

Implementation of Enterprise Resources Planning by Algerian Companies: Case Study

استعمال برنامج تخطيط موارد المؤسسة من طرف المؤسسات الجزائرية: دراسة حالة

Belkacem Bouzida Ismahane*, LMTQ, FSECSG, University of Bejaia, 06000, Algeria

Merzoug Slimane, Docteur, LED, FSECSG, University of Bejaia, 06000, Algeria

Received: 03/08/2021 ; **Revised:** 29/11/2021 ; **publication:** 31/12/2021**Abstract:**

This paper studies the implementation of the Enterprise Resources Planning System (ERP) in Algerian companies. As a source of innovation and value creation in organizations, ERP is considered currently one of the most important technological infrastructure, which helps companies enhance its efficiency by reducing costs, efforts, and time notably when well used. Interviews were conducted with employees from different companies to shape the final questionnaire that was conducted directly and sent by email to collect 35 usable answers. The results obtained of the analyzed data prove that the Algerian companies using the ERP were successful to replace its obsolete software despite the system and company related factors that influence its implementation.

Keywords: Enterprise Resources Planning ERP; technological infrastructure; regression analysis; Algerian companies.

Jel Classification Codes: O32 ; O33

ملخص:

يدرس هذا المقال تطبيق نظام تخطيط موارد المؤسسات (ERP) في الشركات الجزائرية. يعتبر نظام تخطيط موارد المؤسسات حالياً أحد أهم البنية التحتية التكنولوجية كمصدر للابتكار وخلق القيمة في المؤسسات مما يساعدها على تعزيز كفاءتها من خلال تقليل التكاليف والجهد والوقت بشكل ملحوظ عند الاستخدام بالشكل الجيد. للوصول للنتائج المرجوة، تم إجراء مقابلات مع موظفين من شركات مختلفة لصياغة الاستبيان النهائي الذي تم توزيعه مباشرة وإرساله عبر البريد الإلكتروني لجمع في النهاية 35 إجابة كاملة. تثبت النتائج التي تم الحصول عليها من البيانات التي تم تحليلها أن الشركات الجزائرية التي تستخدم نظام تخطيط موارد المؤسسات (ERP) نجحت في استبدال برمجياتها القديمة على الرغم من العوامل ذات الصلة بالنظام أو الشركة التي تؤثر على تنفيذه.

الكلمات المفتاحية: تخطيط موارد المؤسسات ERP؛ البنية التحتية التكنولوجية؛ تحليل الانحدار؛ شركات جزائرية.

تصنيف Jel: O32 ؛ O33

* Corresponding author: ismahane.belkacembouzida@univ-bejaia.dz

I- Introduction :

Different technological infrastructures contribute to removing various barriers that exist between the different departments of the company itself or those that may separate it from other companies that form part of its network of relationships, such as its suppliers, customers, or its various points of sale. The primary goal of using technology in enterprises is to help them perform their job with less effort, less cost and more efficiency. In the current time when all processes in economic companies are automated and digitized, the acquisition and the use of technology is no longer a mere option, but rather an obligation to ensure the institution's market position and preserve its reputation.

To ensure their prosperity, companies need to find the right tool to coordinate and integrate their activities to face market uncertainty (Gattiker & Goodhue, 2004). Among these technologies, we find the Enterprise Resources Planning system (ERP), which allows companies to integrate the various functions of the enterprise and provide information to different users of the information system in real time.

Many previous studies have proven the effectiveness of this system in improving the productivity of the enterprise, raising its level of performance, and helping it to obtain a competitive advantage as well as maintain it (Velcu, 2007), as it is considered an essential factor for the integration of the activities and functions of the institution. On the other hand, we find a set of obstacles or difficulties that make corporate managers avoid or fear using it, among them is the high cost it requires and the possible failure of implementation.

Problematic of the study:

Considering the various advantages of the enterprise resource planning system and its importance against the difficulties that institutions might face when implementing and using it, we ask following problematic:

To what extent are the Algerian companies implementing the ERP system?

To answer this problem, we ask two secondary questions, which are:

- Are Algerian companies implementing the ERP system?
- Do Algerian enterprises implement the ERP system optimally? In other words, have the Algerian enterprises that use the ERP system been able to use it to integrate their functions and thus make them abandon the obsolete independent software?
- What are the factors that influence the implementation of the ERP?

To answer these questions, we put forward the following two hypotheses:

H1: Algerian enterprises implement and use the ERP system.

H2: Technological and company related factors influence the implementation of the ERP.

H3: Algerian enterprises' use of the ERP system allowed them to abandon other obsolete software.

The importance of the study:

This study aims to shed light on the importance of the ERP system for Algerian enterprises in terms of its application and its optimal use that allows the system to ensure the most effectiveness for the company. As this importance is reflected in the labor market, which must be capable of providing the necessary expertise to deal with the system and master this type of technology and all the other technologies related to it. The status of this system in relation to Algerian companies that use it affects other companies that have not yet used it, notably those in the same economic sector (suppliers, customers or competitors) as well as those that can benefit from its wide implementation and use by becoming a supplier of this system or of its related services .

Previous studies:

Many studies have touched the implementation of the ERP, but in order to be more exact, we have searched studies about Algerian companies that have implemented the ERP.

We found studies that relate the use of the ERP to the decision making process (Khalfi, 2018a; Nassima & Hassane, 2020), others analyze the impact of the ERP on organizational performance (Merouani & Belgacem, 2020; Mokhtari, 2017), on competitive advantage (Khalfi, 2018b), or the impact of the organizational change on the proper use of the system (Slimani & Boukrif, 2016). Other studies concentrated of the petroleum companies (Hammadi, 2016; Louati, Rdjem, & Ghattas, 2020). A study also analyzed the process of the choice of the appropriate ERP for the company (Fellah, 2015). From the above we conclude that no previous study tried to investigate the successful implementation of the ERP regarding the system replacing the old obsolete fragmented software, which is the aim of this article.

Study methodology and structure:

To reach the desired results, the descriptive and analytical approach was followed by building a questionnaire that was distributed to a sample of Algerian companies and analyzing its data statistically by SPSS 25 to verify the validity of the study hypotheses. Our article is divided into a theoretical part to better understand the concept of the ERP system and its importance as well as its advantages and difficulties in its application, and practical part that includes the results of the field study that has been conducted.

I- Review of Literature:

The theoretical part of this study includes a historical view of the ERP system, followed by its importance and its advantages, and in the end the requirements for its application, which represent the difficulties that may face companies wishing to implement it.

I-1- From Manufacturing Resources Planning to Enterprise Resources Planning:

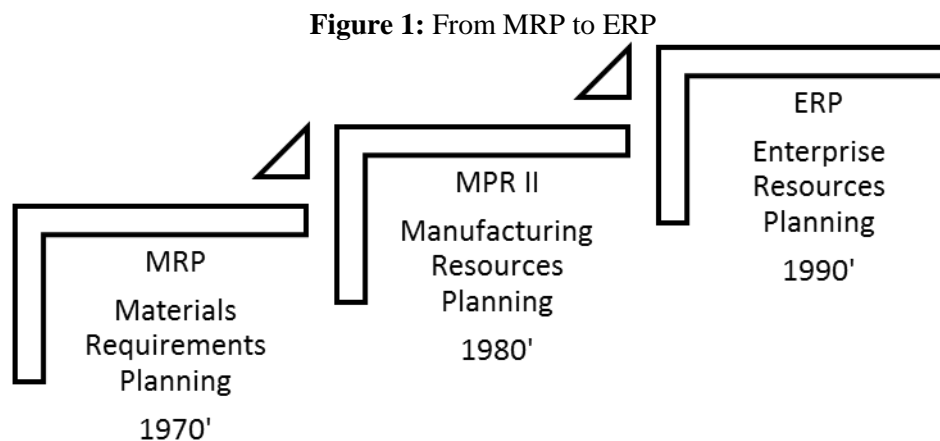
Understanding the history and evolution of ERP is important to understand its current form and use. The starting point of the system began by the need to plan material requirements due to the shortening of product life cycles and the fact that inventory was no longer considered an asset, now companies avoid to maintain an extra stock to reduce costs. From another hand, customer demand cannot always be predicted and forecasted and their orders become more complex with time. The use of Manufacturing Resources Planning MRP became common in companies by the early 1970' through the use of huge post card decks that were displayed in the company for employees to check (Ptak & Schragenheim, 2003, 4). This practice was then replaced by computers with up to date information. The basic function of an MRP is then to calculate the needs of the production department, compare them with what is available and define later on what needs to be purchased and when (Pimor & Fender, 2008, 45). This does not aim to completely eliminate material shortages because these will always occur at the last possible minute of the most critical shipment, but rather, reduce them to the minimum possible level that allows the needed efficiency of operations.

Yet, many problems were witnessed with this system, such as the impact on quality by missing parts, the difficulty to communicate the exact level of completion and the need for additional time to complete the products. Backward scheduling was used to face these problems, it consists of scheduling the operation from the completion back to the required start date and put the production process on a critical path. This offers no recovery time in case one part is missing. As a consequence, the whole production line will be probably delayed. Lead time had to be introduced to the material planning (Waters, 2003, 185).

Benefits of MRP use on the manufacturing operations were noticed in the gain of more control over material purchases, improvement in productivity and quality levels, consequently this reduces investments in inventory and increases the cash flow which provides a

competitive advantage to the companies that use MRP efficiently. Closing the loop with a capacity plan was introduced to the MRP with the development of computers. This progress allows a fast calculation of capacity plans, define critical paths, and list the needed materials. Such a plan could consider a small level, for instance, one single machine, or an individual work center, or even a group of machines as in capacity center. Closed loop MRP was a tremendous step forward the birth of MRP II. This later can track down every movement of assets inventory and the corresponding financial activity to it (Pimor & Fender, 2008, 361).

The creation of this link between material flows and financial flows close the loop with the financial accounting and the Financial Management System that handles manufacturing resources information. Further development of the system was caused by the introduction of Just-In-Time (JIT) practices in the late 80' and early 90' as well as the reinforcement of supplier relationships. These helped the further instauration of the idea that extra inventory is no longer an option for a competitive company and along with the shortening of lead times, JIT practices combined with quality concepts led to lean manufacturing (Ptak & Schragenheim, 2003, 5). In order to fulfill these competitive requirements, not just production resources had to be planned but rather all the company resources in an integrative manner, thus making the evolution from the Manufacturing Resources Planning to the Enterprise Resources Planning.



Source: Made by the researchers

The ERP system is defined as an information system used to integrate several systems and applications with each other, each of them representing one of the company's functions such as finance, accounting, and production, in order to provide the necessary support for the company's activities. The system may include all the company's functions or a few of them (Shim & Shim, 2019).

It is also known as a support system to automate repetitive processes and give managers a comprehensive view of the current process flows which helps solving the problems of disintegration and dispersion of information (Velcu, 2007).

Another definition states that the ERP is a highly standardized system that use one database for many or all of the company's functions, consequently processes standards must be set in place in order to ensure the exchange of data between different departments (Gattiker & Goodhue, 2004).

Using several programs for the various functions of the organization such as accounting, inventory management, human resources management, and others, may not allow the transfer of information between one another, and consequently costs the organization time and effort to exchange data and deal with the redundancy of information. The ERP system allows the integration of all of these programs in one system, which enables its users to easily exchange

information and follow the changes that occur to them in real time. Figure 1 below shows the structure of an ERP system.

Figure 2: ERP system functions



Source: Made by the researchers

I-2- Why invest in the ERP system?

The ERP system is the subject of many studies due to its increasing importance for companies. As it has the ability to integrate different flows of materials, information and financial flows in order to support the strategy applied by the institution (Yusuf, Gunasekaran, & Abthorpe, 2004). Its presence in the institution contributes to standardizing the flow of information and thus facilitating the process of its exchange by various interests and works to improve quality by reducing the volume of errors, which provides the necessary information on time to all parties. The application and optimal use of the ERP system also contributes to improving the organization's performance and its survival in the market (Markus, Axline, Petrie, & Tanis, 2000). On the other hand, some see it as a source for gaining a competitive advantage or improving the already obtained competitive advantage in this era dominated by the use of technology (Shen, Chen, & Wang, 2016). The system reduces costs, time and errors, allowing customers to obtain high quality products at the required time.

I.3. Advantages of the ERP system:

The impact of the implementation of the ERP system is generally outlined in the improvement of the level of customer satisfaction and the reduction of operational costs, which allows to increase the profitability and prosperity of the organization (Chand, Hachey, Hunton, Owahoso, & Vasudevan, 2005).

Some studies divide these advantages into tangible and intangible benefits. The tangible ones can be summarized as:

The reduction of the inventory levels that need to be maintained due to the system's ability to optimally plan a production process, which allows for timely disposal of inventory. The automation of processes in the enterprise that helps to reduce the number of workers,

improve productivity and order process, and reduce production and supply costs, as well as transportation and logistics.

On the other hand, the ERP system raises the efficiency of customer service by raising the volume of orders delivered to customers on time, consequently the customers would pay their debts in the shortest possible period, which reduces the time of financial cycles. The system contributes to improving the cash flow, increasing the volume of income and profits, and reducing the need for maintenance operations in the enterprise (Shen et al., 2016).

As for the intangible advantages, studies reported an abundance of information and the ease of its transfer between the different concerned parts after the ERP implementation. The system also creates new work methods that are more effective or contributes to creating improvements to the already applied processes (Gattiker & Goodhue, 2004). The reengineering it causes in the company's structure was found to be beneficial for business (Mabert, Soni, & Venkataramanan, 2000).

The company would respond better and deal with its customers' requests, and the ERP improves the internal and external communication process, and ensures the flexibility of operations. It ensures also a better integration between systems and thus improves the overall performance of the organization (Al-Mashari, Al-Mudimigh, & Zairi, 2003).

I.4. Requirements for implementing an ERP system:

In order to implement such this system in the organization, managers must first ensure the availability of a set of needed structures, which are the human resources that would efficiently handle the system, the physical structures represented in the information hardware and software, the necessary protection measures to keep data in protected databases and secured communication networks. Besides, the company must ensure that the experts needed to implement and maintain the system are constantly available (Wenrich & Ahmad, 2009).

A basic computer knowledge is required to learn how to handle an ERP but a better control and proficiency from the users would offer them more confidence to better handle the system and ensure its optimal use (Urus, Mat, Nazri, & Fahmi, 2019).

Intranets or extranets are sufficient to connect parts of the organization with each other when the size of the organization is small and its different locations are close to each other. However, in the case of remote locations, or when facing the desire to move to the stage of integrating the program with those of the company's suppliers and customers or its different partners, the Internet is the only means for this.

The process of implementation should be carried out in a gradual manner characterized by caution and takes into account the necessary administrative procedures. This process is supported by a vigilant administrative change and is based on a network of internal and external relations. Preparing employees for the use of the ERP is also important by including them properly in the organizational culture (Motwani, Subramanian, & Gopalakrishna, 2005).

Some studies noted that the application of such a system depends on the size of the organization, the motivation of the employees and the strategy applied, as well as the desired operational functions and advantages of it (Mabert, Soni, & Venkataramanan, 2003). For large enterprises, its cost is not a problem, but rather the difficulty lies in its incorporation into its organizational structure and resisting its rejection by employees, especially the old ones. As for other institutions, their structure makes them more flexible to accept changes and introduce new elements into their system. Therefore, the main problem is their ability to bear its cost. In general, we see that the main problems and difficulties facing enterprises wishing to implement the ERP system are the cost and time required to move from old software to working with it alone (Yusuf et al., 2004). The cost is not limited to the cost of its acquisition, but also to the cost of its application, operation, human resources formation, permanent maintenance and necessary updates. As for the period, it includes studying the project and preparing the technological infrastructure necessary for it, then beginning to install it and use

it alongside old software until being able to and abandon this software. According to some studies, the time required ranges between four months and three years (Shang & Seddon, 2002).

I.5. Obstacles for ERP implementation:

Many obstacles can face companies before the ERP implementation and after it; we can divided them into three categories as (Urus et al., 2019):

I.5.1. Factors related to the user:

The ERP advantages are only reached when the user is satisfied towards its experience with the system (AL-Ghamdi, 2013; Nwankpa, 2015). This satisfaction could be affected by a set of factors, which are the lack of the needed skills and confidence to handle the system that would produce errors when entering the data, hence affecting the quality of information. The user's experience is also affected by the lack of awareness of the ERP that would prevent self-confidence to improve when dealing with the system. This leads to underusing the ERP and its applications.

I.5.2. Factors related to the company:

The problems encountered with the ERP use could be related to the company management and contribute to problems with the data, the system, and the interface of the ERP. They are divided into four categories. The lack of adequate training which mostly refers to the initial training after the ERP implementation that is often found too brief and too general. Other problems are the lack of technical support, the lack of control and the lack of financing such as the sharing of password keys by many ERP users to reduce the cost of acquiring many keys from the supplier. This represents a risk of inexact data and redundancy. Besides, interoperability problems persist when there is a lack of the needed financial resources for the system update and personalization.

I.5.3. Factors related to the system:

The chosen ERP system itself could be unsatisfactory when it lack the needed functions that reflect the company's activities. The employees will have to work on two or many systems and accomplish the data transfer and modification manually from and to every system. This process is time and cost consuming and often results in data redundancy and inexactitude. Excel spreadsheets are in general used alongside the ERP system.

II– Methods and Materials:

A questionnaire was prepared and distributed to a sample of Algerian companies during the second semester of 2019 in two forms, the first was printed and distributed directly, and the second was sent by email as an online form. The response rate to the questionnaire was approximately 27 % from 35 companies and this percentage is due to the reluctance of most companies to answer the questionnaires sent via e-mail, which is a common case. The direct distribution process also encountered many problems such as the request of written authorizations by the university for each company as well as their high discretion regarding their technological infrastructure.

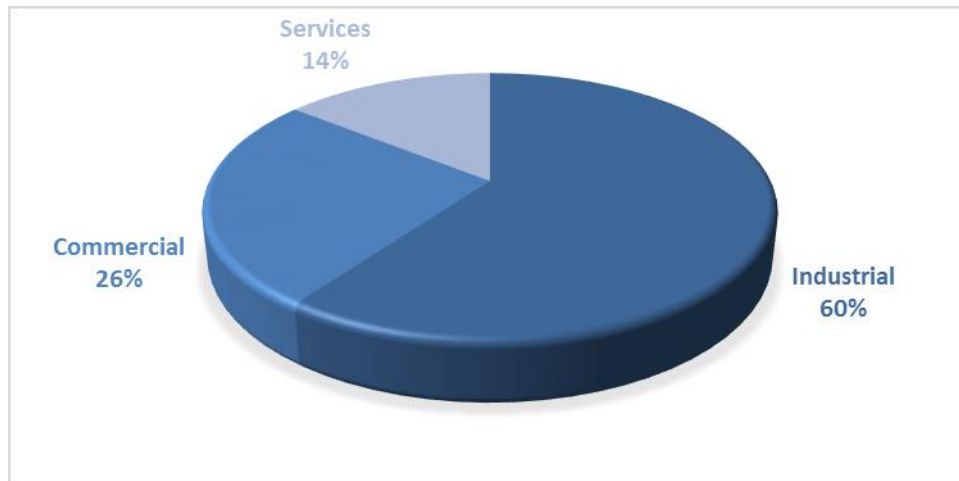
III- Results :

We begin the presentation of our results by the characteristics of our sample, their use of the ERP, than we analyze the existing correlations between this system and the available IT infrastructure. We conclude our Results by the multiple regression analysis of the factor having an impact on the use of the ERP and a discussion of these results.

III.1. Sample characteristics:

Companies are of diverse economic sectors, having 21 companies from the industrial sector, 10 from the commercial one, and 4 companies offer services as shown in figure 3.

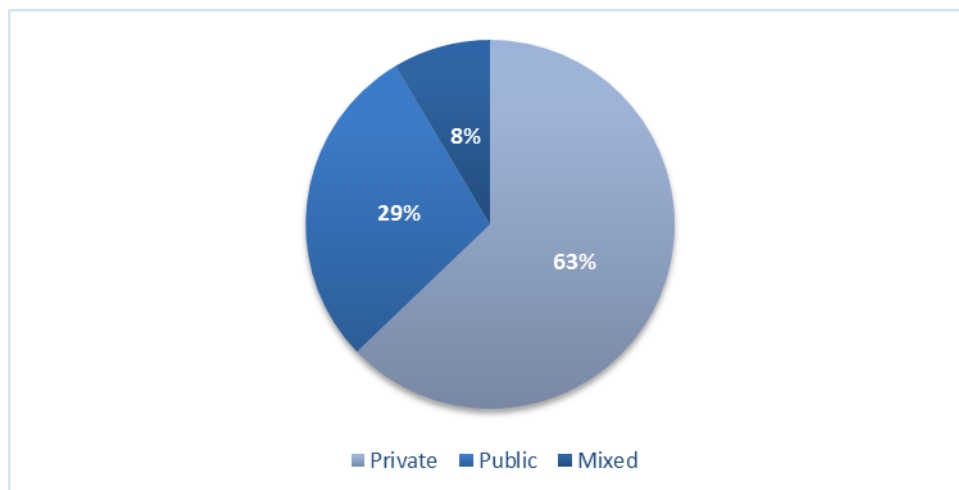
Figure 3: Economic Sectors of the companies



Source: Made by the researchers

The companies of our sample belong mostly to the private sector with a rate of 62.9%, while the rest are divided between the public sector at 28.6% and mixed ownership by 8.6%. This is particularly due to the ease of receiving researchers by private companies unlike public ones that impose many bureaucratic procedures.

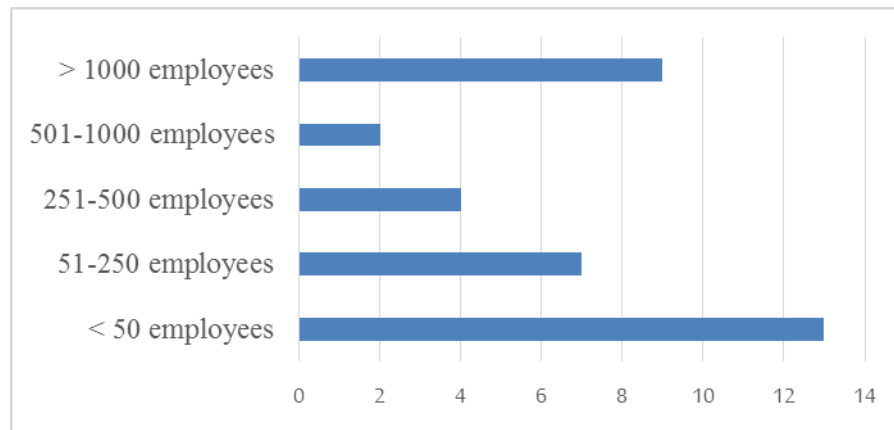
Figure 4: The Companies' Ownership



Source: Made by the researchers

The largest percentage of companies is 37.1% representing with less than 50 employees. As for companies that have employees between 51 and 250, they represent 20% of the sample. It is followed by the percentage of those that have between 251 and 500 employees, at 11.4%. The smallest percentage goes back to the companies that employ between 501 and 1000 employees, and finally the large ones, with more than 1000 employees represent 25.7%, as is represented in Figure 03.

Figure 5: The Companies' size

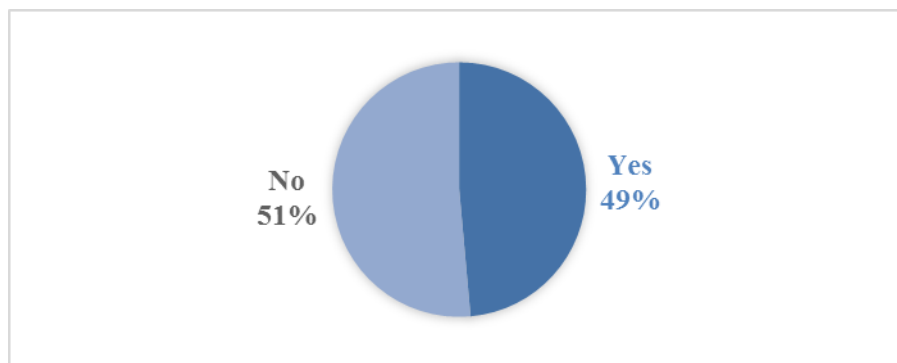


Source: Made by the researchers

III.2.The use of the ERP:

Nearly half of the sample have already implemented the ERP and are currently using it. Even though previous studies have found that there is a correlation between the company size and the use of the ERP (Giaglis, Minis, Tatarakis, & Zeimpekis, 2004), stating that bigger companies tend to use more of the logistics information systems, yet we found no correlation between these two elements, neither with the economic sector of the company, the company ownership, nor its wilaya.

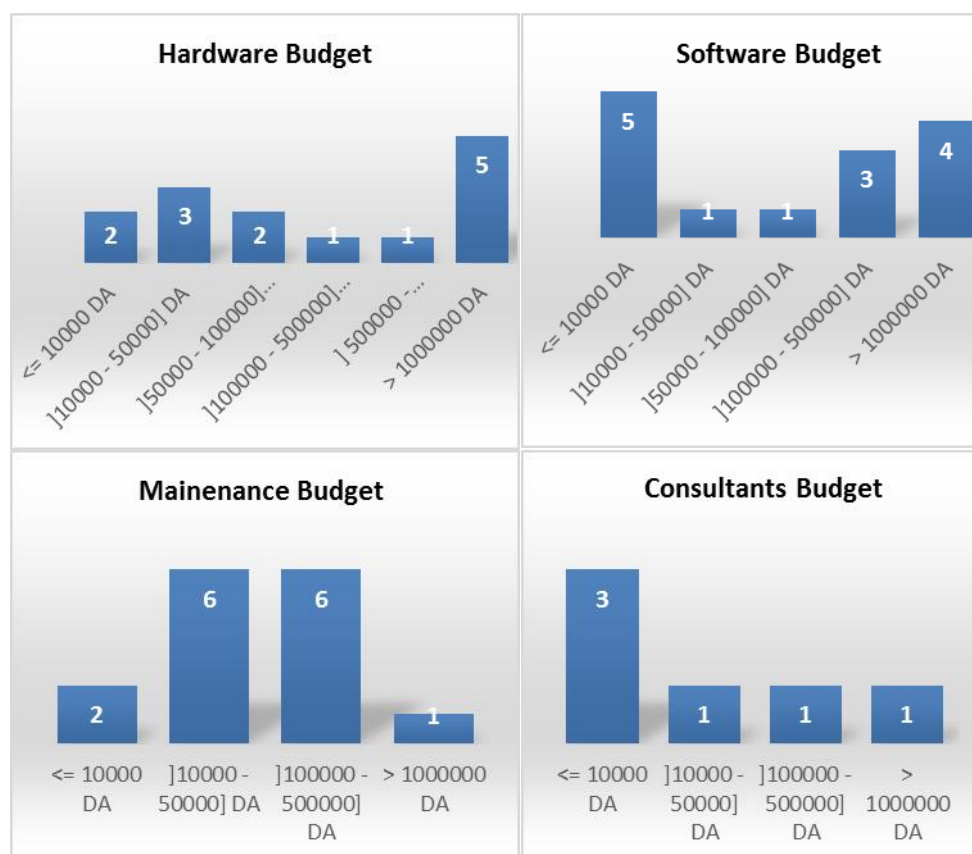
Figure 6: The extent of using the ERP system



Source: Made by the researchers

No significant correlations were found between the existence of the ERP system and the budgets that companies allocate for technological infrastructure, whether it is the software, hardware, salaries, maintenance, or other IT advantages. Figure 7 below demonstrates the annual budgets but nearly half of the sample refused to answer this part of the questionnaire. For that we have only represented the given answers that indicate the importance given to the software and hardware budgets followed by the maintenance budget. As for the consultants, most companies use their own IT staff.

Figure 7: Annual IT budget



Source: Made by the researchers

But we have found that the use of the ERP is correlated positively to the existence of an IT section in companies, the training offered to the employees for the use of the technological infrastructure, and the use of the companies' IT technicians to train the employees. The ERP implementation is also correlated to the type of training given to employees, whether they receive it when newly recruited or it is regularly performed.

Table 1: Correlation between ERP and Deployed Human Resources

	Existence of IT Section	Training	Type of Training	Trainers
Pearson Correlation	.360*	.629**	.693**	.748**
Sig.	0.034	0.000	0.000	0.000

Source: Made by the researchers based on SPSS analysis

The use of the ERP is strongly correlated to the presence of centralized data warehouse to save the huge amount of data treated by this system. No significant correlation was found between the ERP use and the storage networks. But concerning the internet network and according to the meetings that were conducted with several companies that implement the ERP system, the interruptions that occur at the level of the internet network services greatly affect the flow of production processes, especially if it happens for a long period.

Negative correlations were found between the use of the ERP and the old independent software that handle the different functions in the company including the accounting, the human resources management, the inventory management and the billing software.

Table 2: Correlation with other IT Infrastructure

	Centralized Data Warehouse	Storage Networks	Accounting Software	Human Resources Software	Inventory Management Software	Billing Software
Pearson Correlation	,662**	0,262	-,529**	-,349*	-,343*	-,529**
Sig.	0,000	0,129	0,001	0,040	0,044	0,001
Number	35	35	35	35	35	35

Source: Made by the researchers based on SPSS analysis

III.3. Regression analysis:

In order to assess the factors that have an influence on the use of the ERP and go deeper in the nature of the aforementioned correlations, we conduct multiple regression analysis. In every case, we consider the use of the ERP as the dependent variable except for the last regression analysis, where we consider the ERP the independent variable in order to evaluate its impact on the use of old software.

III.3.1. Impact of Company Factors on ERP:

We begin our analysis by considering the companies characteristics as the independent variables, which are the wilaya where it exercises its activity, the company size, its sector of activity, and the nature of its ownership, as in private, public or mixed as mentioned before. The table of coefficients indicate a medium value of R (.492).

Table 3: Regression Analysis Model

Model	R	R ²	Adjusted R ²	Standard error of estimation
1	.492 ^a	0.243	0.142	0.470

a. Predictors: (Constant), Company Size, Sector, Wilaya, Company Ownership

b. Dependent variable: ERP

Source: Made by the researchers based on SPSS analysis

The analysis of variance indicate an acceptable value of F test but it is not significant (0.072>0.05). Yet, we assess the coefficients in table 5 to heck if all the model's elements are insignificant.

Table 4: Analysis of Variance

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.121	4	0.530	2.402	.072 ^b
	t of Student	6.622	30	0.221		
	Total	8.743	34			

a. Dependent variable: ERP

b. Predictors: (Constant), Company Size, Sector, Wilaya, Company Ownership

Source: Made by the researchers based on SPSS analysis

The elements of the regression model altogether are significant with a t value greater than 2 (t=6.623, Sig.= 0.000). The only element with a significant value for the t test goes to the company's sector where we found t=2.009>2 with the significance level =0.054. As for the other characteristics, they were not significant to the use of the ERP.

We can also find the acceptable result of tolerance where they are all greater than 0.3 and the variance inflation factors are all less than 3.3.

Table 5: Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.	Statistics of colinearity	
	B	Standard Error	Beta			Tolerance	VIF
(Constant)	1.573	0.238		6.623	0.000		
Sector	0.028	0.014	0.326	2.009	0.054	0.960	1.042
Wilaya	-0.012	0.015	-0.132	-0.805	0.427	0.938	1.066
Company Ownership	0.059	0.159	0.076	0.368	0.715	0.591	1.692
Company Size	-0.118	0.064	-0.384	-1.834	0.077	0.577	1.733

a. Dependent variable: ERP

Source: Made by the researchers based on SPSS analysis

III.3.2. Impact of Technological factors on ERP:

Many technological infrastructure were found necessary if not obligatory for the appropriate use of the ERP in a company. We analyzed the impact of the use of the barcode, intranet and extranet, mobile and wireless applications, storage networks, and centralized data warehouse on the implementation of the ERP. The result for R indicates a strong correlation (0.779).

Table 6: Regression Analysis Model

Model	R	R ²	Adjusted R ²	Standard error of estimation
1	.779 ^a	0.607	0.522	0.350

a. Predictors: (Constant), Barcode, Extranet, Mobile & Wireless Applications, Intranet, Storage Networks, Centralized Data Warehouse

b. Dependent variable: ERP

Source: Made by the researchers based on SPSS analysis

Table 7 below indicates that the value of the F test is high (F=7.196) and significant at 0.000, we can then read the coefficients table to identify the nature of the relation.

Table 7: Analysis of Variance

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.304	6	0.884	7.196	.000 ^b
	t of Student	3.439	28	0.123		
	Total	8.743	34			

a. Dependent variable: ERP

b. Predictors: (Constant), Barcode, Extranet, Mobile & Wireless Applications, Intranet, Storage Networks, Centralized Data Warehouse

Source: Made by the researchers based on SPSS analysis

The coefficients of our model are significant for the use of mobile and wireless applications (t=2.883>2, Sig.=0.007) and centralized data warehouse (t=4.727, Sig.= 0.000). The strongest B score was found for the impact of centralized data warehouse indicating that this element has the strongest impact on the ERP. Tolerance levels are all acceptable (>0.3) as well as the variance inflation factors (< 3.3).

Table 8: Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.	Statistics of colinearity	
	B	Standard Error	Beta			Tolerance	VIF
(Constant)	0.852	0.432		1.970	0.059		
Mobile & Wireless Applications	0.382	0.133	0.381	2.883	0.007	0.804	1.244
Centralized Data Warehouse	0.706	0.149	0.704	4.727	0.000	0.634	1.577
Storage Networks	-0.157	0.153	-0.149	-1.023	0.315	0.663	1.508
Intranet	0.042	0.134	0.041	0.312	0.757	0.819	1.221
Extranet	-0.340	0.200	-0.217	-1.704	0.099	0.869	1.150
Barcode	-0.072	0.145	-0.067	-0.494	0.625	0.770	1.299

a. Dependent variable: ERP

Source: Made by the researchers based on SPSS analysis

III.3.3. Impact of ERP on old software:

The implementation of the ERP has an impact on other software, which is the case for independent software for accounting, billing, inventory management, and human resources. To evaluate this impact we used multiple regression analysis where we have put the ERP in the independent variable. The value of F test is high ($F= 8.976$) and it is significant at 0.000.

From table 9 below we see that t test was significant for all the elements, its value was found always greater than 20 and significant (Sig. >0.05). Analyzing Beta results, we observe that its value is negative which allows us to conclude that the companies of our sample that implemented the ERP are using it in an integrative way. In other words, the ERP is used to replace the independent software and it integrates the company's functions in one single system.

Table 9: Multiple Regression Analysis parameters

Dependent variables	Parameters	B	Standard error	t	Sig.
Accounting S.	Constant	2.444	.198	12.351	.000
	ERP	-.444	.124	-3.581	.001
Human Resources S.	Constant	2.222	.166	13.420	.000
	ERP	-.222	.104	-2.140	.040
Inventory Management S.	Constant	2.216	.209	10.617	.000
	ERP	-.275	.131	-2.098	.044
Billing S.	Constant	2.444	.198	12.351	.000
	ERP	-.444	.124	-3.581	.001

Source: Made by the researchers based on SPSS analysis

IV- Obstacles of ERP implementation:

According to the interviews that have been conducted in the light of this study, the companies that have already implemented the ERP or wish to implement the system but still are incapable to do so, state that many factors limit the implementation. The main factor is the cost of its implementation and the operational use. The more employees in need to have an access to the system, the more raising costs to acquire new access keys. Some companies to face this problem manage to coordinate the processes between the implemented ERP and an open source ERP (a free cloud system like Oodoo). The use of an open source software is free and allows companies to perform some tasks with this later and then transfer the data to the main ERP.

The shortage of specialized training agencies in this field which have made the companies seek foreign expertise from Tunisia for instance to implement and train the employees to use SAP ERP, as well as those specialized in its maintenance and repair. The internet network is also another issue, with limited servers; every breakdown could halt the production process by more than 80%.

V- Discussion:

The sample of Algerian companies we have studied comes mainly from the industrial sector and of private ownership, they are mostly small firms having less than 50 employees or big with more than 1000 employees. From the above results, we can state that Algerian companies are beginning to adopt to the necessary changes of digital transformation. Nearly half of our sample have already implemented the ERP and thus, they are providing what it needs to use it optimally, by that, we refer to the needed technological infrastructure and the employees training. The annual budget indicates the importance of hardware elements followed by software, maintenance procedures, and finally consulting and training budget. We can then state that the first hypothesis: Algerian enterprises implement and use the ERP system is correct but cannot be generalized to all firms.

We continued further our analysis to by measuring Pearson correlations; they prove medium to strong correlation between the use of the ERP and the employees training. Other correlations exist between the ERP and other technological infrastructure while negative correlations exist with old independent software. For this reason, we continued with regression analysis to identify the factor that have an impact on the implementation of the ERP.

While presenting the theoretical background, we found that the factors or obstacles that could influence the use of the ERP are related to the system itself, the company or the use, due to confidentiality issues, we have not included user related factors in our study. In the first regression model, we have put company related factors in the independent variables; it indicates the impact of the company's sector on the implementation of the ERP. The second model discusses system related factors and it indicates the impact of centralized data warehouse in the first place followed by mobile and wireless applications on the ERP implementation. Consequently, we accept the second hypothesis: Technological and company related factors influence the implementation of the ERP.

As for the third regression analysis, it evaluated the impact of the ERP implementation on the use of independent software (accounting, billing, inventory management, and human resources), The negative results indicate that the companies that use the ERP have managed to use it in an integrative manner that replaces the old software. Hence, we can accept the third hypothesis: Algerian enterprises' use of the ERP system allowed them to abandon other obsolete software.

IV- Conclusion:

This study shows the status of the ERP system in Algerian companies. Despite the great importance of this system now in light of the technology sweeping all fields, which made it the subject of researchers for several reasons, yet its application is still limited by several factors. Nevertheless, the companies that use it have been able to abandon the informational software that operates independently which justifies the investment budgets that were dedicated to such technology. Therefore, it can be said that this institutional void may be considered a profitable field, especially for emerging companies that may provide significant services to Algerian companies by introducing them to such systems and accompanying them in the process of their implementation and train the human resources necessary to ensure maximum benefit from this investment. In addition to this, other services can also be profitable such as providing various maintenance and modernization services without having to receive foreign experts at higher costs. As for the research perspective, the study sample can be expanded in the future, analyzing in depths the various reasons for the reluctance of Algerian companies to implement the ERP system, as well as the extent of the success of this system in helping the companies that apply it to reduce their costs and raise their efficiency.

References:

1. AL-Ghamdi, A. S. A.-M. (2013). Change management strategies and processes for the successful ERP system implementation: A proposed model. *International Journal of Computer Science and Information Security*, 11(2), 36.
2. Al-Mashari, M., Al-Mudimigh, A., & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, 146(2), 352-364.
3. Chand, D., Hachey, G., Hunton, J., Owoso, V., & Vasudevan, S. (2005). A balanced scorecard based framework for assessing the strategic impacts of ERP systems. *Computers in industry*, 56(6), 558-572.
4. Fellah, K. (2015). Méthodologie de sélection et de mise en place d'un Progiciel ERP au sein d'une entreprise : cas de SAÏDAL Algérie. 8(1), 40-71.
5. Gattiker, T. F., & Goodhue, D. L. (2004). Understanding the local-level costs and benefits of ERP through organizational information processing theory. *Information & Management*, 41(4), 431-443.
6. Giaglis, G. M., Minis, I., Tatarakis, A., & Zeimpekis, V. (2004). Minimizing logistics risk through real-time vehicle routing and mobile technologies. *International Journal of Physical Distribution & Logistics Management*.
7. Hammadi, N. (2016). Implantation du Système ERP dans les entreprises du secteur pétrolier en Algérie. Cas : Benchmarking entre ENAFOR, ENTP et Schlumberger Algérie. *Revue finance et marchés*, 3(2), 1-20.
8. Khalfi, I. (2018a). Information systems and decision making effectiveness-Case study of N'gaous Company for Preserves.
9. Khalfi, I. (2018b). في الأنشطة اللوجيستية و أثرها في تحقيق ميزة تنافسية استخدام تكنولوجيا المعلومات للمؤسسة. Université de Batna 1-Hadj Lakhder.
10. Louati, K., Rdjem, K., & Ghattas, M. S. (2020). Analysis the use of the ERP system in the Algerian petroleum company. *المجلة الجزائرية للتنمية الاقتصادية*, 7(2), 237-252.
11. Mabert, V. A., Soni, A., & Venkataramanan, M. (2000). Enterprise resource planning survey of US manufacturing firms. *Production and Inventory Management Journal*, 41(2), 52.
12. Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). The impact of organization size on enterprise resource planning (ERP) implementations in the US manufacturing sector. *Omega*, 31(3), 235-246.
13. Markus, M. L., Axline, S., Petrie, D., & Tanis, S. C. (2000). Learning from adopters' experiences with ERP: problems encountered and success achieved. *Journal of information technology*, 15(4), 245-265.
14. Merouani, R., & Belgacem, S. (2020). The impact of ERP information quality on performance creativity: Study a sample of companies operating in the regions of Setif and Bordj Bou Arreridj. 496-480, 13(1), *مجلة العلوم الاقتصادية والتسيير والعلوم التجارية*.
15. Mokhtari, H. A. H. (2017). L'impact Des Systèmes Erp « Enterprise Ressource Planning » Sur La Performance Organisationnelle De L'entreprise : Etude à Partir Des Entreprises En Algérie. *Revue d'ECONOMIE et de MANAGEMENT*, 16(1).
16. Motwani, J., Subramanian, R., & Gopalakrishna, P. (2005). Critical factors for successful ERP implementation: Exploratory findings from four case studies. *Computers in industry*, 56(6), 529-544.
17. Nassima, O., & Hassane, O. (2020). THE EFFECT OF ENTERPRISE RESOURCE PLANNING 'ERP' ON MANAGEMENT CONTROL AND DECISION-MAKING PROCESS. *les cahiers du mecas*, 16(2), 107-118.
18. Nwankpa, J. K. (2015). ERP system usage and benefit: A model of antecedents and outcomes. *Computers in Human Behavior*, 45, 335-344.

19. Pimor, Y., & Fender, M. (2008). *Logistique*: Dunod.
20. Ptak, C. A., & Schragenheim, E. (2003). *ERP: tools, techniques, and applications for integrating the supply chain*: Crc Press.
21. Shang, S., & Seddon, P. B. (2002). Assessing and managing the benefits of enterprise systems: the business manager's perspective. *Information systems journal*, 12(4), 271-299.
22. Shen, Y.-C., Chen, P.-S., & Wang, C.-H. (2016). A study of enterprise resource planning (ERP) system performance measurement using the quantitative balanced scorecard approach. *Computers in Industry*, 75, 127-139.
23. Shim, S. J., & Shim, M. K. (2019). Effects of user perceptions of SAP ERP system on user learning and skills. *Journal of Computing in Higher Education*, 1-16.
24. Slimani, R., & Boukrif, M. (2016). Les changements organisationnels et managériaux induits par l'implantation d'un ERP: cas de l'entreprise ALCOST Bejaia. *مجلة الاقتصاد والمجتمع*, 12(12), 115-97.
25. Urus, S. T., Mat, T. Z. T., Nazri, S. N. F. S. M., & Fahmi, F. M. (2019). ERP Sand Clock Barriers and Antecedents Model: From the Lens of Task Technology Fit Theory. *The Journal of Social Sciences Research*, 103-116: 101.
26. Velcu, O. (2007). Exploring the effects of ERP systems on organizational performance: evidence from Finnish companies. *Industrial Management & Data Systems*, 107(9), 1316-1334.
27. Waters, C. D. J. (2003). *Logistics: an introduction to supply chain management*: Palgrave Macmillan.
28. 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.
29. Yusuf, Y., Gunasekaran, A., & Abthorpe, M. S. (2004). Enterprise information systems project implementation:: A case study of ERP in Rolls-Royce. *International Journal of Production Economics*, 87(3), 251-266.