

IMPACT OF ERP ON PERFORMANCE OF ALBANIAN COMPANIES; A FACTORIAL ANALYSIS

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ABSTRACT

Nowadays companies are shifting their attention towards flexibility, savings and efficiency in order to win or to survive in the market. Sound Accounting Information Systems (AIS) are considered to be a critical factor for success that enables companies to gain competitive advantages and to perform business reengineering. Investments in AIS, specifically in ERP systems may be considerable because they require money, time, effort and personnel changes in the organization; therefore a careful analysis of their impact on the business performance should be made. Albania is a country with not a very long experience in the market economy, but nevertheless the manual AIS already belong to the past. In this paper we analyze the importance of ERP on the overall business performance. Through factorial analysis we study the most important factors for the success of the ERP. We find that three are the most important factors for the success of ERP, the Quality and flexibility of the system, Cost-efficiency of the system and the Quality of produced output. We also study the degree of impact of these factors depending on the size of the business. We find that the first factor has a low impact on small entities and a big impact for the large entities. While the second factor has not a clear impact (neither low, nor large) for the small entities but a large impact for the big business and the third factor has a low impact on the small/medium entities and a high impact on the large entities.

Keywords: AIS, Business performance, Factor analysis

JEL Classifications: M41

1. INTRODUCTION

Nowadays, the business environment has fully shifted from the industrial age to the information age; and the basis for the organization competition has changed from tangible assets to intangible information. As companies around the world are transforming themselves into an information-based competition, their ability to exploit intangible assets has become far more decisive than their ability to invest and manage physical assets (Kaplan and Norton, 1996).

More and more organizations believe that qualified information is critical for their company success (Wang et al., 1998). Data quality has become crucial for the success of AIS in today's IT age, because the need for qualitative data management is increased, as data processing has shifted from the role of operations support to a major operation in itself

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(Wang, Kon & Madnick, 1993). With enhanced access to information technologies, the mission of the AIS is increased from simply providing formal and financial information, into including a wide range of information. In particular, the use of technology ERP (Enterprise Resource Planning) has facilitated the embracement of this new mission (Chenhall, 2003).

ERP definition includes several synonyms such as: software packages, enterprise systems, wide-enterprise systems, enterprise business systems, integrated software's, and enterprise application systems (Gable 1988, Holsapple and Sena 1999; Rosemann, 1999), which are defined by different authors, but with no significant differences. Referring to the literature and to the best known authors in this field of studies, some of the ERP definitions are given below:

Referring Alshawi (2004), an ERP is an attempt to create an integrated product that manages most of the operations in a company. What is unique about ERP systems is that they integrate all the functions by creating a single unified system, rather than separated applications.

According to Davenport (1998), ERP applications are software packages that connect and manage the flow of information within and between complex organizations, allowing managers to take decisions based on information that truly reflects the current state of the business. These systems also automate the complex processes and transactions and they have the potential to reduce costs.

Kumar and Van Hilegersberg (2000), claim that ERP systems are support systems that gather in a single database the data needed for various business functions such as manufacture, finance and supply chain, so that transactions should be processed only once.

An important feature of ERP is that they are considered the first approach that combines the concepts of integrated business management with the information technology, (Slooten and Yap, 1999).

The studies show that an ERP system is not just a pure software package that fits in the organization, but is an organization infrastructure that affects the way people work. ERP imposes its own logic on the company's strategy, and on its organization and culture, (Shehab et al, 2004).

The focus on ERP software has won a strategic role in today's businesses, even in Albania. Considerable investments are devoted to ERP projects to improve the overall performance of the companies. Consequently, it is important to evaluate the past performance, the current and the future one, to judge whether these investments are profitable for business or not.

Considering the ongoing developments of the ERP systems around the world, and the short history of the ERP systems in Albanian economy, we can distinguish an obvious trend towards ERP implementation by more and more Albanian companies, which while growing want to capitalize on the advantages that information system have to offer. The first Albanian companies offering ERP solutions were established in the 1990s and the first products were issued on the market by late 90'. Today the Albanian ERP market is

dominated by three major providers: IMB (Institute of Business Modeling), Infosoftware SD and TPK Solutions, who have not only met the needs of local businesses but in some cases have also provided ERP and AIS solutions for foreign companies operating in Albania.

Albanian ERP packages are simple and considered easy ERPs. They are designed for businesses that do not have complex functions, or that are not geographically dispersed. Nevertheless, while trying to move in line with the global ERP evolution trend, the Albanian ERP vendors are also offering services such as E-Business, Cloud Computing and Web applications for domestic and foreign companies operating in Albania. On the other hand the companies using ERP solutions are growing in number and under this conditions an analysis is needed to distinguish the factors that impact their selection for ERP software, and also to investigate whether the huge investments in ERPs has had any economic return so far or not.

The structure of this paper is as follows: in the first section we present a short literature review on the ERP systems, their impact on business performance and factors leading toward ERP success. Next we present the methodology of the study and the main hypotheses tested. In the third section we present the data analysis and we conclude the paper by presenting the Main Findings and conclusions of the study.

2. LITERATURE REVIEW

ERP systems have become a major incentive to transform an enterprise into an integrated organization, directed to real-time information processing (Arik, AG, 2006). Various data point to the fact, that ERP systems have become one of the largest IT investment of 1990s (Chung and Snyder, 1999).

Despite the risks, the implementation of ERP is widespread in many different types of industries (Kumar and Van Hillegersberg, 2000; Mabera et al., 2000). Generally, adopting organizations seem to think that the entrance of ERP systems, allows more efficiency in organizational performance, and therefore, a better financial performance than non-adopter organizations, (Davenport, 1998). Previous studies as Hunton et al (2003) found that while ERP adopters have demonstrated no difference in financial performance after ERP, the performance of non-adopter's has deteriorated during this period.

On the other hand Poston and Grabski (2000, 2001) report something different between adopters and non-adopters. While ERP adopters have not done anything better than their counterparts in some fields, non-adopters have improved their performance over the others. For a longer-term examination for the differences between adopters and non-adopters, Nicolaou (2004) reports that at least two years are needed before adopters begin to demonstrate positive differences in the financial performance from the non-adopters. Therefore the timing factor may partly explain the results found by Poston and Grabski (2000, 2001). The most important literature in technology investments suggests that strategic investments in IT and ERP, give to the firm the opportunity to realize tangible and intangible benefits, which in turn helps it to maintain the operational efficiency for a long time (Nicolaou, 2004; Kettinger et al., 1994; Mata et al., 1995).

In order to measure the value that an ERP system adds to the organization, first of all the system should be implemented successfully, and it should be put into operation. Therefore organizations should first measure the performance of the implementation and of the operational use of ERP, in order to fully measure the value added system (Arik, AG, 2006). The majority of researchers, report that the immediate effects of ERP implementation are the problems with the productivity and the profit (Davenport, 1998, Poston and Grabski, 2000, Hitt et al., 2002, Hunton et al., 2003, Nicolaou, 2004). These are thought to come from the problems with the integration of the new systems, from the disagreement between people, processes and technology, and from the changes in general management issues during and after the implementation (Nicolaou, 2004; Murray and Coffin, 2001, Peterson et al 2001; Ross and Vitable, 2000, Scott and Vessey, 2000; Soh et al., 2000; Stephanou, 2000). Organizations relying on ERP, experience a temporary worsening of the performance and the productivity, as a result, the value added activities become more complex from what they were planned to be (Brown and Vessey, 1999).

Measuring the success of ERP projects is a widely discussed topic. First of all what is meant with the success of an ERP project. In the studies of critical issues in ERP projects, Kumar et al. (2003) tries to define this success. According to Kumar the most used criteria to measure the success are the completion of the implementation on time and on budget. From the perspective of ERP software users, the success of an ERP project means the simplicity of use and the improvements of the daily tasks. Mashari et al (2002), states that the firms that have implemented ERP systems create more value. While according to Davenport (1998), ERP adds value to the organization through Integration, Optimization and Information, where Integration represents the unification and the harmonization of ERP (of the data's and processes), with the organization's environment; Optimization is the standardization of the most processes using the best practices (Benchmarking) embedded in ERP and; Information is the ability to create and maintain data that are consistent, timely and accurate and that support the unique business analysis and the decision-making needs of the job force.

Considering the complexity and the size of investments in hardware, software and human resources, as well as the impact level on the business value, the project implementation of an ERP system is a risky experience for each company. Therefore it is essential to treat carefully and successfully such a giant project, but more important is to understand what does it mean success and how to assess it (Davenport, 1998).

3. METHODOLOGY

In this study, we have surveyed 50 business entities which have implemented and use an ERP solution. The sample was randomly selected and was made subject of a questionnaire. The survey was conducted online through Google Forms tool. In total 150 questionnaires were sent out and 50 responses were returned, thus having a response rate of 33%. According to Visser, et al, (1996) on line surveys with lower rates of return responses (at about 20%) yielded more accurate measurements than those with higher return rate (at about 60-70%). Therefore we consider a response rate of 33% to be an acceptable and reliable rate to perform the analysis of the gathered data.

The questionnaire consisted of 28 questions in total. The questions were of different types: Likert scale (from 1 to 5) questions, open questions, alternative choices and close questions (answers Yes or No). Analysis of the data gathered by survey was performed through a statistical package (SPSS program).

We organized the study towards two main hypotheses:

Hypothesis 1: In what way has the ERP investment impacted the performance of the businesses in Albania?

H1 was focusing mainly on the dimensions (if any) of the impact of ERP solutions on the performance of the business. We tested H1 through factorial analysis of the data because in the case of studies with many variables, the analysis can be complicated due to the large number of variables and the fact that some variables may measure different aspects of the same underlying factor. In such situations it is suggested the use of factorial analysis, which tends to aggregate several initial variables into one or more general underlying variables (factors). More specifically, factorial analysis aims to reduce the dimensions of the original space and give a new interpretation of space, lying in a reduced number of new dimensions, which is supposed to replace the old dimensions (Rietveld and Van Hout, 1993). Thus, factor analysis provides not only the opportunity to gain a clear view of the data, but also the access to use the output in subsequent analyzes (Field, 2000, Rietveld and Van Hout 1993).

In the questionnaire there were 20 initial variables that were presumed to have an impact on the performance of the business. Based on the received responses the 20 variables were aggregated into three factors (general variables). This kind of grouping of variables into factors made it easier to measure which are the ERP dimensions that affect the business performance, and how they affect it.

Hypothesis 2: In what extent did the use of ERP software affected the performance of businesses in Albania?

H2 was an attempt to somehow measure the degree of impact the different factors have on the businesses performance. Testing of H2 was performed based on factorial analysis of H1. Once the three factors of ERPs impact on businesses performance were outlined, the proportion of small/medium and large businesses in the sample was built, consequently assessing whether the impact of each factor on performance was Low or High.

4. DATA ANALYSIS

The questionnaire had 28 questions and its first part addressed questions regarding the sample descriptive statistics. In terms of size and capital composition (whether it was an entity with domestic or foreign capital), the sample showed the following distribution:

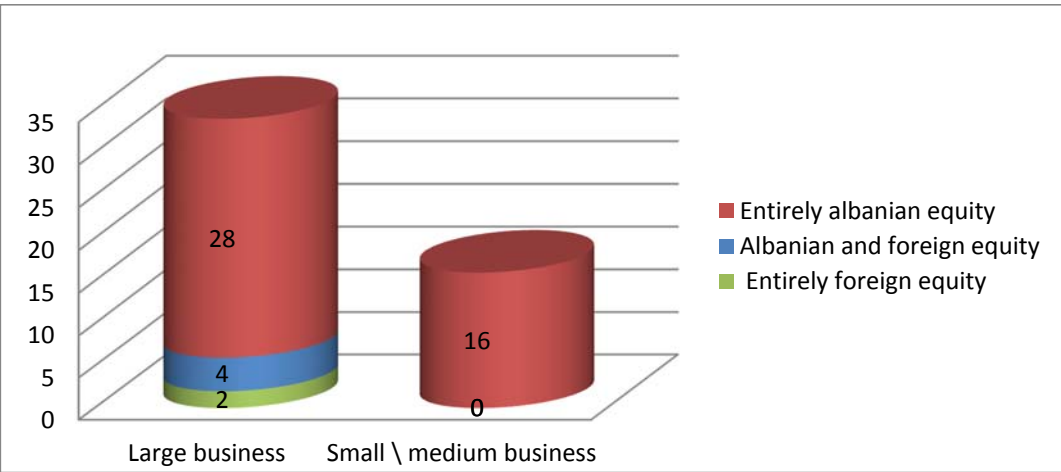


Figure 1: The capital structure of businesses by size

As we can easily figure out from the figure, most of the businesses belong to wholly-owned Albanian capital and these businesses are categorized as large businesses. The fact that most businesses are categorized as large ones, has a great importance for the purposes of this study, because as large businesses that have a wider and a more complex use of ERP software, therefore making it easier to study the impact of the ERP. Also it is important to focus on entities with Albanian capital so as to investigate what kind of ERP systems do the Albanian businesses prefer, ERP offered by domestic vendors or ERP offered in the global market. This was the focus of the next question in the survey.

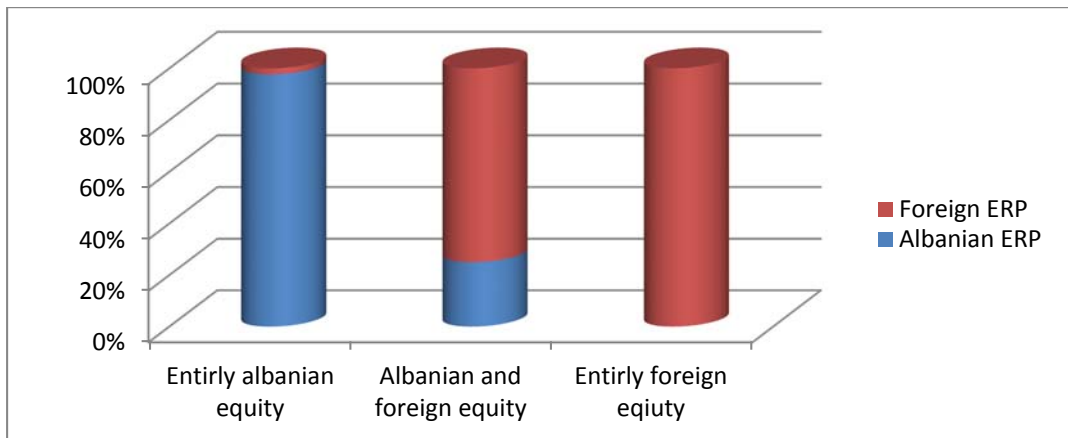


Figure 2: ERP packages used by entities operating in Albania

We can see that entities with (complete or partly) foreign capital seem to prefer most foreign ERP. We can explain this feature whether by the fact that foreign entities operating in Albania, are characterized by the need for complex, multifunctional and multi-currency ERP, which the Albanian ERP vendors, despite their huge experience, cannot offer; or by the fact that foreign entities are mainly subsidiaries or branches of bigger foreign companies and therefore chose to implement in Albania the same ERP the company is using. On the

other hand the Albanian businesses tend to focus more on domestic ERP indicating that the Albanian ERP solutions have managed to cope with the needs of the Albanians' entities.

To identify more specifically which are the reasons that led businesses to the selection of a certain ERP, respondents were asked to make an assessment that resulted as follows in figure 3. We can see that the dominant reason is the system flexibility, so when choosing an ERP solution the majority of the entities focus on how well it adapts to the specific requirements of their own business operations. The system flexibility is an important factor, not only during the implementation phase, but also for the future maintenance of the system, how the ERP will adapt to changes in the business environment. Also, factors like functionality and simplicity in use, as well as the total costs of implementing and maintaining are indeed important for the final decision.

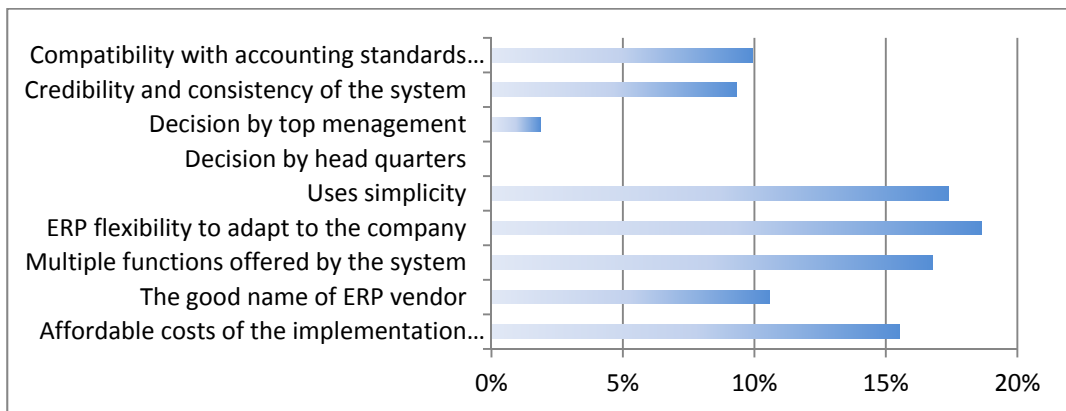


Figure 3: Factors that influence the selection of an ERP to businesses operating in Albania

To identify which function of the program is used more often, the respondents were asked to select the module of the program that they use more frequently.

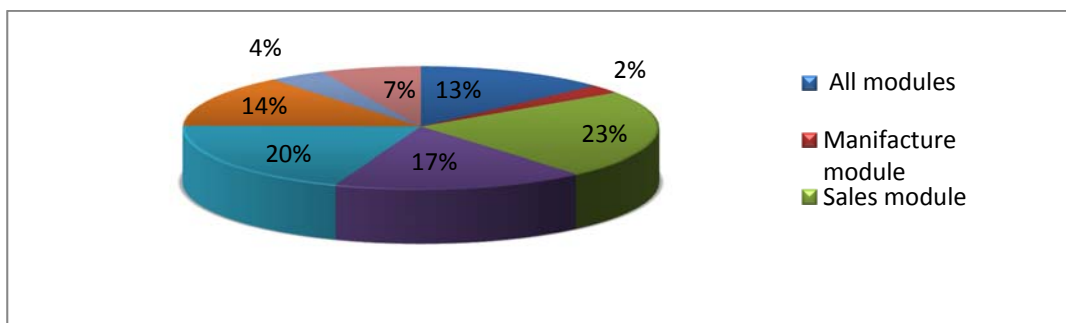


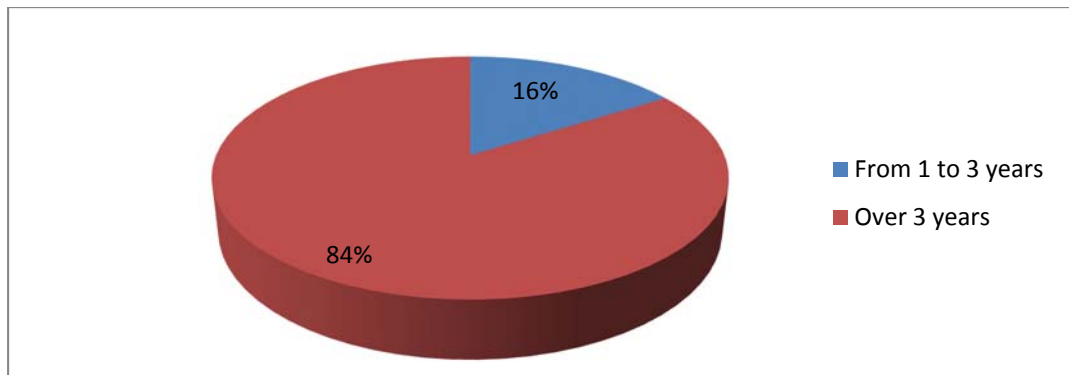
Figure 4: The distribution of businesses by the modules they use on ERP systems

We can see that the Sales Module is the most used module because it is the most frequent transaction for the entities. These entities use many other different modules too, but the main objective remains to increase sales. We may note that the sales module is the broader and the more complex module, while the other modules tend to be simpler, either being it

an ERP offered by Albanian ERP vendors (Alpha, Finance, Balance), or by foreign ERP (Navision, Peachtree, Oracle). From the fact that ERP software attaches more importance to sales module, it is a clear expectation that entities will require and use more functionality exactly at this module.

Other modules, which are used widely by businesses, are inventory and accounting modules, which are also very important.

Regarding the longevity of ERP software in an entity the results are shown in figure 5. We can see that the majority of the entities have been using the ERP systems for more than three years .



.Figure 5: The distribution of entities according the time they have ERP systems in use

In extent to the longevity of ERP project the respondents were also asked regarding the degree of success of the project. According to a report prepared by The Standish Group International in 1994, there are identified the success and the failure rates, as well as the reasons for the failure of SI projects. In this report, the projects are classified as: Succeeded – if the project is completed on-time and on-budget, with all features and functions as initially specified. Challenged – if the project is completed and operational but over-budget, over the time estimate, and offers fewer features and functions than originally specified. Failed or impaired – if the project is canceled at some point during the development cycle.

The answers of the respondents on the success (or not) of the ERP project are given in figure 6. Beyond the fact that the majority responded that the implementation has been successful, it is important to note that no response was registered as a failed implementation. This is a positive indicator, which means that the surveyed businesses are moderately satisfied or very satisfied with the ERP systems they are using.

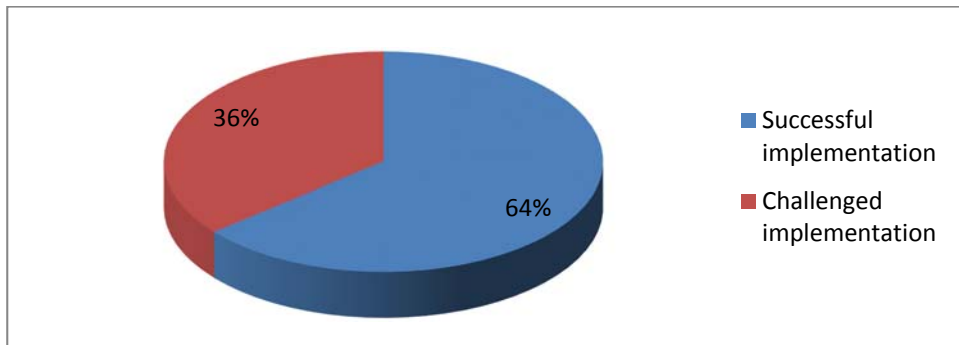


Figure 6: The level of success of implementation of ERP systems

The second part of the questionnaire focused on questions covering the study hypothesis testing. The questions in this part of the questionnaire are of the Likert Scale type where respondents provide assessment from 1 (no impact at all) to 5 (most influential). Each question focuses on a variable which is presumed to have impact on the overall performance of ERP in an entity.

Testing H1

Using SPSS, three factors were derived as the collection of 20 variables. Therefore the 20 observed variables will be represented by three main factors. The initial number of factors is as one as the variables. The higher the variance can be, better the factors can be explained. The first factor explains more total variance; while the other factors follow explain less variance, so their variances tend to decrease. The graphical explanation of the total variance from three factors is presented in Scree Plot map, as it is shown below:

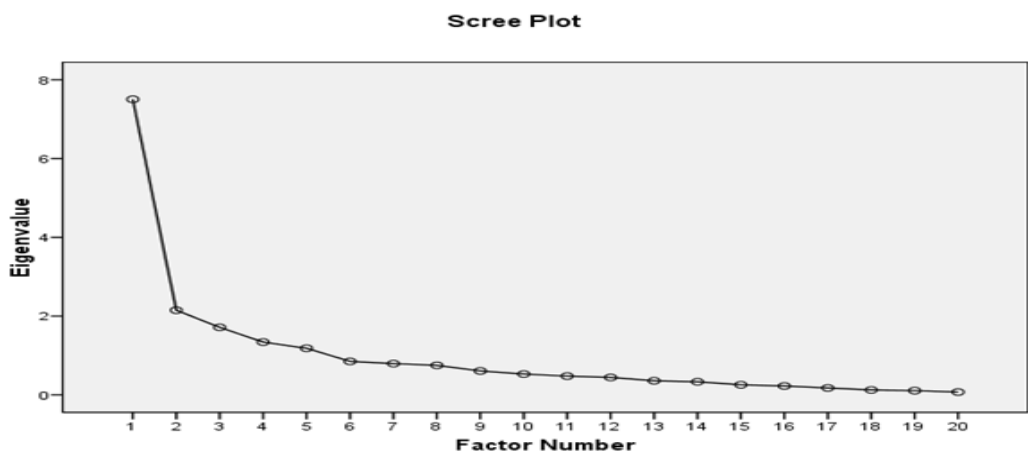


Figure 7: Scree Plot map

From the third factor and on, as we can easily see, the line is almost flat, which means that the next factor explains fewer the total variance.

Variables	Factor 1	Factor 2	Factor 3
Data accuracy of the system	0.68		
User's convenience with ERP	0.76		
<i>The influence of the employee's productivity growth</i>	0.48		
Security and protection of ERP data's	0.76		
<i>System flexibility to adapt to the businesses changes</i>	0.54		
<i>Providing necessary information for the daily issues</i>	0.60		
<i>The dependence of the business from ERP for the daily operational activities</i>	0.54		
<i>Availability of providers support in the businesses problem situations with the system</i>		0.37	
<i>System impact in the inventory management improvement</i>		0.34	
System influence in the inter-departmental productivity & communications improvement		0.90	
System influence to ease the compliance of rules and legal obligations		0.51	
The impact of ERP in reducing overall operating costs		0.53	
<i>The impact of ERP in improving budget process</i>		0.49	
<i>The training adequacy of ERP vendor</i>			0.48
<i>System influence in providing nessecary information about costumers in the right time</i>			0.53
System influence in business client relations improvements			0.76
The impact of ERP on sales growth			0.55
The impact of ERP on time delivery of customer orders			0.66
<i>The impact of ERP on improving the decision-making process</i>			0.48
<i>The impact of ERP on improving the quality of financial reporting</i>			0.49

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.

Table 1: Rotated factors matrix

Table 1 shows how the variables are weighted for each factor and it also shows the correlation between variables and factors. The possible values for the correlations range from -1 to 1. Correlations less than 0.3 are eliminated, so that the output could be easily readable. The goal of the Factor Analysis is to group variables into factors - variables that

express different aspects of the same factor, and to highlight those variables with the highest variance (those variables that explain better the factors). Finally we can name and interpret the factors.

1. Quality and flexibility of the system – the accounting software affects the performance of entities in Albania through its quality and flexibility. The quality refers to the terms of the comfort that they offer the users of ERP, to the accuracy of the data produced for daily issues and not only, to data security, and to the ability to adapt with the continuous business changes. It is indeed important for businesses, the relationship between the user and the system, because this relationship affects the output. Also, the adaptation of ERP system to meet the changing needs of businesses and to protect the information, has an important impact on the performance of entities.
2. Cost-efficiency system – accounting software affect the performance of businesses in Albania, in terms of facilitating the implementation of the rules and laws, reducing the overall operating costs and increasing inter-departmental communication. Reduction of time and labor costs, minimizing the manual work and impacting on improving time to respond the organizational and legal requirements, represent the main elements through which ERP significantly affects the business performance. The successfully implemented ERP systems, can save a lot of costs which expressed in monetary terms are indeed important materials for entities.
3. The quality of the output – ERP systems affect the performance of businesses in Albania also through the quality of the output they produce. This factor indicates that ERP systems have strategic importance for businesses, as they affect the finalization of sales (which is the main activity of the units), as well as in improving the quality of decision making.

Also of importance is the support after the implementation of the ERP. Therefore, creating a symmetric and reciprocal relationship, between the provider and the business during the implementation phase, where both parties communicate constantly and provide support for each other, represents a necessary and a sufficient condition for the positive performance of the ERP project.

Factors influence on business performance		Small/Medium business			Large business			Total		
		Foreign ERP	Albanian ERP	Total in %	Foreign ERP	Albanian ERP	Total in %	Foreign ERP	Albanian ERP	Total in %
		Nr	Nr		Nr	Nr		Nr	Nr	
Quality and flexibility of the system	Low	2	7	56	2	12	41	4	19	46
	High	1	6	44	3	17	59	4	23	53
Total		3	13	100	5	29	100	8	42	100
	Low	1	7	50	2	13	44	3	20	46

Cost-efficiency of the system	High	2	6	50	3	16	56	5	22	53
Total		3	13	100	5	29	100	8	42	100
The quality of output	Low	3	6	56	2	13	44	5	19	48
	High	0	7	44	3	16	56	3	23	52
Total		3	13	100	5	29	100	8	42	100

Table 2: The level of influence of the factors in the businesses performance

Testing the hypothesis 2

After three factors were identified, the following step is to highlight how these factors affect each type of entity. The influence of each of the factors above was categorized in two levels: on low-impact when the evaluation by the respondents was 1 or 2 and high-impact when the evaluation by the respondents was 3, 4 or 5. Table 2 shows the results and we can see how each factor affects each type of business. By analyzing the data, we have these results:

Quality and flexibility of the system – The majority of the small / medium business believes that quality and flexibility of ERP has a low impact on their overall business performance, but most of the large businesses, think that this factor has a high impact. Referring to the fact that this factor is expressed in terms of the user's satisfaction, of the data security and of the labor productivity; we expected this factor to have a greater impact in large businesses compared to the small ones, because the large businesses engage many users in the program and they deal with more information.

Cost-efficiency of the system – regarding to this factor, we can conclude from our survey, that small businesses do not have a clear separation whether this factor has a high impact or a low one in the business performance, because the answers are in an equal measure. Therefore we can conclude that, accounting programs affect the performance of the small/medium businesses with an average influence. The high or low impact depends on the type of modules that businesses choose to implement in the programs, as well as the users that they engage to work with ERP. On the other hand in the large businesses this factor seems to have a high impact as well. As big businesses implement the ERPs to increase the automation and to grow the interdepartmental communication, it is expected that their influence in terms of the reductions in operational costs, the ease to accomplish the legal obligations, and the growth of the interdepartmental productivity is of a high overall level.

The quality of produced output – At the small/medium businesses this factor has a low impact and this makes sense taking into the consideration the factor variables. These entities generally engage in partial implementations of ERPs. The functions in terms of sales' are usually simple in these kinds of businesses (small/medium businesses generally apply cash accounting, where there are no significant differences between time of order and the delivery time). While at the big businesses the influence of the quality of produced output

is high because these kinds of entities perform full implementations of complex systems and the relationship that they have with the customers (big business policies generally apply collectible subsequent sales and often there are visible differences between the order and the time of delivery), is much more different from the small/medium businesses. Also the big businesses have a more complex decision-making process and financial reporting, and therefore the need to optimize these strategic functions is more visible there.

5. MAIN FINDINGS AND CONCLUSIONS

The ERP of nowadays are used by businesses as their long strategy to increase their market performance. Although ERP are relatively new 'invention', these systems have proven to be very successful in global markets. Businesses invest from thousands to millions of dollars for ERP business projects, with the belief that the long-term returns will be much higher.

The performance of ERP systems in the organization is different at different stages of the life cycle. At first, at the beginning of the project implementation there is a general 'disorganization' of the work in the enterprise. The dramatic change of the way of working and the importation of all the business system application is often accompanied by problems, resistance and by the decrease of employee productivity. This is a normal behavior in every beginning of an ERP project. Then, slowly, users begin to be friendly with the program and with the new way of working; in addition, the business begins to feel improvements in the quality of reporting. At the stage of maturity, the bond of employees but also of the whole business with the ERP systems becomes a symbiosis, where both parties benefit in maximum.

The development of ERP's in the Albanian market is characterized by a short, relatively recent history, but a history which deserves attention, especially for its recent developments. There is a massive interest from both ERP providers and businesses to embrace time updates of the computerized AIS-like: E-Business, Cloud Computing, development multifunctional complex ERP etc. This fact shows that the future of ERP systems in Albania will be as it is nowadays in the global markets.

ERP software affects the overall businesses performance that operates in Albania. This effect appears towards: the flexibility and the quality of systems applications and also towards the cost-efficiency and the quality of the output that they produce. The impact of ERP's is more obvious at the big businesses than at the small/medium ones. This occurs because big businesses give more strategic importance to the investments in ERP, compared to small/medium businesses, which implement these systems mostly for operational purposes and they are mostly simple users of ERP packages.

The support of the providers and the quality of the expertise, available for the unit sets, are important for the subsequent perception that creates the user unit, in relation to the value that ERP adds. The lack of service provided in the necessary time and quality, curbs the desire of users to work and stimulates the hostile relationship with the system. On the other hand the correct presentation of the providers in terms of the offering support, the attention towards the business problems and the user's needs, creates the confidence and promotes the cooperation between the parties.

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