ERP Solution and End-user Efficiency in Bosnia and Herzegovina

Zaimović Tarik [1], Kozić Muharem [2], Mudrov Tarik [3]

[1]School of Economics and Business Sarajevo, University of Sarajevo, Bosnia and Herzegovina
[2]Faculty of Economy, "Džemal Bijedić" University of Mostar, Mostar, Bosnia and Herzegovina
[3]Ferretto Group Central Europe d.o.o., Sarajevo, Bosnia and Herzegovina

Abstract - Over the past decades, the ERP systems have become indispensable in business processes, particularly in the planning and handling of company resources. At the same time, the ERP system implementation remains a complex process involving a number of factors affecting the quality final solution. This paper aims to measure the end-user satisfaction with an ERP system as it directly affects their efficiency, and thus the ERP system efficiency in achieving the goals and objectives of the company. End-user expectations and attitudes play an important, if not crucial, role in ERP implementation success. In this paper, the user satisfaction was measured through six different user efficiency factors: compatibility, complexity, training, quality of support, adaptation to the needs, and feeling of reliability. The factors were measured comparing SAP solutions and local-developed ERP systems. The conducted research has shown statistically significant results indicating that SAP is better accepted ERP solution by the users than observed local solutions.

Keywords - ERP systems, implementation of ERP systems, end-user satisfaction with ERP systems, user efficiency factors

1. Introduction

In today's competitive environment, corporate framework has become inconceivable without information technologies integrating business processes aligned with overall business goals.

The Enterprise Resource Planning (ERP) systems provide most commonly used platform for integration unifying the three most important components: business management practice, information technologies, and specific business goals. ERP systems are integrated software architectures supporting the data flow throughout different organizational units in a company. In their basic, the enterprise resource planning systems are extensive software systems that integrate a number of business processes, such as manufacturing, supply chain, sales, finance, human resources, budgeting, and customer service activities [1] often associated with enormous investments in software and in customization [2].

The usage of ERP systems initially referred only to big companies, mostly industrial, in the company resource planning. In past years, the position of the ERP systems has radically changed and they are used in various types of company business, regardless of the size and importance of business. ERP is considered as one of the most important innovations that will allow companies to achieve substantial benefits by automatizing, standardizing and monitoring business performance [3].

In all, the implementation of ERP systems gives a lot of advantages to the company, some of which are: integration of functional areas, modernization of organizational processes, transfer of information, improvement of efficiency and productivity level, easier activity tracking and forecasting, and higher consumer satisfaction. Besides the advantages that usually outweigh deficiencies, some obstacles appear during the ERP system implementation. The most often are: the limitation of the level of adaptation, required synchronization of business processes with the ERP system, a high cost of the ERP

implementation, and in addition, a possible lack of continuous technical support.

Despite predominate focus on technology aspects of successful ERP implementation, a crucial part of overall utilization offered by any software still remains the user acceptance [4], [5]. In this paper, we would like to present the comparison between SAP as one of the world leaders in the ERP technology market and local/country ERP solutions from the standpoint of user efficiency. The research goal was to measure the efficiency of ERP users through six factors affecting the quality of the ERP system acceptance.

2. Research Background

To ensure the quality of information, i.e. their timeliness, accuracy, and reliability for the purpose of business decision-making, we need information systems. One of the simplest definitions of information systems is that they are systems for managing information to meet information needs of an organization. The primary task of information systems is the collection, storage, processing, and distribution of information. The ERP systems are primarily oriented towards business management and at the same time they operate through integrated modules enabling the functionality of business segments, such as: planning, production, marketing, distribution, sale, accounting and finances, human resources management, and other segments. This often results in extensive investments in software and in customization [2].

To be considered as an ERP system, a business application needs to meet the following minimal functionality requirements in three main modules (accounting and finances, fixed asset management, procurement and sale management), to provide system integration, an adequate licensing fee to differ it from simple applications, the possibility of a multi-user way of work, and an industry specific function. In addition to the three main functional modules above, an ERP system today implicitly covers all main functions, such as production, accounting and finances, sale and distribution, and human resources management. The most present main modules of modern ERP solutions are: financial accounting, production planning, materials management, sale and distribution, human resources management, and controlling [6]. Besides the main modules, ERP vendors also offer other various modules specialized for specific needs of business systems. The selection of a module depends on the type of industry the company is in, as well as different functions within a module that can be added or removed from the software package. In this way, every company can modify the ERP solution and adapt it to its needs accordingly.

Most often criticism of the ERP system introduction addresses its extensive cost – because, as a rule, these are complex and expensive programs. Also, many believe that the need to adapt the software to individual processes in the company means insufficient possibility to adapt it to user requests, the time spent, and an increase in costs, many of which are not anticipated. Over the past decade, organizations have made significant investments in comprehensive information systems solutions, predominantly enterprise resource planning (ERP) systems. Despite obvious benefits, ERP system implementation often results in failure with reported problems suggesting the issues are not just technical, but include wider behavioral factors [7], [8]. At the same time, understanding adoption from the user's perspective is the challenge in itself, as the users and the ability to learn how to make good use of the technology is the precondition for comprehensive tangible benefits of ERP implementation.

Furthermore, it's not possible to estimate benefits of improved productivity and competitive advantage without successful implementation [9], but often this requires changes in overall processes including human dimensions [10] as well as coordination within the organizations [8]. In other words, the users' acceptance is critical tipping point in ERP systems successful implementation. To make this even more complex, a substantial change in organizational culture, structure and ways of working, is the pre-requirement of ERP solution implementation [11].

Despite expected benefits, Maguire et al. [12] report that 90% of early ERP projects were either late or over budget, while Plant and Willcocks [13] note that not more than 30% of promised benefits were delivered. Building on early Rockart [14] concept of critical success factors, many studies have been assessed and identified different CSFs affecting the ERP implementation [15], [16], [17]. However, majority of these analyses is taken at organization level and top managers have evaluated the CSF for ERP implementation, neglecting the perception of the end users as one of the most important aspects of implementation.

Furthermore, companies which adopted ERP systems exhibit better performance in both terms of user productivity and firm's performance [18]. User acceptance and effective use of ERP systems is clearly identified as one of the critical success factors in overall successful implementation of ERP solutions [19]. Comprehensive business application and relevant level of use of the ERP system is the ultimate goal of any management.

Number of studies emphasize recognizing that individual user productivity related to ERP systems

as one of the most important determinants for firm's overall organizational productivity [20], [21], often concluding that ERP usage is a major factor affecting work at the individual level and that the users are mostly concerned with how ERP system is helping them perform their daily job functions. Realizing significant productivity gains require adequate and appropriate use of information systems [22], and user adoption is directly associated with how they perceive EPR system in assisting them to attain desired performance outcomes [23]. Finally, Agaoglu et al. [24] in their study conducted on 220 employees involved in ERP implementation investigate the CSFs and their effect on the ERP implementation success from users' point of view. In their analyses of respondents' perception, they found that the most important factor to achieve success in ERP project implementation is the "user involvement", followed by "user training".

3. Research Framework

Our paper looks at user efficiency in using ERP systems in Bosnia and Herzegovina. The presented research provides comparison and analysis of local ERP solutions in relation to a world-recognized solution, precisely the SAP AG company as a world leading solution provider in the domain of ERP systems and one of the most recognized solutions in the business software products. The hypotheses and research in this paper use SAP company solution as a benchmark – a standard through which the results will be observed and analyzed.

An anonymous online survey consisting of 23 questions was conducted. The questionnaire itself consisted of two parts. The first had questions helping us to define the respondents themselves (social and demographic characteristics) and the second consisted of questions directly relating to user efficiency factors (Likert five-point scale).

The questionnaire was divided in three sections. First we identified which ERP system is used in particular company, followed by basic demographic questions (respondent's gender, years of experience, function performed in the company, etc.). The third section composed of 19 questions related to user acceptance and efficiency factors. The answers were presented on the Likert scale, aimed at measuring each of the six defined user efficiency factors [4], [5], [24]. Questionnaire was composed on research studies mentioned earlier and listed in Table 1.

Table 1. User efficiency factors and reference research

Compatibility	The ERP system is very compatible with other software. The ERP system is very compatible with the existing hardware. The ERP system is compatible with all networks.	[5], [26]
Complexity	The ERP system is simple for usage. The interface design in the ERP system is simple and easily understandable. The ERP system enables simple and quick performance of often repetitive tasks.	[21], [25]
Quality of support	I am satisfied with the level of support I have while working with the ERP system. The help desk always responds as soon as possible and starts solving possible problems in the ERP system performance. The help desk always successfully resolves any problem related to the ERP system performance.	[24], [27]
Adaptation to the needs	The ERP system is fully adapted to the actual company needs. The ERP system performs the set operations very effectively. The ERP system interface is fully adapted to its users' needs. The navigation through the ERP system interface and its functions is quick and simple.	[4], [28]
Feeling of reliability	The ERP system is completely reliable. The ERP system interface gives me a feeling of reliability. The ERP system provides access to information in real time.	[29], [30]

The questionnaire's reliability was examined by Cronbach's alpha test, with high reliability of the measuring method – Cronbach's alpha coefficient of 0.93. The measuring method was divided into six subscales and verified whether it can be used in this way. To this end, a factorial analysis was carried out. Nineteen items of the applied measuring method were subjected to the principal components analysis (PCA). Before carrying out the PCA, the appropriateness of the data for factorial analysis was evaluated. The indicator value of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is higher than 0.6 (KMO=0.847) and the indicator value of Bartlett's

Test of Sphericity is significant (Sig=0.00, p<0.05), so the factorial analysis is justified.

The analysis of the principal components (factors) revealed the presence of six factors with characteristic values higher than 1, which explains variances of 46.32%, 9.99%, 7.62%, 5.73%, 4.81%, and 3.84%. The analysis results corroborate the use of the scale items in the form of six separate scales (i.e., six subscales).

Table 2. Percentage share of variance explained by the factors

Factors	Eigenvalues of correlation matrix – PCA		
	Total	% of variance	% cumulative
1	8.800	46.317	46.317
2	1.899	9.995	56.312
3	1.448	7.619	63.931
4	1.088	5.728	69.658
5	1.056	4.808	74.466
6	1.015	3.839	78.305
7	0.913	3.362	81.667
8	0.729	3.156	84.823

All answers were collected online with a questionnaire with pre-defined questions intended for users of ERP systems. Before sending the questionnaire, it was verified whether the respondents actually use the observed software in order to increase the truthfulness of the questionnaire and the relevance of the observed sample. The results were analyzed in a statistical data processing program – SPSS, version 25.

4. Research Results

The questionnaire was distributed to 100 companies in Bosnia and Herzegovina according to GDP structure, and the response rate was 66% respondents (N=66 of valid observations). Within the total sample, 34 were males (51.5%) and 32 females (48.5%).

Table 3. An overview of the respondents' years of experience

Years of experience	Frequency	Percentage
0–2 years	23	34.8
2–5 years	17	25.8
5–10 years	16	24.2
More than 10 years	10	15.,2
Total	66	100

Table 3. shows the respondents' distribution according to the years of experience. We can conclude that most of the respondents have less than two years of experience (34.8%). 25.8% of the respondents work with the observed ERP system between 2 and 5 years, 24.2% between 5 and 10 years, and the lowest number of the respondents has more than 10 years of experience with the observed ERP system (15.2%).

Table 4. A descriptive overview of the respondents' job positions

Job position	Frequency	Percentage
Bookkeeper/accountant	30	45.5
Accounting assistant	8	12.1
Managers	23	34.8
Other positions	5	7.6
Total	66	100

As shown in Table 4., most of the research participants are respondents who work as bookkeepers/accountants (45.5%), followed by managers (34.8%). The remaining respondents consist of administrative staff and clerks in payment collection departments.

Table 5. A descriptive overview of the ERP system type used by the respondents

Type of ERP system	Frequency	Percentage
SAP	30	45.5
Pantheon	15	22.7
IMIS	7	10.6
E-Line EDI	6	9.1
Other	8	12.1
Total	66	100

In terms of the ERP system type used by the respondents in their job, we can conclude that most of the respondents, i.e. 45.5%, use SAP. The second place belongs to Pantheon with 22.7% of the respondents, followed by IMIS with 10.6%. The least of the respondents use E-Line EDI (9.1%). Eight of the respondents used another information system, e.g. Info max, Spin, Imelbis, Point 2000, Infonet, NIBIS, and Q-ERP. The above data are presented in Table 5.

As presented in Table 6., the average value on the "compatibility" subscale is M=12.85 (SD=2.02). The theoretical range of the results on this subscale is from 9 and 15, so the obtained average value could indicate a higher compatibility evaluation of all ERP systems. Further, the table shows that all other subscales gave average values indicating a higher evaluation of the user efficiency. We could single out the average value for "training," which is M=11.35

(SD=3.21) and the lowest in relation to all other subscales, indicating the users' lowest satisfaction with this aspect in their work with the ERP system.

The highest average value was obtained for "adaptation to the user needs," i.e. M=17.36, with the range of results on the subscale from 11 to 20, where the respondents, i.e. the ERP system users, confirmed in their answers a high level of adaptation of the ERP systems to their end-user needs.

Table 6. Descriptive statistical values of the variables used in the research

Variable	N	min	max	M	SD	Skew	SE_S	Kurt	SE_K
Compatibility	66	9	15	12.85	2.02	-0.55	0.29	-0.93	0.58
Complexity	66	6	15	12.97	1.95	-1.46	0.29	2.64	0.58
Training	66	5	15	11.35	3.21	-0.31	0.29	-1.36	0.58
Quality of support	66	5	15	12.27	2.79	-0.77	0.29	-0.52	0.58
Adaptation to the needs	66	11	20	17.36	2.58	-0.86	0.29	-0.24	0.58
Feeling of reliability	66	7	15	12.97	2.13	-1.19	0.29	1.05	0.58

Note: N = total sample, M = arithmetic mean, SD = standard deviation, Skew = skewness - asymetry of distribution, SE_S = standard skewness error, Kurt = kurtosis of distribution, SE_K = standard kurtosis error

To know which statistics to use (parametric or nonparametric) before processing the results and answering the hypotheses, we need to examine whether the survey results tend toward normal distribution. The results of examining the normality of the distribution are shown in Table 7.

Table 7. Examination of the distribution normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Compatibility	.186	66	.000	.875	66	.000
Complexity	.173	66	.000	.850	66	.000
Training	.166	66	.000	.884	66	.000
Quality of support	.179	66	.000	.865	66	.000
Adaptation to the needs	.203	66	.000	.871	66	.000
Feeling of reliability	.171	66	.000	.845	66	.000

Lilliefors Significance Correction
KS and Sh-W = Kolmogorov-Smirnov and Shapiro-Wilk tests for normality of the distribution, p = significant

Both Kolmogorov-Smirnov and Shapiro - Wilkov tests show that the distribution of results on every subscale of the used questionnaire deviates from the normal distribution results (p<0,05). Hence, the nonparametric statistics will be used for data processing and analysis.

In the following tables we look at the results related to specific hypotheses.

Table 8. Comparison of the ERP systems according to overall results
H1: SAP is better accepted by the users than the local ERP solutions.

Type of ERP system	N	min	Max	M
SAP	30	60	95	**86.50**
Pantheon	15	58	94	**82.00**
IMIS	7	50	82	**69.00**
E-Line EDI	6	68	94	**77.50**
Other	8	61	95	**80.50**

The results of this research (Table 8.) indicate that the respondents ranked SAP best in relation to the other observed of ERP systems. SAP scored the highest median (86.50), followed by Pantheon (82.00), E-Line EDI (77.50), and finally IMIS (69.00) with the lowest median. The median value of other not listed ERP systems is 80.50. Looking at the results obtained in this research, we can finish with and confirm the above hypothesis H1 because SAP was best ranked by the users of ERP systems.

One-Sample Kolmogorov-Smirnov Test (Table 9.) also indicates that SAP is more acceptable compared to other ERP solutions and that the difference between the ERP solutions is statistically significant. So, not only that SAP is more acceptable than other systems but this result is statistically significant as well.

Table 9. One-Sample Kolmogorov-Smirnov test

One-Sample Kolmogorov-Smirnov Test		Type of ERP system
N		66
Normal Parameters a,b	*Mean*	*2.1970*
	Std. Deviation	*1.41660*
Most Extreme Differences	*Absolute*	*.255*
	Positive	*.255*
	Negative	*-.199*
Test Statistic		*.255*
Asymp. Sig. (2-tailed)		*.000c*
a. Distribution test is normal.		
b. Lilliefors Significance Correction		

Table 10. Comparison of the ERP systems according to the results for the compatibility factor

H2: SAP is technically more compatible with the existing systems in the company (hardware and software) than local ERP solutions.

Type of ERP system	N	min	Max	M
SAP	30	9	15	**14,00**
Pantheon	15	9	15	**13,00**
IMIS	7	9	15	**11,00**
E-Line EDI	6	10	15	**13,00**
Other	8	10	15	**12,00**

In terms of the compatibility factor, SAP received the best score (14.00) while the score for Panthen and E-Line EDI was 13.00. Other ERP systems not listed in the questionnaire had a score of 12.00. IMIS scored the lowest (11.00). Hence, we can verify the correctness of hypothesis H2 in terms of the research results relating to the compatibility factor (Table 10.).

Table 11. Comparison of the ERP systems according to the results for the complexity factor

H3: SAP is more complex for the end-user than local ERP solutions.

Type of ERP system	N	min	max	M
SAP	30	9	15	**13.50**
Pantheon	15	8	15	**13.00**
IMIS	7	6	14	**12.00**
E-Line EDI	6	12	15	**13.00**
Other	8	10	15	**14.00**

Table 11. shows the research results in terms of the system complexity factor, so we see that the other ERP systems (Info max, Spin, Imelbis, Point 2000, Infonet, NIBIS, and Q-ERP) received the highest grade for complexity (14.00). Therefore, we cannot confirm the correctness of hypothesis H3. SAP (13.50), Panthen (13.00), E-Line EDI (13.00) and IMIS (12.00) follow the other ERP systems.

Table 12. Comparison of ERP systems according to the results for the training factor

H4: SAP provides better training for end-users than local ERP solutions.

Type of ERP system	N	min	max	M
SAP	30	6	15	**13,00**
Pantheon	15	5	15	**12,00**
IMIS	7	6	14	**8,00**
E-Line EDI	6	8	15	**9,50**
Other	8	6	15	**11,00**

Looking at respondents' answers relating to training before starting to work with the ERP system (Table 12.), the best ranked was SAP (13.00), followed by Pantheon (12.00), other ERP systems (11.00), E-Line EDI (9.50), and IMIS (8.00) as the last one. Given the best result in terms of the training factor in the usage of ERP systems, we can confirm the correctness of hypothesis H4.

Table 13. Comparison of ERP systems according to the results for the quality of support factor

H5: SAP provides more quality support for its software than local ERP solutions.

Type of ERP system	N	min	max	M
SAP	30	5	15	**13.00**
Pantheon	15	7	15	**12.00**
IMIS	7	7	14	**12.00**
E-Line EDI	6	11	15	**13.50**
Other	8	9	15	**14.00**

The research also measured the quality of support the users had for their respective ERP systems (Table 13.). For this factor, the other ERP systems received the best score (14.00), followed by E-Line EDI (13.50). Third place belongs to SAP (13.00) and the last to Pantheon and IMIS which occupy the same place with an equal score (12.00). Looking at these results, we cannot confirm the correctness of hypothesis H5.

Table 14. Comparison of the ERP systems according to the results for the factor of adaptation to user needs

H6: SAP is better adapted to business process needs in the company than the local ERP solutions.

Type of ERP system	N	min	max	M
SAP	30	12	20	**18.00**
Pantheon	15	12	20	**19.00**
IMIS	7	11	18	**16.00**
E-Line EDI	6	14	20	**16.00**
Others	8	12	20	**19.00**

In relation to the other factors, the quality of adaptation to the ERP system user needs is the factor that received the best score in this research (Table 14.). Therefore, we can conclude that the users are most satisfied exactly with this user efficiency factor. The other ERP systems and Pantheon received the best score (19.00), followed by SAP (18.00) while the lowest score was given to IMIS and E-Line EDI systems (16.00). This research has not confirmed the correctness of hypothesis H6.

Table 15. Comparison of ERP systems according to the results for the feeling of reliability factor

H7: SAP provides a better feeling of reliability than the local ERP solutions

Type of ERP system	N	min	max	M
SAP	30	9	15	**14.50**
Pantheon	15	9	15	**13.00**
IMIS	7	7	13	**12.00**
E-Line EDI	6	10	15	**13.00**
Other	8	7	15	**13.00**

Table 15. shows the research results relating to the feeling of reliability the ERP system gives to its end users. SAP was the highest-ranked (14.50), followed by Pantheon, E-Line EDI and other ERP systems (13.00), and finally IMIS (12.00). Given the collected answers in the research, we can confirm the correctness of hypothesis H7.

By summarizing the research results, we can highlight that SAP did not turn-out to be better from local solutions if we look quality of the support for end-users and the factor of adaptation/customization to user needs. But for the other values that were measured, SAP showed better results. Generally, if we observe the cumulative results, SAP was better accepted by the end-user than other surveyed solutions.

5. Conclusion

Finally, we can conclude that the conducted research has shown statistically significant results that are relevant and indicate that SAP is a better accepted ERP solution by the end-users than the local solutions in terms of all six examined variables.

Among all observed variables, we can point out that SAP has not proved to be better than the local solutions in terms of the factors of quality of support and adaptation to the needs of business processes in the company. The respondents believe that the local ERP solutions provide more quality support and are better adapted to the company's needs. On the other hand, SAP was better ranked than the local solutions in terms of the factors of compatibility with the existing hardware and software, end-user training, and the user's feelings of reliability while working with an ERP system.

References

[1]. Wenrich, K., & Ahmad, N. (2009). Lessons learned during a decade of ERP experience: A case study. *International Journal of Enterprise Information Systems (IJEIS)*, *5*(1), 55-73.

[2]. Doom, C., Milis, K., Poelmans, S., & Bloemen, E. (2010). Critical success factors for ERP implementations in Belgian SMEs. *Management*, *23*(3), 378-406.

[3]. Ruivo, P., Oliveira, T., & Neto, M. Emerald Article: ERP use and value: Portuguese and Spanish SMEs. *Industrial Management & Data Systems*, *112*(7), 1008-1025.

[4]. Oliveira, T., Neto, M. D. C., & Ruivo, P. (2013). Commercial ERP systems and user productivity: A study across European SMEs. *Procedia Technology*, *9*, 84-93.

[5]. Rajan, C. A., & Baral, R. (2015). Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user. *IIMB Management Review*, *27*(2), 105-117.

[6]. Schulz, O. (2014). *Using SAP: a guide for beginners and end users*. Galileo Press.

[7]. Skok, W., & Döringer, H. (2001). Potential Impact of Cultural Differences on Enterprise Resource Planning (ERP) Projects. *EJISDC*, *7*(5), 1-8.

[8]. Chang, M. K., Cheung, W., Cheng, C. H., & Yeung, J. H. (2008). Understanding ERP system adoption from the user's perspective. *International Journal of production economics*, *113*(2), 928-942.

[9]. Addo-Tenkorang, R., & Helo, P. (2011, October). Enterprise resource planning (ERP): A review literature report. In *Proceedings of the World Congress on Engineering and Computer Science* (Vol. 2, pp. 19-21).

[10]. Kwahk, K. Y., & Kim, H. W. (2008). Managing readiness in enterprise systems-driven organizational change. *Behaviour & Information Technology*, *27*(1), 79-87.

[11]. Kallunki, J. P., Laitinen, E. K., & Silvola, H. (2011). Impact of enterprise resource planning systems on management control systems and firm performance. *International Journal of Accounting Information Systems*, *12*(1), 20-39.

[12]. Maguire, S., Ojiako, U., & Said, A. (2010). ERP implementation in Omantel: a case study. *Industrial Management and Data Systems*, *110*(1), 78-92.

[13]. Plant, R., & Willcocks, L. (2007). Critical success factors in international ERP implementations: a case research approach. *Journal of Computer Information Systems*, *47*(3), 60-70.

[14]. Rockart, J. F. (1979). Chief executives define their own data needs. *Harvard business review*, *57*(2), 81-93.

[15]. Karim, J., Somers, T. M., & Bhattacherjee, A. (2007). The impact of ERP implementation on business process outcomes: A factor-based study. *Journal of management information systems*, *24*(1), 101-134.

[16]. Ngai, E. W., Law, C. C., & Wat, F. K. (2008). Examining the critical success factors in the adoption of enterprise resource planning. *Computers in industry*, *59*(6), 548-564.

[17]. Dezdar, S., & Sulaiman, A. (2009). Successful enterprise resource planning implementation: taxonomy of critical factors. *Industrial Management & Data Systems*, *109*(8), 1037-1052.

[18]. Ram, J., Wu, M. L., & Tagg, R. (2014). Competitive advantage from ERP projects: Examining the role of key implementation drivers. *International Journal of Project Management*, *32*(4), 663-675.

[19]. Nah, F. F. H., Tan, X., & Teh, S. H. (2004). An empirical investigation on end-users' acceptance of enterprise systems. *Information Resources Management Journal (IRMJ)*, *17*(3), 32-53.

[20]. Amoako-Gyampah, K. (2004). ERP implementation factors A comparison of managerial and end-user perspectives. *Business Process Management Journal*, *10*(2), 171.

[21]. Kositanurit, B., Ngwenyama, O., & Osei-Bryson, K. M. (2006). An exploration of factors that impact individual performance in an ERP environment: an analysis using multiple analytical techniques. *European journal of information systems*, *15*(6), 556-568.

[22]. Sun, Y., Bhattacherjee, A., & Ma, Q. (2009). Extending technology usage to work settings: The role of perceived work compatibility in ERP implementation. *Information & Management*, *46*(6), 351-356.

[23]. Amoako-Gyampah, K., & Salam, A. F. (2004). An extension of the technology acceptance model in an ERP implementation environment. *Information & management*, *41*(6), 731-745.

[24]. Ağaoğlu, M., Yurtkoru, E. S., & Ekmekçi, A. K. (2015). The effect of ERP implementation CSFs on business performance: an empirical study on users' perception. *Procedia-Social and Behavioral Sciences*, *210*, 35-42.

[25]. Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management & Data Systems*, *111*(7), 1006-1023.

[26]. Ahmad, M. M., & Cuenca, R. P. (2013). Critical success factors for ERP implementation in SMEs. *Robotics and computer-integrated manufacturing*, *29*(3), 104-111.

[27]. Chou, H. W., Chang, H. H., Lin, Y. H., & Chou, S. B. (2014). Drivers and effects of post-implementation learning on ERP usage. *Computers in Human Behavior*, *35*, 267-277.

[28]. Calisir, F., & Calisir, F. (2004). The relation of interface usability characteristics, perceived usefulness, and perceived ease of use to end-user satisfaction with enterprise resource planning (ERP) systems. *Computers in human behavior*, *20*(4), 505-515.

[29]. Hsu, P. F., Yen, H. R., & Chung, J. C. (2015). Assessing ERP post-implementation success at the individual level: Revisiting the role of service quality. *Information & Management*, *52*(8), 925-942.

[30]. Tenhiälä, A., & Helkiö, P. (2015). Performance effects of using an ERP system for manufacturing planning and control under dynamic market requirements. *Journal of Operations Management*, *36*, 147-164.