THE CHALLENGES OF ADVANCED MANAGEMENT METHODS FOR THE ROMANIAN ORGANISATIONS

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Abstract

The aim of the paper is to study the use of the advanced management methods in Romania, through the evolution of the Enterprise Resource Planning (ERP) and Business Intelligence (BI) systems. The study set sights on Romanian organizations which implemented a SIVECO ERP and BI software and the methodology used is both quantitative and qualitative. In the past few years I have attempted to point out certain essential elements of integrated information systems, used as decision and management instruments available for managers. Therefore, I have tried to induce the managers of the organizations, with which I have collaborated, the awareness that the ERP and BI systems are most mere accounting applications. The purpose was to demonstrate some hypothesis concerning the relationship between the size of the organization, the implementation of ERP and BI applications in all functions of the organization, the management method used, and the role of IT&C in decision making. The practical value of this study consists in the measurement of the impacts of contingency factors, and in the assessment of the ERP systems success. The results demonstrate that the relationship between the size and the level of implementation and ERP and BI success is moderated by IT assets. The originality of this article consists in the study realized in computer based advanced management methods implementation.

Keywords: Business Intelligence, Enterprise Resource Planning, management methods, decision.
JEL Codes: M14, M21, M0, L53, L86

1. Introduction

Romanian society discovered after 20 years of market economy that most of the population is involved in the public sector. This is reflected in my study in choosing of the respondents (70% from the public domain). This was not the only reason that had lead to this polarization, but also the fact that ERP and BI applications in general, and those of SIVECO in particular, have a relatively high cost price which made the most of the beneficiaries of IT services, being large organizations (usually more than 2000 employees - to be noted that although all public organizations surveyed had a size between 150 and 800 employees, and they are actually mostly subsidiaries or components of large public organizations). Also private companies that have purchased SIVECO Applications typically have more than 1000 employees. [1]

Even data were collected only from 13 organizations, of a total of over 500 implementations that SIVECO has achieved in almost 20 years, Mr. Sorin Dimofte Director of Implementation and Consulting in SIVECO Romania, has assured me that the choosing of this organizations was representative as a research sample. Also it is important that in the Romanian economy we find only 2000 large organizations that need ERP implementations, and these organizations are clearly in SAP, Oracle and SIVECO portfolio.

2. Research Methodology

The questionnaire was built on the basis of a study made by professors and specialist of Auburn University of Alabama, study oriented on identifying the differences existing between the use of the information

systems in the human resource management in the public and private sector. [7] I made my 2010 research based on a managerial research developed in the ERP field, for the Romanian 2004 national natural resources companies. This research has revealed the global IT and specific ERP implementing level in the Romanian natural resource companies as well as some problems that are country-wide valid. As I have supposed the financial business function through using ERP is almost 100% implemented in every company, the new concepts of CRM and SCM have a very poor implementation (under 30%), the payroll of HRM is almost 100 % implemented, but in the general HRM only the most usual applications are implemented, and there is a relationship between computers and database software as a basis for the ERP software. [7]

I designed a questionnaire, that I have distributed to 13 large companies that have implemented the SIVECO Application and I have formulated a series of hypotheses able to emphasize the importance of the integrated informational systems within an organization and to show whether they are employed as advanced management methods. I have stated seven hypotheses based upon the most recent specialized studies in American literature displayed by well-known magazines. The answering organizations undergoing the investigation have been chosen out of SIVECO Romania implementations portfolio; they have given answers at the level of year 2010.

3. Respondents

The target population was composed of representative companies from the public and private field, where SIVECO has made relevant enterprise application implementations. On this basis I have studied correlations and interdependence between information systems and managerial decisions, but mostly I have tried to validate a few assumptions, in order to identify weaknesses and to propose solutions of better ERP and BI implementation.

All these companies have implemented ERP solutions from SIVECO portfolio, as the largest inland ERP implementer. I also tried to receive data from the other two big companies that implement ERP applications in Romania (SAP and Oracle), but because these two IT companies are operating in Romania through many implementers (EBS, Lasting, Romsys, Red Point for SAP and Omnilogic and RomSoft, Multidata Soft for Oracle), this was not possible. And because SIVECO implemented ERP solutions both in the public and private sectors I operate on two levels.

4. Graphical results over the SIVECO Implementation

I have noticed that in most cases exists a correlation between the number of personnel and the number of computers from that organization. Only Aerostar Bacau and Romvag Caracal seem to not respect this correlation. It should be noted that on the axis of ordinates we have a value that identifies not only the number of personnel but also the number of computers multiplied by 10 (for the homogeneity of values) (figure 1).

I have analyzed the level of implementing of ERP applications in the functions of the enterprise through SIVECO Applications (SA), and that the implementation of analytical and managerial decision tools through SIVECO Business Analyzer (SBA). Because the answer given by respondents was not always gradual (I have not received the degree of importance given to the level of IT&C implementation for each function). I was forced to agree the 1 value for implementation and 0 values for non implementation. The 6 investigated functions were: production (MP), accounting (MCG), management accounting (MFC), purchasing and sales (MAD), human resources (MRU) and payroll (MS). The 6 investigated functions: production, accounting, management accounting, purchasing and sales, human resources and payroll are actually only 4, and I thoroughly investigate the human resource and financial accounting function. From figure 2 I can observe a maximum implementation in most private firms (less Cam Serv which is a small organization), and an improved implementation for public company with some exceptions (CET Brasov). Please note that the field of the activity of the organization could influence this interpretation. [6]

The main modules in human resources management (figure 3) with the highest degree implementation in organizations are personnel records, training, and the red flag should be put into the recruitment and selection, employee performance evaluation and follow-career employees. [6]

In the previous figure I highlighted the organizations that have implemented a thorough software module for human resource activities and I have identify best results for two public organizations such as the Hidroserv Haţeg and Hidroserv Severin and a small private company. Probably the reasons are the financial and economic efficiency and the fact that these organizations have placed a great emphasis on human resources.

If I separately address to SIVECO Business Analyzer (SBA) Business Intelligence software considered as an advanced management method, and in this attempt I identify how to use specific tools such as scenarios, forecast analysis, "what if" type analysis or tracking aggregation and breakdown structures and levels, I point out some conclusions. I marked in table 1 with a red traffic light the problems and there are not dominant, the forecast and the scenarios are well used, and "what if" type tests are unfortunately seldom used. (Table 1)

If I try highlighting the analytical managerial decision tool for the investigated companies I found two private companies, those in charge of production of railway wagons and three energy companies seem most advanced in this field.

I then tried to point out which are the main indicators monitored through the use of management decision support system methods and I observed that organizations focus on financial and economic indicators and less on the performance. We can see the result in table 2.

5. Statistical Assumptions on Testing Links Between Management Decision and Information Technology

Hypothesis 1. *Implementation of ERP applications in all functions of an organization can lead information technology in a strategic resource of the organization [8]*

To prove this hypothesis I have started to quantify the effects induced by the implementation of ERP applications in all functions of an organization. Thus have used data on turnover and clear profit for eight organizations (six public capital organizations were exempted from this investigation as part of organizations like the ANR or Termoelectrica). I took additional data that were not in the quantitative questionnaire from http://www.doingbusiness.ro/financiar/ site and http://www.siveco.ro/web/.

Then I gathered the information related to the increase of turnover and clear profit for the year following the implementation, and data on the average ERP implementation in organization business functions. I have used five variables for this purpose. (Table 3, 4).

I used a t test and F test. By means of a t-test, I have tried to test the media for the implementation of ERP systems and the effect induced on the clear profit and turnover of the organizations, for public and private case (two populations). (Table 5) [6]

Significance level 0.027 Sig is small for PN_efect (Clear Profit Effect) (0,027<0.05), and higher for ERP_Mediu (Average ERP) variable. The conclusion is that the average growth in clear profit is equal to the type of property.

I have conducted a regression analysis to determine the link between the degree of implementation of ERP applications on the functions of the organization and profit growth effect induced by these organizations, and I noticed that there is a good link (with a significance of correlation R = 0.73> 0.63 for 7 degrees of freedom). F-test also has a high enough value (6843), and the Sig. corresponding F statistics is slightly less than 0.05 (0.04) which gives significant linear relationship between two variables. Because both F that has a high level, and significance Sig. is reduced, can be concluded that the results are not coincidental. [6] [9] (Table 6)

Hypothesis 2. *Implementation of ERP and BI applications in all functions of an organization increases the influence of the advanced management methods in the decision making processes of the organization [10]*

Hypothesis 2 will be tested in particular from the perspective that BI applications

influence the organization's performance management processes and less in terms of ERP applications. (Table 7, 8)

I have conducted a regression analysis to determine the link between the degree of implementation of BI applications such specific BI tools and profit growth effect induced by these organizations, and noticed that it is a very good (with a significance of correlation R = 0.908> 0.63 for only two degrees of freedom). Due to the low number of degrees of freedom F ratio is small and value Sig. is greater than 0.05 (0.275), and although the linear relationship between two variables which is very good (R = 0.908) is not necessarily explained by the influence of variable change on the dependent variable PN_efect (Clear Profit Effect) and independent variable BI_Mediu (BI Average) for private organizations. [6] [9]. (Table 9)
In public organizations R is 0.19, so there is no correlation.
I have conducted a regression analysis to determine the link between the degree of implementation of the mix type BI and ERP applications and profit growth effect induced by these organizations, and noticed that it is a very good correlation with a significance of R = 0.908 > 0.63 for only two degrees of freedom). Due to the low number of degrees of freedom, F ratio is small and value Sig. is greater than 0.05 (0.2), linear relationship between two variables that is good (R = 0.8), so this is not necessarily explained by the influence of variation in the independent variable on the dependent variable PN_efect (Clear Profit Effect) - BI_ERP_Mediu (Bi & ERP Average) for public organizations. [6][9]
In private organizations R is 0.418, so there is no correlation.

Conclusions

The motivation of the approach is supported by the fact that IT&C industry has had an explosive development during the last years in Romania. Accordingly, this industry represents 10% of Romania's gross domestic product, a quite high percent in case one notices that not long ago it represented only 3%. At the same time, global financial crisis is being deeply felt in Romania due to the structural crisis Romanian society has been led towards. When employing the phrase "led towards" we refer to the defective management of the last 20 years during which the numberless wrong decisions that were taken were responsible for nowadays crisis.

The managers and users (final or not) of the advanced management methods and of informational systems need not know the complex technologies, the abstract concepts or the specialized applications belonging to informational systems; instead, they should be provided a definite conceptual framework of, at least, five areas: the fundamental concepts of the informational system, the applications of informational systems, the development of informational systems, and the management of informational systems.

Managerial decision, managerial capacity, managerial experience, and management as a resource of an organization is directly dependent on the integrated management informational systems, the ERP, BI, and KM applications, or globally speaking on the informational technology; all these devices should be considered as advanced management methods.

In the case of Hypothesis 1 I have concluded that the increasing of average clear profit is equal to the type of property. Regarding the link between the degree of implementation of ERP applications on the functions of an organization, and the effect induced by the increase in profit in these organizations have noted that there is a good link. F-test also has a high enough value and value Sig. corresponding F statistics is slightly less than 0.05 which gives significant linear relationship between two variables. So the Hypothesis 1 is confirmed. In the case of Hypothesis 2 because of the low number of degrees of freedom (we received responses on the issue of BI only from 6 organizations, 3 public and 3 private), and although because the linear relationship between variables that quantify the implementation of BI type applications and the effect induced in profit organization, this relationship is not necessarily explained by the influence of variation in the independent variable. So the Hypothesis 2 is not confirmed. As a general conclusion I would say that public organizations successfully implement ERP applications and the private one are already focused on the implementation of BI applications.

In this context the basic concepts of computer system provides the technical and behavioral foundation that helps applications such as ERP and decision-making process for building a company's strategic advantage over competitors. IT system is reflected by the structure and IT hardware equipment and base software. Using the IT systems and their applications in operational management, it can be developed a competitive advantage for the organization at local, national and up to forms of electronic commerce and information exchange level.

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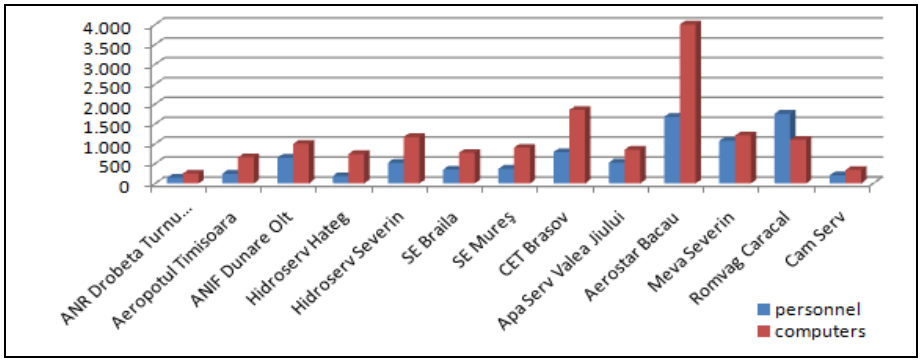

Fig. 1. Correlation between the number of personnel and the number of computers

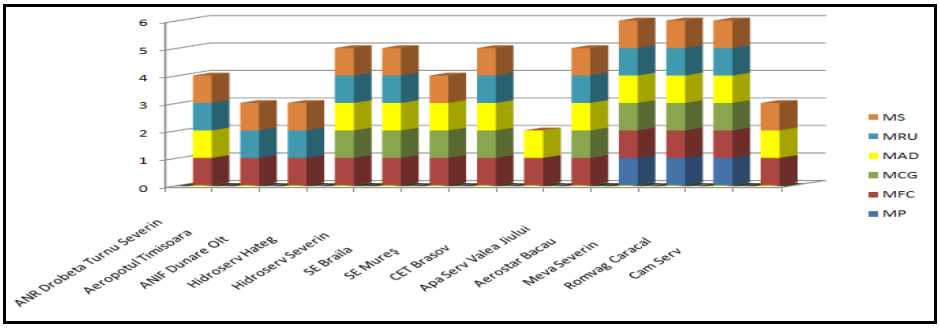

Fig. 2. ERP implementation on the functions of the enterprise through SIVECO Applications (SA)

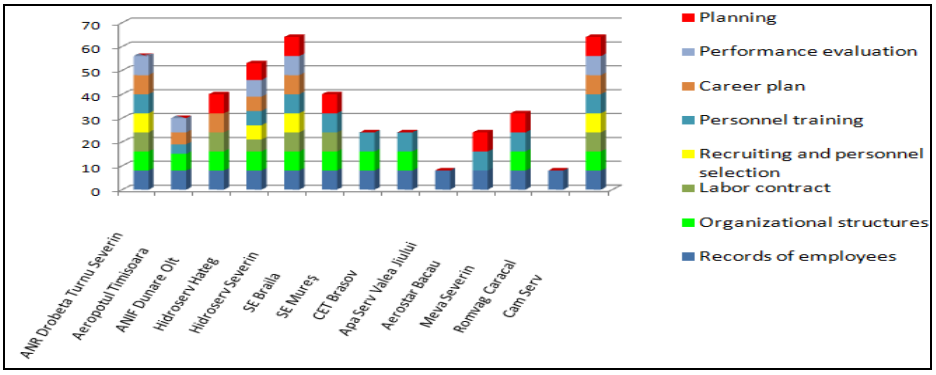

Fig. 3. Human resource management implementation

Table 1. Implementation of analytical and managerial decision tools through SIVECO Business Analyzer (SBA)

company	SBA_Scenario	SBA_Forecast	SBA_What_If	SBA_Drill_Up
ANR Drobeta Turnu Severi	0	0	0	0
Aeropotul Timisoara	0	4	0	0
ANIF Dunare Olt	4	4	4	0
Hidroserv Hateg	3	4	2	1
Hidroserv Severin	4	0	0	3
SE Braila	4	3	1	2
CET Brasov	0	0	0	0
Apa Serv Valea Jiului	4	0	0	0
Aerostar Bacau	0	0	0	4
Meva Severin	4	4	0	4
Romvag Caracal	4	4	0	4

Table 2. Indicators monitored by SBA as an analytical and managerial decision tool

company	I_Economic	I_Financial	I_Comercial	I_Performance
ANR Drobeta Turnu Severin	4	4	0	0
Aeropotul Timisoara	4	3	2	1
ANIF Dunare Olt	0	4	0	0
Hidroserv Hateg	3	4	2	1
Hidroserv Severin	2	4	1	3
SE Braila	2	4	1	4
CET Brasov	4	4	4	0
Apa Serv Valea Jiului	2	4	3	0
Aerostar Bacau	4	4	0	4
Meva Severin	4	4	4	4
Romvag Caracal	4	4	4	4

Table 3. Financial Data

company		2004	2005	2006	2007	2008	Year of SA Siveco Implementation	ERP Influence	Turnover Growth	Clear Profit Growth
aerostar sa	Turnover		102.734.723	140.976.614	139.190.732	152.690.000	2005	15%	1,37	1,98
	Clear Profit		6.800.130	13.450.668	10.146.868	10.918.559				
meva sa	Turnover		90.802.614	155.011.404	209.629.504	328.826.131	2005	15%	1,71	2,65
	Clear Profit		-6.992.582	11.528.766	4.747.312	7.867.540				
romvag sa	Turnover		60.911.735	130.263.915	235.895.459	302.726.345	2005	15%	2,14	3,13
	Clear Profit		4.745.474	14.874.455	15.325.519	9.082.897				
Camser Sa	Turnover		26.955.087	47.580.665	73.061.618	110.160.481	2005	15%	1,77	1,45
	Clear Profit		443.074	641.107	822.363	1.077.039				
Anif RA	Turnover		179.696.769	214.390.573	288.268.864	324.877.828	2007	15%	1,13	0,42
	Clear Profit		526.938	4.271.825	9.211.456	3.855.090				
Apaserv SA	Turnover	11.859.977	11.593.374	10.745.401	10.704.345	12.258.359	2004	15%	0,98	0,84
	Clear Profit	338.915	283.794	-429.255	-1.825.127	-6.152.954				
Aeroport TV SA	Turnover		17.122.761	19.634.749	23.472.912	30.544.667	2005	15%	1,15	0,52
	Clear Profit		294.102	152.459	2.417.314	4.873.558				
Hidroserv Hateg SA	Turnover		13.971.037	15.016.682	18.628.756	26.569.491	2005	15%	1,07	0,70
	Clear Profit		76.170	53.158	178.185	247.465				

Table 4. Variables used in proving Hypothesis 1

company	ERP Average	Ownership	Turnover Effect	Clear Profit Effect
Aeropotul Timisoara	0,5	0	1,15	0,52
ANIF Dunare Olt	0,5	0	1,13	0,42
Hidroserv Hateg	0,83	0	1,07	0,7
Apa Serv Valea Jiului	0,83	0	0,98	0,84
Aerostar Bacau	1	1	1,37	1,98
Meva Severin	1	1	1,71	2,65
Romvag Caracal	1	1	2,14	3,13
Cam Serv	0,5	1	1,77	1,45

Table 5. Independent t test for testing equality of means

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
ERP_Mediu	Equal variances assumed	,130	,731	-1,336	6	,230	-,21000	,15716	-,59456	,17456
	Equal variances not assumed			-1,336	5,606	,233	-,21000	,15716	-,60121	,18121
PN_efect	Equal variances assumed	8,487	,027	-4,405	6	,005	-1,68399	,38226	-2,61935	-,74863
	Equal variances not assumed			-4,405	3,378	,017	-1,68399	,38226	-2,82708	-,54091

Table 6. Linear regression analysis between ERP implementation in organization functions and the effect on clear profit growth

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,730[a]	,533	,455	,76035

a. Predictors: (Constant), ERP_Mediu

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3,956	1	3,956	6,843	,040[a]
	Residual	3,469	6	,578		
	Total	7,425	7			

a. Predictors: (Constant), ERP_Mediu

b. Dependent Variable: PN_efect

Table 7. Variables used in proving Hypothesis 2

company	ERP Average	Ownership	Turnover Effect	Clear Profit Effect	BI Average	BI & ERP Average
Aeropotul Timisoara	0,5	0	1,15	0,52	0,25	0,71
ANIF Dunare Olt	0,5	0	1,13	0,42	0,75	0,14
Hidroserv Hateg	0,83	0	1,07	0,7	1	1
Apa Serv Valea Jiului	0,83	0	0,98	0,84	0,25	0,86
Aerostar Bacau	1	1	1,37	1,98	0,25	0,43
Meva Severin	1	1	1,71	2,65	0,75	0,29
Romvag Caracal	1	1	2,14	3,13	0,75	0,57

Table 8. Linear regression analysis between BI implementation and effect on clear profit growth for private organizations

Model Summary

Model	R Proprietate = 1 (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate
1	,908[a]	,825	,650	,34347

a. Predictors: (Constant), BI_Mediu

ANOVA[b,c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,556	1	,556	4,717	,275[a]
	Residual	,118	1	,118		
	Total	,674	2			

a. Predictors: (Constant), BI_Mediu

b. Dependent Variable: PN_efect

c. Selecting only cases for which Proprietate = 1

Table 9. Linear regression analysis between ERP & BI implementation and the effect on clear profit growth in public organizations

Model Summary

Model	R Proprietate = 0 (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate
1	,800[a]	,641	,461	,13682

a. Predictors: (Constant), BI_ERP_Mediu

ANOVA[b,c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,067	1	,067	3,567	,200[a]
	Residual	,037	2	,019		
	Total	,104	3			

a. Predictors: (Constant), BI_ERP_Mediu

b. Dependent Variable: PN_efect

c. Selecting only cases for which Proprietate = 0