementation is shorter and less expensive, while the basic disadvantage of this approach is its lack of flexibility and the possible disparity of the modules in relation to the needs of the firm.

The ASP model implementation components may be rented in their entirety from the side of the provider-firms involved in the so-called application hosting. Contemporary communication technologies enable such solutions while in essence the firm that desires to install the ERP system eliminates "worries" regarding the installation, implementation, maintenance, upgrade-BL, and hiring of ERP staffing, and leaves this to the ASP. The cost of this type of arrangement is usually based on the client's monthly salary. Other options exist here as well. For example, it is possible to install complete hardware and software with ASP while it's also possible to keep the hardware "in-house" and offer the entire task of software maintenance to ASP. This approach like the other approach has advantages and disadvantages. The basis advantage is in the overall reduced cost of the installation of the ERP system, while the primary disadvantage is that the entire firm's data lies in the framework of the other firm. Of course, all questions and details related to this type of implementation are regulated through individual contracts.

It's necessary to let it be known that an application exists which alludes to the previous creation of the BPR (Business Process Reengineering) studies. It's important for the firm to analyze the existing processes well (so-called, "as-is" status) and afterwards to create a new plan of business processes (status "to be"), and only afterwards to work on the implementation of software solutions. This application justifies the fact that the implementation of the ERP software solution isn't exclusively a software project. It's actually a project which deeply effects the reorganization of the business process. That is, it's about the business event. Unfortunately experience has shown that in a great number of cases this particular type of BPR project involves the same kind of expenses while the implementation of the ERP system has no relation to the results of the project. Training with the ERP system has an extremely significant role and it all boils down to the type of explanation:" this field shows this, this button does this." What used to be routinely understood as training is now considered worthless. One example would be: how to label the capability of the understanding of the fundamental flow of data through the processes themselves. In the attempt to release the meaning of a new understanding of the work surroundings, a distinction must be drawn between education and training, as education demands greater attention. Research shows that companies easily fall into the trap of forcing training programs which are too software oriented. In this way the fact is that the ERP systems operate with the entire set of business processes. The meaning of traditional training ideas often deceives careless

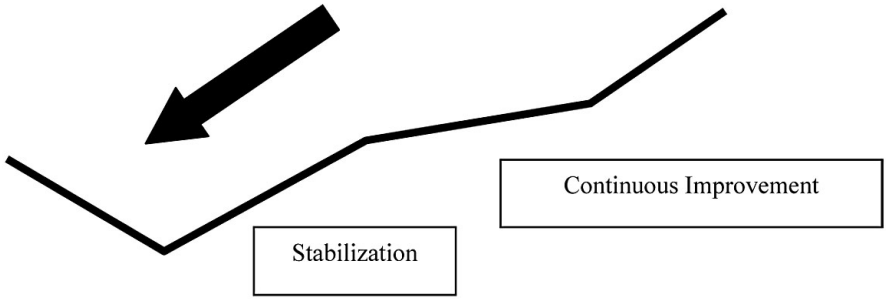
individuals because the relationship between training, changes in administration and adequate personnel become apparent. A great number of experts agree that serious difficulties which appear in the ERP implementation process aren't systematic. "We are rarely witnesses to the situation when the ERP system alone- the actual software-makes mistakes"- This is how we arrive to the most important requirement which is training.

## Problems in implementation of the ERP system

The implementation of the ERP system represents quite a complex assignment. It also has to do with extremely expensive projects because the implementation does not include only the installation of the hardware and software but the significance of the aspects of adaptability of software solutions, new staff, adequate LAN and WAN infrastructure, user training, and so on. Moreover, for this reason, the management of this project is of the utmost importance for the firm, while on the other hand, the firm may experience undesirable consequences which may even result in bankruptcy. In the second half of the 1990's the number of successful implementations increased and the basic reasons for that are as follows: new methods of implementation, new tools, and a greater number of qualified staff, better preparations and so forth.

According to the study, "Surprising Facts about Implementing ERP" (J. W. Ross)[13] five phases exist which are involved in the analysis of the ERP project and process implementation as the following picture demonstrates: Design, Implementation, Stabilization, Continuous Improvements and Transformation.

**Picture 2.** Implementation Process of the ERP Systems




*Source:* Promotional Material of the B4B firm from Novi Sad "Basic information about the SAP system"

Particular emphasis must be placed on the decline in performance of the system in the so-called post- implementation period. The graphics are based upon the experiences of a number of firms-subjects who were involved in the ERP implementations and who first-hand, noted the decline in performance of the system following its implementation,

13 Ross J. W. (1996): *Surprising Facts About Implementing ERP*, Englewood Cliffs, New Jersey.

almost by the book. According to the results of the study in some firms the decline lasted a few weeks while in others 12 months.

**Anticipated business promotions as a result of the adaption of the ERP solution**

***Integration -*** The ERP System in itself must offer the entire integration of all business processes and transactions in such a manner that it ensures absolute consistency and precision of data. With that in mind, it's possible to recognize three forms of integration:[14]

- **Process integration**, **data and organizational elements**- simultaneous satisfaction of functional, financial and management principals through a common data base are ensured,
- **Application Integration-** single entry of all data which reflects on all the areas where it is necessary drastically decreases the possibility of errors prior to entry while they are quite frequent at multi-level data entry. In this way, entire data consistency for all users in the system is insured.
- **Technical integration**- the three-layered architectural system (data base, application levels, user interface) ensures that each transaction which is realized in the ERP system immediately ensures the accuracy of the data base while the changes are immediately apparent in the system reports.

All transactions in the system, like their reflections on relevant parts of the system separate in real time. This type of integration significantly promotes the quality of the arrival of business decisions since consistent and relevant data is at the disposal of managers at all levels. The data is selected according to the needs of individual organizational entities and levels through the utilization of various organizational elements of reporting. Data may be pulled from other systems in the system as well for the sake of reporting and controlling. Integrated IS also take precedence due to the fact that regardless of the kind of module system they are or the kind of organizational whole they belong, the users have identical interface which results in the reduction of time and cost of training in the cases where employees change positions.

The nature of the system is such that it insures the reconciliation of reports regardless of which segment of the business system it comes. The integrity of the business information systems insures the daily accuracy of information which is the basic pre-requisite for accurate and virtual reporting of all levels of leadership structures. One must not individually debouch the meaning of the mentioned support of the system prior to arriving to both strategic as well as operative decisions.

14 Spasojević, S., Šutuljić, B. (2008): *Integrisani poslovni informacioni sistemi*, Međunarodni naučno-stručni skup „Energetske tehnologije 2008", 23-24 maj, Vrnjačka Banja, Srbija, E-Zbornik, ET-43.

As a result of its complete technological, organizational and functional organizational ERP solutions, its implementation means the standardization of the business process and the flow of documentation.

Insight into the correct business data consequently carries the opportunity for more precise and effective business planning. The planning is conducted in several versions while constructed plans may be analyzed and revised. The ERP business IS assumes the entire integration of the business process through the logistic chain which includes: purchasing, warehousing, manufacturing, maintenance, quality management, sales and subscriptions. The business processes in their entirety are integrated with the financial business aspects. Transactions are regulated through the material, management, financial accounting, investment management, and basic resources. The third group is functionality. It is also entirely integrated into one system and may be found in the domain of business management resources, payroll accounts, appointments and fees.[15]

***Flexibility -*** Standard ERP solutions assume that the best solutions have been installed in them from the international business practices which may be recognized during the course of the previous project implementation.

The system may be adapted to the business firm's needs at the time of installation in so much as the firm finds the business processes to have been adequately installed. On the other hand, the firm also has the opportunity to analyze standard solutions offered by the system as well as the utilization of those solutions which have proven to be the best during the uncovering of business processes. The option exists in all (segments) of system modules. During the course of the implementation it's not necessary to install all of the modules at the same time, even though in most cases they are in the contents of the purchased licenses of the system. The firm may appropriate the sequence and dynamics of the implementation in compliance with its developmental, organizational needs, and capabilities.

This way what is achieved is that the system adapts to the needs of the firm and not the other way around. In so much as developed surroundings are present and delivered alongside the system, the system enables the adaptability of the screen, the processing and the reports according to the needs of their users. Although an entire array of previously defined forms and reports exist in the system itself the system permits and creates reports which those who utilize it require every day for the purpose of making business decisions.

***The possibility of the installation of new modules***[16] **-** Business information system solutions according to the "informational islands" principle still exist in a great number of firms, i.e., applications created according to the needs of individual organizational wholes. Except for the fact that that kind of application has a significant disadvantage

15 Ibidem.

16 http://www.sap.com/westbalkans/

in the non-existent contacts between individual contacts, it's often the cast that the system does not cover all business processes of the firm. The ERP solutions integrally cover all business processes of the firm in all organizational entities of the firm with its integrated functionalities. Thereby the admission process which is more and more emphasized and preferred in the creation of efficient and functional organizations is entirely fulfilled. The integrity of the business process in the exclusive IS enables other, more precise and universal planning as well. Since we are referring to the system which functions in real time, the consequences of planning may also be kept track of in the same manner.

***Openness (The opportunity for implementation in stages) -*** Every implementation of the ERP solutions is the collaborative effort of the implementer and the firm in which the system is being implemented. The degree to which internal resources of the firm become engaged depends on various elements that may be greater or smaller due to the reason that the implementation of the system itself may be approached in several ways, of which two of the most critical have been mentioned:

1. Big Bang - the simultaneous implementation of all anticipated modules and functionalities. In this way, an entirely integrated system along with all of the advantages it offers may be obtained in a shorter period of time. Also, not just any connection should be made with the already existing applications which would function parallel to the ERP solutions. In the first place, this admission requires organizational maturity of the firm as well as significant engagement of the firm's resources.
2. Stages of implementation- the stages of functionality of a certain confirmed order. In this way the need to engage the firm's resources is smaller while it's even possible to adjust the purchase of hardware accessories according to one's needs.

***Authorization -*** It's possible to adapt the ERP solution to the work process and to the needs of certain users which is quite significant in the cases where certain data need to be secured for certain users or in the case when the user completes only a certain number of business transactions in the system. Different levels of authorization in addition to the adaptability of certain screens (with the elimination of all that is unnecessary) for certain users may be achieved with the simple utilization of the system. Authorization also ensures that certain levels of management have access to only the information relevant to the execution of business solutions. In some cases the possibility of the authorization of certain facts is of conclusive importance for business (protection of business secrets and business data). The authorization and standardization of business processes (sometimes supported through workflow functionality) enables irregular business conduct. Should they indeed occur, they may be relatively easily uncovered since the system provides evidence of the user, the object, and the time of each transaction.

***Workflow -*** ERP solutions ensures the tools for the unfolding of the business process- Business Workflow. This tool ties the information from the business process with the

individual employees in such a way that it signals the need to execute individual activities on the basis of parts of the process already executed. Responsible communication between business functions of the system initiates unfolding of the business process.

## Modules of the ERP system[17]

The ERP system is a modular system which assumes that its parts may be combined and extended according to its needs. The manufacturers of the ERP system make various combinations of these modules while a great number of them take the following module as their base: Sales and distribution of SD; Material management MM; Product planning PP; Quality management QM; Unit maintenance PM; Human resources HR; Financial accounting FI; Controlling CD; Basic instruments AM; Projects PS; Work Flow WF; Industrial Solutions IS.

## The research on the influence of integrated business is to the business performances of Serbian companies

In this research, the data collected through the survey about the application of information systems and their influence on the operating of companies in Serbia. About 100 companies have been surveyed, but only the results obtained from 73 business subjects, where the survey has been conducted in a valid way, have been taken into account. The survey have been carried out by teachers and associates of Agricultural College with the help of students and within the school subject called Strategic Business Planning, which is realized on the second year of the fundamental/ bachelor studies of management.

17 http://www.sap.com/westbalkans/

**Table 1.** Answers to questions from the survey

| **The division of the company - the Republican Bureau of Statistics (%)** | | | |
|---|---|---|---|
| Micro 0-9 | 14 | 19 | |
| Some 10 - 49 | 28 | 38 | |
| Medium 50 - 249 | 13 | 18 | |
| Great 250 and more | 18 | 25 | |
| **The activity that deals with company?** | | | |
| Production | 20 | 27 | |
| Service | 43 | 59 | |
| Mixed | 10 | 14 | |
| **Whether a company has an information system?** | | | |
| Yes | 73 | 100 | |
| Not | - | - | |
| **When you introduce an information system in business?** | | | |
| In the last year of business | 12 | 16 | |
| In the last 2-3 years | 16 | 22 | |
| Earlier | 45 | 62 | |
| **Information System are introduced?** | | | |
| Independent | 21 | 29 | |
| With the help of specialized companies for the introduction of IS | 52 | 71 | |
| **How long did the period of introduction?** | | | |
| 1-6 months | 50 | 69 | |
| 6 - 12 months | 12 | 16 | |
| More than 12 months | 11 | 15 | |
| **Have you had organized training with employees to use new software and new computer equipment? (see Table 2)** | | | |
| **What software (software) solutions are used?** | | | |
| SAP | 13 | 22 | |
| Oracle | 14 | 23 | |
| Sage | 2 | 3 | |
| Microsoft Business Solutions | 29 | 49 | |
| PeopleSoft | 2 | 3 | |
| Something else | | - | |
| Some local solutions - please specify | MAG<br>LUNA<br>AB SOFT<br>FOX PRO<br>MY SAL<br>VISUAL<br>AMADEUS<br>BIT-THS | 3<br>1<br>2<br>3<br>1<br>1<br>1<br>1 | |
| **Do you have softer?** | | | |
| Bought | 60 | 82 | |
| Rents it | 10 | 14 | |
| Something else | 3 | 4 | |

*Source:* the research

**Table 2.** Organization of training for the use of IS

| **Have you organized training with employees to use new software and new computer equipment?** | | | |
|---|---|---|---|
| | Number of months | Number of companies | Total company |
| Yes, with the help of specialized companies for training | 1<br>2<br>3<br>6 | 14<br>9<br>13<br>4 | **40** |
| Yes, our own resources | 1<br>2<br>3<br>6 | 9<br>2<br>3<br>1 | **15** |
| Not | | | **18** |

*Source:* the research

**Table 3**. The coverage area of operations

| **What areas of your business software you cover?** | |
|---|---|
| | Number of points [1] |
| Production | 33 |
| Procurement | 50 |
| Sale | 57 |
| Marketing | 34 |
| Quality Management | 23 |
| Accounting | 56 |
| Human Resources | 34 |
| Something else | 15 |

*Source:* the research

**Table 4**. Software links field operations

| **Have you integrated the software (link) and that certain area?** | |
|---|---|
| **Area ↔ Area** | **Number of points** |
| Sale ↔ Accounting | 10 |
| Procurement ↔ Accounting | 6 |
| Maintenance ↔ Production | 5 |
| Procurement ↔ Wrehouse Operations | 13 |
| Sale ↔ Wrehouse Operations | 9 |
| Sale ↔ Bookkeeping | 5 |
| Production ↔ Sale | 12 |
| Production ↔ Warehouse | 13 |
| Integrated into all business areas into a single IS | 33 |

*Source:* the research

**Table 5**. The savings from the implementation of IS

| Are you due to the introduction of IS made some improvements in business? | | |
|---|---|---|
| | **Saves** | **Score** |
| If yes - what are the areas | quality of production | 2 |
| | efficiency | 3 |
| | quality of service | 3 |
| | procurement | 17 |
| | finance | 4 |
| | controls | 2 |
| | logs | 2 |
| | production | 7 |
| | sales | 25 |
| | accounting | 10 |
| | marketing | 11 |
| | imports | 2 |
| | human Resources | 6 |
| | bookkeeping | 2 |
| We did not | 2 | |

*Source:* the research

**Table 6.** Saving resources by applying IS

| What are the savings achieved as a percentage of these resources? | | |
|---|---|---|
| **Resource** | **Number of companies** | **% savings** |
| **Manpower** | 8 | 5 |
| | 15 | 10 |
| | 11 | 15 |
| | 9 | 20 |
| | 1 | 25 |
| | 7 | 30 |
| | 1 | 35 |
| | 3 | 40 |
| | 1 | 45 |
| | 2 | 50 |
| **Time** | 2 | 5 |
| | 12 | 10 |
| | 7 | 15 |
| | 4 | 20 |
| | 2 | 25 |
| | 12 | 30 |
| | 5 | 40 |
| | 3 | 45 |
| | 8 | 50 |
| | 1 | 60 |
| | 1 | 80 |
| **Money** | 9 | 5 |
| | 20 | 10 |
| | 6 | 15 |
| | 5 | 20 |
| | 7 | 30 |
| | 3 | 40 |
| | 1 | 60 |

*Source:* the research

## Conclusion

It can be concluded that the application of software solutions in Serbian companies is significant and has an influence on the increase of competitiveness in those organizations that introduced them. In this way, integrated management systems create conditions for faster and better development. In the end, the results confirm the readiness for changes and indicate that those Serbian companies that have adjusted to a new information era realize better business results.

Observing the survey results in domestic companies within the context of IS application, the following conclusion can be drawn: 38% of small and 25% of large companies was surveyed. Regarding to the occupational activities that they deal with, the number of service activity companies was the biggest (59%), followed by production companies (27%). Of all surveyed companies, 62% of them have the information system that was introduced more than three years ago. Over two thirds of subjects introduced IS with the help of specialized firms and approximately the same number declared that the period needed for IS introduction had been shorter than six months. The most popular software solution in one half of companies was Microsoft Business Solutions, while the other half uses other programs. In accordance with the expectations, 82% of companies bought the software and only 14% of companies rent it. The training for using new programs and equipment was organized for employees in 55 companies, 40 of which used the help of specialized training firms and 15 of which relied on their own resources. The fields of business operating which were mostly covered are: accounting, sales and purchase, while production only comes sixth, which sounds logical taking into regard that the majority of surveyed companies had service activities as their main occupation. As for software, the most integrated fields, viewed individually, are: purchase and warehouse business, production and warehouse, production and sales, production and accounting. However, most commonly, all fields of business operating are integrated into one unique system, which is an indicator of indisputable positive influence of IS on all elements of organization structure. By introducing IS, the most important savings were realized in the sales and purchase sector, followed by marketing and accounting. The savings resulting from the application of IS in business are related to the work labour, time and money resources. Depending on a company and its size, the percentage of savings regarding work labour is between 5% and 50%. The results of the research in the field of time saving are even more intensively expressed. It was found out that their range is from 5% to incredible 80%. This shows that the application of IS, especially in big business systems, becomes a factor indispensable to business practices. Money saving, as a result of IS application, ranges from 5% to 60%, which also seems logical, since previous results indicate work labour and time savings.

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# UTICAJ INTEGRISANIH POSLOVNIH INFORMACIONIH SISTEMA NA POSLOVNE PERFORMANSE SRPSKIH PREDUZEĆA

*Saša Spasojević[18], Boško Vojnović[19], Aleksandra Nikolić[20]*

## Rezime

*Industrijsku eru zamenila je informatička era razvoja. Pod takvim uticajima okruženja sve kompanije su bile prinuđene da uvedu informacione sisteme u svoju organizaciju u cilju stvaranja konkurentske prednosti. S obzirom da je Srbija u tehnološkom zaostatku za razvijenim delom Evrope, a da je prilagođavanje promenama uslov uspešnosti, ovim radom pokušavamo da dođemo do odgovora: koliko preduzeća u Srbiji ima informacioni sistem, kada i kako su ga uveli i koje oblasti poslovanja su povezali – integrisali? Došli smo do zaključka da svi anketirani subjekti u manjoj ili većoj meri koriste informacioni sistem i to uglavnom za potrebe računovodstva, prodaje i nabavke i da su u najvećoj meri integrisali sve oblasti poslovanja u jedan jedinstven IS, kao i da su uštede u poslovanju po osnovu toga evidentne.*

***Ključne reči:*** *organizacija, integrisanje, klase IS, planiranje, implementacija*

18 Mr Saša Spasojević, Visoka poljoprivredna škola Šabac, Tel: +381-15–344-580, E-mail: sasaspasojevic@open.telekom.rs

19 Prof. dr Boško Vojnović, Visoka poljoprivredna škola Šabac, Tel: +381-015–344-580, E-mail: bosko_v@open.telekom.rs

20 Dr Doc. Aleksandra Nikolić, Fakultetu za ekonomiju i inženjerski menadžment, Univerziteta Privredna akademija, Novi Sad, E-mail: aleksandranikolic.fimek@gmail.com