THE CONTEXT OF INTRODUCING ERP SYSTEMS

Krisztián Kisari
Szent István University
E-mail: kkisari@gmail.com

Zoltán Zörög
Károly Róbert Collage
E-mail: zzorog@karolyrobert.hu

László Attila Csapó
Szent István University
E-mail: Csapo.Laszlo.Attila@gtk.szie.hu

István Takács
Károly Róbert Collage
E-mail: itakacs@karolyrobert.hu

—Abstract —

Today, information has become a key factor of corporate strategy. It is recognized as an outstanding resource by those who can acquire process, evaluate and utilize it. It appears to be an important value and a mean of power at the same time, in every organization starting from small enterprises to multinational companies in case it is quickly and accurately processed. The large-scale, rapidly and frequently changing datasets must be managed these days to transform their inner value to profit. With the spread of electronic data processing the main problem that a leader faces is not acquiring the information but producing the data which is needed in a specific situation to carry out the planning, analysis and coordination activities and to take a decision in accordance with these. Integrated ERP system is the key to display information in the right time and the right place. It can be stated that there is a wide range of the systems offered; thus companies with the most various needs, scope of activities and scale can find the one that fits their expectations and possibilities the most.

In the life of corporate leaders sooner or later the time will come when they want to overcome the data sets that are generated during the operation of the company and coming from outside of the company. The aim of preparing our study is to examine if those causes could be identified which independent of the attributes of the company contribute to the introduction of ERP systems.

Key Words: *resource, information, management, ERP*

JEL Classification: M15

1. INTRODUCTION

1.1. Literary Overview

Information – similarly to capital or human resources – has grown to become a resource by now. Information-management is not only the science of management information systems, the technique of establishing end user softwares, IT or system organization, but all of the above mentioned together. Perhaps even more than that: it is an approach, an economy management technique for those economists, system organizers and engineers, whose aim is the cheaper use of information resources, the more effective utilization of corporate assets (DOBAY, 2003).

HÁGEN (2009) as a result of his research, draws attention to the fact that the adaptation of new processes, methods is vital for the maintenance of the effective operations of enterprises. One needs to be open for new, innovative systems, and needs to try to build these into the decision-making mechanism. Integrated ERP systems might help with all this, just like it is stated by HERDON – RÓZSA (2011). They emphasize that the systems provide a frame to the collection, processing and transmission of information, thus serving the production, service and control tasks.

1.2. Research Methods and Devices

The correctly chosen method influences the success of the research fundamentally. In accordance with that, besides carrying out the primary and secondary research based on the instructions recommended by the works consulted, we paid attention to using the most appropriate statistic methods during the evaluation of the results. During our work we took those theoretical elements into consideration, which fit into our research and the use of which were likely to be successful.

1.3. Secondary research as a method

As a secondary research, we used the database of EUROSTAT to present how prevalent integrated ERP systems are.

1.4. Questionnaire Survey, as a Primary Research Method

The primary research is based on a questionnaire survey (SCIPIONE (1994) and NOELLE-NEUMENN – PETERSEN (1998)). During the questionnaire survey, corporations using ERP systems have been contacted. Apart from that, we used the **snowball sample-taking** method (MALHOTRA 2009), during which we aimed at an initial group of respondents, and then asked them to transmit the questionnaire to others

belonging to the target group. The process can be continued in consecutive waves, which leads to the snowball-effect**. A total of 181 questionnaires have been filled in**, 155 in electronic form and 26 on a paper-based form. There were 34 Hungarian, 25 French, 23 Italian, 22 Slovak, 18 German and other nationalities' corporations among the respondents. **58% (105 pieces) of the filled in questionnaires can be considered complete,** in other cases, the respondent did not get to answer the last group of questions; however, their answers have still been recorded.

More question types are represented in the questionnaire, in many cases we used Likert-scale, but apart from that we can also find ordinal scales there.

The data analysis happened with the help of Microsoft Excel and the SPSS 17.0 statistic program package. We used the former for displaying the data in the form of different statistic lines (quantitative, qualitative, territorial), tables (cross tables), figures, while the latter was used on one hand for re-coding data, calculating variables, on the other hand for the creation of statistic tests, analyses. (VINCZE - VARBANOVA 1994; VARGHA, 1989

1.5. Survey Results and the Evaluation of Those

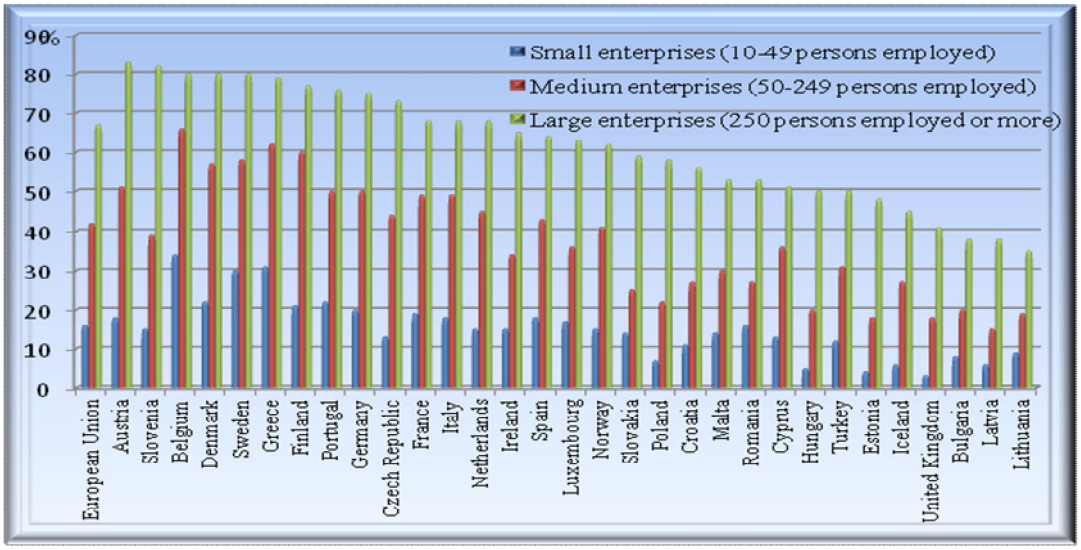
The degree of the use of ERP systems varies significantly among different European countries. Based on the data included in figure 1 it can be stated that according to the size categories based on the number of employees, half of the member states exceed the rate of the European Union in all three size categories.

It is important to note that at the majority of member states, the proportion of enterprises using ERP system exceeds – in more cases significantly – 50%. It can also be noticed that in case of some member states, this level is reached even by middle-sized enterprises. Considering small enterprises, the proportion of enterprises using ERP system is between 3-34%, while in case of middle-sized enterprises, this value is between 15-66%.

Spread of ERP systems was examined in different sectors of the national economies (fig.ure 2).

It can be read from the figure, that 39% of the enterprises in the IT sector use an ERP system. One in three enterprises in the field of info communication puts the use of integrated systems into the foreground. Regarding the following four sectors, a nearly identical degree of spread can be noted within the given sector.

Figure 1: Proportion of Enterprises using ERP system in different size categories in the member states of the European Union in 2010

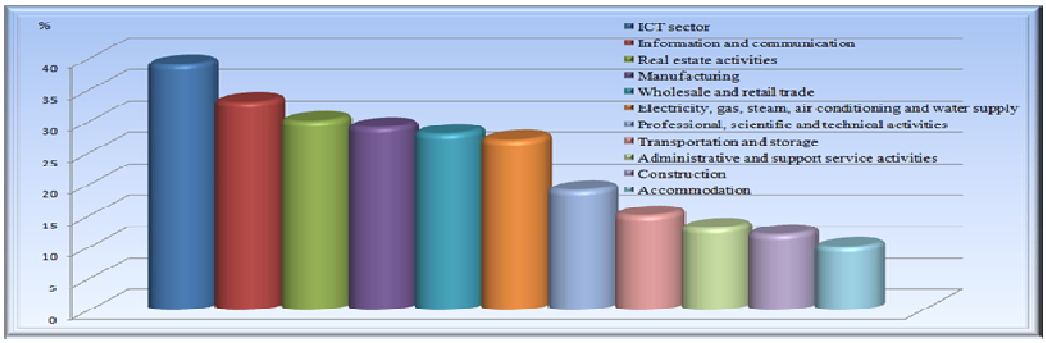


Source: own construction, based on a EUROSTAT database

In Hungary, the number of those enterprises, who are attempting to maintain or strengthen their position in the market with the help of an integrated system. Number of enterprises which uses ERP systems has constantly risen between 2008 and 2010. (Figure 3).

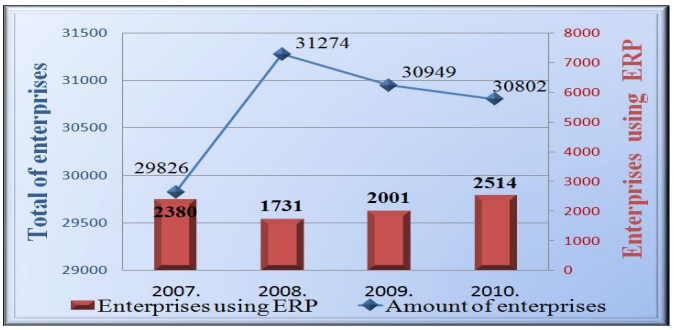
Although the rise in the amount of enterprises using integrated systems is not steep, the amount of enterprises introducing ERP systems in 2010 is almost the double of those in 2009. It needs to be noted, that the proportion of enterprises using ERP systems in Hungary in 2010 was 8%.

Figure 2: The spread of the use of ERP systems in different sectors of national economy in the member states of the European Union in 2010



Source: own construction, based on a EUROSTAT database

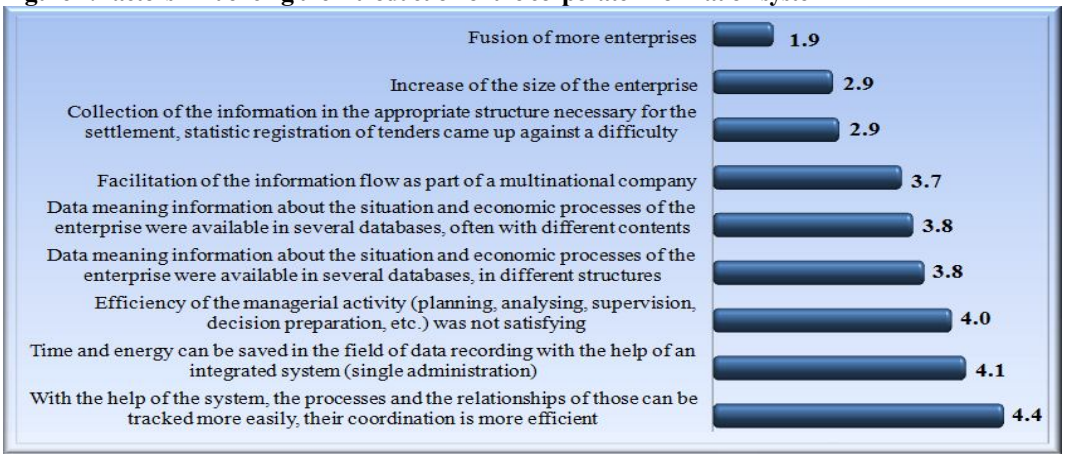
Figure 3: The number and proportion of enterprises in Hungary using integrated ERP systems



Source: own construction, based on HCSO data

Managers come across the idea on a daily basis, that the corporate processes – in order to reach a more effective operation – need to be reformed. When it comes to reforming the processes, why couldn't it be carried out together with the development of the IT system? It is important to examine what leads to the break-away from the traditional direction solutions, why the management of an enterprise decides in favour of the introduction of a new – perhaps unknown – integrated system. It is an important information for us from the following aspect: if the reasons for the reformation are not special, then enterprises not yet using corporate information systems might also decide in favour of the introduction. Examining the reasons on a five-level scale, we got the results to be seen on figure 4, in which the factors promoting, quickening the introduction of the corporate information systems can be identified.

Figure 4: Factors influencing the introduction of the corporate information system



(0=had no influencing effect, 5= had the biggest influencing effect)
Source: own construction

Based on the figure, it has been stated, that the size increase realized through the fusion of more enterprises, or via self-effort does not appear as a significant, special motivation. The same can be said about the inefficient settlement of tenders as well. The factor playing the most important role according to the respondents, was the tracking of the interior corporate processes, which is a quite a common reason, as it might appear as a requirement in case of most enterprises.

Apart from these, the increase of the efficiency of the management activity and the time factor has been highlighted by the respondents with higher rates. Further examining the responses, it can be stated, that the reasons for the introduction were the ones depicted earlier in present paper mainly because of the high values of the middle-sized enterprises.

As the three possible answers in connection with the size of enterprises (increase of the size of enterprise, fusion of more enterprises, facilitation of the information flow as part of a multinational company) did not appear as significant influencing factors, the differences in the reasons of introduction based on the headcount of the full-time employees – as a marker for the size of the enterprise – have been examined with the Kruskal-Wallis test (table 1).

Based on the data of the table, the significance is below 5% - which means that the null hypothesis is not realized – in case of the answers regarding the facilitation of the information flow of multinational companies, the efficiency of the managerial activities and the data collection for tenders and statistic reports. These reasons were more relevant in case of the larger enterprises – based on the employee numbers – regarding the introduction of the corporate information system.

Table 1: The reason for introducing the corporate information system depending on the size category

	Chi-Square	df	Asymp. Sig.
Increase of the size of the company	0,5111	3	0,9164
Fusion of more companies	2,1975	3	0,5324
Facilitation of the flow of information at a multinational company	**12,4062**	**3**	**0,0061**
Saving time and energy during data record (single administration)	3,5725	3	0,3115
Efficiency of the managerial activity (planning, analysing, supervision, decision preparation, etc.) – for example due to the slow, inefficient supply of information – was not satisfying	**12,5339**	**3**	**0,0058**
Data meaning information about the situation and economic processes of the enterprise were available in several databases, in different structures	5,9003	3	0,1166
Data meaning information about the situation and economic processes of the enterprise were available in several databases, often with different contents	4,1389	3	0,2468
With the help of the system, the processes and the relationships of those can be tracked more easily, their coordination is more efficient	2,5373	3	0,4686
Collection of the information in the appropriate structure necessary for the settlement, statistic registration of tenders might become easier	**12,6802**	**3**	**0,0054**

a Kruskal Wallis Test; b Grouping Variable: Headcount of the full-time employees

Source: own constructionIt is easy to see that the answers regarding the easier tracking of the corporate processes and the more efficient coordination of those do not show a significant difference among the different enterprise sizes.

Examining the differences in the responses regarding the reasons for the introduction based on the taxed result data of the enterprises, we got the results of table 2.

The sample has been divided into three categories based on the sum of taxed result, and the responses have been examined with the Kruskal-Wallis test.

The difference between the categories can be defined based on three reasons below 5% error level:

- increase of the size of enterprises,
- fusion of more enterprises,
- Data meaning information about the situation and economic processes of the enterprise were available in several databases, often with different contents.

TOTH (2009) defined the investment expenses of corporate information systems at 5-10% of the annual revenue, the operational expenses at 1% of the annual revenue. Based on the data in table 3, difference on a significance level under 5% can be defined in case of one response, namely the following: data meaning information about the situation and economic processes of the enterprise were available in several databases, often with different contents.

Table 2: The reason for the introduction of the corporate information system based on the taxed results of 2008-2010

	Chi-Square	df	Asymp. Sig.
Increase of the size of the company	**8,29**	**2**	**0,016**
Fusion of more companies	**6,77**	**2**	**0,034**
Facilitation of the flow of information at a multinational company	2,11	2	0,348
Saving time and energy during data record (single administration)	0,34	2	0,842
Efficiency of the managerial activity (planning, analysing, supervision, decision preparation, etc.) – for example due to the slow, inefficient supply of information – was not satisfying	5,92	2	0,052
Data meaning information about the situation and economic processes of the enterprise were available in several databases, in different structures	3,38	2	0,185
Data meaning information about the situation and economic processes of the enterprise were available in several databases, often with different contents	**10,44**	**2**	**0,005**
With the help of the system, the processes and the relationships of those can be tracked more easily, their coordination is more efficient	3,58	2	0,167
Collection of the information in the appropriate structure necessary for the settlement, statistic registration of tenders might become easier	1,92	2	0,384

a Kruskal Wallis Test; b Grouping Variable: Taxed result categories
Source: own construction

The average gradation of smaller enterprises show a higher rate, based on both the taxed result and the revenue, which means that the respondents of these enterprises claimed the introduction of the corporate information system more beneficial.

As a summary, we can state, that using the grouping factors based on the Kruskal-Wallis tests, the responds regarding the reasons of the introduction are concordant in only a few cases. In order to uncover common, to some extent coherent reasons, we used main component analysis. With this method, the relations of the original variables with the main component variables based on the relatively better correlations of the evaluation opinions signal the approach of the opinions.

The reason factors for the introduction of the corporate information system are united by three main component variables. Based on the main component weight matrix elements – which are the correlation coefficients of the original variables and the main component variables – the opinion connections can be interpreted, which are depicted in table 4.

Among the examined reasons, the following factors relate to the first main component:

- Efficiency of the managerial activity (planning, analysing, supervision, decision preparation, etc.) – for example due to the slow, inefficient supply of information – was not satisfying,

Table 3: Reason for the introduction of the corporate information system based on the revenues of 2008-2010

	Chi-Square	df	Asymp. Sig.
Increase of the size of the company	2,61	2	0,271
Fusion of more companies	1,43	2	0,49
Facilitation of the flow of information at a multinational company	2,34	2	0,31
Saving time and energy during data record (single administration)	3,39	2	0,183
Efficiency of the managerial activity (planning, analysing, supervision, decision preparation, etc.) – for example due to the slow, inefficient supply of information – was not satisfying	1,82	2	0,403
Data meaning information about the situation and economic processes of the enterprise were available in several databases, in different structures	2,86	2	0,24
Data meaning information about the situation and economic processes of the enterprise were available in several databases, often with different contents	**7,88**	**2**	**0,019**
With the help of the system, the processes and the relationships of those can be tracked more easily, their coordination is more efficient	3,39	2	0,184
Collection of the information in the appropriate structure necessary for the settlement, statistic registration of tenders might become easier	5,83	2	0,054

a Kruskal Wallis Test; b Grouping Variable: Revenue categories
Source: own construction

Table 4: The examination of the reasons for the introduction of the information system through main component analysis

	Component		
Denomination	**1**	**2**	**3**
Increase of the size of the company	-0,3578	**-0,9223**	-0,1463
Fusion of more companies	-0,7407	0,6713	-0,0257
Facilitation of the flow of information at a multinational company	-0,4281	**0,9035**	0,0208
Saving time and energy during data record (single administration)	-0,1810	**0,9754**	-0,1255
Efficiency of the managerial activity (planning, analysing, supervision, decision preparation, etc.) – for example due to the slow, inefficient supply of information – was not satisfying	**0,9477**	-0,2808	-0,1515
Data meaning information about the situation and economic processes of the enterprise were available in several databases, in different structures	**0,9496**	-0,1548	-0,2726
Data meaning information about the situation and economic processes of the enterprise were available in several databases, often with different contents	**0,9748**	0,1948	0,1083
With the help of the system, the processes and the relationships of those can be tracked more easily, their coordination is more efficient	-0,1301	0,1027	**0,9862**
Collection of the information in the appropriate structure necessary for the settlement, statistic registration of tenders might become easier	0,4859	-0,3177	**0,8142**

Source: own construction

- Data meaning information about the situation and economic processes of the enterprise were available in several databases, in different structures,
- Data meaning information about the situation and economic processes of the enterprise were available in several databases, often with different contents.

The following factors relate to the second main component:

- Facilitation of the information flow as part of a multinational company,
- Time and energy can be saved in the field of data recording with the help of an integrated system (single administration),
- Increase of the size of the enterprise.

The following factors relate to the third main component:

- With the help of the system, the processes and the relationships of those can be tracked more easily, their coordination is more efficient,
- The collection of information of tenders, statistic records might become easier.

2. CONCLUSION

Our examinations lead to the conclusion that the responses given as the reasons for the introduction can be defined as universal. They can be related to several different enterprises, or at least they do not depend on the size, revenue and taxed results of the given enterprise. The respondents do not mention among the reasons for the introduction – regarding neither of the grouping factors – the important speciality and advantage of the corporate information system, the single administration, the availability of the data in databases of different structures, or the more efficient co-ordination of the corporate processes; however,

these factors have a high priority regarding the reasons of the introduction, since these three factors have been mentioned as significant reasons, based on the data of figure 4. Therefore, enterprises of any revenue, taxed result or size can find themselves in any moment on the degree of disorder of information available about the operation of the enterprise, the lack of traceability in the corporate processes, where they decide in favour of the introduction of an integrated system.

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