

## RETAIL ENTERPRISE RESOURCE PLANNING SYSTEM

Dragica JOVANČEVIĆ and Dušan COGOLJEVIĆ

College of Economics and Entrepreneurship Belgrade



Prof.Ph.D Dragica Jovančević Prof.Ph.D Dušan Cogoljević

**Key words:** information and communications technology, ERP, RFID, productivity, speed, performances

**Abstract:** As of lately, the importance of information and communications technologies (ICT) in retail business is constantly growing. ICT use provides for improvements in productivity, speed, efficacious management of vendors' relations in supply chain and competitiveness for the retail businesses, especially of the small and medium sized ones, which, in addition to this, exerts a positive effect on their performances (Mohan, 2012). ICT use is regarded as a critical factor for retail business success. This especially pertains to the Enterprise Resource Planning (ERP) systems and to the Radio frequency Identification (RFID). (JEL Classification: L81 M41 O32)

### Introduction

When applied, the Enterprise Resource Planning systems serve to improve the information flow, reduce costs, improve relations with vendors and reduce the customer response time (Al-Mashari, 2003). It enables integration of information, flexibility in access to information, functionality and insignificant influence on the use of the "new" accounting practice (Galani, 2010).

Generally speaking, the research work that was carried out into the business practice has showed improved financial performance (Return on Assets (ROA), Return on Investment (ROI) and Asset Turnover (ATO)) in all the enterprises, including the retain ones, which apply the Enterprise Resource Planning system compared to those that have not yet introduced this system (according to Hunton, 2003).

Productivity is significantly improved.

Benefits from the successful application of the Enterprise Resource Planning system in businesses depend, among other things, on the size of the enterprise and on the production date of the applied Enterprise Resource Planning system (Abdullahai, 2012).

Due to its huge importance, regardless of some of its slightly negative aspects, application of the retail Enterprise Resource Planning system is on the rise. This exerts positive effects on the productivity, speed and performances of the retail businesses.

### 1. A Review of Research Papers and Works

Owing to the growing importance of the Enterprise Resource Planning systems, more scientific papers and works are produced that are dedicated to the effects and problems

faced in the adoption or application of this system. In addition to the works of the general interest in this matter, research papers and works dedicated to the research into the significance and problems related to the successful application of the retail Enterprise Resource Planning system grow richer as well. Within the context of this issue, specific aspects of the retail Enterprise Resource Planning system are being analyzed by individual countries, individual global retail companies and different retail business forms (shops).

The entire (available) literature that was used in the production of this paper serves as a fundamental basis for in-depth and complex analysis of the retail Enterprise Resource Planning system, primarily from the aspect of its influence on business productivity, speed and performances (Vojteški Kljenak, 2012; Kvrgić, 2012, Lukić et al., 2011; Lukić, 2011a).

### 2. Hypotheses, Methodology and Data

Scientific works and books are dedicated to the research of different hypotheses in relation to the retail Enterprise Resource Planning system. The main hypothesis (H1) used in this paper shall pertain to the influence of the Enterprise Resource Planning system on business performances in the retail sector. The other hypothesis (H2) in this paper, which is directly related to the previous one, is the influence of the Enterprise Resource Planning system on the improvement of the accounting information system, as an integral part of the integrated information system in the retail businesses.

As for the methodology used in this paper, the above mentioned hypotheses are being researched based on the descriptive, theoretical, normative and qualitative empirical analysis.

Relevant data for the research of these hypotheses by relying on the above listed methods in this paper was predominantly collected from the relevant scientific works and papers.

### 3. Theoretical Dimensions of the Retail Enterprise Resource Planning System

The ERP system (acronym made of the term Enterprise Resource Planning), that is, the business information system can be concisely described as a system of software applications that integrates basic business processes in an enterprise, such as the production, distribution, finances (i.e. accounting) in one uniform entity. This is how a system is established, owing to which it is possible to manage all the human and material resources on one hand, and on the other, it enables planning, development and

monitoring of the business processes and procedures ("The Use of Information and Communications Technologies in Serbia" ("Korišćenje informacione i komunikacione tehnologije u Srbiji"), Institute for Statistics of the Republic of Serbia).

Due to its importance, there is a high share percentage of the new technology, including the ERP system, in the business operation of the large retail companies (see Table 1). In the United States of America and in the European Union, more than 50% of the retail companies have accepted and are placing their orders on the market online (according to the e-Business Survey 2007). This has positive effect on the business performances.

**Table 1** - Percentage (in %) of the total number of companies using the e-business software systems (by individual sectors and company sizes or groups, EU-7, 2007)

	Enterprise Resource Planning (ERP)	Customer Relationship Management (CRM)	Bar coding	Radio Frequency Identification (RFID)
Retail sector (EU7, total)	16	20	59	8
Micro (1-9)	10	9	35	0
Small (10-49)	29	13	53	2
Medium (50-249)	37	23	66	6
Large (250+)	33	38	81	15
USA	6	35	69	15
Transport and logistics	21	17	-	13

*Note:* Results obtained based on (for the retail sector, total): 1026 interviews in 7 countries EU (DE, FR, PL, SE, UK). 125 interviews were made in the USA.

Data for the retail sector, transportation and logistics and for the USA are weighted against the employment levels ("companies representing x% of the employment levels in individual sectors").

Data for the companies – company size groups (from micro to large) are presented as % of the total number of companies within each individual size group.

*Source:* e-Business Survey 2007.

Similarly to the case of the ERP system, the use of the Customer Relationship Management (CRM), starting from 2007, has been one of the major indicators of the development levels in the use of information and communications technologies among all the enterprises in the EU, including the retail ones. In shortest, the Customer Relationship Management system can be defined as a sum of processes enabling the gathering of the necessary information on consumers, sales, marketing process effectiveness, consumers' reactions and market trends ("The Use of Information and Communications Technologies in Serbia" ("Korišćenje informacione i komunikacione tehnologije u Srbiji"), Institute for Statistics of the Republic of Serbia).

The use of RFID technology is on the rise, too. There are more companies using RFID in the United States of America than in Europe. Similarly, the larger retail chains are more frequently using RFID than the smaller ones. The RFID technology is, owing to its importance, nowadays increasingly being treated as a critical factor of business success in the modern retail sector.

Enterprise Resource Planning is a universal concept and a system applicable in all the sectors, including the retail one, with the aim to achieve an integrated information system – an enterprise, especially with respect to the supply chain, buyers, human resource, finances and administration. In other words, in its essence the Enterprise Resource Planning system is an integrated information system, based on a multitude of hardware and software components. It integrates all the business activities in one information system. Business processes that are integrated provide for the development of an efficacious communications and information distribution (network), which results in an increase in productivity, speed and improved business and financial performances.

Owing to its importance, the Enterprise Resource Planning system has been broadly applied by the large retail chains. Key components of the retail Enterprise Resource Planning system are presented in Figure 1.

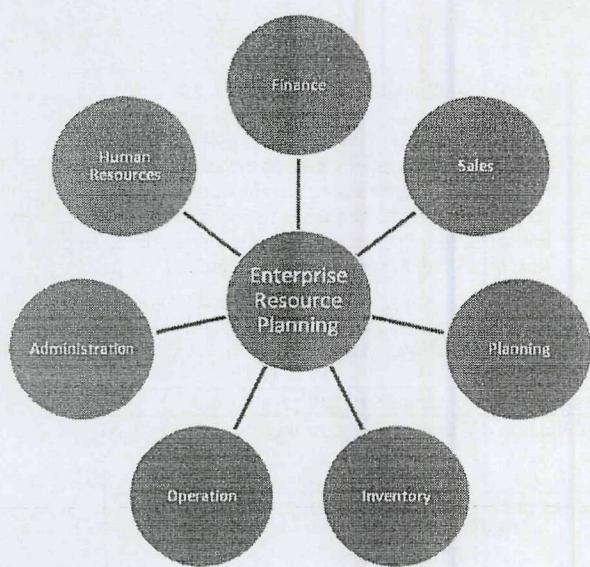
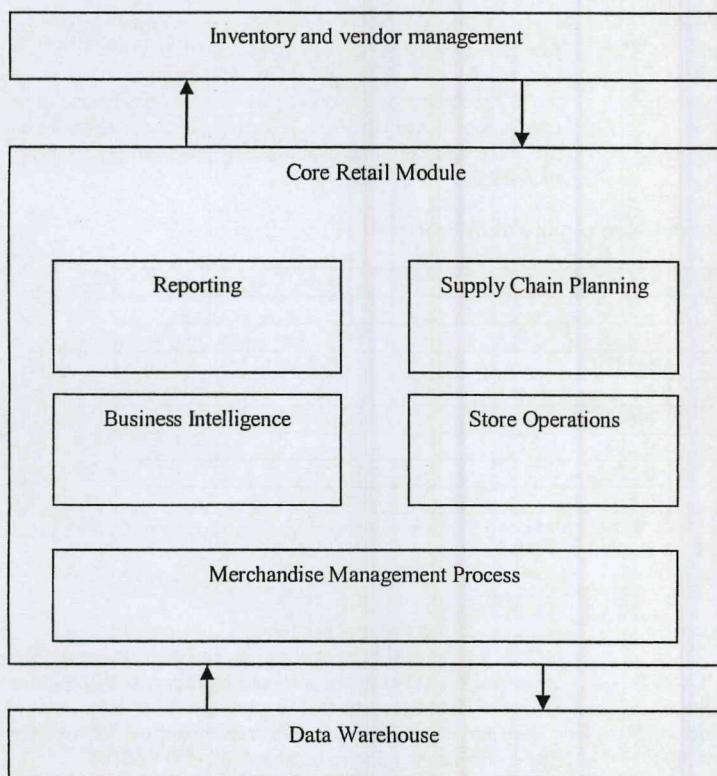


Figure 1 - Retail Enterprise Resource Planning System Components

Source: DMSRetail: Retail Enterprise Resource Planning (<http://www.dmsretail.com/erp.htm>)

The main components of a retail enterprise resource planning system include the following: inventory management, retail planning, supply chain planning and execution and corporate administration.

Specific components of the resource planning system in retail shops are primarily related to supply chain planning and execution (see Figure 2).



**Figure 2 - Components of a Resources Planning System in Shops**

Source: DMSRetail: Retail Enterprise Resource Planning (<http://www.dmsretail.com/erp.htm>)

#### 4. Critical Factors for Successful Application of the Retail Enterprise Resource Planning System

There are numerous factors influencing the successful application of the Enterprise Resource Planning system in all the enterprises, including the retail ones. In addition to the organizational factors, there are also the

**Table 2 - Critical factors for a successful application of the Enterprise Resource Planning system**

Dimensions	Definition	Examples of factors
Business dimensions	Achievement of expected strategic business goals (competitive advantage)	Support to top management Pilot project
Organizational dimensions	Integration levels between different departments	Business process Reengineering Clear targets Influence on the organization
Application dimensions	Users' satisfaction and provision of the required functionality	Quality of information system Users' satisfaction Training for users and education
Financial dimensions	Achievement of the expected return (return on investment)	Careful selection of packages Partnership between the supplier and the buyer

Source: Abdelghaffar, (2012)

The role of the Enterprise Resource Planning under the circumstances of the "new generation" of enterprise information system has changed. It now includes both the automation of internal business processes and the external relations: with the buyers, vendors or suppliers, banks, tax administration bodies. The new enterprise information system has now become more open and transparent and it is now applied in all the segments of business operations (in all

national (macro) factors such as the economic growth, national legal regulations and infrastructure, information and communications technologies (Abdelghaffar, 2012). General critical factors for successful application of the Enterprise Resource Planning system are presented in Table 2.

companies, which includes the retail ones, too) (Serova, 2012).

Research work on the business practice has showed that generally speaking, there is a strong correlation link between the critical factors and improvements in effective use of the Enterprise Resource Planning system. Pearson's correlation between the critical factors and the application of the Enterprise Resource Planning (ERP) system is presented in Table 3.

**Table 3 - Pearson correlation between the critical factors and the application of ERP systems**

Critical Factors	Correlation
Project Management Principles	0.579 <sup>a</sup>
Flexibility/evaluation of the ERP project	0.499 <sup>a</sup>
Human resources' development	0.327
Reengineering process	0.576 <sup>a</sup>
Support to top management	0.695 <sup>a</sup>
Costs/budget	0.431 <sup>a</sup>
Information technology infrastructure	0.182 <sup>a</sup>
Consultancy services	0.595 <sup>a</sup>

a – Correlation is significant on the level of 0.01 (two-tailed).

Source: Ehie, (2005)

As of lately, the retail businesses are increasingly adopting and applying the Enterprise Resource Planning system with the aim to achieve certain economic benefits (Garg, 2010). In the context of the above fact, great significance is placed on the efficacious control of the critical success factors, which are, to some extent, different from one to another country. By using the example of the retail sector in China, the research

work has shown that the technological and organizational factors, i.e. the quality of application, and the readiness of an organization to effectively introduce and apply the Enterprise Resource Planning systems, influence to a great extent the quality and levels of the achieved economic benefits from the ERP system upon its introduction (Zhu, et al., 2010).

### **5. Economic Benefits from Retail Enterprise Resource Planning System Application**

All the economic benefits from the application of the ERP system can be categorized as the visible and the invisible ones. The visible benefits from the use of ERP programs are as follows: inventory reductions, personnel reductions, productivity improvements, orders management improvements, reductions in end cycle financing, reductions in information technology related costs, reductions in supply costs, improvements in cash management, increased revenues

from sale/profit, reduction of transportation/logistics costs, reductions in maintenance and improved delivery time.

The invisible benefits from the ERP program application are as follows: information/more visible, new/improved processes, quicker response time to buyers, reductions in costs, improved levels of integration, standardization, flexibility, globalization, Y2K, business performance and in the chain of offer and supply (Palladino, 2010).

There are multiple economic benefits from the application of the retail Enterprise Resource Planning systems. These are presented in the form of a SWOT analysis in Table 4 below.

**Table 4 - SWOT Analysis of Retail Enterprise Resource Planning Systems**

WEAKNESS	STRENGTHS
Expensive to procure Requires significant employee training Compatibility issues with other / legacy systems Security concerns	Provides an enterprise wide view of the workflow Allows integration with systems of associates and business partners Helps in routine decision making Allows streamlining of business processes
THREATS	OPPORTUNITIES
Opposition to globalization and transnational movement of goods Increasing complexity of such systems Divided opinion over the Return-On-Investment (ROI) from such tools Security concerns regarding sharing of data over a network	Booming retail sector in the emerging global markets The retail sector is overlooked by the major ERP solution providers High efficiencies becoming critical in the retail sector due to the cut-throat competition and paper-thin margins

Source: DMSRetail: Retail Enterprise Resource Planning (<http://www.dmsretail.com/erp.htm>)

Generally speaking, the application of the Enterprise Resource Planning system contributes to the improvements in *inventory management*. It enables efficacious management of complex and interrelated processes in the supply chain. This in turn exerts positive effects on the reductions in inventory.

Effects of the Enterprise Resource Planning system application on inventory management are especially significant for the retail businesses. This is quite understandable, bearing in mind the high inventory share in the working capital and assets in the retail businesses.

Research work on the retail practices has shown that the application of the Enterprise Resource Planning system significantly contributes to improvements in inventory supply chains management, and at the same time to the better inventory planning (Belbağ et al., 2009). This in turn exerts positive effects on operational performance of the retail businesses.

Application of the Enterprise Resource Planning system exerts certain partial influence on the improvement in quality of the *accounting information system*. Benefits to the accounting operations, if observed per individual segments, are as follows: 1) Benefits for accounting from the use of information technology: faster data collection, facilitated

*Table 5 - Influence of the Enterprise Resource Planning (ERP) system application on improvement of the management accounting practice*

results' production, faster results' processing, facilitated data collection, and in general, improved system flexibility; 2) Operational benefits for accounting (time): reduces the time necessary for production of monthly, quarterly and annual balances, as well as for the use of these financial reports; 3) Organizational benefits for accounting: increased flexibility in information production and integration levels of accounting applications, improves decision making based on timely and reliable information, quality of financial reporting and internal audit function; 4) Management accounting benefits: improved control of working capital, increase in use of ratio analysis and reduction in time spent on issuing of payrolls; 5) Operational accounting benefits (costs): reduces the required number of accounting personnel (Kanellou, 2011).

In addition to the above, application of the Enterprise Resource Planning system contributes to the *management accounting practice improvement*. This has been supported by the results obtained through studies and research work on the example of Greek companies, as shown in the Table 5.

Improvements in the practice of management accounting	ERP	Non-ERP
Calculation of costs per basic activities	30%	20%
Target costs' calculation	40%	35%
Life cycle costs calculation	35%	35%
Benchmarking	50%	40%
Balanced scorecards – Balance card, system of financial and non-financial benchmarks and criteria for business performances	45%	20%

Source: Galani, (2010)

Information presented in the above Table clearly indicate that the businesses relying on the Enterprise Resource Planning system apply more latest management accounting concepts in comparison to those that have not yet included this system in their operations. This has a positive effect on the reduction of costs as a determining factor in their overall business performances.

*System of financial and non-financial business operational performance benchmarks – the Balanced Scorecard approach* is being broadly applied in the retail sector as well (Lukić, 2011b). It provides for all the necessary pieces of information for efficient use of the retail Enterprise Resource Planning (Rosemann, 1999). This entirely applies to the use of other modern technology means in the retail business.

#### **6. Downsides of Retail Enterprise Resource Planning System Use**

In addition to the significant advantages, the application of the enterprise resource planning system certainly has certain downsides. These are as follows: long and expensive implementation process, long payback (return on investment) period, incompatibility issues, etc. When introducing the Enterprise Resource Planning system in retail businesses, both in general and in individual business sectors, one has to bear in mind the strong impact of this process, its progress and of the predominant culture of the company in question.

Costs inherent to the retail Enterprise Resource Planning system application are significant. The key overall categories of costs in application of the Enterprise Resource Planning system are as follows: consulting, hardware/infrastructure, implementation team, training and software (Table 6).

**Table 6 - Categories of costs in Enterprise Resource Planning system application**

Categories of Costs	Average Costs (in %)	Ranking (in %)
Consulting	30	20-60
Hardware/infrastructure	25	0-50
Implementation Team	15	5-20
Training	15	10-20
Software	15	10-20

Source: Beheshti, (2010).

#### **7. Major Retail ERP Vendors and their Products**

It is well known that the global Enterprise Resource Planning market is dominated by relatively few vendors.

Their respective market shares are as follows: SAP - 29%, Oracle Applications - 10%, The Sage Group - 7%, Microsoft Dynamics - 4%, SSA Global Technologies - 3% and Others 47% (DMSRetail: Retail Enterprise Resource Planning (<http://www.dmsretail.com/erp.htm>)).

Dynamics - 4%, SSA Global Technologies - 3% and Others 47% (DMSRetail: Retail Enterprise Resource Planning (<http://www.dmsretail.com/erp.htm>)).

Major retail ERP vendors and their products are shown in Table 7.

**Table 7 - Major Retail ERP Vendors and their Products**

Retail ERP Vendors	Product
1 SAP	SAP for Retail
2 Oracle	Oracle Retail Merchandising System (ORMS)
3 The Sage Group	Sage Pro ERP
4 Microsoft Dynamics	Microsoft Dynamics NAV
5 Aldata	Aldata G:O:L:D:
6 JDA software	Portfolio Merchandise Management (PMM)
7 Jesta I.S.	Vision Merchandising suite
8 NSB Group	Connected Retailer Merchandising

9 Island Pacific	Island Pacific Merchandising System (IPMS)
10 Tomax	Tomax Merchandising Management
11 GERS	GERS Merchandising
12 Retalix	Retalix HQ

Source: DMSRetail: Retail Enterprise Resource Planning (<http://www.dmsretail.com/erp.htm>)

If observed as a breakdown by individual country, the reliance on individual brands of ERP systems certainly varies among the retail businesses. As an illustration, major brands

of the ERP systems used in the Chinese retail industry are presented in the Table 8.

**Table 8 - Major brands of ERP systems applied in the Chinese retail sector**

Brand	Frequency	Percentage
Oracle	20	28.99
National	17	24.64
SAP	9	13.04
Kingdee	9	13.04
Local – others	8	11.59
UFIDA	4	5.80
International - others	2	2.90
Total	69 <sup>a</sup>	100

<sup>a</sup> Some retailers double the modules more than one ERP brand.

Source: Zhu et al. (2010)

### 8. Radio Frequency Identification - RFID

Radio frequency Identification (RFID) is a modern information technology that emerged later than the Enterprise Resource Planning (ERP) system. Owing to its economic importance, it is more and more applied in all the companies, including the retail ones, in all the different segments of their business operations, and especially in the supply chain management.

Application of the radio frequency identification is beneficial to all the companies, including the retail ones, and contributes to significant saving of money and increase in competitiveness (Mohan, 2012). This has produced a positive effect on their business performance.

### Conclusion

As of recently, many enterprises, including those from the retail sector, invest more and more into the development of a resource planning system in order to integrate all their business activities in one unique system. The effects of the application of the Enterprise Resource Planning system are as follows: reductions in transaction business costs and increase in productivity, buyers' satisfaction levels and profitability.

Adoption of the Enterprise Resource Planning system contributes to the uninterrupted maintenance of the targeted operational efficiency, improvement of the overall liquidity, increasing of profitability and improvement of the buyers' orders management. All this has positive effects on the financial performances.

In a nutshell, the Enterprise Resource Planning system serves to improve productivity, speed and performances. However, in addition to its significant

advantages, it has certain downsides, too. These are: the limited application under certain circumstances, existing business processes have to be synchronized with the Enterprise Resource Planning system in the enterprise in question, costs of the Enterprise Resource Planning system can be extremely high, continuous technical support for this system can be quite weak and the Enterprise Resource Planning system can be too rigid for the specific needs of individual organizations that wish to embark on some new business segments in the near future (Palladino, 2010). Despite all the aforesaid, advantages of the use of an Enterprise Resource Planning system exceed by far its weaknesses, and it should be applied as much as possible in the retail businesses.

Efficacious application of the Enterprise Resource Planning system contributes in a part to the improvement of the accounting information system, quality of the accounting system and specifically of the financial reporting and business decision making. This also has positive effect on the total performances of all the enterprises, which includes the retail ones, as well (Matolcsy, 2005).

### References

- Abdelghaffar, H. (2012), "Success Factors for ERP Implementation in Large Organizations: The Case of Egypt", *The Electronic Journal on Information Systems in Developing Countries*, 52, 4, pp. 1-13.
- Abdullahi, M. and Acosta, F. (2012), "Impact of Adopting Enterprise Resource Planning Systems by Commercial Organizations in Kenya", *DLSU Business & Economics Review*, 21, 2, pp. 63-86.
- Al-Mashari, M. (2003), "Enterprise resource planning (ERP) systems: a research agenda", *Industrial Management & Data Systems*, 100/3/1, pp. 22-27.
- Beheshti, H. M. and Beheshti, C. M. (2010), "Improving productivity and firm performance with enterprise resource

- planning" *Enterprise Information Systems*, Vol. 4, No. 4, pp. 445-472.
- Belbağ, et al.** (2009), "A Research on Corporate Enterprise Resource Planning (ERP) Systems used for Supermarket Supply Chain Inventory Management in Turkey", *European Journal of Scientific Research*, Vol. 38, No. 3, pp. 486-499.
- DMSRetail:** Retail Enterprise Resource Planning (<http://www.dmsretail.com/erp.htm>)
- Ehie, I. C. and Madsen; M.** (2005), "Identifying critical issue in enterprise resource planning (ERP) implementation", *Computers in Industry*, 56, pp. 545-557.
- Galani, D. al et.** (2010), "The Impact of ERP Systems on Accounting Processes", *World Academy of Science, Engineering and Technology*, 66, pp. 418-423.
- Garg, P.** (2010), "Critical Success factors for Enterprise Resource Planning implementation in Indian Retail Industry: An Exploratory Study", *International Journal of Computer and Information Security*, Vol. 8, No. 2, pp. 358-363.
- Hunton, J. E. et al.** (2003), "Enterprise resource planning systems: comparing firm performance of adopters and non-adopters", *International Journal of Accounting Information Systems*, 4, pp. 165-184.
- Kanellou, A. and Spathis, C.** (11-12 July 2011), "Accounting Benefits and Satisfaction in an ERP Environment", *8<sup>th</sup> International Conference on Enterprise Systems, Accounting and Logistics (8<sup>th</sup>ICESAL)*, Thassos Island, Greece, pp. 360-375.
- Kvrgić, G., Lukić, R. and Vojteški Kljenak, D.** (2012), "The Effects of Corporate Social Responsibility on Performance in Retail", *Metalurgia International*, vol. XVII no. 7, pp. 184-193.
- Lukic et al.** (2011), "Assesment of productivity in retail food trade", *Technics Technologies Education Management*, Volume 6, Number 2, pp. 503-515.
- Lukić, R.** (2011a), "Estimates of economic performance of organic food retail trade", *Economic research*, Vol. 24, No.3, pp. 157-169.
- Lukić, R.** (2011b), *Evaluacija poslovnih performansi u maloprodaji*, Ekonomski fakultet, Beograd.
- Matolcsy, Z. P. , Booth, P. and Wieder, B.** (2005), "Economic benefits of enterprise resource planning systems: some empirical evidence", *Accounting and Finance*, 45, pp. 439-456.
- Mohan, A. and Rajeev, P. V.** (March 26-28, 2012), "Role of Information and Communications Technology (ICT) in Indian Small and Medium Retail Enterprises (SMREs)", *International Conference on Technology and Business Management*, pp. 701-712.
- Palladino, A. P.** (2010), *Zara and Benetton: Comparison of two business models*, Master thesis, Universitat Politècnica de Catalunya, p. 52.
- Rosemann, M. and Wiese, J.** (1999), "Measuring the Performance of ERP Software - a Balanced Scorecard Approach", *Proc. 10<sup>th</sup> Australasian Conference on Information Systems*, pp. 773-784.
- Serova, E.** (2012), "Enterprise Information Systems of new Generation", *The Electronic Journal Information Systems Evaluation*, Volume 12, Issue 1, pp. 116-126.
- Vojteški Kljenak, D. , Lukić, R. and Kvrgić, G.** (2012), "Green Retail Sale as a Factor of Business Success", *Metalurgia International*, 17 (11), pp. 127-132.
- Zhu, Y. et al.** (2010), "What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry", *International Journal of Information Management*, 30, pp. 265-276

**Correspondence to:**

**Dragica JOVANČEVIĆ**

[dragica.jovancevic@vspep.edu.rs](mailto:dragica.jovancevic@vspep.edu.rs) College of Economics and Entrepreneurship Belgrade

Please send us an invoice to this email:  
[dragica.jovancevic@vspep.edu.rs](mailto:dragica.jovancevic@vspep.edu.rs)

Copyright of Metalurgia International is the property of Fundatia Metalurgia Romana and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.