"An empirical study of ERP implementation, in Small and Medium Enterprises in Greece."

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Abstract

Throughout the world, organisations rely heavily on deploying the correct software for their business operations. Therefore, choosing a particular operational system and software can have a significant effect on a company's formulated business strategy. The investment required in an enterprise resource planning (ERP) system is very high and inappropriate selection of an ERP system could present difficulties for the company. Meticulous planning is, therefore required, in the ERP selection process. If the business has the knowledge needed to take the right steps in the evaluation and selection of an ERP product, the time taken in the implementation will be less and consequently the chances of success will be greater. ERP selection is very different from the process of purchasing off-the-shelf software such as accounting or payroll packages. Since little is known, about how small and medium sized enterprises (SME's) implement ERP systems this study has concentrated on Greek SME's and the questions that the research aimed to address include:

- Has the Greek small and medium size enterprises using and ERP system any differences from the global ones' (eg. Chinese market)?

- Does ERP system implementation affect the small business in a positive or negative way?

Further, this study has identified that SME's lack the required knowledge, regarding how companies identify their system needs and how they choose appropriate software vendors and products for one of their most significant areas of operation. The findings from the study also suggest that expenses have a negative effect on the usage of the ERP system, but implementation of the ERP system does present positive overall affects on the SME if done correctly. It is hoped that the findings presented in this paper can aid development of ERP success models and Information Systems (IS) research.

Word count 8.325

Presently business and organisations face many challenges especially those that result from globalisation (Yusuf *et al.*, 2004), and this has led to unprecedented levels of competition. In competitive global markets, business and organisations need to find better business solutions, with flexible and reliable structures. Much of an enterprise's infrastructure and organisation is enabled by information systems that directly or indirectly support business processes of crucial importance to growth, survival and competition (Markus *et al.*, 2000a). By managing these processes more efficiently, competitive advantage can be gained via cost reduction, product enhancement, and customer service improvements. Global market change has become a constant, which reveals a clear and imperative need for continuously improving business processes. Since business processes are fundamental building blocks of an organisations' success, information technologies that focus on process management and improvement have been good candidates to help organisations to fulfil their corporate visions and to improve their competitive positions.

RESEARCH OBJECTIVES OF THE STUDY

The primary purpose of this study is to understand how Information Technology (IT) is adapted (Avgerou, 2008) and used in local companies in Greece in a well defined context and to provide answers to the following questions.

The questions that this article wishes to explore are:

- Has the Greek small and medium size enterprises using and ERP system any differences from the global ones' (eg. Chinese market)?
- Does ERP system implementation affect the small business in a positive or negative way?

SIGNIFICANCE OF THE STUDY

Presently no similar research findings have been established or published because this study concentrated on micro Greek SME's (Goutsos *et al.*, 2004, Diakoulaki *et al.*, 1992). According to the new classification of Eurostat. Furthermore, there is limited research in the area of Greek micro SME ERP implementation so this research is unique because of the large scale (across Greece) of the study and because there were no existing research studies to compare the results against.

This article evaluated the existing literature surrounding Enterprise Resource Planning Systems, and through the findings of this survey, new factors not well addressed prior to the literature, about small countries such as Greece, are revealed. The factors are due to the Greek scenario (Diakoulaki *et al.*, 1992) which is rather complicated primarily due to the small size of the Greek business and organisations

CONSIDERATION OF METHODS APPROPRIATE FOR THE STUDY

In order to undertake research and to handle information, researchers are expected to carefully select an appropriate underlying research assumption or a research paradigm, a research methodology, and a set of methods for collection and analysis of data (Myers *et al.*, 2002).

One the most important aspects of research in the social sciences in general and information systems in particular, is to decide on an appropriate starting point for the research and on the conceptual framework within which the data will be collected and analyzed. It is also important, especially in information systems research, to decide if the data collected will be of an essentially qualitative or quantitative nature or a combination of these (Green *et al.*, 2005).

RESEARCH METHODOLOGY

This study examines information systems from a socio-technical approach. It seeks to examine not how specific information systems work, but how and why people choose and use information systems. As Hirscheim (1992, p.28) argues, information systems are fundamentally social rather than technical, and IS epistemology draws heavily on the social sciences. The aims of social research can be manifold in three common aims, exploration, description, and explanation. The researcher would rather take an anti-positivist view and assume that one can only understand by researching into the individuals who are directly involved in the activities to be studied.

As there was no public research, up to the time this thesis was written, on Greek SME's the study was designed with a descriptive, exploratory, and explanatory focus. It seeks to discover if Greek SME has used ERP systems, to discover the nature of adaptation, implementation decisions, and procedures that managers and end-users used.

Survey research has been chosen since its one of the most important areas of measurement in applied social research. The broad area of survey research encompasses any measurement procedures that involve asking questions of respondents. The objective of the survey was to collect all the quantitative data, whose analysis could be used for the formation of the toolkit.

Action research (Petter et al., 2008) has not been adopted, as the researcher is not part of the implementation team or in any way has any connection or influence with the implementation project. Ethnographic research is similar to a case study, but again the time factor is a limiting factor of the research approach. Even so, for the reasons of triangulation the researcher has conducted six case studies, to validate the derived results.

Grounded theory has been adopted while, the researcher due to his profession (Accountant/Tax technician) and his academic background will use an Etic perspective throughout the study, but regarding the economic data changes thought the usage of the ERP system an Emic perspective will not be avoided.

A cross – sectional survey will be followed instead of a quantitative method; while the latter neglects aspects of cultural environment (Riemer et al., 2008) and social interaction that could affect systems development . Critics have pointed out that quantitative methods encourage researchers to separate themselves from the phenomena, which is a contradiction of these research objectives.

Another reason for conducting a survey instead of choosing another method is that the former is more flexible, while questions such as who, what, where, how many, how much could be asked, and focus in contemporary events could be given. (Kim et al., 2006).

LITERATURE REVIEW

The development of information systems success models, such as the Delone and McLean model (DeLone *et al.*, 2003), has been an important contribution toward our improved understanding of information systems management. However, several issues

in information systems success models remain under question and especially for SME's in countries such as Greece.

Delone and McLean suggest that in order to develop a comprehensive measurement model/instrument for a particular context, the constructs and measures should be systematically selected considering contingency variables, such as the organisational structure, size, or technology, and the individual characteristics of the system. Yet, most studies in this arena do not elaborate on the rationale for their choice of success dimensions and success measures employed. Further, as was stated in the previous section, in order to fully account for potentially countervailing measures and dimensions of success (e.g., high quality but poor cost-effectiveness), model completeness becomes critical. Through a review of alternative models from the literature, (Melone, 1990) highlights the subjectivity inherent in the selection of a single effectiveness measure. This suggests that where the aim is to gain a full, overarching view of success, it is critical that the complete set of success dimensions be employed, not a selected subset.

Although the Delone and McLean model has been a valuable contribution to our improved understanding of information systems success, their taxonomy is presented without sufficient explanation of its underlying theory and epistemology, with many questioning the suggested causal/process nature of the model e.g., (Ballantine *et al.*, 1996), (Myers et al., 1997). (Seddon et al., 1994) were the first to empirically test the causal structure (part of the structure). Their investigation supported some of the model paths but not others. Other researchers have since tested other causal relationships between the six variables of the Delone and McLean model yielding mixed results (Hunton, 1997). While (Rai et al., 2002) attempted to provide a theoretical underpinning for the causal model, they managed to do so only for the paths leading to the USE construct. This lack of theoretical grounding, combined with a weak explanation for causality and mixed results from empirical studies, raises concerns about the causality of the Delone and McLean model and the utility of the suggested relationships.

Gable's IS-Impact Measurement Model(Gable *et al.*, 2008) has eliminated the "use" construct from their model, but preliminary findings related to the IS-Impact model

validation and extension by (Fazidah et al., 2009) have shown that cultural issues could affect it. It is also stated in the limitations of Gable's study that such issues could affect it since it is concentrated to the data came only from the Australian public sector.

Although information systems investments are in many ways comparable to traditional investments such as production equipment, they entail a strong organisational element as well. It is a common tendency to measure enterprise systems only in terms of financial criteria. However, it is widely acknowledged that enterprise systems result in considerable intangible impacts in addition to more tangible impacts. Thus, use of traditional financial measures alone may not account for evidence of information systems payoffs (Ballantine *et al.*, 1996), (Kaplan et al., 1992). In addition, economic evaluations and quantitative measures tend to be difficult to obtain and easy to manipulate.

Holland and Light's model (Holland et al., 1999) can be seen as important as it focuses on the actual organisation, strategic and tactical processes that can exist in an ERP implementation process but from a management perspective. Their model though lacks as the authors stated in their paper, "a set of quantitative measures for assessing the impact of each factor on the implementation outcome for a large sample of companies"

Brown and Vessey (Brown *et al.*, 1999) focused on existing IS research literature and ERP cases to develop a model able to identify variables that might be critical to successful implementation of ERP systems. However, (Brown et al., 2003) find that top management support in and of itself is not enough—they advocate active involvement by top management in project planning and project execution. The latter involves keeping the project on track; endorsing and communicating changes in schedules and rollout plans. In fact, (Nicolaou, 2004) had also found that the concept of system fit went hand in hand with organisational strategic vision. Given that this vision must consider elements of fit, expansion and benefits derived from such expansion — these changes appear to be more in keeping with activities that ERP adopting firms would undertake later in their post implementation life cycle.

The transition from indirect batch-oriented use of information systems to more direct, on-line and integrated IS has changed the way organisations produce and manage information. The modern information systems trend is toward changed organisational structures and behaviours that facilitate interOrganisational activities. New measures and evaluation models are required to measure success with contemporary Information Systems (Ishman, 1996),(Sedera et al., 2003). Yet, most Information Systems success studies continue to rely on instruments and measures that were validated with what are now outdated information systems (Saarinen, 1996). This paper has summurized in the design of the survey questionnaire the critical success factors that are affecting an ERP implementation and is going to explore if there are any inherent factors in the Greek Environment and particularly in SME's that are affecting the implementation of ERP systems.

ERP AND THE GREEK ENVIRONMENT

The international ERP vendors have dominated the Greek market of Enterprise Resource Planning Systems, with some significant presence of local software especially at the level of small and medium size enterprises. In particular, small-size companies do trust local information technology solutions due to their flexibility and quick adoption of legal regulations, and factoring-in cost issues and vendor local support. Nevertheless, the ERP landscape within Greek SME's remains blur; no comprehensive study of the extent of ERP adoption and functionality use within this business group has been performed to-date nor has there been any effort to promote "true" ERP solutions that encompass typical accounting and sales processes. A call for proposals to support information technology infrastructure and business software by the Ministry of Development that has successfully concluded (the program was called "Do Electronic Business») demonstrated the acute need of Greek SME's to resort to modern ERP platforms. Almost 90% of the approximately 2500 proposals submitted (and eventually of those funded) requested the implementation of packaged software solutions of international ERP's or "quasi"-ERP's from Greek vendors. Thus, despite the e-business dogmas of B2C, B2B and e-marketplace paradigms, the true need of Greek enterprises is to adopt modern IT solutions for their core processes (and assure effective and

reliable backbone transactional IT system) before they embark upon bottom-line improving e-business initiatives.

The philosophy behind Enterprise Resource Planning systems is the creation of value though economy of scales and complete resource planning through processes that are in accordance to industry specific best business practices

The Greek companies according to the definition of Eurostat are considered small and Medium sized.

Small and Medium size companies may gain competitive advantage and add value, through processes that are contrary to industry specific best business practices due to the following reasons as stated by (Nathanael, 2003) :

a. SMEs in general derive their competitive advantage more from the knowledge and experience of employees, and from intrinsic ways of performing critical tasks than from formalized procedures. This knowledge and experience cannot be analyzed into specific process steps, and as a result, it cannot be mapped in an ERP system
b. SMEs have limitations on their operation that are different from large corporations. These may be dictated by the lack of capital, adequate personnel, manufacturing capabilities, regulatory distortions etc. SMEs, as a result, may not be able to streamline their processes, which make the functionalities of ERP systems irrelevant for these companies.
c. ERP systems provide a scope and granularity of processes that are practically redundant for SMEs, which, when applied, increase bureaucracy, without offering useful management information.

As (Nathanael, 2003) states , commercially available ERP's constrain rather than support their operations. ERP software apart from the accounting module, which is dictated by law, in order to be fully adapted by an SME, needs to be customizable to reflect the business practices of the SME.

This action of course is controversy while a critical success factor of a systems implementation is not to customize the system.

This article will query the need of customization, in order an ERP system implementation to be considered successful and whether this is a critical success factor in the Greek environment.

SURVEY RESULTS

The purpose of this survey was to explore whether Greek SMEs use ERP systems, at least as they are considered and defined in the literature, and to pinpoint the critical success factors for their implementation. It was also important to identify additional influences and there was a specific set of questions that cover the aspect of user satisfaction that is a major part of the pre mentioned framework.

In this paper the data collected are presented in the form of frequencies, percentages, cross tabulations and charts with appropriate explanations and reporting of key results.

Further analysis like cross-tabulating and matching findings with similar surveys is going to be explored in the following chapter.

Sample sizing

In order to determine the correct sample size for this survey the sample size calculator has been used.

In accordance with the data from the Greece national statistical agency, the total Greek economy has an emphasis to self-employed businesses and the service sector. Further, more they could not provide data for companies that are using an information system and specifically an enterprise resource planning system.

Since there were no available data regarding the ERP implementations in Greece and the pre mentioned means could not accurately be determined, but while the sample size doesn't change much for populations larger than 20,000 (Guthrie *et al.*, 2008) the following sample was found to be adequate enough for the survey.

Margin of Error	5.62%
Confidence level	92%
Population Size	20000
Response distribution	50%
Recommended sample size	300

Table 0-1 Sample Size Calculator from RaoSoft

t tests - Correlation: Point biserial model

Analysis: A priori: Compute required sample size

Input:	Tail(s)	=	One
	Effect size |ρ|	=	0.17
	α err prob	=	0.0562
	Power (1-β err prob)	=	0.92
Output:	Noncentrality parameter δ	=	3.0028819
	Critical t	=	1.5921527
	Df	=	301
	Total sample size	=	303
	Actual power	=	0.9205954

Table 2 Sample size calculator from G*Power

The recommended sample size , even for the low "effect size" convention as Cohen (1977) calls, was 300-3003 companies, with an error margin of 5.62%, and a confidence level of 92% out of a sample of 20,000 companies or more.

Response rate

300 companies were randomly selected from the Greek Stock market and from local chamber of Commerce of Athens and Thessaloniki. The reason for not solely selecting the sample from the stock market was so as the sample should not to be biased, while the companies in the stock market are considered to be the top in Greece. In order to avoid this bias and to include small implementations also to the study companies from the local chambers of Thessaloniki and Athens have been chosen.

Emails regarding the online questionnaire were sent to these selected companies.

14 questionnaires were returned since the correspondence emails did not exist any more. In addition, 11 respondents reported that their company policy did not allow them to disclose any information on their IT departments.

According to (Jobber *et al.*, 1989) the response rate is defined as "the percentage of total questionnaires mailed/sent (and not returned as undelivered) that were returned by the respondents".

Hence after the follow ups emails (over a period of six months), the usable response rate was 61, 09% (168 out of 275 (300 minus 25 (14+11)) which is an acceptable response rate for the future analysis.

Nevertheless, out of the 168 respondents only 154 used an ERP system while the remaining ones use either a CRM or an SCM (supply chain management) system. Therefore, these 14 SMEs are omitted from the survey analysis since they did not use ERP systems in any way. The remaining result for survey analysis is 56% out of the original sample.

The results response rate was beyond acceptable while in an online survey are not considered to be above 30% [1]

The high percentages of replies are due to the researcher's attempts, primarily by sending three follow up emails, and two follow up of telephone conversation for companies outside the area of Thessaloniki. For the area of Thessaloniki, the researcher scheduled a meeting with 10 SMEs and hand delivered the paper-based questionnaire, which they completed, and these results were entered into the online questionnaire.

Data Analysis procedures

Descriptive statistics, the mean, and standard deviation were computed to summarize and analyse patterns in the response of the sample.

In order to validate the results, the Cronbach's alpha method has been used, but while data will probably have a multidimensional structure, the Cronbach's alpha will usually be low.

Results

From the selected sample most of the respondents were from, as they can be seen in figure 1, were from the manufacturing sector 47.40%, then whole/retail sector came with 38.31% and finally the service sector with 14.23%. These results are expected as they are close to the ones the *European E-Business W@tch at 2008* has published for Greece. We can see a difference in the size the of the companies, and someone could argue that the sample in not representative of the total Greek economy. We must take

[1] http://www.utexas.edu/academic/diia/assessment/iar/

into consideration the fact that these companies actually use an ERP system and not reflect the total of Greek economy. The Greek statistical agency could not provide data regarding the companies that are using an ERP system, at the time this article was written.

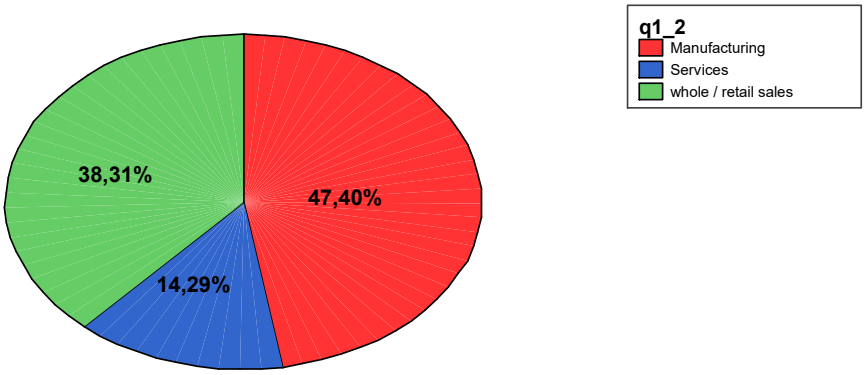

Figure 1 Area of activity

20.8% percent of the respondents where the CEO of the company followed by the head of IT by 17.5% and then the head of the accounting by 15.6%. A result like this was accepted for two reasons. The first one is the micro scale of the Greek companies and because of this the CEO tends to make the decisions and secondly the dominance that the owner plays in the company (Prahalad, 1993). It is a common belief in Greece that company owners at least from SME's are reluctant to leave others to make decisions regarding the company, while falsely believe they have all the necessary knowledge to run their business correctly (Karagiannis *et al.*, 2000), (Vrechopoulos *et al.*, 2003). A main characteristic of Greek SME's is the dominance of their owner throughout the company and the reluctance of hiring managers and consultants (Benos *et al.*, 2007b) in order to perform tasks in the company. It is acknowledged by Greek literature that Greek entrepreneurs of SME's falsely believe that they have all the necessary knowledge and capabilities to run their business (Benos *et al.*, 2007a). The result is therefore expected that the CEO would have a high response rate to the questionnaire.

The CEO was also primarily responsible for the upgrade of the system. In the Greek Environment, this can be explained in two ways. By cross tabulating the responsible for the system upgrade person with the number of employees the results change while the company "grows" in size, where as the head of the accounting department from above 250 employees is more involved is such a decision. As explained previously, Greek companies, even quoted ones, are family owned (Poutziouris *et al.*, 2006) and usually have few employees. Where the CEO is not the owner is just the director of the SME. It is possible given the nature of the Greek business environment (Goutsos *et al.*, 2004) that the CEO could be influenced to make an improper decision for the SME purely in the grounds that the Vendor will pay the CEO a commission rate (Saarinen *et al.*, 1994) for selecting that Vendor. This practice is also followed by credible auditing firms like Ernst and Young, which earned hundreds of millions of dollars in consulting revenues from implementing PeopleSoft software for third parties pursuant to an "Implementation Partners Agreement" it had with PeopleSoft.[2]

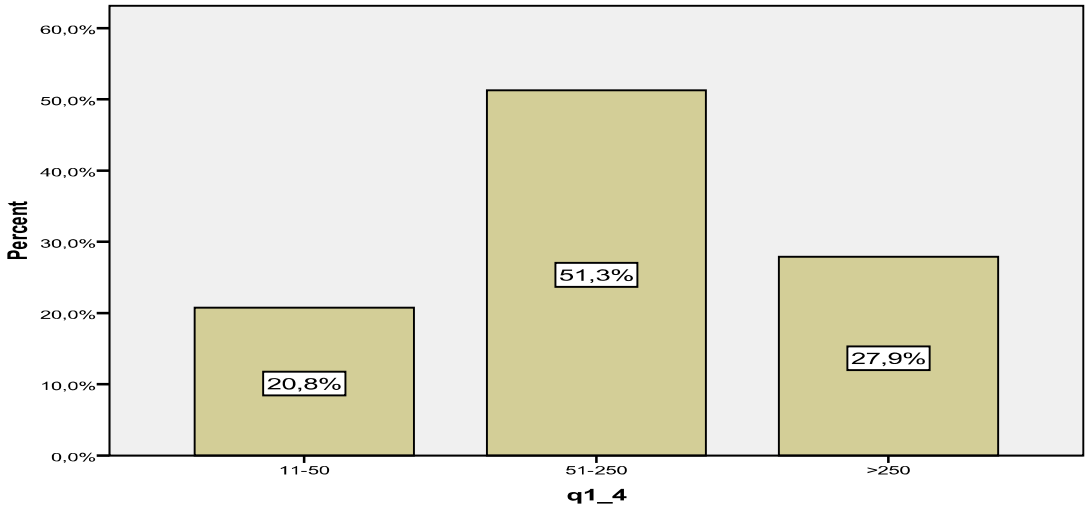

Figure 2 average number of the company's employees

[2] http://www.cfo.com/article.cfm/3004744?f=related

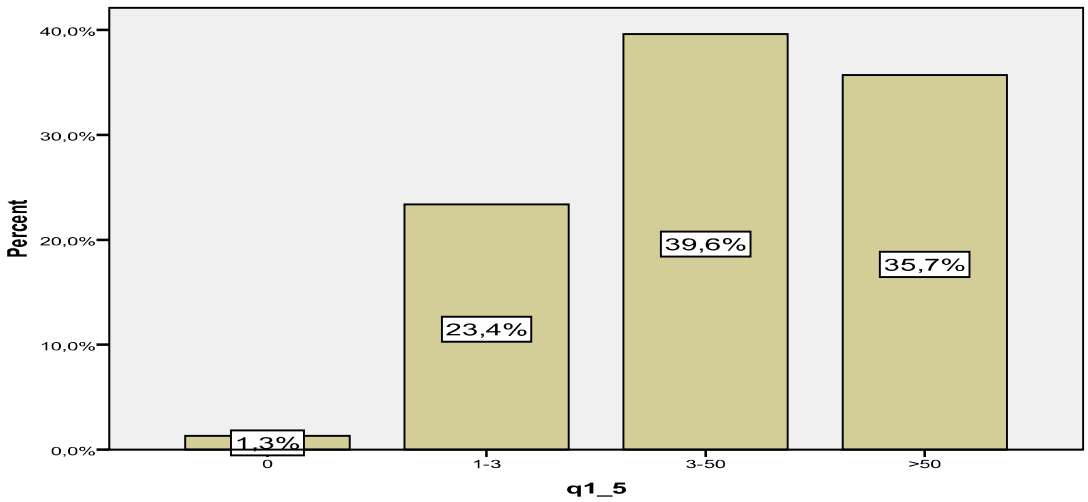

Figure 3 average turnover

The small and medium Greek company environment, as it can be seen in figure 3 and 4, is verified while only 35.71% have a turnover of more than 50 million Euros per year. In order to be considered a small enterprise the number of employees must fall below 50 employees. As it was seen only 20.8% of our sample had below 50 employees, to be considered as small enterprises, 51.3% is medium and 27.9 are considered large. Therefore, the majority of SMEs in this sample 72.1% are small and medium sized. Comparing the number of employees by sector the Manufacturing sector had 47.4%, followed by wholesale retail sector 38.3%, and Service sector 14.3%. These results do not fully reflect the Greek economy, which is more service oriented (McDonald, 2007) , in accordance with the Greece national statistical agency, with an emphasis to self employed businesses.

In usual circumstances it is expected that the higher the number of employees the higher the average turnover, but it can be seen that 31.8% of companies with an average turnover of 3-50 million fall into the category of 51-250 employees where the total of 39.6% is the sum of the companies with an average turnover of 3-50million. While the companies with 51-250 employees would be expected to fall into the category >50 million. What is causing this apparent problem is that these Greek SMEs are *not issuing invoices*[3],[4]. This result is a problematic area of the Greek environment since the

[3] http://www.express.gr/news/news-in-english/188871oz_20090707188871.php3

government has been striving to solve this problem of tax evasion from SMEs not issuing sale invoices since 1981 up today. This point will not be solved in this article but helps to explain the reason for the previous result of adding the Greek companies into small and medium sized instead of large ones.

The above result is also validated by the recent 2009 Corruption Perceptions Index, which is carried out in 180 countries around the world, and measures the degree to which corruption is perceived to exist among public officials and politicians on a scale where 0 is the most corrupt and 10 is graft-free also validate the pre mentioned argument. "*Greece is perceived as the most corrupt of EU countries, along with Bulgaria and Romania, an annual corruption perception ranking released on Tuesday (17 November 2009) by Transparency International shows.*"[5] Greece holds the 71st place among 180 countries[6] , and is among the last in the European ones as. From the above analysis, it is considered that throughout this study Greek companies are considered to fall correctly into the new EU directive definition of SME's.

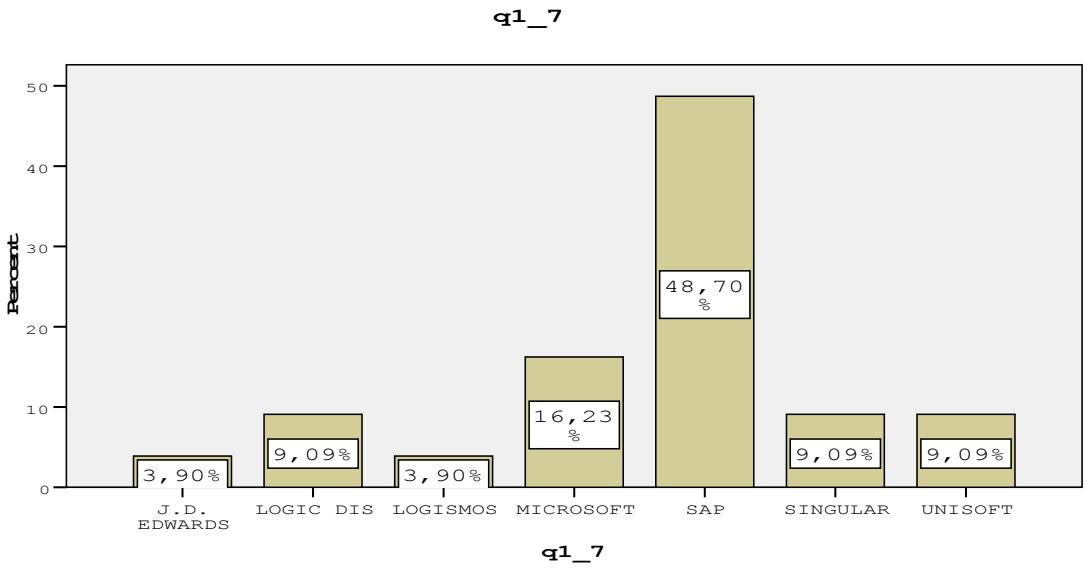

Figure 4 Vendor Implemented ERP System

[4] http://www.eipa.eu/files/repository/eipascope/20100114122130_Eipascope_2009_2_Article3.pdf
[5] http://euobserver.com/843/29003,

[6] http://www.transparency.org/policy_research/surveys_indices/cpi/2009/cpi_2009_table

SAP dominates the Greek market followed by Microsoft Navision whose share is still 3 times less than SAP while the Greek ERP show similar uptake by Greek SME's. This is also justified by the fact that most of our sample was in the manufacturing sector, in which SAP has a clear advantage (Werner *et al.*, 2003), (Tsili *et al.*, 2008) in conjunction with the other vendors at least in Greece. The Greek ERP vendors (Jacobides, 2007) show similar uptake by Greek SMEs. The above Greek ERP "map" is validated and doesn't changed since 2009 and probably will not up to 2013 as it can be see by the survey called "Greece Enterprise Application Software 2009-2013 Forecast and 2008 Vendor Shares", conducted by IDC- CEMA . In their survey it can be seen that SAP dominates again the market, it follows, Singular Logic, Microsoft (Dynamics Navision), Entersoft and Oracle.

Another issue that the survey showed, and was expected, was the few years that the systems have been implemented, only 3.2536 years (mean). This of course can be explained because the ERP trend is quite new to the Greek SME's (Fotios *et al.*, 2007). The "newest" systems arrive from the manufacturing sector of 3.0559 years, followed by services 3.4613 years, and finally the "older" arise from the whole/retail sector 3.4573years. This paradox though, while ERP systems are primary implemented in manufacturing companies, can be explained from the fact that more manufacturing companies have recently implemented and ERP system compared to the other sectors. ERP systems are being adopted globally due to the advantages of using these systems versus legacy systems. Enterprise systems are rich in terms of functionality and their potential benefits to adopting organisations (Markus *et al.*, 2000b) through the employment of "best practices" (O'Leary, 2000).

Typically firms initially deploy standard modules, as they did in our sample (table 73) such as financial accounting, personnel administration, general logistics, materials management, production planning, and sales and distribution (Kirsch *et al.*, 2006). Firms after stabilizing their initial deployments then web-enable their implementations by implementing modules such as SCM, CRM, EDI, E-Commerce (Shields *et al.*, 2001). The findings from studies (Su *et al.*, 2010, Quezada *et al.*, 2009, Willis *et al.*, 2002),

however, suggest that performance benefits vary with the number and type of modules implemented and the usage of the ERP system over time.

The average cost of such an implementation is 1-150,000 Euro ,with a high std deviation 1.452, with barriers concentrating in the small implementations of up to 30.000 Euros 30,3% and medium implementations 300,000-1,500,000 with 35.5% .

The results have shown that 65.4 % reported a budget higher than the expected budget (Chan *et al.*, 2003), (Wixom *et al.*, 2001), which was almost up to 50% of the actual one. There was a 75% of more than 30% budget overrun in the whole /retail sector, and the manufacturing sector was the most over budgeted by 53.8% (table 76). These results can be explained from the poor business cycles (Wargitsch *et al.*, 1998) that the pre-mentioned companies had documented, something which either lead them to follow the best business practices of the ERP system (Weill, 2004) and reorganize their whole business processes (Fattah, 2003) , or to customize a lot the system in order their processes to be adapted (Gargallo *et al.*, 2007).

Given that ERP implementation is in its infancy most SMEs adopting tend to implement all at once (Karuppan *et al.*, 2008), (Shaw, 2007), (Hatzakis *et al.*, 2007). Most of the systems have been implemented in an "all at once implementation" 57.8%, and it will be interesting to see in the analysis if this is affected by sector or size of the company. We see that the service sector decided to install specific modules or to focus to specific key business processes, rather than installing the system "all in once". This can be explained because the service sector as mentioned earlier had installed the least modules needed in order for the system to go-live (Quattrone *et al.*, 2006). Packaged implementation lead to the dissatisfaction of the end users, after the implementation took place (Motwani *et al.*, 2005). This could be explained from the user resistance in the new system (Shang *et al.*, 2004). If we see this result in conjunction with the result that 46.8% of the overall users suggested that they can do their job without ERP, it is actually controversy. On a second view, though we can see that the results from the manufacturing sector are actually similar with only 2% of difference, which is in the margin of statistical error. Apart from that, the question referred to the packaged implementation so the service and the wholesale / retail sectors could be

omitted since they primarily choose to install the ERP system either in modules or in few key business processes.

Most of the companies implemented the system for instant and accurate need of information (Ahituv *et al.*, 1987) 25.9%, and decision support needs (Lai *et al.*, 2008) 19.79%, followed by 14.84% - Increase of sales (Ghose *et al.*, 2006). Only 10% upgraded Through a European Union subsidy/ allowance (Sandvig, 2003). This possibly means that Greece has to put more efforts to promote EU funds[7]. No one has selected the -Usage of the State of the art software (Sankaran *et al.*, 2008) or other.

One of the withholding factors of acquiring an ERP system is the cost of it (Kulonda *et al.*, 2009, Özogul *et al.*, 2009). If we bear in mind the installed modules we could see the service sector is less reluctant while it actually install few modules and not an ERP system, as it is considered by literature. The demand for life – long education of the personnel is considered to be one of the main restrains of the acquisition of an ERP system (Liang *et al.*, 2010). As it was seen from the user satisfaction results 62.5% require more training. In addition, if we also bear in mind the fact that vendors "hide" in their initial offers these costs then the overall change before and after the implementation is justified. A constrain in the implementation of an ERP system is the demand for external advisors (Wu *et al.*, 2007). The change between before and after implementation is quite high, but we must bear in mind the nature of the Greek SME's, and CEO's. Since CEO's / owners are quite dominant and restrictive (Tsoukas *et al.*, 2005) , the "intrusion" of advisors could result the leak of sensitive information outside the company. Apart from that, the cost of using external advisors is quite high, and compared to almost 50% budget overruns we have seen, the transfer is from before to after implementation is justified.

Regarding the economic data, the researcher had to contact the accounting departments to gather at least an estimate of the questions asked. Most of the companies where reluctant to reveal sensitive economic data and this is the reason why the formation of the questionnaire was so vague.

[7] At the time this article was written, the low response in adopting a system through a European Union subsidy/ allowance was noticed , and a EU funding program was granted by November 2009 named ESPA 2007-2013 for SME's

They did respond though in the multiple-choice questions. The results can be seen below.

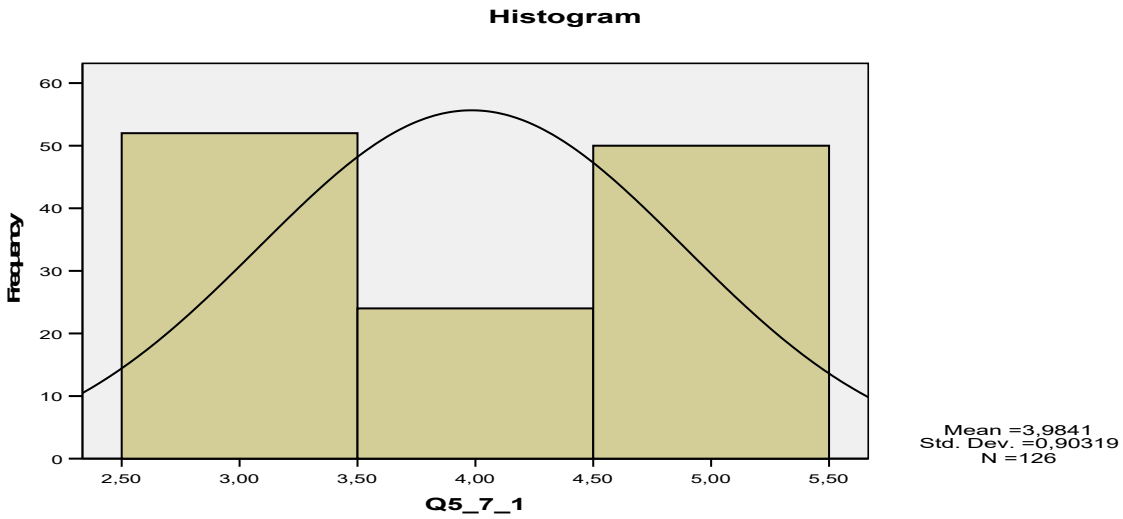

Figure 5 changes in sales

About 60.7% percent reported more than 2% and up to 5% of total upgrade in their gross sales after the implementation of the system and another 41.3% saw a 0% raise. This rise was more than expected and probably is due to the web capabilities such a systems has, of holding an electronic shop 24 hours per day 7 days a week.

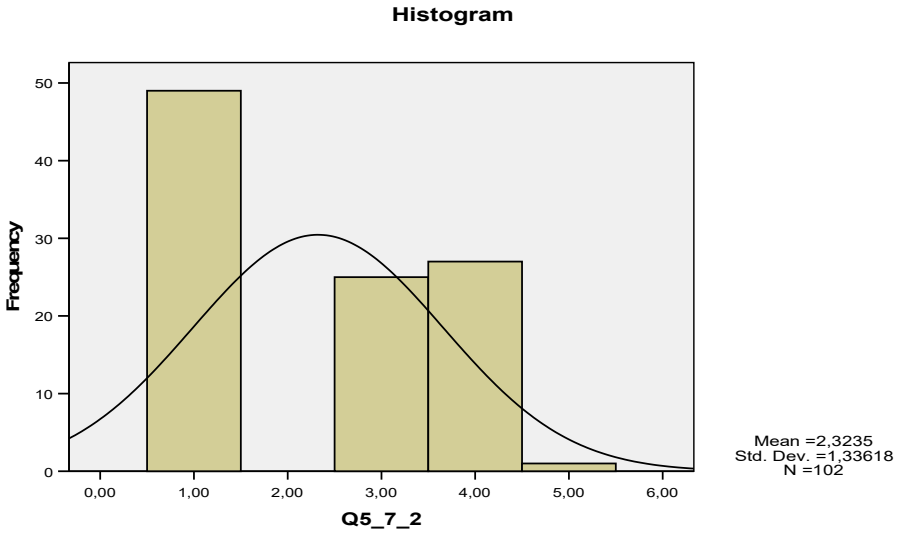

Figure 6 changes in expenses

Regarding their expenses 48% saw -5% decrease in their expenses while all the others saw a 2% increase by 26,.%. This is probably the result of more effective inventory control and the reorganisation of the tasks of the employees. Unfortunately this lead to the unemployment of low non-experienced workers.

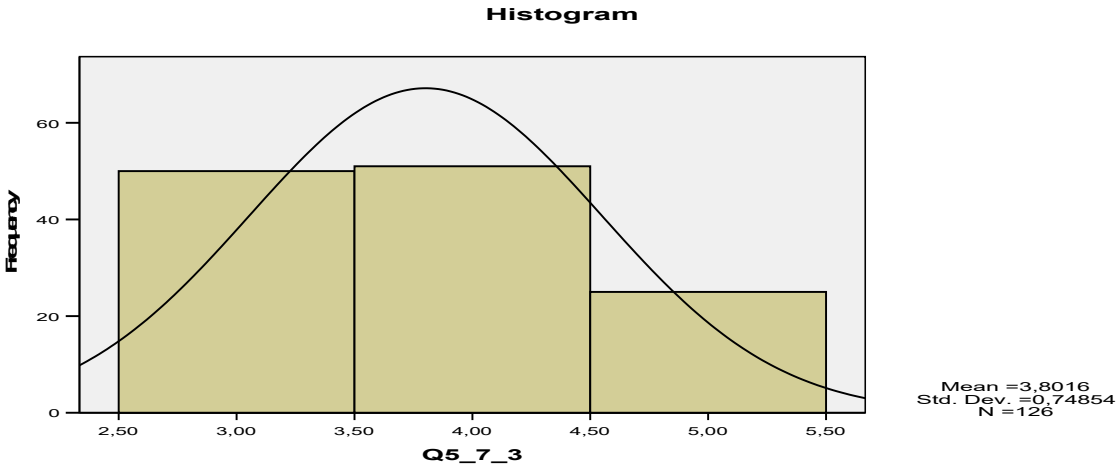

Figure 7 changes in production efficiency

Regarding the production efficiency a huge 80.2% saw an increase. This massive increase is probably due to the fact that most of our sample was in the manufacturing sector. The effects from adopting good practice skills from the system and the more efficient production (e.g. Less 1st material thrown away, etc) line lead to this result.

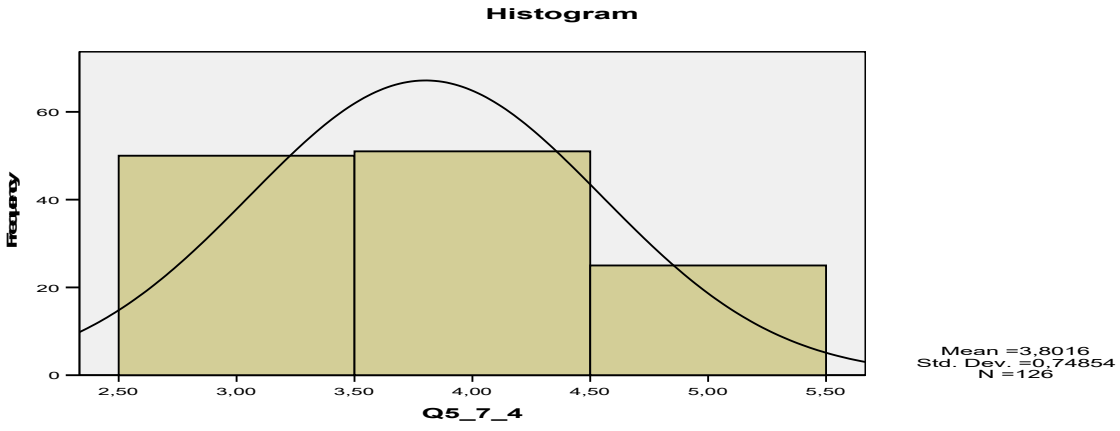

Figure 8 changes in personnel efficiency

Regarding the personnel efficiency 60% saw a rise of more than 2%. This could be due to the less time consuming functions the personnel had to perform in order to complete their tasks.

As an overall we could say that a successful ERP implementation affects the small business in a positive way.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Some limitations should be noted, but at the same time, they present opportunities for future research.

Although the overall response rate in the survey is acceptable, the implication for this study may have been enhanced if the response rate had been higher. The number of respondents should be expanded. Some strategies can be implemented to boost response rates. For example, the Greek national Statistic Department, to add in their annual questionnaire (which is obligatory, to whichever company is sent to) apart from economic data questions, to include questions about Information Technology. A similar agency to the Greek one, the Cyprus one did and they could provide data overall the Cyprus company that uses an ERP system. In Greece at the time, no similar data could be retrieved.

A decision support system (DSS) and other application software in the fictional areas of business such as computer-assisted design (CAD) and computer-assisted manufacturing (CAM) could be included. Thus, this study focuses on small and medium sized companies in Greece.

Future research could be conducted of SME's in several countries so as more valuable and contributing results to appear in the cultural issues that affect the ERP implementations. Comparative studies could be conducted to particularly examine the differences and similarities of critical success factors in an ERP system success in SME's among Europe, or globally. For instance, is the proposed framework affected by the size and the sector a company operates in?

Mean scores on the dimensions and measures establish a benchmark against which further, future executions of the survey can be compared. Differences across the respondent cohorts suggest either differing expectations or differing experiences, both

of which suggest possible value from management action. For instance, is the use of the ERP system obligatory for the users?

Differing expectations may suggest the need for better conditioning of expectations of particular groups, or increased training. For instance, what is the response towards the implemented system, among different levels of management? Differing experiences of the ERP system may suggest value in closer attention to the source of these differences, and may point to problem organisational entities, modules, versions, processes, cultures, or even individuals. Dependent upon organisation size and number of respondents, useful comparisons may be possible across stakeholder-groups, or across organisational units. It is also possible to 'repeat' the study for other systems or modules, or at a later date, in order to compare across systems and across time, while the ERP implemented systems have only recently been implemented.

DISCUSSION

As it was addressed in literature Enterprise resource planning systems are rich in terms of functionality and their potential benefits to adopting organisations (Markus *et al.*, 2000b) through the employment of "best practices" (O'Leary, 2000). Some of the influences they could have to an organisation include:

Integrating the organisation's activities by processing a large majority of an organisation's transactions (O'Leary, 2000) and managing the information needs of companies (Gefen *et al.*, 2000) is a major task and ERP systems if implemented successful can aid the integration of the process, people, system and the tasks allowing the business to spend less time figuring out what's going on and more time improving what should be done better and concentrating on that (Slater, 1999) . The project scope includes issues associated with facilitation of intra-organisation communication and collaboration (O'Leary, 2000) which are important elements in business operations. Both small and large companies can benefit from the technology investments in enterprise, systems and strategically (Markus *et al.*, 2000a) as they enable organizational standardisation, thus eliminating information asymmetries and providing on-line and real-time information such as access to on-line ERP databases (O'Leary, 2000). An interesting aspect of ERP systems is that there are options to purchase only

the modules needed presently and acquire any extra modules can be purchased at a later date and integrate into the system (Gefen *et al.*, 2000) .

Limitations of ERP systems have also been widely documented; as identified below. ERP's can have a negative impact on the work practices and culture of an organisation *(Allen et al., 2001).* Many authors such as, (Gefen *et al.*, 2000) suggests that there is a need for extensive technical support prior to its actual use to overcome these cultural (rational) difficulties. It has also been identified that there is a need for competent consulting staff to extensively customise the ERP (Gefen, Forthcoming 2000) to increase the acceptance of a new system and to reduce the "lack of feature-function fit" between the company's needs and the packages available (Markus *et al.*, 2000b). Another finding suggests that it takes an average of 8 months after the new system is installed to see any benefits (Koch *et al.*, 1999). For example, the Total Cost of Ownership (TCO) of ERP, as identified by the Meta Group (Koch *et al.*, 1999), includes hardware, software, professional services and internal staff costs.

The pre mentioned influences are interesting to the field of Information Systems because ERP systems are a very complex information system which provide a single solution from a single supplier with integrated functions for major business functions from across the value chain.(Paul Bocij, 2002).

These influences could be identified as both direct and indirect. For instance the business cycles of the implemented system company's are integrated to the ERP system (Argoneto *et al.*, 2010), while if these cycles on the planning stage have been found to be weak they could be replaced from the business cycles the ERP system proposes (Nandhakumar *et al.*, 2005). For instance, a company in order to sell an item via a typical information system, they should go to the inventory, "design" the item and then go to the sales module to print the dispatch note or the invoice. In an ERP system, the item should be designed, bought or manufactured and then it could be able to be sold or dispatched. This extra step of "buying" does not allow the company to have any missing data from the cost accounting view.

Literature review revealed that there is lack of research on the adoption and selection of ERP systems, in the Greek Environment (Angeliki K. Poulymenakou, 2005,

Ge *et al.*, 2009). Published research in the ERP systems mainly focuses on issues related to the implementation phase of the ERP lifecycle (Rose *et al.*, 2006). This study can help CEO's to recognise the importance of an ERP system (Boonstra, 2006). The impact it could have to their organisation (Malhotra *et al.*, 2009) and with the help of the toolkit as a decision support tool to provide to them better planning. With a proper plan, an ERP system may be implemented successfully in an SME (Koh *et al.,* 2009), and may be utilised effectively and efficiently.

While Small and medium sized enterprises are the overwhelming majority by 99.8% in EU-27, the benefits from the usage of an ERP system in SME's should be evaluated and further reviewed. SMEs in the EU-27 employed, on average, 4.3 persons in 2005[8]. This figure varied considerably between Member States from highs of 12 persons per SME in Slovakia and upwards of 7 in Estonia, Ireland, Latvia and Germany, to less than 3 in the Czech Republic (2004) or Greece. As stated in the 2008 review of Eurostat, Greece is considered to be among the EU countries that hold not only SME's but also micro scaled companies.

ERP implementations on SME's and micro companies have not yet been fully explored by literature (Scott *et al.*, 2009, Razmi *et al.*, 2009), while ERP systems are primarily implemented into large organisations.

The pre mentioned influences and the need for a more accurate and cost effective way of business operation, in the current recession years, leaves no further choice but to operate with a single solution from a single supplier with integrated functions for major business functions from across the value chain. SME's may gain competitive advantage (Lavie *et al.*, 2008) and add value, through processes that are contrary to industry specific best business practices. Even so the companies should be aware of lock ins , which is a situation which makes a customer dependent on a vendor for products and services, unable to use another vendor without substantial switching costs.

SMEs have limitations on their operation that are different from large corporations (Allee, 2000, Ching-Chin *et al.*, 2010). These may be dictated by the lack of capital

[8] Eurostat Statistics in focus31/2008

(Beckman *et al.*, 2008), adequate personnel (Wright *et al.*, 2002), manufacturing capabilities (Trentesaux, 2009), regulatory distortions (Anderson, 2003) etc. SMEs, as a result, may not be able to streamline their processes, which make the functionalities of ERP systems irrelevant (Lasserre, 2004) for these companies. ERP systems provide a scope and granularity of processes that are practically redundant for SMEs, which, when applied, increase bureaucracy, without offering useful management information.

The above restrictions as (Nathanael, 2003) states , commercially available ERP's constrain rather than support their operations. ERP software apart from the accounting module, which is dictated by law, in order to be fully adapted by an SME, needs to be customizable to reflect the business practices of the SME. This action of course is controversy while a critical success factor of a systems implementation is not to customize the system.

Studies indicate that nearly 30 to 50 percent of all global ERP deployments worldwide are problematic ones (Umble *et al.*, 2002), (Mabert *et al.*, 2003). This high incidence of problematic implementations is attributed to firms failing to proactively manage their organisational transformation needs in tandem with the technical implementation of their standard ERP systems (Scott *et al.*, 2000, Koch, 2002).

The researcher has found through personal interviews problems that are most common in the Greek environment. The problems identified can be found in SME's implementation throughout Europe, (Computer Fraud & Security Bulletin,(1987), (Hashimzade *et al.*), (Goossenaerts *et al.*, 2009) but not to the same extent as in Greece.

The pre mentioned companies needed two software packages, and as (Schneider, 2006) indicates this is a common problem in SME's. The first should be used for IRS purposes, printing invoices and despatch notes etc, In addition, the latter should be used for the company itself.

The most common problem that Greek SME's face is the selling of goods/ services without providing the proper invoices or dispatch notes. Some could consider that this is a whistle blowing action for criminal activity but unfortunately it's the everyday reality for Greek SME's(Gianaris, 1981). Of course this action is leading to the failure of the

primarily reason for which an ERP system is implemented. Accurate and correct information to anyone, which is interested in. Of course not all Greek companies act like this, while the ones' the survey took place are the Greek stock market quoted ones so they are considered to be legitimate and gain from the usage of an ERP system.

The second area that the author has found to be problematic is what it is considered by the Greek Vendors to be an ERP system (Spanos *et al.*, 2001). The Greek Vendors consider every software, which is based on SQL to be an ERP system, something that in most cases is very wrong. Instead of searching ways to provide software packages that could help the companies as a whole they try to find ways of "binding" them to their software. They sell their base system, and later on they charge outrageous amounts for installing modules to their systems (Scott *et al.*, 2009).

The third problem that the author has found is the "commission" that the vendors pay to the persons in charge of the implementation, so as their system to be chosen instead of their rival (Canada *et al.*, 2008, Dimitropoulos *et al.*, 2009). Of course, this attitude "blows" the whole implementation to the air while none of the literature critical success factors is used.

The fourth problem that the author found was that most of the vendors in Greece try to hide costs from the implementation in order to get the job, and later on while the company couldn't do much to escape from this situation they have to pay the extra cost to get the job done (Ketikidis *et al.*, 2008). A common practice is to charge very small amount/hours for the training of the users, something that again leads to the failure of the implementation. The researcher located discussions on internet blogs (2007) that made reference to the usage of Microsoft Navision where a company did not pay for the annual service fee for 2008 while the system was implemented and they discovered they had to pay a penalty of 50% for the renewal of the system for 2009 found a similar practice[9] If credible companies like Microsoft Greece, and for all the pre mentioned reasons the researcher has mentioned follow such "bad" practices, the Greek ERP market is at baby-born stage.

[9] http://www.pctechnology.gr/vbull/vb/showthread.php?t=37962 ,
http://www.mibuso.com/forum/viewtopic.php?f=23&t=16385&view=next

CONCLUSION

As addressed in literature an ERP system is designed independent of country or culture. Each country though has its own specificities: organisational, cultural, political and economic (Robertson *et al.*, 2004, Morris *et al.*, 2008), and these can have an important influence on the potential of the new IS and especially an ERP system.

ERP vendors encourage the use of global templates to facilitate the implementations. The global template incorporates standardized definitions of organisational structures, master data and business processes (Betz *et al.*, 2007). However, in literature it is argued against the extensive use of global templates due to the lack of flexibility at a local level to take advantages of regional opportunities and to account for cultural differences (Hanseth *et al.*, 2001, Liang *et al.*, 2004b). But global templates are being increasingly adopted by large companies to improve the information flow due to standardisation (Ellingsen *et al.*, 2007).

(Krumbholz *et al.*, 2001) investigated cultural differences between a large pharmaceuticals company's operations in the United Kingdom and Scandinavia. They found differences in how the ERP system should be implemented to take into account different legislative requirements in each country. They did not find any significant cultural differences studied the adoption of innovation in particular ERP systems, across different European cultures. It was found that national culture does affect the adoption of ERP systems and more specifically that there would be a negative impact in countries with higher levels of uncertainty avoidance, masculinity and power distance.

Some authors argue that these cultural differences are further exacerbated when comparisons are made between eastern and western counties. (Liang *et al.*, 2004a) argue that these systems are based on "rule based" mature economies rather than relation based governance systems like China. (Wu *et al.*, 2003) compared the implementation of locally developed ERP systems to foreign developed ERP systems in Taiwan and the impact on user satisfaction. As would be expected, they found significantly higher satisfaction to the local system as it reflected the local use preferences. (Davison *et al.*, 2001) supports this divide between east and west by arguing that the majority of ERP vendors are western and are therefore unlikely to

support various aspects of eastern culture. By using simplistic examples he supports his argument; such as the automatic allocation of numbers by the system which may be offensive homonyms. In addition, the majority of reports in ERP systems tend to be online while Asian workers prefer paper based reports.

The Greek environment could not be compared to the Asian study, but the Greek issues addressed in the discussion chapter were a clear indicator that cultural issues such as the Greek environment could affect an ERP system.

Researchers such as (Al-Mashari *et al.*, 2003) and (Kumar *et al.*, 2003) indicate that firms that emphasize CSFs throughout their ERP deployment process achieve smoother implementations and consequently quicker obtainment of performance benefits. Most firms use a standard CSF-based approach while implementing their ERP systems. Researchers such as (Jarvenpaa *et al.*, 2008) and (Krumbholz *et al.*, 2001), however, indicate that the "not invented here" and "unsuitable for our environment" are common barriers that hamper information system deployments such as ERP. Their studies suggest that national and organisational culture characteristics underlie these barriers and influence the success of the implementation process.

In addition to the pre mentioned studies, this article has discovered influences of Enterprise Resource Planning (ERP) systems implementation in Small Medium Enterprises and particularly in Greece. This research focused on critical success factors for implementing an ERP system in an SME in the Greek environment.

We could also say as an overall that a successful ERP implementation affects the small business in a positive way.

This research project was intended to provide practical new insights into the implementations of an ERP system into the Greek environment. Identifying one key success factor is impossible and ambiguous due to the complexity of an ERP implementation project. This research project will try in the future to embed a framework that would utilize the results from this research. The results provided will also be used for the development of an ERP implementation toolkit.

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