

Technical University of Cluj Napoca



**UNIVERSITATEA
TEHNICĂ
DIN CLUJ-NAPOCA**

**The IT&C Impact
on the Romanian Industry
and over the
Romanian Organizations Management**

Habilitation Thesis

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"Without continual growth and progress, such words as improvement, achievement and success have no meaning"

Benjamin Franklin

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Preface,

My habilitation thesis covers four areas of Engineering and Management, which were disseminated in my research activity by four major managerial studies, one of them focused on the implementation of IT&C technologies in the Romanian mining industry in the 2004 year, the second one to the SIVCO ERP and BI implementation in large Romanian companies during the 2011 year, the third one to the implementation of the eGovernment systems in the 2013 year, and another analysis of SMEs in the Jiu Valley in the 2014 year. This four studies are synthesized in a doctoral thesis and four research contracts. The project management is applied in an EU-funded project completed and in another one being at the beginning. The result of this research is presented in a suggestive and pragmatic form in almost 80 scientific papers and 10 books, all developed in the last 10 years.

The interest of my four researches based on surveys consists in the powerful impact IT&C technologies have upon the development of nowadays organizations as well as upon the daily life of each individual; nevertheless, one should not ignore the special condition Romanian economy and especially Romanian society as a whole is confronted with during the current period.

Implementation of ERP, BI and eGovernment systems in Romanian organizations

Best represented area of research in the 2004-2014 years, after presenting my PhD thesis in industrial engineering thesis, was the market analysis of the implementation of ERP, BI and eGovernment software in Romania, because the work in this area comes as a natural continuation of the work as a programmer and analyst conducted during 1991-1996, and to the teaching activity during the 1997-2004 years. Thus, since IT&C has undergone profound changes in the world and even in Romania, analysis and implementation of software I have continued in the direction of software implementation and training of future specialists in this area. So if by developing the thesis I have designed software for human resources and managerial decision after this moment of my career I've assessed the Romanian market software implementations and have trained hundreds of master students for using software in their field of specialty.

Designing and implementing of eLearning Platforms

After 2008, with the support of two of the largest software houses operating in Romania, Microsoft and SIVCO, I have coordinated the implementation at the University of Petroșani an Office 365 platform, a cloud version with over 3000 users of the well known Office suite offered by Microsoft, <http://www.ziare.com/microsoft/stiri-microsoft/microsoft-program-gratuit-pentru-universitatea-Petroșani-1205814>. Also I have implemented as a project manager an Ael eLearning platform, through HRD project 59756, <http://7.upet.ro>, and I have also performed an analysis system for the implementation of other eLearning platforms, for an online master, but unfortunately this project did not receive financial support. (HRD 39352).

I have implemented in 2010-2013 at the University of Petroșani, an eLearning portal, that was designed using a CMS, General Public License Drupal, the e-Content being developed with InfoPath (as an application for development of scenarios), and the converting scenarios in lessons as learning objects was made using Edu Integrator. In the current economic context of Romania and especially in the difficult situation that mining areas are faced with, University of Petroșani aims to represent a powerful center for improvement, continuous training and re-conversion of the labor force. The project "Alternative professional

training using IT solutions - a solution for re-conversion of the labor force in the mining industry" represent a solution for this social problem, by developing modern and innovative methods of training based on an e-Learning platform containing eight courses in a multimedia format.

I have also accomplished a partnership between University of Petroșani and Siveco Romania in the IT field focusing on ERP systems and on eLearning platforms through AeL product. I have proposed in 2008 (POSDRU 39352) an online Master's Programs that our university could developed with the collaboration of Freiberg Technische Bergakademie. The implementation of the online Master Program could create a flexible and highly qualified labour force that could be adapted to the constant changes on the labour market.

Project Management and SME's Management

I have involved from 1992 in the IMM field as a private manager, and from 2010 as a project manager or expert in the implementation of four projects funded through the European Social Found – SOPHRD (Sectoral Operational Programme Human Resource Development). I have also included the Small and Medium Enterprises (SME's) organizations in my research activities because, in the present economic environment probably represent one of the element to re launch the Romanian economy. In this field of study I have made a complete analysis, at the level of 2014 year, of the Jiu Valley SME's.

Applied computer science in engineering. Computer integrated manufacturing and the design of software applications

I have design an information system for the personal management for a small or medium enterprise, possible geographical scattered. The application has been developed using the triad Apache-MySQL-Php offered by Merlin Desktop in the open source vision. The end user needs only a computer and an Internet browser (client server at the 2004 year). From the analysis system point of view, the application solves two areas of the human resources management: personnel record and organizational analysis.

I have designed an information systems that allow a better computer aided formation and selection for the formers, in fact a decision support systems at 2004 year level. This application has been designed in Visual Studio-Visual C++ based on facts and rules.

I have designed a Project Management software in 2007 year, that offer for the user the possibility to work much easier with menus or edit mode menus, in the detriment of worksheet applications such as Microsoft Office Project. The designed application was structured on two levels, the data base level and the application designed around a php script.

Although my scientific work was focused on a national issue, the concepts used in the analysis and design of specific applications for the Romanian market were visible and recognized internationally by the 20 citations in journals or conference proceedings, of which the most important papers cited were the following.

In the area of management systems, in implementation of systems ERP and BI systems in Romania, my paper work **"IT&C Impact on the Romanian Business and Organizations. The Enterprise Resource Planning and Business Intelligence Methods Influence on Manager's Decision: A Case Study"**, was quoted in the Economic Computation and Economic *Cybernetics* Studies and Research journal by M. Muntean and C. Muntean <http://www.ecocyb.ase.ro/2013a.htm>, in implementation of BI systems in Romania. The same paper work was quoted by A.R. Alzobaidi, <http://stec.univ-ovidius.ro/html/anale/ENG/full-text.php>, in the issue of efficient use of methodological management subsystem.

In the human resource management and modern methods of education and training in issues of eLearning software implementations in Romania, the paper work “**E-Learning Platforms in Romanian Higher Education**”, was quoted by Gopal Sakarkar in the International Journal of Computer Applications, <http://research.ijcaonline.org/volume56/number4/pxc3882866.pdf>, in a comparative analysis of worldwide eLearning architectures for presenting the SIVCO AeL eLearning platform.

In the field of applied computer science in engineering and the design of information systems, the paper work “**Client Server Versus Distributed Network Applications in Human Resource Management**”, was quoted by Ikhu-Omoregbe N. A. and Azeta A, in International Journal of Electrical & Computer Sciences, <http://www.ijens.org/1010302-5454%20IJECS-IJENS.pdf>, in the issue of MySQL client server technologies. The same paper work was quoted by Igor Petukhov, Lyudmila Steshina and Ilya Tanryverdiev in The Fifth International Conference on Advances in Computer-Human Interactions http://www.thinkmind.org/index.php?view=article&articleid=achi_2012_3_50_20233 in the issue of client server technologies, and by Azeta Ayo, C.K. Atayero and Ikhu-Omoregbe N.A in Adaptive Science & Technology, 2009. ICAST 2009, 2nd International Conference.

The 2014 year represent a jubilee, for me, the celebration of two decades of teaching experience. Today I can say with conviction that practical experience in IT, but also in applied management (corporate leader and project manager for European projects) allowed me to teach in the last 20 years over 4000 students and master students, in the spirit of using with assiduity the computer science in the fields of engineering and management. Maybe not accidentally, my academic qualification is structured like a pyramid education, the applied computer science and programming courses (graduate of the School of Computer Science in 1986 from Petroșani and in 2002 graduate of academic studies at the Technical University of Cluj Napoca) is the link between Engineering (university graduate as a mechanical engineer in 1991 at the University of Brașov and a PhD in industrial engineering in 2004 from the University of Petroșani) and Economic (degree in management in 2009 from the University of Petroșani and PhD in Management in 2011 at the University of Craiova). This multidisciplinary training allowed me to use information technology to prepare future engineers in Applied Computer Science Engineering, computer aided design and manufacture, and future economists in Management Information Systems.

PART 1. INTERDISCIPLINARY SCIENTIFIC, PROFESSIONAL AND ACADEMIC ACHIEVEMENTS

THE CURRENT STAGE OF SCIENTIFIC RESEARCH AT THE NATIONAL AND INTERNATIONAL LEVEL - THEORETICAL FRAMEWORK

1. ADVANCED MANAGEMENT METHODS. MANAGEMENT SYSTEMS.

The Implementation of ERP and BI systems in the Romanian organizations

Management Information System (MIS) is basically concerned with processing data into information. Data collection involves the use of Information Technology (IT) comprising: computers and telecommunications networks (email, Voice Mail, Internet, telephone, etc.). Computers are important for more quantitative, than qualitative, data collection, storage and retrieval. Special features are speed and accuracy, and storage of large amount of data. Telecommunications provide the means for one-way or two-way communication and for the transmission of messages. A MIS enables businesses to provide answers to managers in search of knowledge. MIS does this by combining raw data about the organization's operations (contained in its basic information technology systems) with information gathered from employees in expert systems that reflect the organization's procedures. (Satyanarayana et al, *Management Information System to Help Managers for Providing Decision Making in an Organization*, International Journal of Reviews in Computing, 2009) MIS differ from regular information systems because the primary objectives of these systems are to analyze other systems dealing with the operational activities in the organization. In this way, MIS is a subset of the overall planning and control activities covering the application of humans, technologies, and procedures of the organization. As organizations grow, MIS allows information to move between functional areas and departments instantly, reducing the need for face-to-face communications among employees, thus increasing the responsiveness of the organization. (Laudon, *Management Information Systems. Managing the Digital Firm*, 2006)

Information systems are the means by which organizations and people, using information technologies, gather, process, store, use and disseminate information. The domain of information systems requires a multi-disciplinary approach to studying the range of socio-technical phenomena which determine their development, use and effects in organizations and society. (UK Academy for Information Systems) We consider that the most relevant Information Systems for the Romanian organizations are the Management Information Systems. Also for historical reasons, many of the different types of Information Systems found in commercial organizations are referred to as "Management Information Systems". However, within a pyramid model, Management Information Systems are management-level systems that are used by middle managers to help ensure the smooth running of the organization in the short to medium term. The highly structured information provided by these systems allows managers to evaluate an organization's performance by comparing current with previous outputs.

An important type of information system is represented by Enterprise Resource Planning (ERP), a tool that integrate the economic processes of an organization and optimize its resources. ERP represent systems based on the architecture client/server developed to process transactions and facilitate the integration of all processes starting with the planning and development stage and reaching to the relations with the suppliers, customers and other partners. (Fotache, *Enterprise Resource Planning*, 2004). On an international level the integrated information systems have evolved for more than 45 years and nowadays all the economic processes of an organization could be integrated. In Romanian there are still some

insular applications (own applications, not integrated and usually very small). The only solution of making a business efficient is to use the ERPs (planning the resources of the enterprise or information integration in a business), and derives from the name of ERP which means that you need a single database where all the functional systems can be combined in a single integrated one, which is offered to all departments by information distribution. (Fotache, *Enterprise Resource Planning*, 2004). Unlike 10-15 years ago, the dynamics of the economic life imposes the companies to use integrated information systems, which should coordinate all the functional departments of the company. This tendency appeared as a natural reaction to the new challenges of the modern information technologies in a moment when the phenomenon of globalization and the competition between different companies started to increase. A more careful analysis points out the essential competitive advantages: quality information, collaborative dimension and openness to e-business, which are absolutely necessary in a modern economy (Fotache, *Enterprise Resource Planning*, 2004). The current ERP systems perform the integration of all management functions of an organization, starting from planning, providing the stock of raw materials and material, defining the technologies, coordinating the production processes and last but not least, performing the financial-accounting management, the human resources, end products stock management and developing and maintaining the customers relations and the relations with the business partners. Such an ERP system allows the decisive factors to develop complete analysis on the business plan. The options of simulating the activities and the flexible and dynamic character of the applications have led to the development of forecast plans, evaluations and predefining the trends in the evolution of the industry the organization belongs to, qualitative analysis, the integration of the new e-business technologies and online communication.

Information systems include also Business Intelligence (BI) that is a concept which refers to the way in which decision can be made faster and easier. In the current society the companies collect huge quantities of data daily: information about orders, inventories, and transactions from work sites and of course information about customers. Companies also collect data as demographic data and email lists from external sources. Unfortunately more than 93% of the data are not used in the decision making process.

The evolution of the MIS in Romania during the last 20 years, is connected with the evolution of database software, from simple and non complex applications, designed by small software companies in Database Development Systems (DDS) such as FoxPro, to applications made in Relational Database Management Systems (RDMS) for Servers by huge software companies such as Oracle, IBM (International Business Machine) and Microsoft in Ms SQL (Structure Query Language) Server, and are reflected in a optimistic manner in the MIS software implemented for business function in Romanian companies. The classical and ordinary database software used in small applications and developed through DDS like FoxPro (1990-1995) are declining in front of new server oriented RDMS, led by Oracle, IBM (using data server DB2) and Microsoft (using Ms SQL Server). This is happening because the servers have become integrant part in a company. These database servers support today ERP and BI software.

While noticing a short overview of the evolution of the main management methods during the last 50 years I have tried to draw out the chapter dealing with the advanced methods used by the management of Romanian organizations. Management methods have witnessed an evolution lately, namely during the period 1990 -2010, strictly connected with the information and communication technologies. Accordingly, while the decade '70 – '80 belonged to the management methods characterized by strategy, leadership or excellence (Drucker, *The practice of Management*, 1954), beginning with the '90s, the personalities of management history have proposed, conceptualized, and studied management methods in close connection with information technology. The years '90s and 2000 were strongly

influenced, in the field of management methods and techniques, by a series of professors, researchers and scientists belonging to American universities and having an engineering, management, and IT interdisciplinary training. The methods meant for organization's strategy, such as score-card, or for complex management decisions, such as business analyses, represent in our vision the sole solution a business and an organization may adopt in order to enter the decade to come. We consider that in 2012 the category of the advanced management methods should include: Enterprise Resource Planning, Business Intelligence, Balanced Scorecard, Business Process Reengineering, Business Process Management, and Enterprise Content Management. Below, some major management milestones along with the most prominent proponents are presented. The timeline is only approximate and so is the following discussion. The point is simply to discuss the rapid development of methods and approaches in the 1980s and 1990s and try to identify some connections that can be useful in understanding why the same method can be successful in one company but a failure in another. (Emblemsvag, *Process Thinking - A New Paradigm for Science and Engineering*, Futures, 2000)

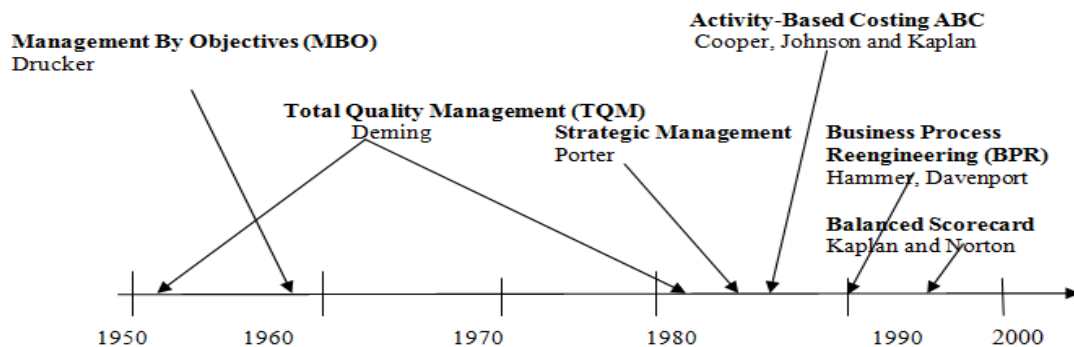


Figure 1. Management Timeline Techniques

Source: <http://www.emblemsvag.com/historic.htm>

2. ADVANCED MANAGEMENT METHODS. MANAGEMENT SYSTEMS

Implementation of e-Government systems in Romania

The word e-Government translates literally as "electronic government". However, the term e-Government has established itself worldwide as meaning "the administration of government by means of electronic technology". In general, it means the simplification of work routines and processes through the application of information and communication technologies (ICT) in the areas of information, communication and transaction within and between state institutions as well as between the government and citizens or businesses. e-Government is the set of all available to everyone in the country. It is also a synonym for a modern and innovative land, in which quality, trust and quickness play a central role. Public authorities use technologies such as the Internet or mobile services to get into contact with citizens and businesses. They also use these technologies to carry out internal work processes. e-Government has an impact on every citizen, business and public authority. [\[http://www.digitales.oesterreich.gv.at/site/6506/default.aspx\]](http://www.digitales.oesterreich.gv.at/site/6506/default.aspx)

Today, despite a high level of availability of e-Government services in Europe, differences still exist amongst Member States and the take-up of e-Government services by citizens is low. In 2009, only 38% of EU citizens used the internet for accessing e-Government services, compared to 72% of businesses. General internet take up will be lifted if the usage and quality and accessibility of public online services rises.

In the area of e-Government Romania is lagging behind, especially in take-up, being at the lowest place in the EU for both citizens (at 8%) and businesses (at 50%). In online service provision, Romania is greatly below EU average in both services for citizens (at 50%) and businesses (at 75%). The proportion of citizens using the Internet to interact with public authorities has risen by 3 points to 41% over the last year. Better yet, the share of e-Government users filling in forms has also increased, to 50%. Eleven Member States already achieve the first target (up from five last year), and six already reach both. Continuing progress at the current rate would result in both targets being achieved well ahead of 2015. The list of 20 basic public services contained in the annual report “Digitizing Public Services in Europe: Putting ambition into action - 9th Benchmark Measurement” – Capgemini, prepared for the European Commission, Directorate General for Information Society and Media, December 2010 shows the Romania position. [<http://www.epractice.eu/en/document/288410>]

Information Society Indicators	Romania	EU-27
Overall ICT expenditure (as a % of GDP)	1,1	2,4
% households with broadband connection	23	61
% of enterprises with broadband	52	86
e-Government usage by individuals (%)	8	41
e-Government usage by enterprises (%)	50	75

Figure 2. Romanian Information Society Indicators

Source: Capgemini et al., (2010), p. 207

In 2007 the degree of e-Government implementation within various Romanian regions is presented below: while all nine local administration authorities within Bucharest region of development (including the county of Ilfov) have official web pages, in the South-West region (counties of Mehedinti, Dolj, Gorj, Valcea and Olt), only 14 of the 33 cities are visible on the Internet, that is 42.4%. Also below the national average of 60.6% are the Centre region (counties of Alba, Sibiu, Brasov, Covasna, Harghita and Mures), with 54.7%, the North-East region (counties of Suceava, Botosani, Neamt, Iasi, Bacau and Vaslui), with 56.2%, and the South region (counties of Arges, Prahova, Dambovita, Teleorman, Giurgiu, Calarasi and Ialomita), with 55.8%.

Table 1. Percentage of urban settlements with official websites

Development region	No. of urban local authorities	No. of local authorities that have websites	%
Bucharest	9	9	100
Centre	53	29	54.7
North-East	32	18	56.2
North-West	32	23	71.8
South	43	24	55.8
South -East	33	23	69.6
South -West	33	14	42.4
West	37	25	67.5

Source : Stoica, V, and Ilas, A. (2009), “Romanian Urban e-Government. Digital Services and Digital Democracy in 165 Cities”, *Electronic Journal of e-Government* Volume 7 Issue 2, pp. 171 - 182

3. MODERN METHODS OF EDUCATION AND TRAINING.

Designing and implementing of eLearning Platforms

SIVECO AeL eLearning Platform. Theoretical Framework

E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term Blended learning is commonly used. E-Learning pioneer Bernard Luskin argues that the "E" must be understood to have broad meaning if e-Learning is to be effective. (Bernard Luskin, Think "Exciting": *E-Learning and the Big "E"*, Educause Review, March, 2010, <http://www.educause.edu/ero/article/think-exciting-e-learning-and-big-e>)

In higher education especially, the increasing tendency is to create a Virtual Learning Environment (VLE) (which is sometimes combined with a Management Information System (MIS) to create a Managed Learning Environment) in which all aspects of a course are handled through a consistent user interface standard throughout the institution. A growing number of physical universities, as well as newer online-only colleges, have begun to offer a select set of academic degree and certificate programs via the Internet at a wide range of levels and in a wide range of disciplines. Another used concept is Learning Management System (LMS), which is a software application that uses a computer to organize courseware and track student records and progress. Web-based training (WBT – a training delivered over the Internet) is often combined with LMS. Also CMI (Computer Managed Instruction) is another name for LMS. (http://innovativelearning.com/online_learning/e-learning.html)

On a worldwide level there are many professional e-learning platforms of which we can mention Blackboard, Web CT, Ariadne, Pearson Learning Studio, IBM Lotus Learning Space, Top Class, IntraLearn and eCollege. The e-learning system has been implemented in many Romanian universities, as for example the Bucharest Academy of Economic Studies (AES), the Gheorghe Asachi Technical University of Iasi, the University of Bucharest, (www.credis.ro/index1.asp), The University Babes Bolyai from Cluj Napoca, The Technical University of Cluj Napoca (The Virtual University of Cluj Napoca, www.coned.utcluj.ro), as well as the West University of Timisoara and the Transylvania University of Brasov.

The Romanian software and the companies which offer support in designing and developing e-Learning platforms are AeL - Advanced e-learning (Siveco Romania S.A.), ASK e-learning (InsideMedia), eLearn (Timsoft Timisoara), Softwin and Expert Learning System. AeL is an universal and integrated e-learning solution, offering facilities for the management and presentation of various types of educational content, such as multimedia interactive materials, interactive guides, exercises, simulations, and tests. Over 15.000 schools from Europe, Middle East, Africa and CIS have already experienced the AeL e-learning solution. The extensive AeL eContent Library includes over 3.700 interactive lessons on 21 subjects, and over 16.000 reusable learning objects.

Microsoft Office 365 Platform. Theoretical Framework.

Cloud computing is a way of working in the field of computers and of computing. It represents an assembly of computing services, applications, access to information and data storage that can be distributed to the end users. They do not need to know the physical location and configuration of the systems that provide these services. (A. Murray, "Virtualization Defined – Eight Different Ways", F5 White Paper, <http://www.f5.com/pdf/white-papers/virtualization-defined-wp.pdf> [March 30, 2013])

Joseph McKendrick, published the results of an analysis performed on a large sample of firms. These conclusions are based on a new survey of 364 enterprise application and business managers, conducted among members of the Oracle Applications Users Group

(OAUG). The survey, explored strategies and philosophies in cloud implementations, for public, hosted, and private cloud efforts. Many companies are now working their way up the cloud - computing learning curve, getting comfortable with new security protocols and ways of deploying and managing technology solutions. Cloud computing itself has been around in various forms for a number of years, starting with third-party hosted applications, evolving to Software-as-a-Service offerings, online IT infrastructure and private clouds. In recent years, cloud projects have typically been triggered when IT executives weighed options for the next version of their enterprise software. In many cases, companies are now weighing cloud as an option for supporting their next upgrade of Oracle E-Business Suite. (J. McKendrick, “*Cloud at the Crossroads: 2012 OAUG Survey on Application Delivery Strategies*”, Library resource Guide, Published by Unisphere Research Delivering Certainty, March 2012)

In education the virtualization is also widespread as Timothy Bower from Kansas State University at Salina shows in his work. (T. Bower, “*Experiences with Virtualization Technology in Education*”, Journal of Computing Sciences in Colleges, Vol. 25 Issue 5, pp. 311-318, May 2010) According to this, virtualization technologies used in conjunction with traditional technologies offer appealing options to access Unix / Linux systems as needed to complete course assignments.

In Romania, at present moment, the use of computing virtualization can be considered still in its infancy. This is caused by two components: -little information of the area managers in areas with potential; -a faulty assignation of the IT infrastructure development plans. The first component, in terms of cause is actually divided between the beneficiaries and the providers of such solutions or more explicitly suppliers of information. The second component, however, is strictly given by users who prefer that in their IT development plan to include the acquisition of classical solutions, failing to understand, that a greater investment at the beginning, is in fact a lower total investment in the long term.

4. APPLIED MANAGEMENT. AREAS OF MANAGEMENT

Project Management

In the field of Project Management, in Romania after 2007, PM has been identified with the Projects for absorption of European Funds through Strategic Operational Programs (SOP). In 2008-2014 period I was involved in writing tree HR SOP application forms, and then I have managed two of them as a project manager, receiving European funding, first one brought 375,000 Euro to the University of Petroșani and the second one will bring 100,000 Euro to the same university.

I was involved in these field from 2008 year when I have proposed **POSDRU 39352 - e-Master in the field of Project Management (PM) and Information Technology Systems (ITS)** at the University of Petroșani. These project was based on a partnership with Technische Universität Bergakademie Freiberg. The two Master`s Degree Programs proposed to be implemented on a eLearning platform (Project Management and Information Technology Systems), provide relevant qualifications on the labour market, 20% of the total of Master Students who are learning in the Faculty of Mining and other 20% from the Faculty of Electrical and Mechanical Engineering. Unfortunately the project did not receive financial support. <https://actionweb.fseromania.ro/index.php?cmd=pr&projectid=39352>

In 2009 I have wrote another application form **POSDRU 59756 - Alternative professional training using IT solutions - a solution for the reconversion of the mining labor force**, also based on an eLearning Platform, and also in training in IT and management field. I have proposed 8 training programs in IT, management and some specific field for Jiu Valley region: tourism and survey. In 2010, University of Petroșani, and Eduard Edelhauser as Project Manager have received a 1,000,000 euro founding for these project. The Romanian labour market is in a continuous transformation process since the beginning of the last decade

of the XX century, the influences of the transitions to a market economy being felt even nowadays. Under the conditions of an unprofitable, decayed industry, the economical restructuring led in the first years after 1990 to a massive industrial downfall, the investment level dropped and the labour market experienced a significant increase in unemployment and informal employment. To that end it is eloquent the fact that the percentage of employed persons in the industry from the total employed population has decreased dramatically since 1990 until 1999, the socio-economic impact being felt especially in mono-industrial areas of Romania. The impact was felt on the labour market through a significant depreciation of the employment rate of working age population (15-64 years) being considered alarming especially by comparison with the EU evolutions. By using TIC in training, including an e-learning component, our POSDRU 59756 project aligns itself with the European vision that highlights these technologies as *“a key mechanism to create more economical and social opportunities for EU citizens and for improving their access to quality services”* (CALISIS, 2009 page 29). So in 2010-2013 years I have managed this SOP in Human Resources Development in the West and South - West regions, in the counties Hunedoara, Gorj, Vâlcea and Mehedinți, where the reconversion of the mining labor force was necessary.

In 2013 year I have proposed another POSDRU project, these time only as partner PM, based on a partnership with West University of Timișoara **POSDRU 141118 - Training is not ephemeral, but a steep in career !**

<https://actionweb.fseromania.ro/index.php?cmd=pr&projectid=141118>. The project main goal is to facilitate the transition from school to active life of 400 students enrolled in the national education system in the West, in a period of 18 months with a total eligible cost of 1,551,445.50 lei. The project targets both correlation and theoretical knowledge acquired by students with practical work related to specialization, and professional guidance and counseling them through learning personal skills relevant to the labor market and increased opportunities for participation in the labor market. In the University of Petroșani I have focused for the third time in the IT and management field. These time our target were students in IT and management, not master students or unemployed persons. Now I have proposed a partnership whit a major Romanian university from the West region (West University of Timisoara), after in 2008 I had proposed a major European university from the mining area (Technische Universität Bergakademie Freiberg), and after in 2010 I have proposed the most important IT company from Romania (SC SIVCO Romania SA) In 2014 - 2015 years I manage this project as a University of Petroșani project coordinator.

Another important area of project management is the information systems for project management. We know that project management is the science management of the resources, so that resources could completely cover a project, so it is necessary for solving the triad **activity time cost**, which has as a software solution the implementation of the network programming. Dedicated software for PM, already exist and the most familiar is Microsoft Project, the first version of the software dating for more than 20 years ago. In this field I have designed a customized software.

5. APPLIED MANAGEMENT. AREAS OF MANAGEMENT

SME's Management

“A company's primary responsibility is to serve its customers. Profit is not the primary goal, but rather an essential condition for the company's continued existence”. This Peter Drucker statement, who was called by the famous journal “The Economist” - “the greatest thinker - which management science has ever created” shows the importance of the role that SMEs play in society, through their flexibility and efficiency. Another interesting and useful perspective related to the management of SMEs, is my personal perspective to the Romanian business environment. It's actually my personal experience of 20 years in the Romanian

business. I set up my first SME in 1992, when the business environment in Romania was during his pioneering. After more than 15 years of continuous activity in trade retail and IT services, I was able to develop a network of stores and create more than 15 jobs in this area. The 20 years of practice gives me a completely different view of the business than a theoretician that teach out a series of concepts that are not necessarily connected to reality.

The SMEs situation in Europe in the 2012 year. The more than 20 million SMEs in the EU represent 99% of businesses, and are a key driver for economic growth, innovation, employment and social integration. The role of SMEs is crucial for the European economic recovery - their number, employment capacity and value added constitute a large share of the European economy. Providing the right conditions in which SMEs can flourish is paramount for ensuring a sustained recovery and achieving prosperity for all EU citizens. Overall, SMEs accounted for 66.5% of all European trillion value added at current prices against a total value added produced by the private, non-financial sectors of approximate one trillion.

The world economy is experiencing the worst economic crisis since 1930-1933, and never the recovery of Romania in particular, and of Europe in general, did not depend so much that today, from the SME sector. There can be no reason for complacency following the advances in these areas: the objective remains the restoration of a competitive European SME sector which is able to absorb its share of the 26 million European unemployed and the millions of young people without training opportunities, while standing its ground against overseas competition.

The SMEs and their employees in Romania and Jiu Valley in the 2012 year. In Romania, in the 2012 year, there were about 430,000 SMEs (have disappeared over 70,000 companies in the 2009-2012 years of crisis) and only 1,500 large enterprises. Services remained a favorite field of activity for SMEs while trade has lost its attractiveness. We have presented below in figures the pre-crisis situation. In the 2008 - 2012 years the total number of employees in Romania decreased from 5,000,000 to 4,400,000. In 2012, from the 2.5 million SMEs employees, 800,000 employees are engaged in micro-enterprises (having less than 10 employees, with an average of 2 employees per firm, for that there are about 400,000 microenterprises), Other 800,000 employees work in small businesses companies SE (under 50 employees, with an average of 20 employees working in about 40,000 companies) and 800,000 employees work in the 8,000 medium enterprises ME. Note that in the first four years of the crisis have disappeared about 370,000 jobs in Romanian SMEs. Another difficult nationwide situation is represented by the employment rate of only 62% of the active population (although official unemployment rate does not exceed 5-6%).

The share of SMEs in Romania of all registered companies is 99.7% and the number of employees of SMEs in Romania is 65.9% from the total workforce in all businesses, it can be said that the future job of a university graduate may be largely a SME. We have in Romania only 4.3 million employees from the 21 million total population, and 3.7 million of them are working in SMEs and large companies. Of these 4.3 million employees, 2.45 million are employed in SMEs, which I think says enough about the importance of the SME field for a manager. I should mention that in Hungary, in Czech Republic and in Poland, half of the population is employed.

I had a feeling of sadness in the last four years, when the economic crisis set up in Romania, and where this crisis coincided with a structural crisis. There is an extremely serious macroeconomic problem in Romania, because counties with 400,000 – 500,000 inhabitants, the fifth in number of employees employer has only 100 employees. So there is a very low absorption capacity of the economy for the young generations in the labor market. A solution for this situation could be the entrepreneurship and IT skills of the younger generation in Romania, but nevertheless supported by active measures of the Romanian government. The same solution for a company to recover, based on entrepreneurship and

digital skills, capacities that define our young generation, had foresaw Drucker in his 1993 work "Managing for Results" saying: "Even small businesses today increasingly consist more of people that are applying knowledge, not manual dexterity or physical strength to work." So for SMEs and young people who will lead them, the solution is represented by the knowledge society, society that can not be thought detached from information technology.

6. APPLIED COMPUTER SCIENCE IN ENGINEERING AND QUALITY SYSTEMS

Computer Integrated Manufacturing (CIM)

CIM in engineering is a method of manufacturing in which the entire production process is controlled by the computer. Typically, it relies on closed-loop control processes, based on real-time input from sensors. It is also known as flexible design and manufacturing. DELMIA is a premier brand for digital manufacturing solutions, focused on two unique software applications that can be used to streamline manufacturing processes. DELMIA automation provides solutions to digitally design, test and validate the control of a machine, work-cell, or entire factory line and DELMIA PLM provides the process and resource capability to enable continuous creation and validation of manufacturing processes as related to the product throughout the entire product lifecycle.

Functional design has materialized in Autodesk Inventor and is not just a command or tool set, but rather a method or philosophy. This is an evolving Inventor usability issue and a different approach to 3D design. We get arguments from competitors, but with functional design, form doesn't necessarily follow function; instead, function can drive form. Although still relatively young with a lot of room to grow, functional design is a knowledge content toolset that represents a movement from geometric descriptions to rudimentary knowledge capture. Functional design isn't just a set of functions for creating 3D representations, it supports design by function.

Designing software applications

The designing of custom application, adapted to the customer profile was the key element that led me to approach this topic. As in 1996 and also today, there are more enterprise applications designed by prestigious software houses, very complex and having high performances, but at the same time having a high degree of generality and responding only in a limited degree to particular situations.

Design and implementation of an information system (IS) for Human Resource Management (HRM) consisted in finding optimal solutions both hardware and software for the creation of a complex system to meet all requirements in this area. As management information systems and integrated information management systems are used most effectively in the absence of a professional analysis of the domain (in the absence of hardware facilities), especially software and lack of software must be placed first on the inconsistency of analysis phase computer systems design, I tried to design and partly I had created a complete system that includes all these elements. Also in the the information system designed I have to pointed both HRM issues and I have identified solutions for computerization of this issue.

The system analysis is complex and generally available for all the investigated organizations, but the applications designed specifically addresses to small and medium enterprises (SME's) having no claim to be compared in terms of complexity and performance with an Enterprise Resource Planning (ERP) developed by Microsoft or Oracle.

Designing Information Systems in the Distributed Network Application (DNA) technology

The configuration of an application designed under the DNA standard is presented in the figure.

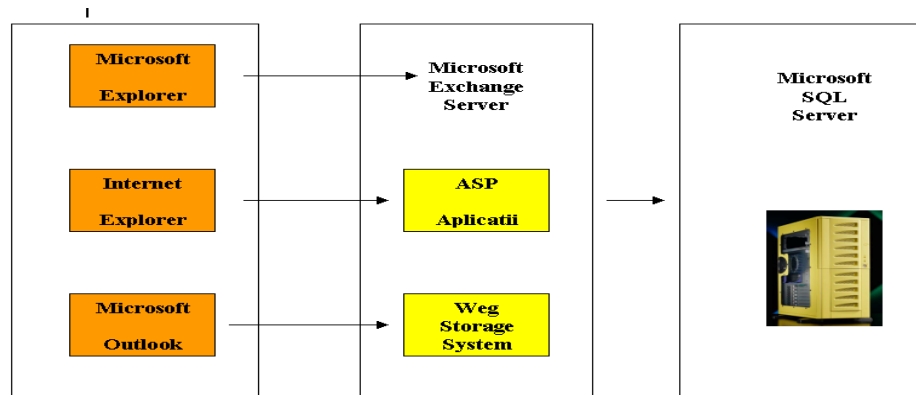


Figure 3. The DNA standard architecture

The applications level for the work-station (customer part)	(presentation level)
The applications level achieved on the applications servers	(business logic level)
The applications level achieved on the SQL server	(data stocking level)

This model assumes that the independent achievement of the data stocking system is giving the access system at the data. Using the client-server model with three levels, has the following advantages:

- High flexibility and adaptive degree on changes
- Possibility of creating and using by the customers

The applications customer achieved on the work-station, using only selection function and displaying the data. The data processing operations and the business logic elements achieving take place on the servers.

Installing the customer soft can often be organized from the server side and can consists only in installing the given operating system, gifted with web-browser. All the needed software component parts are in the "open source" category.

Designing Decision Support Systems

The decision quality depends very much on the circumstantial understanding that surrounds one problem and selection of the appropriate strategy. The better the information the better the decision outcome, because there is lesser hazard and lack of security. If it's new, the advanced information technology has to help to making managerial decisions and the organizations must elaborate the plans using this technology. The decisional support systems are critical in making decisions under all managerial aspects.

The composition of an expert system can be structured on three specific models:

- ✓ Knowledge base
- ✓ Inferential mechanism
- ✓ Facts base

Knowledge base is represented by a structure of data that contain all the specific knowledge introduced into the system by the human expert. Stocked knowledge in the knowledge base represents the objects description in conjunction with the relation between them. Knowledge base is a part of the cognitive systems of the expert systems and it is memorized in a space specially organized.

The inferential mechanism achieves many major objectives after the knowledge from the base has been taken over. This means to choose the control strategy according to the problem to be solved, the achievement of the solving problem plan, the shifting from one control strategy to another, the carrying out of the foreseen actions in the solving plan, and the structuring of the information control for fundamental mechanisms of the inference mechanism. The inferential mechanism consists of an ensemble of procedures.

Facts base is represented by an auxiliary memory which contains all facts (initial facts that describe the problem enunciation) and the intermediate results obtained in the deduction procedure.

PART 1. INTERDISCIPLINARY SCIENTIFIC, PROFESSIONAL AND ACADEMIC ACHIEVEMENTS

PERSONAL ACHIEVEMENTS

1. ADVANCED MANAGEMENT METHODS. MANAGEMENT SYSTEMS

The Implementation of ERP and BI systems in the Romanian organizations

As a reference, for the evolution of the Management Information Systems in the last 20 years in the Romanian Organizations, in the Jiu Valley, one of the most important Romanian extractive industry area, we can say that in 1995 the extractive industry was before of a major social restlessness caused by the future dismissal from the system of a great number of employees. The IT activity was coordinated by means of a nucleus, integrated in National Bituminous Coal Company (CNH or RAH), where the investment level was very low. Thus, three hardware systems coexisted together: old generation computers, as the 1980 Independent PDP and Coral category; AS400 from IBM; PC in a disparate structure. That was the moment when FoxPro took place of older programming languages as Cobol and data processing for a number rather great of employees of RAH in a time of 10 times shorter than before, that was meant an unimaginable gain.

In 1998-1999 because of the governmental requirements a move into another stage has been made, a stage that was considered as visionary, for that moment, and this was outsourcing. In fact, the externalization of IT services for the coal producer took place, by means of the detachment of that activity and the establishment of an independent company. The new economic conditions, corroborated with the technological progress made it possible for the number of PC to increase and then for them to develop into computer networks, easing the work not only of the software developers but also of the end users. AS400 had been used until 2001 only as an archiving system. Software instruments have been permanently developed so that in 2003 DOS application coexisted with the newer Windows applications. So, reports with many graphical elements, became much more accessible. This conditions predicted the development of integrated solutions, fact that was confirmed by the future reality.

Eduard Edelhauser, Lupu-Dima Lucian, *Management Information Systems. A Case Study Over the Last Eight Years in the Romanian Organisations*, **Database Systems Journal**, Vol. III, No. 3 / 2012, pp. 13-22, <http://www.dbjournal.ro/archive/9/9.htm>

A managerial research in the ERP field, for Romanian 2004 national natural resources companies

Methodology

The instrument used for collecting data was the questionnaire. We used SPSS Statistics 17.0 to operate the answers. Using the sampling data we estimated the parameters of one regression model may be used to identify the determinants for PC and ERP applications used in a company. The managerial research is based on a questionnaire of 33 questions focused on hardware, O/S software, RDMS software endowment and implementation of the business software for five business function (manufacturing, SCM, financial, HRM and CRM). Data computing was based on data obtained from 40 firms, organized in 9 companies (90 % of the Romanian mining companies).

We used regression analysis, as a statistical method to evaluate the relation between one independent variable and another continuous dependent variable. With this analysis tool we

have performed a linear regression analysis using the method of the least square in order to plot a line by a set of observations. Thus we have perform the analysis of the dependence and we have appreciated the extent to which the independent variable influence the dependent. With linear regression we output the regression coefficients necessary to predict one variable from the other - that minimize error. Also we used linear regression for drawing a straight line for evaluating the dependency between independent variable called PERS and PERS_MRU, and dependent variable called PC and ACCESS_PERS_MRU.

To this purpose we have use the statistical analysis software SPSS as well as Excel graphs and tables. Thus the method used in data processing where the Excel tools, and the SPSS tools (multiple linear regression and curve estimation of regression lines).

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. In our case the questionnaire was extended over five business functions of a company, and contains eight general questions and five questions for each business function. (Sharma, *ERP implementation in defenders and its influence on manager's job: a case study*, International Journal of Business Research, 2007)

Respondents

We have investigated the main national companies (most important one in coal, metal and salt - natural resources): CNH (National Bituminous Coal Company), CNLO (National Brown Coal Company), MINVEST (National Copper, Gold and Iron Company), SALROM (National Salt Company), and REMIN (National Precious Metal and Non-Ferrous Company).

Table 2. National Companies 2004

CNH	15,800 employees
CNLO	16,500 employees
MINVEST	4,700 employees
SALROM	1,550 employees
REMIN	5,200 employees

Graphical results

We used an econometrical model to explain the existing situation and the intensity of the link between the variables studied using the correlation analysis, while the regression analysis is used to estimate the value of a dependent variable taking in account the values of other independent variable, and appraise the degree wherein the effect can be explain by cause.

Then we made a managerial research, through a variety of business functions such as manufacturing, supply chain management, financial, human resources and customer relationship management. In every business function we focus on 4, 5 or 6 important and usually applications. This second study was based only on the 4 biggest companies (CNH,CNLO, Minvest and Salrom)

Table 3. Financial and CRM – SCM business function

Company % implement	CNH	CNLO	MINVEST	SALROM	Company % implement	CNH	CNLO	MINVEST	SALROM
AFC1	0,62	0,31	0,31	0,23	AC1	0,46	0,31	0,31	0,23
AFC2	0,62	0,31	0,31	0,23	AC2	0,15	0,23	0,08	0,15
AEC3	0,54	0,31	0,31	0,23	AC3	0,08	0,00	0,15	0,00
AFC4	0,00	0,00	0,00	0,00	AC4	0,31	0,31	0,00	0,08
					AC5	0,08	0,00	0,00	0,00

Financials

AFC1	Accounts Payable and Receivable (Trial Balance, General Ledgers, Stocks)
AFC2	Business Transactions, Inventory
AFC3	Fixed Assets
AFC4	Others
Customer Relationship Management & Supply Chain Management	
AC1	Invoices and Bills for Customers and Suppliers
AC2	Customer Management
AC3	Loans
AC4	Contracts
AC5	Others

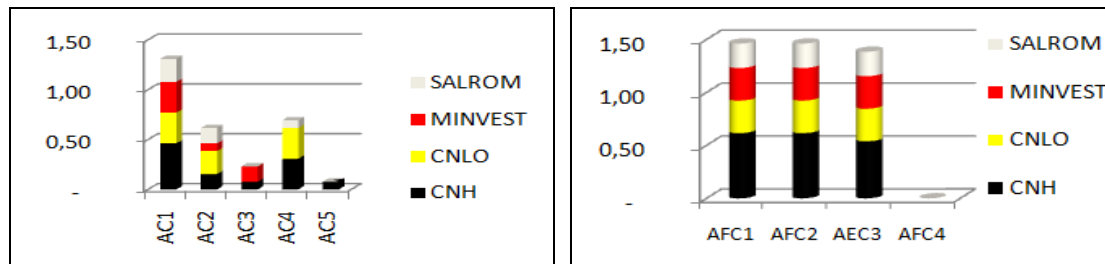


Figure 4. Financial and CRM – SCM business function for the most important mining companies

Table 4. Manufacturing business function for the most important mining companies

Company % implement	CNH	CNLO	MINVEST	SALROM	Manufacturing (for specific mining activities)
AP1	0,62	0,15	0,23	0,15	AP1 Pit Exploitation Activities
AP2	0,46	0,08	0,15	0,00	AP2 Artificial Ventilation Activities
AP3	0,46	0,23	0,23	0,00	AP3 Electro Mechanical Activities
AP4	0,46	0,31	0,31	0,23	AP4 Manufacturing Scheduling
AP5	0,08	0,15	0,15	0,08	AP5 Quality Management Control
AP6	0,15	0,08	0,00	0,00	AP6 Others

Table 5. Human resource and payroll business function for the most important mining companies
Human Resource (HRM)

ARU1	Pay Roll, Flow Chart, Job Design
ARU2	Personal Record Employee
ARU3	Work Book Contract
ARU4	Human Resource Planning and Scheduling
ARU5	Human Resource Training and Learning
ARU6	Others
Payroll (Wage & Remuneration)	
AS1	Work Time Keeping, Time Sheet
AS2	Grid Wage
AS3	Pay Rise, Weighting
AS4	Job Changes
AS5	Others

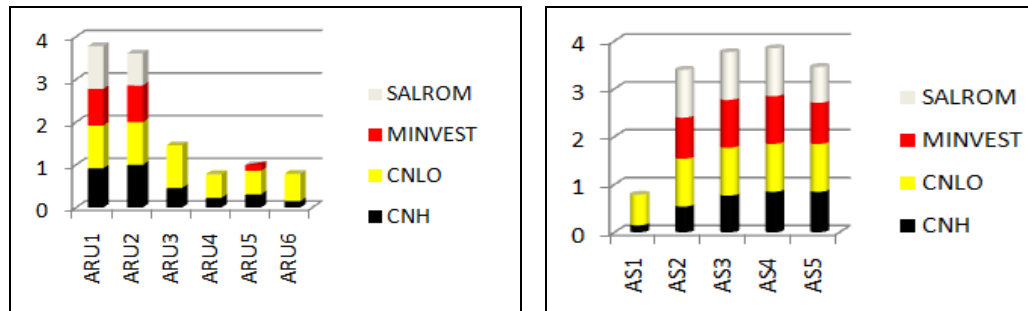


Figure 5. Human resource and payroll business function for the most important mining companies

The research was focused on HRM and as we also predicted the payroll is almost 100 % implemented, but in the general HRM only the the most usual applications are implemented.

For most significant 22 firms (of 40), we have studied the correlation (R) between the independent variable PERS (the personal number of the firms), and the dependent variable PC (the number of personal computers owned by the firms). The following figure shows the evolution of linear regression computed through correlations and square average deviations.

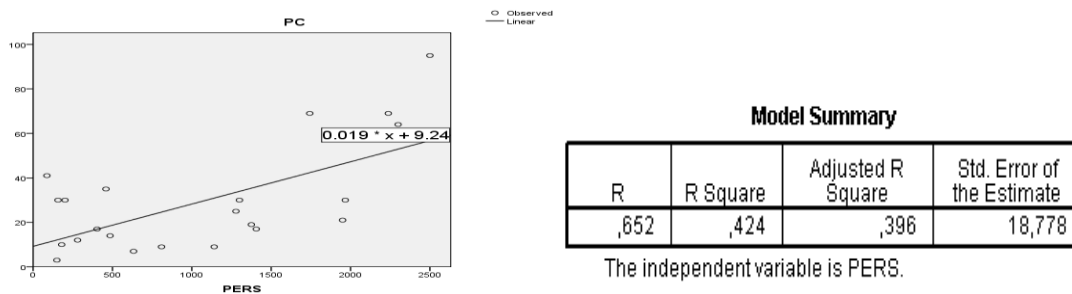


Figure 6. Linear regression analysis between an independent variable called PERS and a dependent variable called PC

The quotient used for the statistical analysis shows a functional dependency between the two variable, in fact the correlation is 0.652 and the adjusted R square is 0.424. We can conclude that a linear correlation exist and the additional statistics parameter are estimates “constant” $A=0.019$, and "slope" $B=9.24$, and the equation is linear.

The research has finally 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 we 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.

The year of 2005 meant a growth of the institutional needs as far as information providing concern. In Romania had already been implemented the tax records system which forced large agencies to migrate to integrated solutions. The availability of ERP solution implementation in the coal companies was low because of the organizational structure and of the aging technique. Another element that leads to that was the permanent perspective of the closing of coalmines and of the reorganization of activity, details that virtually blocked all the investment of the kind.

However even in those given conditions the software instruments, following the natural course of development, was modernized and they have been developed into integrated system (human resources, financial, manufacturing, maintenance), the perspective being that of a dedicated ERP integration for the mining activity.

Eduard Edelhauser, Lupu-Dima Lucian, *Management Information Systems. A Case Study Over the Last Eight Years in the Romanian Organisations*, **Database Systems Journal**, Vol. III, No. 3 / 2012, pp. 13-22, <http://www.dbjournal.ro/archive/9/9.htm>

Eduard Edelhauser, *Study Regarding the Implementation of Enterprise Resource Planning in Romanian Companies*, **The Proceedings of the Ninth International Conference, on Informatics in Economy**, 7-8 May 2009, ISBN 978-606-505-178-2, pp. 157-162, <http://conferenceie.ase.ro/arhive/2009/>

Research over the use of SIVCO ERP and BI software in Romanian organizations

The study set sights on Romanian organizations which implemented a SIVCO ERP and BI software, and were collected in 2010 year.

Methodology

The instruments used for collecting data were a quantitative questionnaire, an qualitative one and an interview. The research based on the quantitative questionnaire was structured on 27 questions focused on hardware and software endowment (8 questions), implementation of the ERP business software for five business function such as manufacturing, SCM, financial, HRM and CRM (6 questions), other 6 questions were dedicated only to Human Resource Management function and the last 7 questions were dedicated to BI management methods.

Respondents

Even data were collected only from 13 organizations, these are representative for the 2010 Romanian economy, because in this economical moment Romania has only 5,000 companies that need an ERP and a BI software instrument as a advanced management method. Also we have only 2,000 big companies having more than 250 employees which can afford to implement a SAP, Oracle or SIVCO ERP software. From these 2,000 big organizations most of them are branches from trans-national companies, and have mostly implemented ERP existing in their main organization, usually SAP or Oracle. So, are likely to be investigated public organizations and private Romanian capital organizations. These two categories have a hundred percent Romanian management, and had to optimize it. The data were collected during January and June 2010, with the help of Sorin Dimofte Implementing and Consultancy Manager of SIVCO Romania. The regression analysis using the method of least squares requires a dataset of n pairs (x_i, y_i) , where y_i are the dependent variables and x_i are the independent ones. There were analyzed over 500 Romanian enterprises, that implement a SIVCO ERP and were identified 13 distinct groups without any significant deviations among the enterprises forming each group. In order to apply this method there were chosen 13 companies that were included in the present study. Each of these 13 companies is representative for the enterprises group, having similar trend. This simplified version of the method is suitable for our problem because in this way there were obtained very clear results.

Graphical results

I have analyzed the level of implementing of ERP applications in the functions of the enterprise through SIVCO Applications (SA), and that the implementation of analytical and managerial decision tools through SIVCO Business Analyzer (SBA). I have observed that in most cases there is a correlation between the number of the personnel and the number of computers in that organization. Only Aerostar Bacau and Romvag Caracal seem to except this correlation. Suggestive seemed a reporting between the number of computers and the number

of personnel multiplied by 1000. In this case the average of 200 (231) is exceeded by the majority public firms (first 9 companies), for Hidroserv Hațeg existing even a significant differences (two-fold). Also this average is greater than the average for the private sector (145).

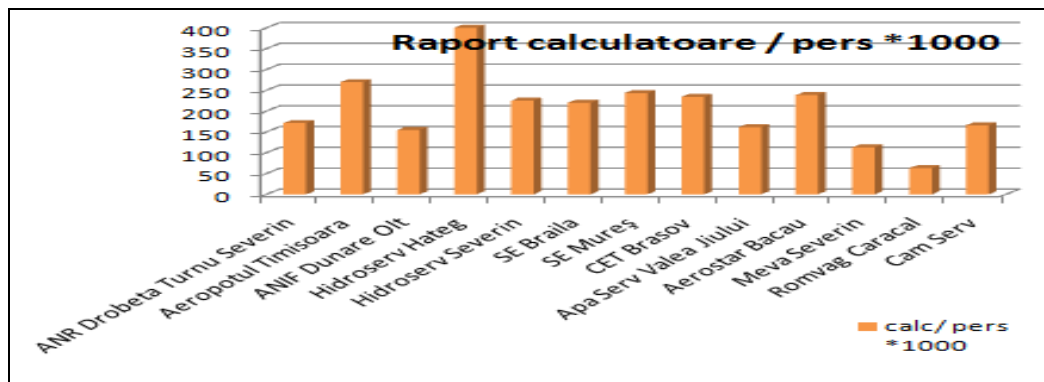


Figure 7. Personel computer report multiplied by 1000

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 value for non implementation. I have also analyzed the level of implementing of ERP applications in the functions of the enterprise through SIVICO Applications (SA), presented in the next figure.

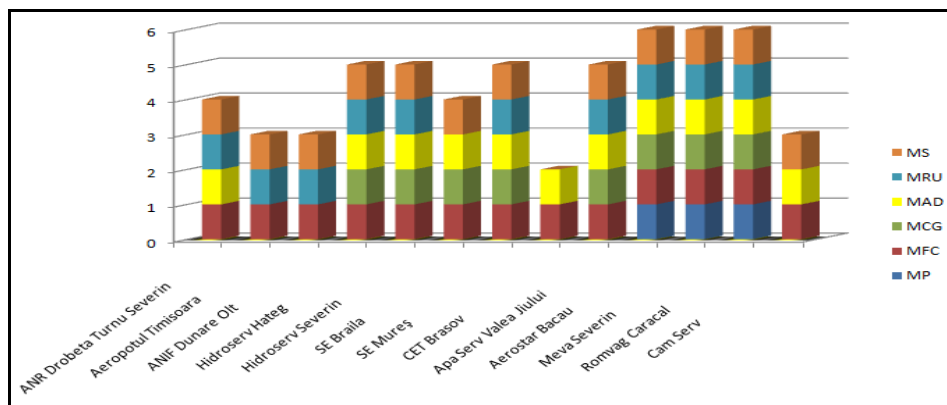


Figure 8. ERP implementation on the functions of the enterprise through SIVICO Applications (SA)

The 6 investigated functions: production, accounting, management accounting, purchasing and sales, human resources and payroll are actually only 4, and I thoroughly investigate the financial accounting function. From the above figure we can observe a maximum implementation in most private firms (less CamServ which is a small organization), and an improved implementation for public company with some exceptions (CET Brasov). Please note that the field of activity may influence this interpretation.

Table 6. ERP implementation in the accounting and commercial business modules

organizatia	CCMMF	CCMS	CCMB	CCMA	CCMV	CCMC	CCMFU	CCMFN
ANR Drobeta Turnu Severin	8	8	8	8	0	8	0	8
Aeropotul Timisoara	5	6	4	0	0	8	7	0
ANIF Dunare Olt	8	7	0	0	0	0	0	0
Hidroserv Hateg	8	8	0	8	0	8	0	0
Hidroserv Severin	8	8	0	8	0	0	0	0
SE Braila	8	7	6	5	0	5	0	0
SE Mures	6	8	5	7	0	0	0	0
CET Brasov	5	6	0	0	0	0	8	7
Apa Serv Valea Jiului	8	8	0	8	0	8	8	8
Aerostar Bacau	8	8	8	6	8	6	0	0
Meva Severin	7	8	6	7	6	6	0	0
Romvag Caracal	7	5	0	6	0	8	0	0
Cam Serv	7	8	0	8	0	0	0	0

The main modules of business investigated were accounting MFC MCG and purchasing and sales MAD through SIVICO Applications 2011 implemented in the 13 organizations. Their modules were CCMMF Fixed Assets Management, CCMS Inventory Management, CCMB Budget Management, CCMA Procurement Management, CCMV Sales Management, CCMC Contract Management, CCMFU CCMFN Billing Management and Cash Flow Management. In the table above I have highlighted those areas that have been awarded a maximum score after the use (8-blue), but also those who received a minimum score according to the same degree of use (0 - red flag).

Eduard Edelhauser, *IT&C Impact on the Romanian Business and Organizations. The Enterprise Resource Planning and Business Intelligence Methods Influence on Manager's Decision: A Case Study*, **Informatica Economică Journal**, Vol. 1, 5 No. 2/2011, pp. 16-28, <http://www.revistaie.ase.ro/content/58/02%20-%20Edelhauser.pdf>

In the next table I have highlighted those areas which have given a maximum score after the use (8-blue flag) and those that received a minimum score according to the same degree of use (0 - red flag). The main components for human resources activities with a maximum use for the organizations surveyed are records of employees, organizational structures and personnel training and the red flag should be placed for recruiting and personnel selection, performance evaluation and planning components. In the same table I reveal that organizations have implemented in a thorough way the software modules for human resources management and identify in this case public organizations such as the two Hidroserv's Hateg and Severin and a small private organization, which from financial reasons and economic efficiency may have placed particular emphasis on human resource.

Table 7. SIVICO Human Resources Management Component Use

Organization / HRM	Records of employees	Organizational structures	Labour contract	Recruiting and personnel selection	Personnel training	Career plan	Performance evaluation	Planning
ANR Drobeta Turnu Severin	8	8	8	8	8	8	8	0
Aeropotul Timisoara	8	7	0	0	4	5	6	0
ANIF Dunare Olt	8	8	8	0	0	8	0	8
Hidroserv Hateg	8	8	5	6	6	6	7	7
Hidroserv Severin	8	8	8	8	8	8	8	8
SE Braila	8	8	8	0	8	0	0	8
SE Mures	8	8	0	0	8	0	0	0
CET Brasov	8	8	0	0	8	0	0	0
Apa Serv Valea Jiului	8	0	0	0	0	0	0	0
Aerostar Bacau	8	0	0	0	8	0	0	8
Meva Severin	8	8	0	0	8	0	0	8
Romvag Caracal	8	0	0	0	0	0	0	0
Cam Serv	8	8	8	8	8	8	8	8

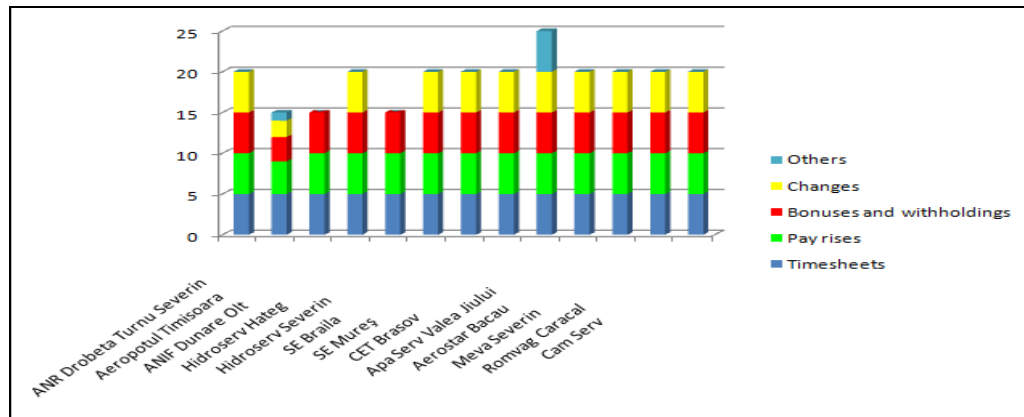


Figure 9. SIVCO Payroll Management Component Implementation

The same phenomenon found in another survey conducted in 2004 for the mining industry from Romania, occurs in organizations that have implemented a SIVCO Application. So payroll is almost 100% managed with modern IT&C methods and maybe just by chance a few organizations do not achieve this high percentage. And if I consider the actual investigated organizations is obvious that except Severin Hidroserv and ANIF all other organizations have successfully implemented all payroll components.

Eduard Edelhauser, *Human Resource Information System in Romanian Organizations, Review of International Comparative Management*, Volume 13, Issue 5, 2012, pp. 756-767, <http://www.rmci.ase.ro/no13vol5/05.pdf>

Another analysis was performed on seven main advanced decision management methods, as shown in figure 4, and I found that reports and queries that are not really traditional managerial decision tools are considered by our respondents decision tools, and the truly advanced management methods such as dashboards, key performance indicators against targets related (BSC Balanced Score Card) and OLAP technology have a less usage.

Related to Balanced Score Card is possible that managers continue to perceive it incorrectly Even this is in fact the essence of management decision, allowing managers to select the appropriate measures for each objective, the translation strategy of the organization goals and objectives and assist organizations in implementing processes that support strategy management. Reports and queries are still mainly perceived as the basic methods in the decision, but surprisingly Excel does not have green lights (is not very efficient used).

Table 8. Seven main **advanced decision management** methods

organizatia	BI_SBA	BI_SBSC	BI_Query	BI_Rapoarte	BI_OLAP	BI_Excel	BI_Etc
ANR Drobeta Turnu Severin	7	0	7	7	7	0	0
Aeropotul Timisoara	6	0	5	7	0	4	3
ANIF Dunare Olt	0	0	0	7	0	0	0
Hidroserv Hateg	5	4	3	7	2	6	1
Hidroserv Severin	7	0	5	6	0	4	0
SE Braila	7	0	6	5	0	4	0
CET Brasov	0	0	7	6	0	0	5
Apa Serv Valea Jiului	2	0	6	7	3	5	5
Aerostar Bacau	5	0	0	7	0	4	0
Meva Severin	7	0	0	7	0	0	0
Romvag Caracal	7	0	7	7	0	7	0

Some organizations seem to use at least 4 - 5 of the seven proposed methods as real management methods. They are Hidroserv Hateg, Apa Serv Petroșani, Romvag Caracal, ANR Severin and Timisoara Airport.

If I separately address to SIVCO Business Analyzer (SBA) a 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 mark in table above with a red traffic lights 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 9. Implementation of analytical **and** managerial decision **tools** through SIVCO Business Analyzer (SBA)

organizatia	SBA_Scenarii	SBA_Previziune	SBA_What_If	SBA_Drill_Up
ANR Drobeta Turnu Severin	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

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 figure below.

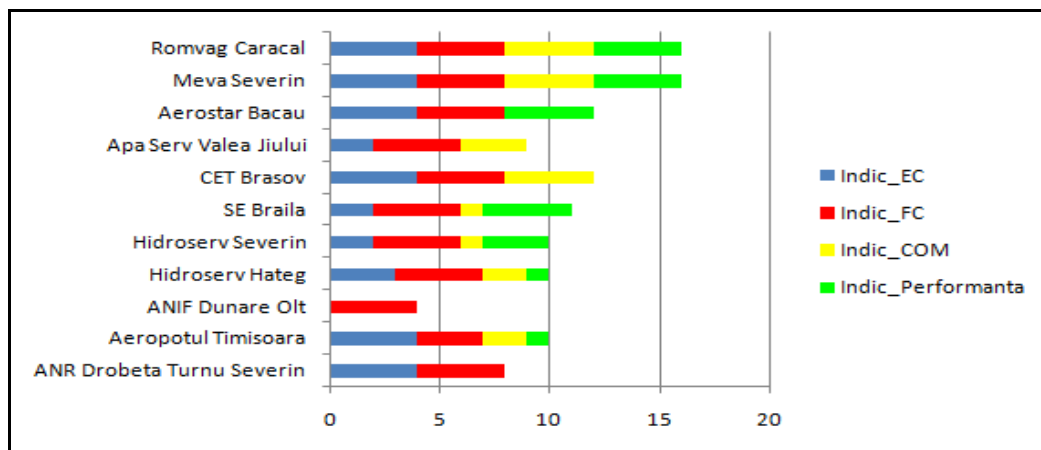


Figure 10. Indicators monitored by SBA as an analytical **and** managerial decision **tool**

In terms of respondents I have note that private firms have an advantage, and in this case there are follow by the public energy firms.

Eduard Edelhauser, *IT&C Impact on the Romanian Business and Organizations. The Enterprise Resource Planning and Business Intelligence Methods Influence on Manager's*

Decision: A Case Study, **Informatica Economica Journal**, Vol. 1, 5 No. 2/2011, pp. 16-28, <http://www.revistaie.ase.ro/content/58/02%20-%20Edelhauser.pdf>

Research Hypothesis

H01 *Implementation of ERP applications in all functions of an organization can lead information technology in a strategic resource of the organization* (Jones, ERP Usage in Practice: An Empirical Investigation, Information Resources Management Journal 2006)

H02 *The number of employees in an organization influences the role of the ERP applications within the respective organizations. The organization dimension is directly connected with the role of the ERP applications within the respective organization* (Princely, Interactions Between Organizational Size, Culture, and Structure and Some IT Factors in the Context of ERP Success Assessment: An Exploratory Investigation, The Journal of Computer Information Systems, 2007)

H03 *There is a direct relationship between the quality of the assisted decision based on IT&C methods and the IT experience of the managers* (Dai, Toward Process-oriented ERP Implementation, Competition Forum Journal, 2006)

Testing the Hypothesis

We used regression analysis, as a statistical method to evaluate the relation between one independent variable (ERP_Mean, BI_Mean and BI_ERP_Mean) and another continuous dependent variable (PN-Effect and CA_Effect given to the ERP and BI level of implementation). With this analysis tool we have performed a linear regression analysis using the method of the least square in order to plot a line by a set of observations. Thus we have performed the analysis of the dependence and we have appreciated the extent to which the independent variable influence the dependent. With linear regression we output the regression coefficients necessary to predict one variable PN, CA from the other ERP, BI

H01

To prove this H01 we 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 seven organizations, from the 13 one. Then we 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. We have used five variables for this purpose.

Table 10. Variables used in proving the H01

Organization	ERP_Mean	Ownership	CA_Effect	PN_Effect	BI_Mean	BI_ERP_Mean
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

We 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 we 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 (6.843), 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.

Table 11. Linear regression analysis between ERP implementation in organization functions and the effect on profit growth

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,730 ^a	0,533	0,455	0,76035

a. Predictors: (Constant), ERP_Mean

ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	3,956	1	3,956	6,843	0,040 ^a
Residual	3,469	6	0,578		
Total	7,425	7			

a. Predictors: (Constant), ERP_Mean

b. Dependent Variable: PN_Effect

Also we 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 $R = 0.980 > 0.63$ 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 ($R = 0.98$), so this is not necessarily explained by the influence of variation in the independent variable on the dependent variable PN_Effect BI_ERP_Mean for public organizations. In private organizations R is 0.418, so there is no correlation.

Table 12. Linear regression analysis between an independent variable called personal and a dependent variable called ERP_BI for private cases (Ownership=1)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	Ownership = 1 (Selected)			
1	0,980 ^a	0,961	0,942	0,05897

a. Predictors: (Constant), employee

ANOVA^{b,c}

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0,172	1	0,172	49,352	0,020 ^a
Residual	0,007	2	0,003		
Total	0,179	3			

a. Predictors: (Constant), employee

b. Dependent Variable: ERP_BI

c. Selecting only cases for which Ownership = 1

H02

For H02 we used regression analysis, as a statistical method to evaluate the relation between one independent variable (personal - size of organization) and another continuous dependent variable (ERP_BI given to the ERP and BI level of implementation). With this analysis tool we have performed a linear regression analysis using the method of the least square in order to plot a line by a set of observations. Thus we have performed the analysis of the dependence and we have appreciated the extent to which the independent variable influence the dependent. With linear regression we output the regression coefficients necessary to predict one variable ERP_BI from the other personal.

The model has been confirmed to be valid because the F test value were 49.35, with significant sig. < 0.05 (0.02). The regression coefficient $R=0.980$ shows a very strong link between the variable ERP_BI given to the ERP and BI level of implementation and the independent variable personal showing the size of the organization, for the private sector. The model explains 96.1% from the total variation of the variable personal ($R^2=0.961$). The rest of 3.9% is influenced by other residual factors not included in the model. In conclusion hypothesis H02 has been confirmed.

Table 13. Variables used in proving the H02

Organization	Ownership	Employee	ERP_BI	BI	ERP
Aerostar Bacau	1	1679	0,43	0,25	1
Meva Severin	1	1071	0,29	0,75	1
Romvag Caracal	1	1754	0,57	0,75	1
Cam Serv	1	205	0	0	0,5

Table 14. Linear regression analysis between an independent variable called personal and a dependent variable called BI for private cases (Ownership=1)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	Ownership = 1 (Selected)			
1	0,593 ^a	0,352	0,028	0,36973

a. Predictors: (Constant), employee

ANOVA^{b,c}

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0,148	1	0,148	1,086	0,407 ^a
Residual	0,273	2	0,137		
Total	0,422	3			

a. Predictors: (Constant), employee

b. Dependent Variable: BI

c. Selecting only cases for which Ownership = 1

In BI methods we found a weak link ($R=0.167$) and also for the private sector we found $R=0.593 < 0.63$. This regression coefficient $R=0.593$ shows an intermediate link in these case.

Eduard Edelhauser, Andreea Ionică, *A Business Intelligence Software Made in Romania, a Solution for Romanian Companies During the Economic Crisis*, **Computer Science and Information Systems Journal - ComSIS**, Faculty of Sciences, Trg Dositeja Obradovića 3,

21000 Novi Sad, Serbia, ISSN: 1820-0214, Volume 11, No. 2, pp. 809-823, 2014, Factor de impact 0,549, DOI: 10.2298/CSIS121207044E, (received 7 dec 2012, accepted 16 ian 2014)
<http://www.comsis.org/archive.php?show=pprms-1304>

H03

General hypothesis (Dai, 2006) will suffer a mutation in the MRU field and will be applied only for the HRM and Payroll component. To validate the hypothesis I investigated the relationship between the number of employees in the department of HR and the number of employees with granted access for SIVECO Applications in human resource management field based on their IT qualification.

Table 15. Regression analysis between the number of employees involved in human resource management field and the number of employees with granted access for SIVECO Applications in human resource management field based on their IT qualification

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,995 ^a	,990	,989	,290
a. Predictors: (Constant), Pers_MRU				

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	90,000	1	90,000	1072,500	,000 ^a
	Residual	,923	11	,084		
	Total	90,923	12			
a. Predictors: (Constant), Pers_MRU						
b. Dependent Variable: Pers_MRU_IT						

I used regression analysis, as a statistical method to evaluate the relation between one independent variable (number of employees involved in human resource management field – pers_MRU) and another continuous dependent variable (number of employees with granted access for SIVECO Applications in human resource management field – pers_MRU_IT). The model has been confirmed to be valid because the F test value is very high 1072,5, with significant sig. <0.05 (0,00). The regression coefficient R=0,995 shows a functional dependency between the two variable, between the variable pers_MRU_IT, and the independent variable pers_MRU. In fact the correlation is 0,995 and the adjusted R square is 0,989. So the model explains 99 % from the total variation of the variable personal ($R^2=0,990$). The rest of 1 % is influenced by other residual factors not included in the model. (Radu, *Economic Statistics*, Universitaria Craiova Publishing House, 2009) I made a correlation between four significant variable: total number of employee of the organization, number of employee involved in human resource management field, total number of computers from the organization and the number of computers supporting the SIVECO Applications for Human Resources Management and Payroll.

Table 16. Relevant correlation

Correlations		personal	Pers_MRU	calculatoare	Pers_PC
personal	Pearson Correlation	1	,746**	,718**	,768**
	Sig. (2-tailed)		,003	,006	,002
	N	13	13	13	13
Pers_MRU	Pearson Correlation	,746**	1	,285	,924**
	Sig. (2-tailed)	,003		,346	,000
	N	13	13	13	13
calculatoare	Pearson Correlation	,718**	,285	1	,445
	Sig. (2-tailed)	,006	,346		,128
	N	13	13	13	13
Pers_PC	Pearson Correlation	,768**	,924**	,445	1
	Sig. (2-tailed)	,002	,000	,128	
	N	13	13	13	13

**. Correlation is significant at the 0.01 level (2-tailed).

Table 17. Regression analysis between raport_pers=pers_MRU / pers and raport_PC=pers_PC / PC

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,479 ^a	,230	,160	,0201787

a. Predictors: (Constant), raport_pers

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,001	1	,001	3,278	,098 ^a
	Residual	,004	11	,000		
	Total	,006	12			

a. Predictors: (Constant), raport_pers

b. Dependent Variable: raport_PC

Table 18. Regression analysis between raport_pers=pers_MRU / pers and raport_PC=pers_PC / PC for private organizations

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	proprietary = 1 (Selected)			
1	,810 ^a	,656	,485	,0217038

a. Predictors: (Constant), raport_pers

ANOVA^{b,c}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,002	1	,002	3,821	,190 ^a
	Residual	,001	2	,000		
	Total	,003	3			

a. Predictors: (Constant), raport_pers

b. Dependent Variable: raport_PC

c. Selecting only cases for which proprietary = 1

The model has been confirmed to be valid only for private organizations because the F test value is high 3,821 and the regression coefficient $R=0,810 > 0,63$ shows a functional dependency between the two variable, between the variable raport_PC, and the independent variable raport_pers. In fact the correlation is 0,810 and the R square is 0,656. So the model explains 65 % from the total variation of the variable personal ($R^2=0,656$). The rest of 34 % is influenced by other residual factors not included in the model. So there is a very strong link between the number of employees involved in human resource management field and the number of employees with granted access for SIVECO Applications in human resource management field, and our hypothesis is confirmed.

Eduard Edelhauser, Andreea Ionică, Monica Leba, *A Research on Management of Information Systems in Romanian Organizations, Actual Problems of Economics*, vol. 12(150), 2013, pp. 399-409, ISSN 1993-6788, Published by National Academy of Management, Ukraine, http://eco-science.net/authors_int.html

2. ADVANCED MANAGEMENT METHODS. MANAGEMENT SYSTEMS.

Implementation of e-Government systems in Romania

An explanatory investigation of the Romanian Public Administration Information and Management Systems

Based on the declared intention of the Romanian government and on the very few achievements, we have decided to fulfill a study that would allow us to make the connection between government intentions and reality. Further, we intend that the results of this approach, to be used in another project for identifying reasons why the e-Government is less that would be necessary for Romania. The present study set sights on Romanian organizations which implemented an e-Government service, more specific the basement for an e-Government service (ERP, GIS and QMS) and were collected in 2012 year.

Methodology

The instruments used for collecting data is a quantitative questionnaire. The research based on the quantitative questionnaire was structured on 55 questions focused on hardware and software (5 questions), implementation of the ERP business software for five business function such as manufacturing, SCM, financial, HRM and CRM (16 questions), other 12 questions were dedicated to Geographic Information Systems GIS implementation, other 10 to Quality Management Systems QMS and the last 12 questions were dedicated to connections between ERP, GIS and QMS

Respondents

There are, according to the territorial administrative organization of Romania 104 municipalities having over 40,000 inhabitants and 320 cities having over 10,000 inhabitants. We chose a sample of 45 local public administration that represent 10% of the total number of cities and municipalities. The number is greater than 30 for which it is accepted that the distribution is normal. Also for descriptive research a total of 20% of the population is sufficiently investigated, and in our case from 424 local governments of cities and towns only half have a form of e-Government, so 45 respondents represent a sample of 20%. Currently the study is based on 8 organizations. Through e-Romania strategy, the authorities estimate that it will be allocated over 500 billion euro in the period 2010-2013, for the connection of all systems of public administration and for offering over 600 electronic services by 2013. In future besides the 424 cities and towns, some villages will be computerized. Citizens of these two cities can afford to pay taxes online, starting from the second half of 2011. The 8 public organizations selected for the moment are: Timisoara City Hall, Brasov County Council, Arad City Hall, Petrila City Hall, Emergency County Hospital Resita, Hunedoara County Council, Veterinary and Food Safety Service of Buzau County and Vulcan City Hall.

The 10 public organizations selected initial were: Timisoara City Hall, Brasov County Council, Arad City Hall, Petrila City Hall, Emergency County Hospital Resita, Hunedoara County Council, Veterinary and Food Safety Service of Buzau County and Vulcan City Hall, Bucuresti City Hall District 4, Fagaras City Hall.

Table 19. ERP Module Implementation

	ERP Accounting	ERP Budgets	SCM, CRM - Supply and Sales	HRM - Human Resources	ERP Manufacturing	Maintenance	Document Management	Business Intelligence
Timisoara City Hall	1	1	0	1	0	0	1	0
Brasov County Council	1	1	0	1	0	1	1	1
Arad City Hall	1	1	0	0	0	0	1	0
Petrila City Hall	1	0	0	0	0	0	1	0
County Emergency Hospital Resita	1	0	0	1	0	0	0	0
Hunedoara County Council	1	1	0	1	0	0	1	0
VFS Service of Buzau County	0	0	0	0	0	0	0	0
Vulcan City Hall	1	0	0	0	0	0	0	0
Bucuresti City Hall District 4	0	0	0	0	0	0	0	0
Fagaras City Hall	0	0	0	0	0	0	0	0

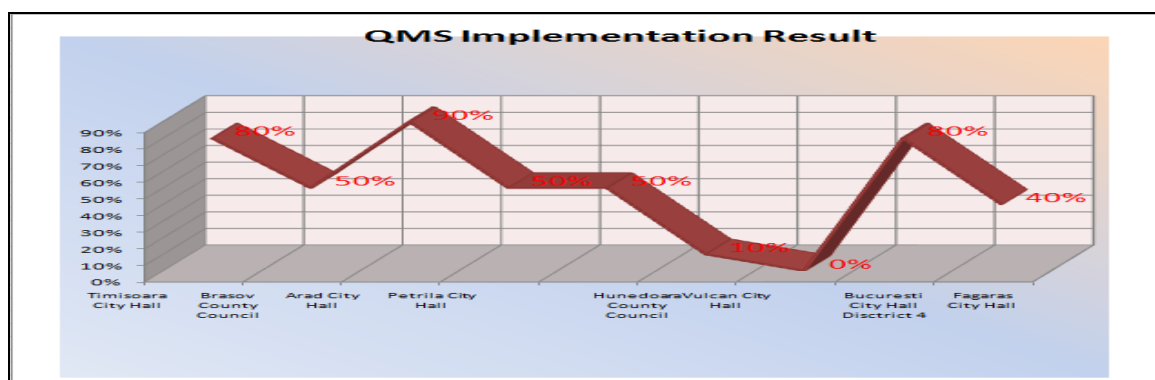


Figure 11. QMS implementation measured through the level of improvement of organization activity

Andreea Ionica, **Eduard Edelhauser**, Lupu Dima Lucian, *An Exploratory Study on e-Government Systems Success in Romania*, AWERProcedia Information Technology and Computer Science, Vol 4 (2013): **3rd World Conference on Innovation and Computer Science (INSODE-2013)**, Antalya, Turkey, 26-29 Aprilie 2013, ISSN: 2147-5369
<http://www.world-education-center.org/index.php/P-ITCS/article/view/2750>
<http://insode.worldeducationcenter.eu/list.php>

The 8 public organizations that answered to the questionnaire were: Timisoara City Hall, Brasov County Council, Arad City Hall, Petrila City Hall, Emergency County Hospital Resita, Hunedoara County Council, Veterinary and Food Safety Service of Buzau County and Vulcan City Hall.

Table 20. Raw data collected through the questionnaire, used as variable for testing the hypothesis

	Company	Employee	Computers	ERP_users	ERP_computers
1	Timisoara City Hall	500	400	400	250
2	Brasov County Council	190	150	150	150
3	Arad City Hall	531	531	80	80
4	Petrila City Hall	135	50	70	70
5	County Emergency Hospital Resita	1000	250	800	250
6	Hunedoara County Council	133	95	0	0
7	Veterinary and Food Safety Service of Buzau County	120	81	0	0
8	Vulcan City Hall	251	79	15	15

We have selected 5 relevant questions from the questionnaire and the responses.

Table 21. Question 6. ERP System Implementation?

(Each respondent could choose only ONE of the following responses)




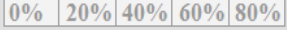
Response	Total	% of responses	%
1 yes	5		62 %
2 in implementation	1		13 %
3 no, but it will be implemented	2		25 %
4 no	0		0 %
Total respondents: 8 Skipped question: 0			

Table 22. Question 10. ERP Module Implementation?

(Each respondent could choose MULTIPLE responses)









Response	Total	% of responses	%
1 ERP accounting	6		75 %
2 ERP budgets	3		38 %
3 SCM, CRM – supply and sales	0		0 %
4 HRM human resources	3		38 %
5 ERP manufacturing	0		0 %
6 maintenance	1		13 %
7 document management	4		50 %
8 Business Intelligence	1		13 %
9 other	0		13 %
Total respondents: 6 Skipped question: 2			

Table 23. Question 20.3. Give a rating for these issues in the context of ERP implementation:

Employee perception regarding the benefits of implementing

(Each respondent could choose only ONE response per sub-question)




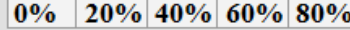
Response	Total	% of responses	%
1 Unsatisfactory	0		0 %
2 Satisfactory	1		17 %
3 Good	3		50 %
4 Excellent	2		33 %
Total respondents: 6 Skipped question: 2			

Table 24. Question 20.5. Give a rating for these issues in the context of ERP implementation:

Top management involvement in implementation

(Each respondent could choose only ONE response per sub-question)



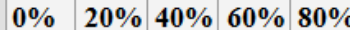
Response	Total	% of responses	%
1 Unsatisfactory	0		0 %
2 Satisfactory	0		0 %
3 Good	3		50 %
4 Excellent	3		50 %
Total respondents: 6 Skipped question: 2			

Table 25. Question 38. What was the reason of QMS implementation?
(Each respondent could choose only ONE of the following responses)



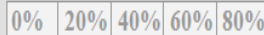
Response	Total	% of responses	%
1 the desire of top management for the efficiency of company	4		57 %
2 the need of improving the company image	0		0 %
3 external reasons (eg. demand of one or more partners / customers to have a QMS)	3		43 %
4 other	0		0 %
Total respondents: 7 Skipped question: 1			

Table 26. Question 43.3. Give a rating for these issues in the context of QMS implementation:
Employee perception **regarding** the benefits of implementing
(Each respondent could choose only ONE response per sub-question)



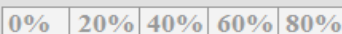



Response	Total	% of responses	%
1 Unsatisfactory	0		0 %
2 Satisfactory	2		33 %
3 Good	4		67 %
4 Excellent	0		0 %
Total respondents: 6 Skipped question: 2			

Table 27. Question 43.5. Give a rating for these issues in the context of QMS implementation:
Top management involvement in implementation
(Each respondent could choose only ONE response per sub-question)

Response	Total	% of responses	%
1 Unsatisfactory	0		0 %
2 Satisfactory	5		83 %
3 Good	1		17 %
4 Excellent	0		0 %
Total respondents: 6 Skipped question: 2			

Edelhauser Eduard, Ionică Andreea, Lupu Lucian, *Statistical Assumption as a Basis for Implementing e-Government Services in Romania*, **Proceedings of the 11th WSEAS International Conference, Advances in Data Networks, Communications, Computers and Materials, Advances in Data and Network Communications Computers and Materials**, Sliema Malta, 7-9 September 2012, pp 121-126, ISBN: 978-1-61804-118-0, <http://www.wseas.org/cms.action?id=2514>
<http://www.wseas.us/e-library/conferences/2012/Sliema/DNMT/DNMT-18.pdf>

Research Hypothesis

H01 *The number of employees in an organization influences the role of the ERP applications within the respective organizations. The organization dimension is directly connected with the role of the ERP applications within the respective organization.*

Testing the Hypothesis

We have demonstrate this hypothesis using the number of ERP users, in the context of the total number of the employees of the organization.

Table 28. Raw data collected through the questionnaire, used as variable for testing the hypothesis

Company	Employee	Computers	ERP_users	ERP_computers
Timisoara City Hall	500	400	400	250
Brasov County Council	190	150	150	150
Arad City Hall	531	531	80	80
Petrla City Hall	135	50	70	70
County Emergency Hospital Resita	1000	250	800	250
Hunedoara County Council	133	95	0	0
Veterinary and Food Safety Service of Buzau County	120	81	0	0
Vulcan City Hall	251	79	15	15

Table 29. Linear regression analysis between employees and ERP users**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,904 ^a	0,817	0,786	129,319

a. Predictors: (Constant), Employee

ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	446781,231	1	446781,231	26,716	0,002 ^a
Residual	100340,644	6	16723,441		
Total	547121,875	7			

a. Predictors: (Constant), Employee

b. Dependent Variable: ERP_users

With this analysis tool we have performed a linear regression analysis using the method of the least square in order to plot a line by a set of observations. Thus we have perform the analysis of the dependence and we have appreciated the extent to which the independent variable influence the dependent. With linear regression we output the regression coefficients necessary to predict one variable ERP_users from the other Employee. The model has been confirmed to be valid because the F test value were 26.716, with significant sig. < 0.05 (0.002). The regression coefficient R=0.904 shows a very strong link between the variable ERP_users given to the level of ERP implementation through the number of current users, and the independent variable employee showing the size of the organization. The model explains 81.7% from the total variation of the variable personal ($R^2 = 0.817$). The rest of 18.3% is influenced by other residual factors not included in the model.

Table 30. Linear regression analysis between an independent variable called Employee and a dependent variable called Computers**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,594 ^a	0,353	0,245	152,873

a. Predictors: (Constant), Employee

ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	76505,519	1	76505,519	3,274	0,120 ^a
Residual	140220,481	6	23370,080		
Total	216726,000	7			

a. Predictors: (Constant), Employee

b. Dependent Variable: Computers

In number of employees – number of computers we found a weak link ($R=0.594$) $R=0.594 < 0.63$. This regression coefficient $R=0,594$ shows an intermediate link in these case. In conclusion for Hypothesis H01 ($R=0.904$) (Table 10) we have found out that between the dimension of the organization and the number of ERP users there is a good link. In conclusion hypothesis H01 has been confirmed.

Eduard Edelhauser, Andreea Ionică, Monica Leba, *A Research on Management of Information Systems in Romanian Organizations*, **Actual Problems of Economics**, vol. 12(150), 2013, pp. 399-409, ISSN 1993-6788, Published by National Academy of Management, Ukraine, http://eco-science.net/authors_int.html

3. MODERN METHODS OF EDUCATION AND TRAINING.

Designing and implementing of eLearning Platforms

POSDRU 39352 - 2008

Designing and Implementing an eLearning Platform for an e-Master at the University of Petroșani in the Field of Project Management (PM) and Information Technology Systems (ITS)

In 2008 I have wrote my first application form, for a 1,845,000 lei non refundable financial support. In our application form we have proposed to design an e-learning platform. The activities which could made possible an implementation of an e-learning platform for the Master`s Degree were:

Curriculum designing

1.1 Design researches and studies on the definition and elaboration of the conceptual model "Complementary Master`s Degree for the labour market";

1.2 Documenting and collecting information regarding the characteristics of "the universities on the labour market" especially for the second cycle in the Bologna system (complimentary Master`s Degree) in a e-learning system which can provide the growth of the qualitative level;

1.3 Design the analysis of the methodological, pedagogical and procedural aspects of delivering the on-line training services in a double European coordination;

1.4 Designing the web page of the project;

1.5 Creating a curriculum for the master program on the basis of the procedures characteristic for the online master`s degrees;

1.7 Developing the scientific content, according to a defined curriculum for the courses of the master`s degree program;

1.8 Implement dissemination activities such as experience exchange on the theme of theories and methodologies of defining and developing a curriculum and of using IT&C in education;

Creating the e-learning technology learning resources;

- 2.1 Providing a minimal infrastructure (hardware, software, connectivity, maintenance) for the implementation of a e-learning platform for the master`s program;
- 2.2 Providing the necessary software infrastructure for the teaching/learning activities by installing and configuration an integrated training and management platform of the digital educational content;
- 2.3 Prepare a lifelong training for the teaching staff in order to use the IT&C in the educational management and to acquire the teaching methodology using the e-learning technology ("eLearning pedagogical" elements);

Developing, testing and simulating the web-based training educational process;

- 3.1 Creating the digital content of the courses from the master curriculum;
- 3.2 Selecting the scientific content and setting the elements which are going to be digitalized;
- 3.3 Setting the degree of interaction for the selected contents elements, in order to reproduce as close and as suggestive as possible the concepts, the processes and the phenomena which represent the object of study of the courses;
- 3.4 Designing the pedagogical design of the scripts;
- 3.5 Creating the e-Content based on the scripts;
- 3.6 Training the technical staff (system administrators) to create the capacity of administrating and using the e-learning platform and training the teaching staff on the management of the digital course objects;

Pilot project implementation – Master`s Degree Program

- 4.1 Teach pilot courses in digital format, for a semester, for the first year of study, using the e-learning technology;
- 4.2 Monitoring the results and the analysis of the impact of using the e-learning technology in the teaching/learning activities;

Edelhauser Eduard, Ionică Andreea, Lupu-Dima Lucian, *Designing an Online Master Using an eLearning Platform at the University of Petroșani*, **Proceedings of 6th International Seminar Quality Management in Higher Education – QMHE 2010**, 8-9 July 2010, Tulcea, pp. 435-438, ISBN 978-973-662-568-8, http://www.tuiasi.ro/users/113/PROGRAM_QMHE_2010.pdf, IDS Number BTW 63

POSDRU 59756 (2010 – 2013)

Designing an eLearning Portal

The technical solution proposed for designing the <http://7.upet.ro/> portal was to use a Content Management System (CMS). A CMS is a system used to organize and facilitate the creation of web content. This platform facilitates the administration and logistics visual content of a portal as we can see in figure 4. Our portal the following specifications: location - <http://7.upet.ro/>, PHP - version 5.2.x, Server application- Apache 2.2.x and data base - MySQL 5.x.

Figure 12. Learning Management System

http://7.upet.ro/ael/admin_cursuri/create_curs_admin_trainer.jsp

Designing the lesson plan

The lesson moment is a file in which information are grouped thematically, which can not be shown separately. It can contain multiple sub-moment for analysis, understanding and interaction. The sub-moment of the lesson is a frame from the lesson moment.

We will present a sample for one competency required for the IT consultant – Team Work in figure 5. Stages as designing the lesson plan, the scenario and the eLearning lesson were used for designing the full training program. The Romanian version of the training program is available on the project site.

Moment 4

Contains		Description	
Moment name:		Team Work	
Time:	1 min	Meets educational objectives:	Yes
Moment description:			

Frame 1 (Sub – moment)

Steep	
Learning Item	Detailed description
Text	Members of the team must consider the goals and team values, to determine which types of information they need to assess potential risk levels and decide which of those levels can be accepted. For the accomplishment of work to implement a new IT applications, the operating organization or in a different organization, IT consultant will be able to identify team members extended, which can be: head hierarchical consultants from other computer companies, colleagues of the department or other departments, marketing specialists
Moment 4	
Frame 1	
Graphical requirement	

Figure 13. Moments and Frames of a Lesson – Lesson Plan

Designing the scenario

Info Path allows structured teaching scenario (teaching activities) from the perspective of integrating several facilities offered by IT&C such as text, hypertext, web pages, images, audiovisual materials, animations, simulations in a lesson. Teaching scenarios are developed step by step, considering the different moments of a lesson. For each point of the lesson we can specify exactly interactive component that we want to use. This mode allows us to have a clear vision of the script as we have shown in figure 6, being able to revert to a specific sequence to optimize it. (Noveanu, E., Istrate O., Oprea, D., Jugureanu, R., *SIVECO Methodology for Designing the Multimedia Curricula*, Litera International Publishing House, 2009)

```

Moments>
<MomentName> Team Work </MomentName>
  = <Frames>
  = <ContentText>
  = <ContentTextItems>
  <ContentTextDescription>
    Members of the team must consider the goals and team values, to determine which
    types of information they need to assess potential risk levels and decide which of those levels
    can be accepted. For the accomplishment of work to implement a new IT applications, the
    operating organization or in a different organization, IT consultant will be able to identify
    team members extended, which can be: head hierarchical consultants from other computer
    companies, colleagues of the department or other departments, marketing specialists
  </ContentTextDescription>
  <tg_ContentText>2</tg_ContentText>
  </ContentTextItems>
  = <ContentTextItems>

```

Figure 14. Teaching scenario in Info Path (XML)

Designing the eLearning lesson

Edu Integrator allows users who do not have programming knowledge to create their own reusable learning objects. The two stages of IT development are brought together in a single user environment, based on a default scenario, is able to create learning objects by linking items that has set in the script as we demonstrate it in the next two figure. (<http://ticavansat.pmu.ro/>)

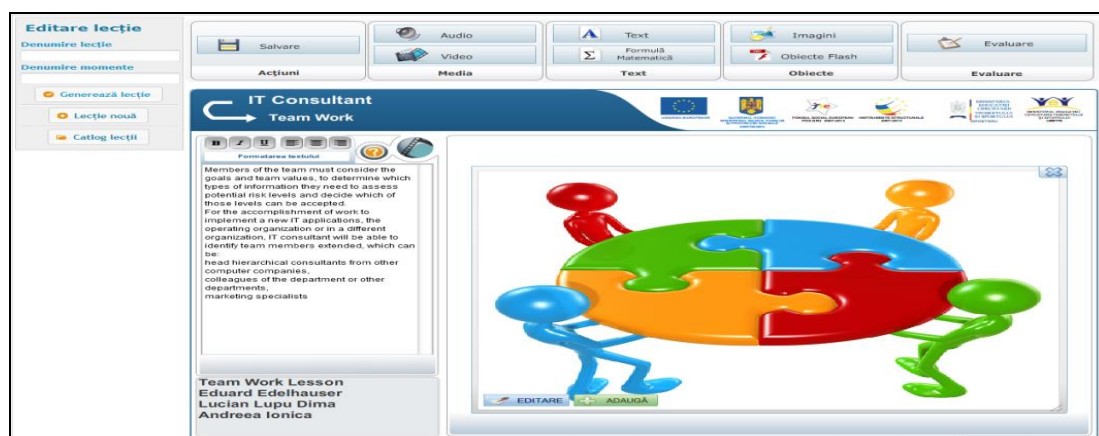


Figure 15. AeL Editor (moment.php) in Edu Integrator



Figure 16. AeL Index Moment in Edu Integrator (<http://localhost/indexMoment.html>)

The workspace is divided into three areas:

- The first area is to in the left of the screen and contains scientific information;
- The second area occupies most of the screen and can contain pictures, animations, simulations, exercises and so on;
- The third area is on the left foot of the screen and provides guidelines for users.

Eduard Edelhauser, Andreea Ionica, Lupu Dima Lucian, *A Romanian Developed e-Learning Platform as a Solution for the Educational Requirements*, **Proceedings of the 1st WSEAS International Conference on Computer Supported Education (COSUE '13), Recent Techniques in Educational Science**, Vouliagmeni, Athens, Greece, May 14-16, 2013, ISSN: 2227-4618, pp.51-56, ISBN: 978-1-61804-187-6, <http://www.wseas.org/cms.action?id=5628>

Office 365 Platform Implementation

Microsoft Office 365 is a cloud based service that is designed to help meet your organization's needs for robust security, reliability, and user productivity. Office 365 combines the familiar Microsoft Office desktop suite with cloud-based versions of Microsoft's next-generation communications and collaboration services including Microsoft Exchange Online, Microsoft SharePoint Online, Office Online, and Microsoft Lync Online to help users be productive from virtually anywhere through the Internet.

Understanding the importance of using of new technologies, the benefits of virtualization, University of Petroșani, has chosen to implement in 2013 the solution from Microsoft Office 365. In this project, a FSC server, located in the university intranet, has been used. There have been created or imported users in Active Directory (AD) and Office365, almost 3000 students and 200 professors. Users from AD to Office 365 have been synchronized and activated. Mail and Lync functionalities have been also set for the users, such as namelastname@upet.ro. Finally WebApps functionalities and SharePoint functionalities and permissions have been perfected. The implementation process is almost complete at present and the benefits will be immediate. All the users either professors or students have access to Office 365 package and to a personalized email account. At the same

time, on this platform a very useful and increasingly more necessary in the educational exchange of information, is created.

For implementing Office 365 at the University of Petroșani, we have created four OU groups, as email address groups for users. Teachers were added in OU CADRE, and students in their faculties (IME, MINE and STIINTE).

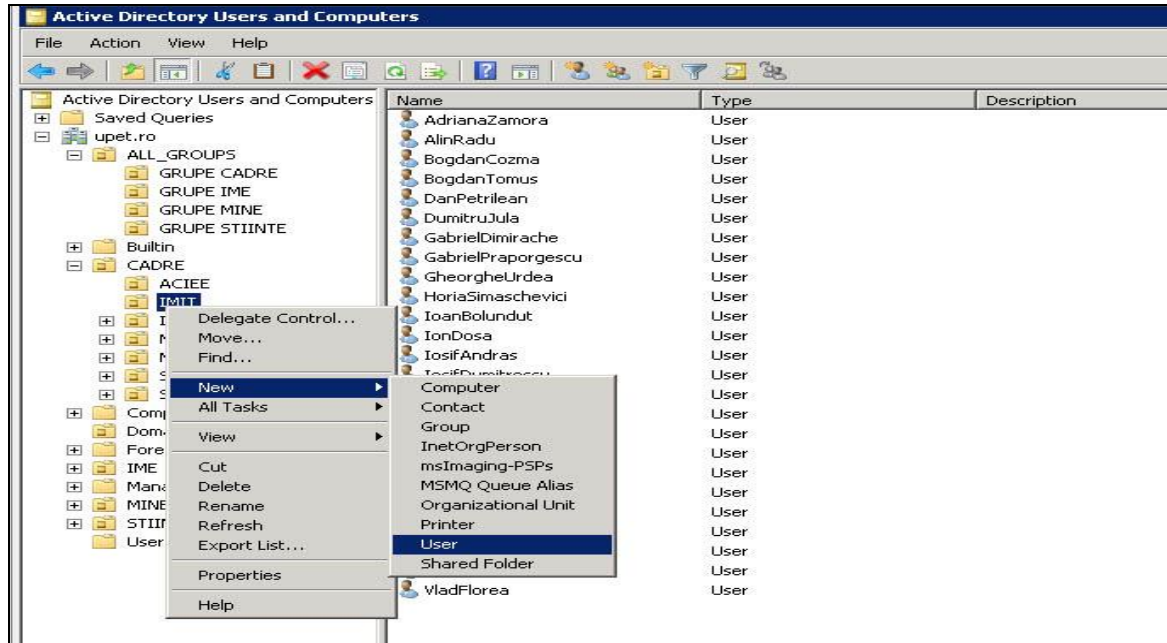


Figure 17. Active Directory for students and teachers of the University of Petroșani

In the current situation when Yahoo email is facing with many problems, Microsoft Outlook application provides a more secure mail service for the University of Petroșani students and teachers. Also another Office 365 component, SharePoint through OneDrive brings an enormous advantage because every user, from the 3000 users from the University of Petroșani can work in a team simultaneously in Word, Excel, Power Point, Blogs, Websites etc. https://upet-my.sharepoint.com/personal/eduardedelhauser_upet_ro/Documents/Forms/All.aspx

4. APPLIED MANAGEMENT. AREAS OF MANAGEMENT

Project Management

I am working continuous in project management since 2010, when I start managing projects financed from the European Union. Also in 2008 I have wrote another application form, that did not receive financial support. Also in 2007 I have design a customized software for project management.

POSDRU 59756

During 2009 and 2014, I have managed as a POSDRU Project Manager that worth over 3,500,000 lei, representing a strategic European project, containing activities of training, software development and studies in the field of human resource. The management of these project involved all the project management fields: planning, Gantt diagram, resources management, budget management, implementing, team building, risk management, advertising, monitoring and evaluating.

University of Petroșani, as applicant and Mining Trade Unions Union Oltenia, the Trade Unions Federation Jiu Valley and SIVECO Romania SA, as partners, have implemented,

during October 2010 and September 2013 under Eduard Edelhauser supervision as a Project Manager, the project *"Alternative professional training using IT solutions - a solution for reconversion of the labor force in mining"*. The Project's objective was to increase the employment rate of the labor force in mining mono-industrial areas from the Jiu Valley and Oltenia, by attracting young unemployed and long term unemployed, on the labor market, by developing modern and innovative methods for electronic eLearning type of training. The project has a 3 years (36 months implementation period) and was cofounded from the European Social Fund through the Strategic Operational Program Human Resources Development 2007- 2013: "Invest in people!", Priority Axis no. 5 "Promotion of active employment measures", Major field of intervention 5.1. "Development and implementation of active employment measures". The strategic multiregional Project - selected within the Strategic Operational Program Human Resources Development 2007-2013, cofounded from the European Social Fund, - was developed in the West and South - West regions, in the counties Hunedoara, Gorj, Vâlcea and Mehedinți, where the reconversion of the mining labor force was necessary. Contracted amount of the grant was 4,607,401 lei and the project absorption was around 3,400,000 lei.

During the implementation of the project were trained over 300 young and long-term unemployed in the Jiu Valley in 13 training sessions at the University of Petroșani through four training programs such as Tourism, Surveying, IT essentials and Management. Also 300 young unemployed were trained in Gorj, Valcea and Mehedinti county, through 20 training sessions in other four IT training programs: Web designer, Computer Aided Design, Text and image processing and IT consultant. The project was based on designing an electronic training collaborative portals. The training and educational portal contained 8 courses in multimedia format, accessible even after the face to face training sessions are ended, training courses were held with traditional methods of training, but also training was made through the portal training. These facilities helped students to easily understand their occupation specific technologies, through access to simulation processes using multimedia tools. Subsequent participation in the course, students had access to the website of the course and the training collaborative electronic portal. In this way, they can deepen the knowledge gained by accessing the online digital courses.

After these project that involved IT training, the University of Petroșani benefited laptops, servers and other hardware and software components worth over 50,000 euro, and also a training and educational management portal (<http://7.upet.ro> – Educational Platform – Learning Management System – Library) containing 8 courses in multimedia format, that was offered by SC SIVECO Romania SA to University of Petroșani as free, permanent and definitive licensing and can be used for university IT and management courses.

The ten activities of the project, as you can find in Action Web, <http://actionweb.fseromania.ro/index.php?cmd=pr&projectid=59756&tab=80>, were very different, two of them representing studies (one of them of the labour market and the second one concerning the impact of the courses over the target group), two of them representing the eLearning designing (designing digital courses in eLearning format and implementing the LMS portal), teaching courses and of course the project management itself.

Study of the labour market in the western development area – Jiu Valley coalfield.

For obtaining the required information, we proposed a questionnaire that outlines the evolutions of the labor market, collecting information about the major changes concerning production methods, new materials use and the implementation of projects or production teams applied by Romanian companies. We elaborated a questionnaire consisting of 24 questions and we distributed it to a number of 100 employers, chosen as being the most significant within the prevailingly mining mono-industrial regions.

The research based on questionnaire and carried out in the organizations within the Jiu Valley showed us a series of important aspects: the training courses needs for the investigated organizations within the Jiu Valley would focus on fields like marketing, IT and accessing the structural funds, the shortcoming of the Romanian education system is the reduced emphasis placed on communication and teamwork between the factors majorly influencing the regional development of the Jiu Valley, we identified competitiveness and qualification as having an important role and competence is the most important criterion for employment, but unfortunately we have identified young people as being a disadvantaged category, similar to former detainees or Romani.

Therefore, we focused on digital competencies professional training that shall be absolutely necessary in terms of the information society EU wants to implement. Thus, in addition to the primary purpose of providing basic computer operating competences (Computer/Networks Operator and Word/Image Processing Operator), we reckoned to focus our professional training in the view of workforce reconversion towards the three main fields where information technology finds its applicability: engineering (CAD Operator in the computer), economy (IT Consultant) and Internet (Web Designer).

Ersilia Furdui, **Eduard Edelhauser**, Lucian Lupu Dima, *University of Petroșani, Training Center for the Mining Industry Workforce Reconversion*, **Proceedings of The 5th International Conference on Manufacturing Science and Education, MSE 2011**, Volume 1, June 2-5, 2011, ISSN 1843-2522, pp. 425-428, <http://conferinte.ulbsibiu.ro/mse/materiale/Conference%20Program%20MSE%202011.pdf>

Designing digital courses in eLearning format containing eContent and multimedia format and Implementing the LMS portal and designing the Web site

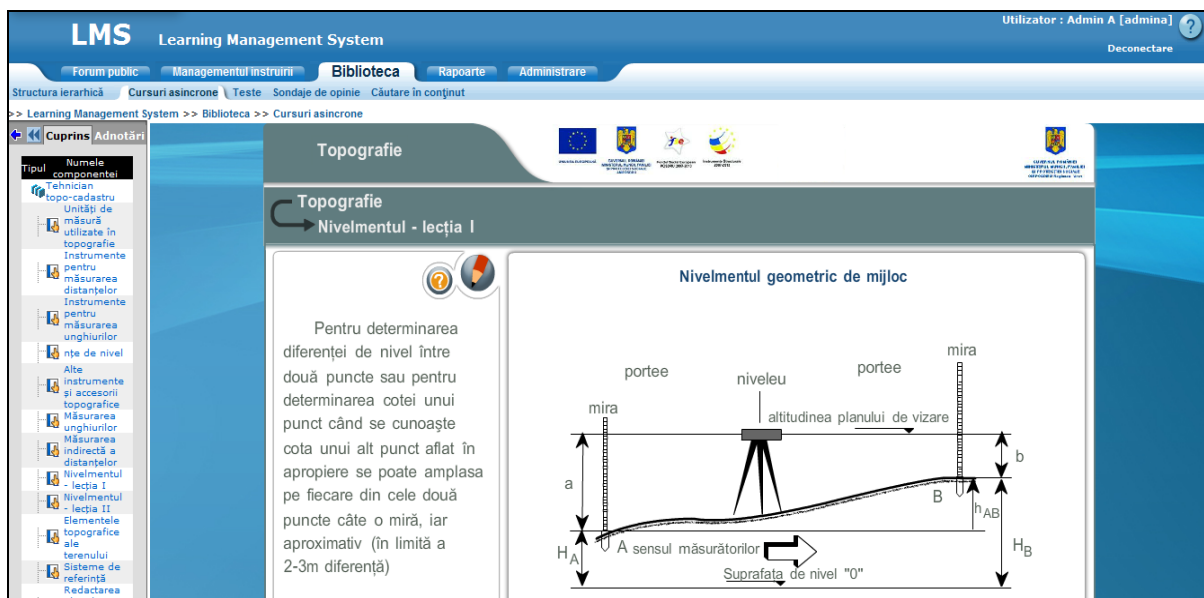


Figure 18. POSDRU 59756 LMS portal



Figure 19. POSDRU 59756 site

The eContent was developed with InfoPath as an application for development of scenarios and Edu Integrator as a software for converting scenarios in lessons as learning objects. Microsoft Office InfoPath was used in different scenarios from simple, ad hoc forms, to highly managed centralized forms solutions. Microsoft FrontPage was used to design Web pages, while Microsoft Internet Explorer was used to display them. InfoPath was finally used for both, to design and to display XML forms. The main advantage of using InfoPath as a tool was to rapidly create a form and having native support for validation. When we have design a form template (.xsn) file, we have created a single file that contains multiple supporting files. Then, when users fill out a form, they are actually filling out a form (.xml) file, which is based on a form template. Edu Integrator enabled the implementation of the script done in InfoPath. Lessons are organized in independent learning units, each unit being divided in turn into several screens - frames. Each screen was built by concatenation - using instructional design principles of learning items. These learning items were: text, additional sources of information (Web address), images, maps, charts, audio, animation, simulations, interactive materials, problem solving, educational games, tests.

http://193.230.241.7/ael/materiale/lectii/index_lectie.jsp?idLesson=44759&courseId=1027

Study concerning the impact of the courses over the target group in the labour market

Questionnaires were developed to assess the impact of active employment measures implemented during the project, and were distributed to the unemployed persons that have participated in the project during the job clubs and job fairs. Regarding the impact of training programs in terms of requirements, expectations and needs of the participants, the survey conducted on a representative sample (both the structure of the target group for the participation and by program type) supports the general conclusion that these programs have had a positive impact on the vast majority of participants.

POSDRU 141118

During 2014 and 2015, I am managing as a POSDRU University of Petroșani coordinator manager, a project that worth over 1,500,000 lei, representing a European non refundable financial support, containing activities of practice and training, a study in the field of identifying skills needs of employers and students and materialized in developing a career

guide, and also a study concerning the impact of the professional guidance over the students in the perspective of employment. The project is based on the transition from school to active life, by improving the employability of students and adaptability of young graduates in their early stage of the first significant job, and also on promoting and developing partnerships among universities and enterprises for implementing practical training stages. The management of these project involved all the project management fields: planning, Gantt diagram, resources management, budget management, implementing, team building, risk management, advertising, monitoring and evaluating.

Study concerning the impact of the professional guidance over the students in the perspective of employment

Questionnaires were developed to assess the impact of active employment measures implemented during the project, and were distributed to the students that have participated in the project during the workshops, soft skill training sessions and coaching sessions. Regarding the impact of professional guidance in terms of requirements, expectations and needs of the participants, the survey conducted on a representative sample, supports the general conclusion that these programs have had a positive impact on the vast majority of participants. <http://www.upet.ro/proiecte/>, <http://www.carierait.uvt.ro/>

Designing Information Systems for Project Management

In addition to my practical activity in the field of project management, as an IT specialist I have designed a useful software for the project management field, having an academic purpose.

The solution that I have proposed as a software management for a project was a software application based on the web technology. The tools used for this purpose are open source software as Apache - PHP - My SQL. The basic necessary to develop non complex program written in PHP and accessing a database managed in MySQL, requires basic knowledge of programming and databases. So I prepared a short guide for writing programs that can be posted on web and allow access on a database posted on a database server. The application wants to be a reply, of course shy to software developed by Microsoft, but I hope that it can be used with as high productivity to solve optimization problems in the time management of a project.

I have chosen to develop this project management software for the beneficiary that does not have already a license and it is a software that uses the most important IT resource - the Internet. I have used MySQL , Apache and PHP all of them being open source software. Apache is a server (the name comes from "a patchy " - a piece of www software development) using CGI (Common Gateway Interface), that is a specification for communication between the servers - generate dynamic documents. This enables the output server CGI programs to be inserted into existing HTML pages, written directives directly into the HTML page . MySQL is a database server capable of executing a large number of SQL commands. It is free and can be installed on computers operating under different operating systems (Windows , Linux , Unix etc...). PHP (Personal Home Page) explains its functionality, ie writing Web pages. Also known as " Hypertext Preprocessor ", he is a scripting language (CEO), which includes HTML and runs on a server. Syntax is borrowed from C + + , Java and Pearl, and allows writing web pages in real time (fast and dynamic).

The basic steps specific to any DBMS require addressing Creating Web technology, in fact upload, update, display and query a database. The application was performed using web technology and can operate on a single computer and a computer network protocol TCP / IP. The application has the following major components :

The database server - Firebird, a product of Borland that is distributed freeware;

The web server – Apache, today the most common web server;

The application itself, that was developed in PHP and generates HTML pages displayed by the browser and query and update the database via SQL commands. Page generated in JavaScript contains sequences to achieve a simple graphical interface for a browser;

The browser - Microsoft Internet Explorer for example is a program included in Windows operating systems and it is used to access the internet from web sites .

Project	Author	Nr.crt.	Task Name	Duration	Stat	Previous Task	Diff. Prev. Task	Color
Management	dr.ing. Eduard Edelhauser	1	Activate 1	6	04/01/2007		0	Green
		2	Activate 2	3		Activate 1	0	Yellow
		3	Activate 3	8	04/09/2007		0	Dark Green
		4	Activate 4	5		Activate 2	3	Cyan
		5	Activate 5	6	04/19/2007		0	Blue
		6	Activate 6	5	04/25/2007		0	Light Green

Figure 20. Task List Interface

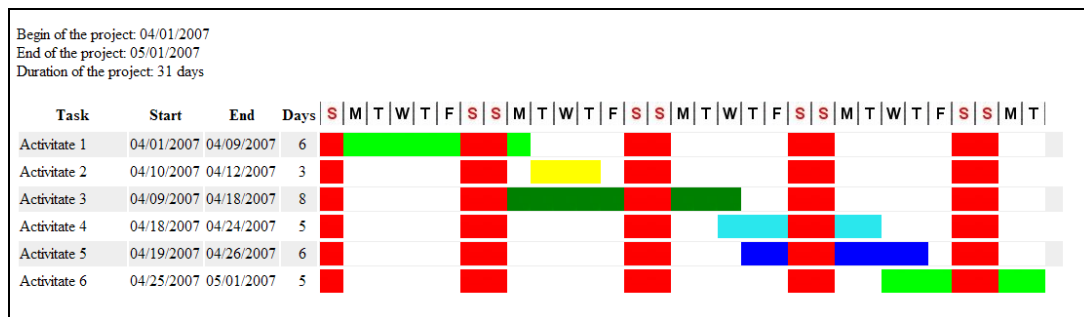


Figure 21 . Graphical Gantt Interface

Edelhauser Eduard, Ionică Andreea, *Implementing a Web Design Project Management Software in a Company*, **Annals of the Oradea University**, Fascicle of Management and Technological Engineering, VOLUME V (XV), ISSN 1583 – 0691, <http://auo.fmte.rdsor.ro/>, 2007

5. APPLIED MANAGEMENT. AREAS OF MANAGEMENT

SME's Management

Research over the the Jiu Valley Medium Enterprises

At the end of 2012 the first 50 medium enterprises in the Jiu Valley achieved a turnover of 450 million lei and provide jobs for 4,000 residents of the Jiu Valley. In the category of medium enterprises we were focused in our study on manufacturing, construction, public services and retail. The 4,000 employees from the top 50 medium enterprises are involved these four areas. At these 4,000 employees we have to add the National Society of Mine Closure with 2500 employees (the former Petrila, Paroseni and Uricani pits) and a recycling company – Mantex General Recycling with 1000 employees.

Table 31. Turnover and employees in Manufacturing (such as PVC profile manufacturing) and Metal building in medium enterprises in Jiu Valley

Enterprise	Turnover	Employee
QUASAR INDUSTRIES SRL	39.245.550	78
ECO FRIGOTEHNICA S.R.L.	3.857.665	23
GEROM INTERNATIONAL SA	13.025.006	164
UPSROM S.A.	4.824.042	102
ADARCO INVEST S.R.L.	11.408.949	75
SIMAUSSROM COMSERVIMPEX SRL	10.661.566	101
Σ	83.022.778	543

Table 32. Turnover and employees in Public services such as water distribution, garbage in medium enterprises in Jiu Valley

Enterprise	Turnover	Employee
TERMOFICARE S.A.	6.169.254	77
APA SERV VALEA JIULUI SA	19.184.345	517
NOVA SERV VALEA JIULUI S.R.L.	612.366	2
PREGOTERM S.A.	7.571.094	236
GOSCOMLOC S.A.	326.386	11
EUROPEAN METAL RECYCLING S.R.L.	18.588.256	21
KASIANI METAL SRL	8.045.907	4
UNIVERSAL EDIL SA	3.323.865	91
Σ	63.821.473	959

Table 33. Turnover and employees in Construction in medium enterprises in Jiu Valley

Enterprise	Turnover	Employee
ENERGOCONSTRUCȚIA PAROȘENI S.A.	7.571.700	90
MASA ADRIGELA S.R.L.	4.020.309	63
NUMERO UNO TEXPORT SRL	5.011.059	38
STEEL DEMOLITION SRL	10.051.167	21
CONSMIN S.A.	30.944.406	17
AVEG S.A.	4.205.168	72
ELCOMPET S.R.L.	10.502.817	124
ATOMIS INTERNATIONAL PROD S.R.L.	240.727	29
Σ	72.547.353	454

Table 34. Turnover and employees in Retail in medium enterprises in Jiu Valley

Enterprise	Turnover	Employee
COOP. STRAJA SOCIETATE COOPERATIVA	4.998.372	85
REALCOM SA	4.404.506	46
EURO-RIVA SERV S.R.L.	6.906.722	40
EXPANS PRESTSERV S.R.L.	6.082.497	26
MTA MARMIS GENERAL COMIMPEX S.R.L.	6.430.390	17
SOCOM UNIREA SOCIETATE COOPERATIVA	13.002.003	321
CEPI IMPEX S.R.L.	7.081.991	13
AGROALIMENT SRL	11.404.323	29
SUPER TRANS COM SRL	14.428.374	70
G.D.R. START COMEXIM SRL	4.653.324	17
Σ	79.392.502	664

Research over the the Jiu Valley Small Enterprises

At the end of 2012 the first 150 small enterprises in the Jiu Valley achieved a turnover of 360 million lei and provide jobs for 3,300 residents of the Jiu Valley. An analysis of turnover and number of employees on several key areas of the classification of the activities of the national economy (CAEN) is presented as follows.

In the field of forestry area we have identify eight companies with over 100 employees and a total turnover of about 15 million lei.

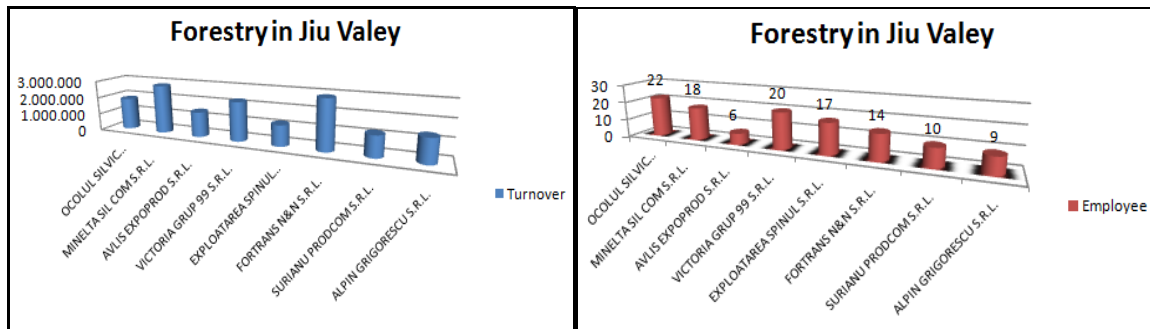


Figure 22. Turnover and employees in forestry small enterprises in Jiu Valley

In the bakery area we have identify nine companies that have achieved an annual production of 22 million lei with about 400 employees.

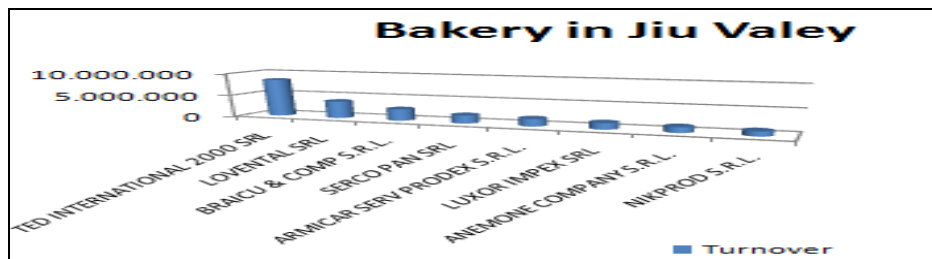


Figure 23. Turnover in bakery small enterprises in Jiu Valley

In the lohn area we have identified six companies in the textile field with 240 employees and an annual production of about 11 million lei.

Table 35. Turnover and employees in lohn small enterprises in Jiu Valley

Company	Turnover	Employee
NAVONA TEX SRL	1.271.862	88
TRICOMAGLIA S.R.L.	1.808.238	48
ROM FRANCE TEXTILE S.R.L.	1.403.070	38
RUNING TEX S.R.L.	1.568.796	37
CARBO SHOES S.R.L.	2.561.412	29
REC - SELECT ERCORA S.R.L.	2.228.413	5

In the production of furniture and electrical equipment we have identified 10 small enterprises with 340 employees and an annual production of about 31 million lei.

Table 36. Turnover and employees in furniture and electrical equipment small enterprises in Jiu Valley

Company	Turnover	Employee
DOMASO CONSTRUCT S.R.L.	5.284.573	49
ELECTRO MAX S.R.L.	5.261.805	30
BKD ELECTRONIC S.A.	3.963.571	45
A END M AGROALIMENT COMPANY SRL	3.661.369	14
SERVICE IMPLEMENTARE PRODUCTIE S.A.	3.055.278	27
EC ELECTRONICS MANUFACTURING S.R.L.	2.587.890	56
INLINEASOFA S.R.L.	2.028.169	34
LANT MINIER S.R.L.	1.990.765	5
TOTAL MOBILA PRODCOM S.R.L.	1.939.355	18
BAGGI MECCANICA S.R.L.	1.715.217	61

In the construction field we found seven companies, with 200 employees and a production of 44 million lei. In the electrical and plumbing we found eight companies, with 250 employees and a production of 15 million lei. In the retail we identified 140 small enterprises with 640 employees and a production of 100 million lei. Of these companies two areas are very well represented: the Second hand or used clothing field - very well represented in the Valley, and pharmaceuticals, summarizing half of the workers from the

commercial field. In the companies that distribute pharmaceutical products we found 13 companies, with 110 employees and a production of 25 million lei. In the companies that distribute used clothing we found five companies, with 260 employees and a production of 10 million lei

Table 37. Turnover and employees in used clothes small enterprises in Jiu Valley

Company	Turnover	Employee
BUBU CRYSTAL SRL	2.919.247	98
MILENIUM SHOPPING S.R.L.	2.810.219	69
DANADRISEKART S.R.L.	1.554.953	20
QUATTRO TORRIANI SRL	1.183.440	41
ALY-MONYK TUG S.R.L.	1.071.981	31

Eduard Edelhauser, **Lucian Lupu Dima**, Study Over the Necessity of IT&C System Implementation in the SMEs of Jiu Valley, The 13th International Conference on Informatics in Economy IE 2014, **Bucharest, Romania May 15-18, 2014**

An explanatory investigation of the Jiu Valley SME's Information and Management Systems

Research methodology and results

In the virtue of the questionnaires we achieved the results. In order to analyze the statistical connections we used correlation analysis for the intensity of the connections between the variables and regression analysis to estimate the value of a dependent variable (effect) taking into account the values of other independent variables (causes). We carried out a multiple regression analysis in order to identify the effect that implementation of ERP, BI and e-Government applications in the decision making processes of the organization.

Methodology

The instrument used for collecting data is a quantitative questionnaire. The research based on the quantitative questionnaire was structured on 21 questions, seven of the focused on Jiu Valley SMEs during the crisis and other 14 questions oriented on IT&C aspects of SMEs such as: hardware, e-Commerce, ERP business software and BI management software.

Respondents

The study set sights on over 25 Jiu Valley SMEs, and data were collected in 2014 year. The survey led us to identify the effect of the crisis on SMEs, but also to sets the current stage of the level of implementation of IT&C tools in the 2014 year in Jiu Valley SMEs. In the category of Jiu Valley medium enterprises we were focused in our study on manufacturing, construction, public services and retail. Almost 4,000 employees from a total of 7,500 employees, from the top 75 medium enterprises are involved in these four areas. In the category of Jiu Valley small enterprises we were focused on forestry, bakery, lohn, production of furniture and electrical equipment, construction and retail. Almost 2.300 employee from the 3.300 of the top 150 small enterprises are involved in these areas.

Even data were collected only from 25 organizations, these are representative for the 2014 Jiu Valley SMEs, because in this economical moment Jiu Valley has only 225 SMEs that could need an ERP or a BI software instrument as a advanced management method. There were analyzed over 225 Jiu Valley SME's, 75 medium enterprises and 150 small enterprises, and were identified 25 distinct groups without any significant deviations among the enterprises forming each group. In order to apply this method there were chosen 25

companies that were included in the present study. Each of these 25 companies is representative for the enterprises group, having similar trend. This simplified version of the method is suitable for our problem because in this way there were obtained very clear results.

Findings and discussions. Graphical results and statistical analysis

Sixty percent of the investigated organizations declare that have a website. In our opinion, in 2014 every organization must had a website, because Romania has more than 5 million mobile or Wi-Fi Internet connection, and more than 3 million cable or dial up Internet connection, representing half of the Romania inhabitants. So there are many opportunities for developing a website, an online store or an Internet sales strategy - *Q1. Your organization has a website ?*

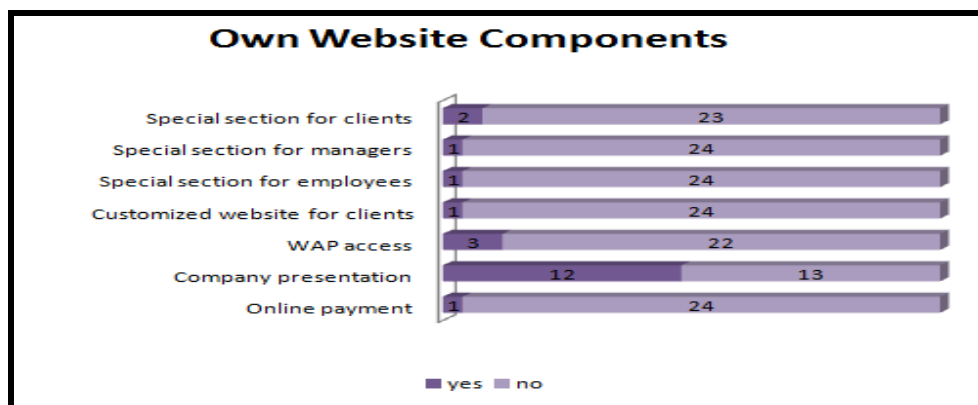


Figure 24. Q2. What components has your website offers for users ?

In the area of website components, we can conclude that Internet is in 80% of the cases use only as an online show window and not as an interactive instrument between organization, employees, managers and customers.

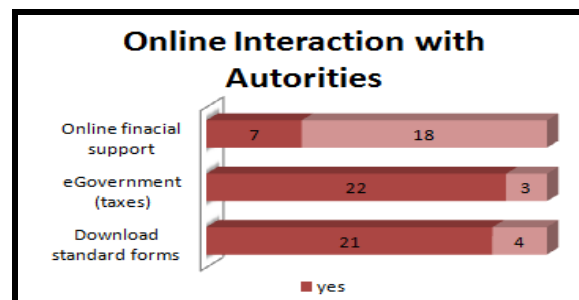


Figure 25. Q5 Your organization has interacted online with local or governmental authorities?

Through e-Romania strategy, the authorities had allocated over 500 billion euro in the period 2010-2013, for the connection of all systems of public administration and for offering over 600 electronic services. So the companies have benefits from these e-Government implementation.

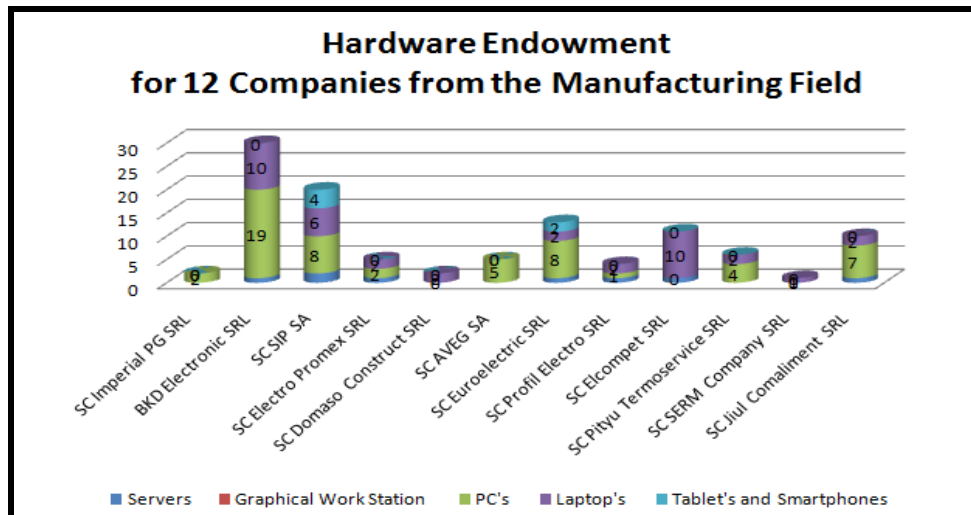


Figure 26. Q6. The total number of computers (**hardware endowment**) in your organization

In Romania in 2012, 66,4% of the household population has a computer (POAT 2007-2013 project). So for these 12 companies having 454 employees, 98 of them being involved in IT&C activities and having 109 computers, we have a very good IT&C endowment.

Organization	Office	CRM	ERP	Ciel, SAGA, WinMentor, Asis Plus	CAD / CAM	GIS	QMS
SC Imperial PG SRL	✓	1	0	0	1	0	0
BKD Electronic SRL	✓	1	0	1	0	1	0
SC SIP SA	✓	1	0	0	1	1	0
SC Electro Promex SRL	✓	1	0	0	1	1	0
SC Domaso Construct SRL	✓	1	0	0	1	0	0
SC AVEG SA	✓	1	0	0	1	0	0
SC Euroelectric SRL	✓	1	0	0	1	1	0
SC Profil Electro SRL	✓	1	0	0	0	1	0
SC Elcompet SRL	✓	1	0	0	1	1	0
SC Pityu Termoservice SRL	✓	1	0	0	1	0	0
SC SERM Company SRL	✓	1	0	0	0	0	0
SC Jiul Comalimint SRL	✓	1	0	0	0	1	0

Figure 27. Q9. Which are the software **components** implemented in your organization

We have a low degree of software usage in the 12 companies from the manufacturing field investigated. Excepting the Office software, having a 100% usage, the CAD/CAM software, specific for the manufacturing field, having a 58% usage, and the accounting information systems, having a 66% usage, other software are used only occasionally. As we already knew from other previous studies, the usage of accounting and payment ERP components is very common in Romanian companies, having a 100% usage for ERP accounting, and a 83% usage for ERP payment in the 12 investigated companies. The CRM and SCM components have a 17% usage, but in the virtue of the Q14 - List proposals of applications, *which you consider necessary to implement* in your organization, 4 companies representing other 33%, wish to implement such a component. Two component are never used: HR ERP component, probably because Revisal software is mandatory in Romania, and manufacturing ERP component, probably because the costs for implementing such a software are very high.

The estimated total amount to be allocated to IT&C endowment is 550,000 lei - 5.5 billion lei for the 25 organizations investigated. (actually only 18 companies have proposed

allocation of funds) - Q12. Please specify what amount (*in lei*) you are willing to assign in the coming years *for software implementation in your organization* ?

Sixty-four percent of the investigated organizations declare that plan to implement a Cloud technology. Even if in Romania it does not exist a harmonized legislation regarding the Cloud, the organizations are very conscious about the Cloud technology, and they plan to implement such a technology - Q13. Please indicate if you plan to *implement a Cloud technology in your organization in the coming years*?

Based on Q7 (Number of computers interconnected in a LAN and to the Internet) and Q8 (How many people in your organization are involved in the IT&C activities) from the questionnaire we have made a regression analyses.

Table 38. Regression analysis and correlation between the number of computers and the number of employee with access to these computers for the 12 companies from the **manufacturing field**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,979 ^a	,958	,954	1,644
a. Predictors: (Constant), Calculatoare				

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	612,628	1	612,628	226,572	,000 ^a
	Residual	27,039	10	2,704		
	Total	639,667	11			
a. Predictors: (Constant), Calculatoare						
b. Dependent Variable: Personal_acces_IT						

We noticed that there is a strong link (with a significance of correlation $R = 0.979 > 0.63$ for 11 degrees of freedom). F-test also has a high value (226), and the Sig. corresponding F statistics is 0.00 (0.00) 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. The regression coefficient $R=0,979$ shows a strong link between the variable Personal_acces_IT given to the level of IT, and the independent variable Calculatoare showing the size of the organization. The model explains 98,5% from the total variation of the variable Calculatoare ($R^2= 0,985$). The rest of 1,5% is influenced by other residual factors not included in the model. So the usage of the computers by the employee of the organizations for the 12 selected organizations from the manufacturing field is excellent.

Table 39. Regression analysis and correlation between the number of computers and the number of employee with access to these computers for the 7 companies from the **services field**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,998 ^a	,997	,996	,986
a. Predictors: (Constant), Calculatoare				

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1482,853	1	1482,853	1525,068	,000 ^a
	Residual	4,862	5	,972		
	Total	1487,714	6			

a. Predictors: (Constant), Calculatoare

b. Dependent Variable: Personal_acces_IT

We noticed that there is a strong link (with a significance of correlation $R = 0.998 > 0.63$ for 6 degrees of freedom). F-test also has a high value (1525), and the Sig. corresponding F statistics is 0.00 (0.00) 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. The regression coefficient $R=0,998$ shows a strong link between the variable Personal_acces_IT given to the level of IT, and the independent variable Calculatoare showing the size of the organization. The model explains 99,7% from the total variation of the variable Calculatoare ($R^2= 0,997$). The rest of 0,3% is influenced by other residual factors not included in the model. So the usage of the computers by the employee of the organizations for the 7 selected organizations from the services field is excellent.

Table 40. Regression analysis and correlation between the total number of employees and the total number of computers for the 7 companies from the **services field**

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,791 ^a	,626	,551	10,328

a. Predictors: (Constant), Personal

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	892,093	1	892,093	8,363	,034 ^a
	Residual	533,335	5	106,667		
	Total	1425,429	6			

a. Predictors: (Constant), Personal

b. Dependent Variable: Calculatoare

So there is an good link between the total number of employees and the total number of computers form the organizations, $R=0,791 > 0,63$ for the 7 selected organizations from the services.

The research has a high degree of novelty, this management analysis is the first of its kind performed in the Jiu Valley. This paper has proposed to capture the situation of SMEs nationally and in particular in the Jiu Valley in the 2012 year, because in this moment, January 2014, the financial statements were available only at the level of 2012. In the category of Jiu Valley medium enterprises we were focused in our study on manufacturing, construction, public services and retail. Almost 4,000 employees from the top 75 medium enterprises are involved these four areas. In the category of Jiu Valley small enterprises we were focused on forestry, bakery, lohn, production of furniture and electrical equipment, construction and retail. Almost 2.300 employee from the 3.300 of the top 150 small enterprises are involved in these areas.

The IT&C level of implementation in Romanian and Jiu Valley SMEs was revealed in a surveys developed in 25 Jiu Valley SMEs. We conclude that we have a low level of managerial culture, and also a low level of top and operational managers IT qualification.

Most of the SMEs have a satisfactory IT&C endowment, SMEs use computers only as office tools and computerized accounting, and this leads to a inefficient managerial decision and a SMEs disadvantage on the business market.

This research concerning the Jiu Valley SME's from an IT&C perspective, represent a basis for two research contracts with two software houses, SC Spectrum SRL Brasov and SC Radix Consult SRL Bucharest.

Eduard Edelhauser, Lupu-Dima Lucian, Lorint Csaba, *Modern Management in Jiu Valley SME's, A Solution to a Possible Social Disaster of a Mono Industrial Area, Proceedings of the 4th Review of Management and Economic Engineering Management Conference: International Management Conference*, 18-20 September 2014, Technical University of Cluj Napoca, Todesco Publishing House

6. APPLIED COMPUTER SCIENCE IN ENGINEERING AND QUALITY SYSTEMS CIM, CAD, CAM and CNC

Designing in Mechanical Engineering is in a continuous change and flexibility. The new product are developed in a very rapid way, so the productivity raise in every moment. Using the new design and manufacturing methods, the product quality will grow, and the manufacturing costs will be minimized.

Autodesk Inventor software products are the best choice for AutoCAD software users who want to add the power of 3D without compromising investments in 2D design data and AutoCAD technical expertise.

DELMIA is a premier brand for digital manufacturing solutions, focused on two unique software applications that can be used to streamline manufacturing processes. DELMIA automation provides solutions to digitally design, test and validate the control of a machine, work-cell, or entire factory line and DELMIA PLM provides the process and resource capability to enable continuous creation and validation of manufacturing processes as related to the product throughout the entire product lifecycle.

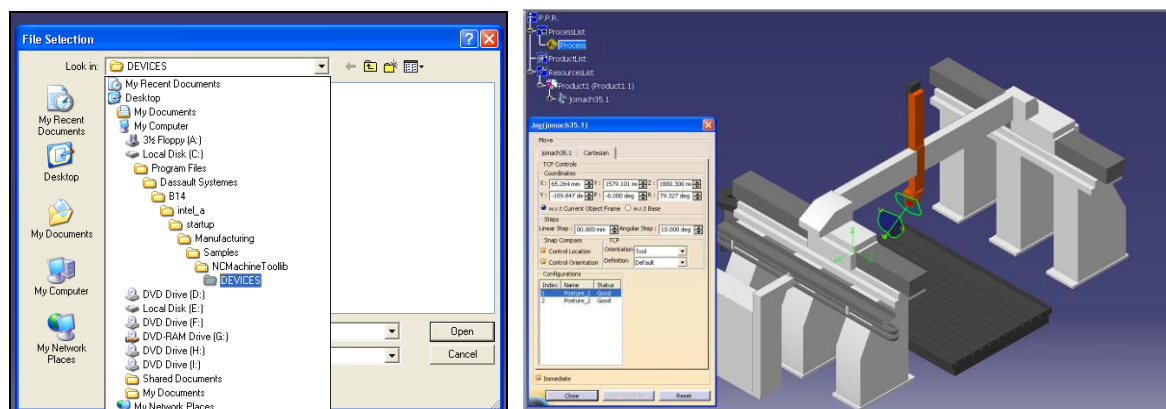


Figure 28. Choosing a 5 axes NC MT. 5 axes simulations for a Jogmach Mill 35.1 associated to a process

Visual Mill as a fully functional 3D milling package from Mec Soft, a general purpose machining program and is targeted at the general machinist. This product is ideal for the rapid-prototyping and educational markets where ease of use is a paramount requirement. Packed with sufficiently powerful manufacturing methods this easy to use software includes basic 3-axis milling and approximately 50 pre-built post-processors.

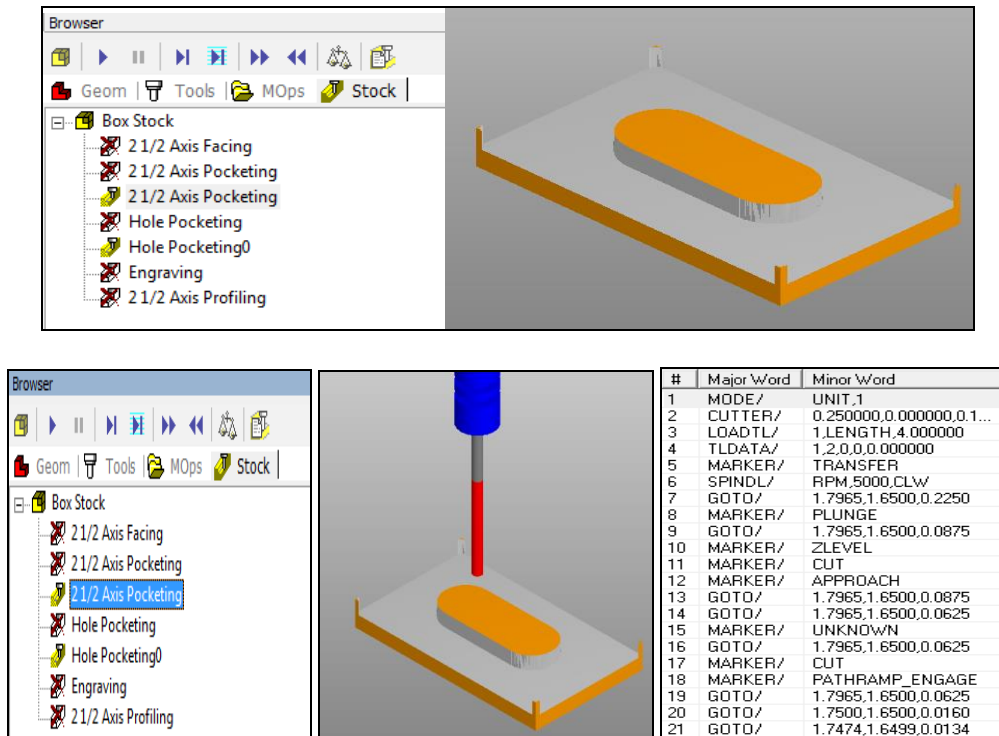


Figure 29. Stock and Simulator. A tool path has been created on the part using the Parallel Roughing command. On the right is the tool path's line-by-line code.

Based on these different CAD / CAM software, I have implemented in free licensed version, Autodesk Inventor Professional in his educational version, Visual Mill, and also the eLearning Lesson for CAD Essentials (<http://7.upet.ro>), for students in Industrial Engineering from the University of Petroșani.

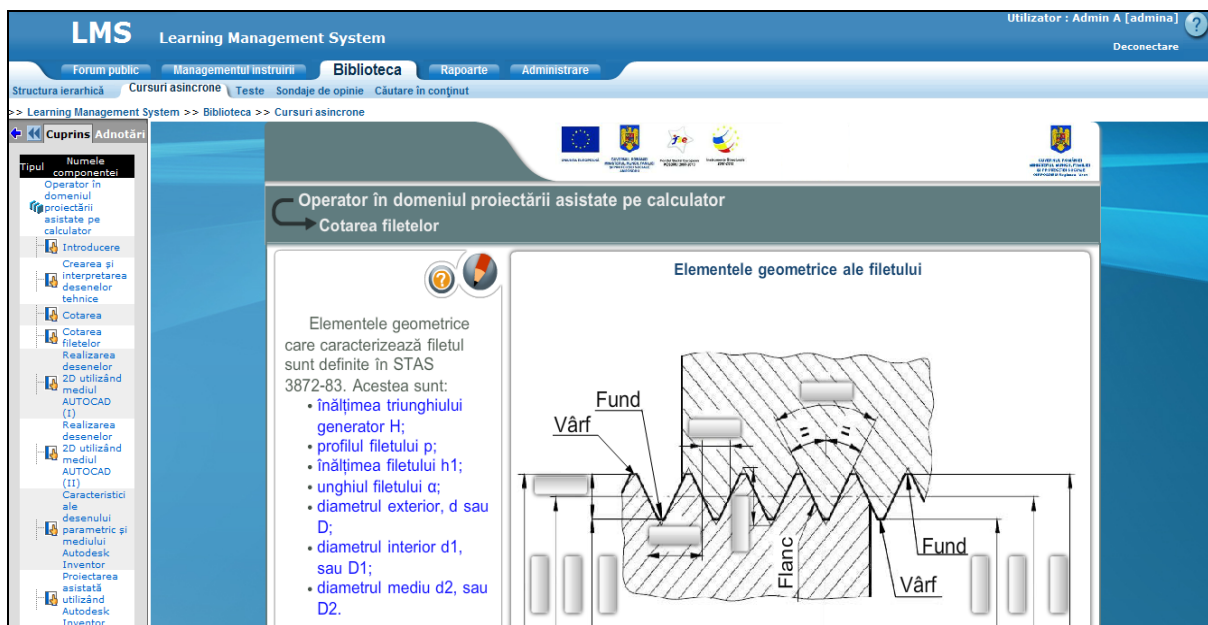


Figure 30 . CAD lessons in eLearning format (POSDRU 59756)

Edelhauser Eduard, Ionică Andreea, *Computer Integrated Manufacturing Through Work-Cells and Computer Numerical Control Machines*, **Annals of the University of Petroșani**, Mechanical Engineering, vol.11 (XXXVIII) , Editura Universitas Petroșani, ISSN 1454-9166, 2009

Designing software applications

I have designed a few applications for the human resource management field, an ERP field in which I have worked in my first years of career, after the graduation. Even if this small software results, could not compete with classic ERP's for SME's such as WinMentor, Senior ERP or other Romanian ERP's, I have used them as an academic tutorial for the students.

I have design an information system for the personal management for a small or medium enterprise, possible geographical scattered. The application has been developed using the triad Apache-MySQL-Php offered by Merlin Desktop in the open source vision. The end user needs only a computer and an Internet browser (client server at the 2004 year). From the analysis system point of view, the application solves two areas of the human resources management: personnel record and organizational analysis.

Throughout my personal application designed in Access I have tried to demonstrate that management information systems can sometimes be very useful not only the user but also easily achievable even by the user. As a trainer I have trained a large number of IT specialists in production, and I always put emphasis on this aspect of the software, and their simplicity of use.

The human resource information system developed in a client-server technology, wants to be an application that allows the use of modern software technologies, in a efficient and productive way (programming language Visual C ++ and Report Generator Crystal Report of Visual Basic), based on a platform existent in advance in a company. (Existence of the database in a format that can be organized even on servers, exemplifying realizing a multiple Access database). The application brings together three modern instruments in the field of programming: first programming method used is open database connectivity ODBC that permit that inhomogeneous databases to be accessed, the second programming method used, the method checks C ++ connecting remote objects, is characterized by elegance and ease of programming, the third method of programming is a very productive and efficient method that the author has attached it to the core of the C ++ application, this method specifies a different language called Visual Basic that combines generating reports and queries under the same name: Crystal Report.

Designing Information Systems in the Distributed Network Application (DNA) technology

I have designed an information systems that allow a better computer aided formation and selection for the formers, in fact a decision support systems at 2004 year level. This application has been designed in Visual Studio-Visual C++ based on facts and rules.

The human resource application that implements DNA technology brings together the results of HR evidence offered by the staff and the organizational analysis. The application is carried out within a DNA architecture, i.e. the application client - server remote and on levels. There are used the application server architecture, containing a database MySQL and an Apache Web applications and as well as a client using the Internet Explorer browser. Application was designed in PHP, which currently is the most used programming language optimized web programming being in fact the future of the programming using the development platform "Maguma Studio".

I have designed an information system for the personal record in the small/middle firm, but firms that consists of main submits geographical scattered. The application has been made using the triad APACHE-MySQL-PhP offered by Merlin Desktop in the open source vision. The end user needs in use a computer network and an Internet browser. From the analysis system point of view, the application tackles two areas of the human resources management: personnel record and organizational analysis

The application is structured on two levels. The first one (the data base level) consists of a data base called “personnel”. The second one (the applications) consists of PhP programs written around the script index.php.

The “Personal” data base design.

The database Personnel is compound of five tables.

- Employee – contains employees private data.
- Compartments – contains the services, compartments and office list.
- Grid – contains salary grid.
- Structure/Internal structure – contains the firm structure including the vacant jobs.
- Cm – contains information in relation with the employees

record.

The five tables work both with the personal record and the organizational analysis. The relation between the employee (wage-earner), job (Structure), working area (Compartments) and the employee wage has been achieved through MySQL facility.

The PhP source-code design.

The PhP program has been made using the development applications platform “Maguma Studio”. The source-code has been structured in 21 programs which function interrelated as it follows.

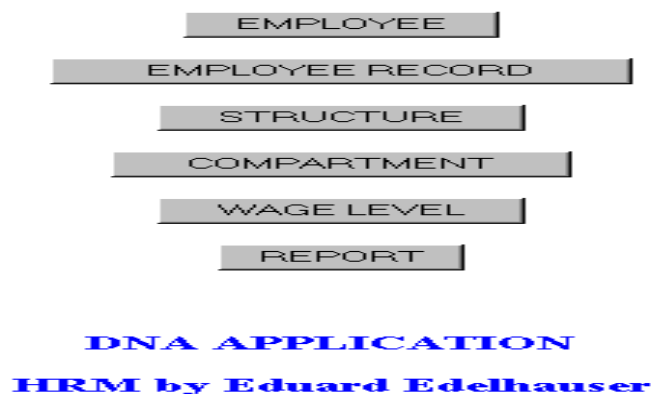


Figure 31. HRM Main menu application

The designing of the main interface requires HTML (Hypertext Marking Language). Visual options PhP has been also used. Five procedures have been use according with the first five control buttons, corresponding also to the five personnel database tables.

Based on the compartment and employee tables, we can get the personnel list according to the structure where someone easy can see the vacant jobs. In order to load the structure there have been used data from the organizational analysis of the underground coal mining industry.

Edelhauser Eduard, *Client Server Versus Distributed Network Applications in Human Resource Management*, Proceedings of the International Conference on Theory and Applications of Mathematics and Informatics ICTAMI 2004, Alexandrium Techological Institute of Thesaloniki (TEI), Thesaloniki, Greece, ISSN 1582 – 5329, **Acta Universitatis Apulensis- Mathematics Informatics**, no 8 / 2004, pp. 129-136, 2004,

<http://www.emis.de/journals/AUA/acta11/08-Eduard%20Edehausler%20lucrare%202/Edelhauser%202.pdf>

Designing Decision Support Systems for training and selection of human resource for the formers in industry

This application is part of the class of decision support systems and expert systems, and it is an application that opens a large number of fields of information in the human resources management approached outside of copyright - recruitment and selection (the improvement and training, the assessment and development, human resource planning). In terms of recruiting, I focused on specific crafts mining (firework, underground electrician, mechanic technician extraction and mining) for recruitment which we have established a set of 106 rules structured in a knowledge base. The inference mechanism was developed in C ++ using a back control strategy. In selecting occupation pretenders to hiring one of the trades specified, we have used a restructured version of the Romania Occupations Code - COR. The application is based on the prior creation of a file of facts, and then determining the fit between actions taken on the system of rules of the knowledge base.

I have analyzed the human resources management problem, in the selection and training area, and I considered that DSS or ES is the most available for the level 1, 2 or 3 managers. One of the main responsibilities of a manager is the formation and training of the personnel he is in charge with. To this purpose the manager has a shift with the necessary skills, which he can use as a resource to fulfill his obligations, towards his employees.

Firms have established as a personnel formation strategy the organization of a internal formation department, large enough to meet the formation needs of the firm, which involves certain selection and formation activities, related to formers.

The skills of the formers include the knowledge of learning methods and stiles as well as of teaching methods and stiles and of the techniques related to the presentation of learning objective and the design of formation activities. It is also necessary to have skills in the field of determining adequate learning programs, designing the formation programs and sessions, the knowing the training and teaching techniques as well as of the methods of use of the formative aids.

Former need several fundamental skills meant to allow them to put into practice the required abilities. These fields can be summarized as it follows.

Table 41. Skills and knowledge necessary for formers

Knowledge	Skill
Learning style	Job design
Learning barriers	Formation needs identification
Fundamental formation methods	Course design
Ways of producing knowledge	Formation session designs
Formation types and available learning tools	The use of audio visual aids
Job design methods and formatting methods	Presentation and control of formation sessions
Formation events design	Discussion supervision
Fundamental methods of formation validation	Preparation of had-outs for formation sessions

As a result of these skills I have designed a package of seven criteria necessary to the formers selection.

Table 42. Selection criteria

Occupational education
Managerial experience and labour protection experience
Former required training
Occupational selection
Medical record
Psychological selection

Table 43. Minimal condition for the former evaluation criteria

CRITERIA	MINIMAL GRADE FOR FORMERS
OCCUPATIONAL EDUCATION	FOREMAN
MANAGERIAL EXPERIENCE	THREE YEARS
TRAINING	DONE
OCCUPATIONAL SELECTION	DONE
MEDICAL RECORD	OK
ANALYTICAL REASONING	VERY GOOD
ANALOGICAL TRANSFER	GOOD
CONCENTRATION	VERY GOOD
WORKING MEMORY	GOOD
VOCABULARY	GOOD
READING COMPREHENSION	VERY GOOD
MATHEMATICAL REASONING	MEDIUM
DECISION	GOOD
CLERK ABILITY	MEDIUM

There are 56 rules for this expert system and they have been listed, two of them being explained in detail.

Rule 49 : If

ANALYTICAL REASONING	yes
ANALOGICAL TRANSFER	yes
CONCENTRATION	yes
WORKING MEMORY	yes
VOCABULARY	yes
READING COMPREHENSION	yes
MATHEMATICAL REASONING	yes
DECISION	yes
CLERK ABILITY	yes

Then

PSYCHO APTITUDE	yes
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Rule 55 : If

OCCUPATIONAL EDUCATION	yes
MANAGERIAL EXPERIENCE	yes
TRAINING	yes
OCCUPATIONAL SELECTION	yes
MEDICAL RECORD	yes
PSYCHO APTITUDE	yes

Then

FORMER MATCH	yes
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I have chosen as a development medium for the expert system a language destined to Windows Visual C++ applications. The application works in two stages:

- ✓ Building the facts – fact file
- ✓ Running of the expert system for the given facts and getting to the matching

The application menus have been thought as grouped dialogues round the dialogue facts, over which I have applied other three menus connected with the six criteria for the selection of the industry formers.

Based on these various software competency I have developed a set of lessons containing database essentials and programming essential for students from various fields of study such as management, engineering and management, mining and survey, from the University of Petroşani.

Edelhauser Eduard, *Computer Aided Formation and Selection for the Industry Formers*, Proceedings of the International Conference on Theory and Applications of Mathematics and Informatics ICTAMI 2004, Alexandrium Techological Institute of Thesaloniki (TEI), Thesaloniki, Greece, ISSN 1582 – 5329, **Acta Universitatis Apulensis- Mathematics Informatics, no 8 / 2004**, pp. 137-145, 2004,
<http://www.emis.de/journals/AUA/acta8/Edelhauser2.pdf>

PART 2. CAREER PLAN. FUTURE DIRECTIONS FOR ACADEMIC, SCIENTIFIC AND PROFESSIONAL CAREER DEVELOPMENT

The main reason that made me to elaborate a habilitation thesis in the field of Engineering and Management was the difficulty which the Jiu Valley in general and the University of Petroșani especially are crossing in this period. Thus Jiu Valley is a region with about 120,000 inhabitants and according to the 2012 census over 10% of the total population of the Jiu Valley has a license in engineering or in business. The current economic context in which the mining industry begins to lose its importance and an area formerly mono industrial, currently has just fewer than 10% of the population engaged in the mining field, mining leads outside. Current academic context given by the number of graduates of the University of Petroșani in mining and related profiles which are currently less than 10% of the graduates, and because there are only four PhD advisers in the Mines, Oil and Gas field, leads us to conclude that the University of Petroșani is now more than a Mining School as it was before 1990. Finally a negative aspect at the University of Petroșani is the lack of perspective in the doctoral studies, and a lack of perspective automatically to all graduates in non-mining areas, representing 90% of the whole graduates.

Relying on these considerations and thinking that the University has licensed over 13,000 graduates currently, that are living in the Jiu Valley, and after 1990 year over 70% of these graduates were trained in economic and non mining engineering, there is an enormous human potential claim to improve doctoral studies, and these potential PhD students trained at a higher level could solve some problems for a former industrial mono area, applying top engineering tools and performance management.

Practical research directions and methods of implementation

I propose for the next 20 years, in the hope that the year 2034 will find me alive and that I will retire from the University of Petroșani at the age of 65, to focus on my professional development and thus further to attract as many engineers and economists in several priority research directions.

These research directions will overlap eight fields of Engineering and Management in which I have focused my teaching and research activity in the last 12 years. The nine domains were grouped into four main themes, one derived from engineering and three from management. Also six of the eight sub-areas are strongly influenced by information technology, which revealed the title of the habilitation thesis.

Advanced Management Methods. Management Systems

The Implementation of ERP and BI systems in the Romanian organizations

Implementation of e-Government systems in Romania

Modern Methods of Education and Training

Designing and implementing of eLearning Platforms

Enterprise Platforms

Applied Management. Areas of Management

Project Management

SME's Management

Applied Computer Science in Engineering and Quality Systems

Computer Integrated Manufacturing (CIM)

Designing software applications

Implementation

I have tried to identify for the Jiu Valley conurbation, organizations focused on research, manufacturing companies to highlight some of the research results of my six important domains, and to be applied as a professional development plan.

1. Because in Jiu Valley there is a national research institute with interests in power, environment and anti explosive fields INCD INSEMEX with over 120 specialists, and because exist in this institute a powerful technical base, there could be done a scientific research at a high level and showing significant scientific contributions not only in the mining field, but also in the field of Engineering and Management.

2. I have an old collaboration developed with this institution, my mother started the foundations of psychological testing for the mining industry in the period 1975-1990 and coordinating this activity. I've benefited from this experience and have developed a decision support system based on the theoretical framework of my mother research. I also collaborated during 2006 - 2007 years in a few research contracts of this institution. I intend in the future to collaborate in training, to form INSEMEX specialists directed in engineering and IT management. I also propose optimize the relation between the major research institutions in the county, the University of Petroșani and INCD INSEMEX through a greater involvement of the project teams from the University and INCD INSEMEX scientific teams.

3. Businesses run by Jiu Valley SME's are involving over 5,000 employees in more than 60 medium companies and over 3,500 employed in the most representative 150 small companies. A few of these companies, having as areas of interest advanced technology, such as Electro Promex, ADARCO Invest and BKD Electronic must become competitive both technological and managerial only involving knowledge of the Engineering and Management field. I intend to lay the foundations of a partnership based on a dual commitment, these firms having an important material and technological ground, and the University of Petroșani, which has an important and well educated human resource. These resources can be shared only resting on a threefold qualification in engineering, management and IT.

4. I strongly believe that mining and energy sector in the Jiu Valley, represented by Hunedoara Energy Complex (CEH) which includes today over 7,000 employees working in four mining assets, (not by 42,000 employees in 17 existing mines as it was in 1997), could represent an element of energetic safety for the Romanian economy. Although CEH currently provides only 5% of Romania's energy production, I believe strongly that when renewable energy, solar and wind sources will be correctly evaluated, the role that coal will play in the energy sector of Romania will increase. For CEH workforce is very aging (in the mining industry even employees with higher education, after 20 years of work in the underground, must retire and massive enrolment have not been performed in the Jiu Valley mining since 1991), middle-level managers and executives are certainly not young engineers or economists, and for these reasons we must offer the training for both engineers and economists to be able to penetrate this field of industry with great importance and complexity.

5. Government institutions of Jiu Valley also totals over 3,000 employees having a high level of qualification, and I am referring here to teachers and clerks. These engineers and economists mostly, essentially can support future development by attracting in Jiu Valley conurbation projects with a high level of management, and focused on the real needs of young people, forming a positive outlook as young and Jiu Valley residents in general. I consider that this specialist must implement their area of competence, an IT&C component with applications in Engineering and Management.

I will try to connect to my past achievements and to build a bridge toward what could be the future of my academic career in the context of the areas of competences in Engineering and Management field.

Developing, implementing and efficient use of integrated computer systems in all organizations.

In my first 10-year career, as a programmer at the Bituminous Coal Company, and through my own company, I have designed management applications to different companies. Later in the next 10 year of my career I have analyzed the implementation of information systems. Thus in 2004, I have investigated nine mining companies totaling an estimated 47,000 people and about 1700 computer systems, and I have identified the role that information systems play in these organizations. Then in 2011 I have investigated 16 representative organizations, selected out of the 250 SIVCO ERP Application implementations in large organizations. I have identified in this case the role that ERP and BI systems have on the management of these organizations. I am now in the process of investigating about 100 SMEs from the Jiu Valley, study that has a research component focused on the analysis of IT & C components of these SME's.

From this perspective I am convinced that I can guide and advise operations managers, IT managers, top managers, IT specialists, business managers and production managers in the purposes of use and efficient implementation of information systems (IS) in their own organizations. I am currently in process of an analysis of the possibilities of IS implementation in SMEs, analysis that runs with the support of two major software houses from Romania Spectrum Brasov and Radix Consult Bucharest in partnership with the most important IS implementer of the Jiu Valley - CC Info 98. Based on this analysis I will involve 100 managers of the Jiu Valley SMEs, and PhD students, for a more efficient perception of IS but also in the direction of training these managers at a higher IT&C level.

Focusing of local government's on the concept of eGovernment

Romania tries for more than six years, and unfortunately do not manage to implement a real eGovernment system. eRomania is still only a dream, and Romania ranks at the last position in EU, in terms of online services for citizens. In 2012 I have conducted a study focused on 10 local Romanian governments, and even it were necessary 45 local administrations, for the study to be representative, it was very difficult to identify local government that have implemented eGovernment services. I have studied in detail in 2013 the Municipality of Petroșani, from this point of view. It is clear that there is so much to do, too little has been done in this area, and it is needed a new perception to be sent both mayors and specialists involved in the implementation of IS and other online software for the citizens.

In this area I intend to create an emulation among local governments, for implementing eGovernment services, and guide managers and specialists from these organizations in order to a better collection of taxes, an effective collaboration with citizens, a modern administration and social dialogue with citizens, based on eGovernment systems. Clearly city hall specialists with the help of PhD students will be interested in this field, and based on a more complete knowledge of E-government implementation, and on an efficient use of IT&C technology, we will get benefits for the citizens.

eLearning, an alternative training method for managers and specialists from the IT&C field. Using AeL as an Innovative, Modern and Complementary Tool for Education

Although in United States, 92% of the universities use an eLearning platform, in Romania only SIVECO tried to impose particularly in gymnasium and high schools, eLearning as an alternative method of training. During 2011 - 2013, I have implemented a SIVECO web-based LMS <http://193.230.241.7/ael/welcome.jsp> (<http://7.upet.ro>), where I have developed curricula and interactive lessons for five areas of computer systems and management.

The eLearning web portal was designed using a CMS named Drupal Suite and the e-Content was developed with InfoPath as an application for development of scenarios and Edu Integrator as a software for converting scenarios in lessons as learning objects.

On the same principle, because the InfoPath Edu Integrator, tools used for developing the web based LMS, are not programming languages, and thus does not require IT&C knowledge teacher and PhD students can develop their own eLearning lessons.

Improving the quality of the grant applications, establish concrete targets and develop a performance management through projects, in order to improve the absorption of European funds

Romania will end in 2014, after obtaining an extension of one year from the European Commission, the first stage of implementation the 2007-2013 EU Structural Instruments, the famous European Funds. I became aware of the importance of attracting European funds for Romania, in 2008 when I start to develop a simulated enterprise at the University of Petroșani with the support of two prestigious IT companies such as Microsoft and SIVECO, SIVECO proposed me to write a grant application in the purpose of implementing an educational platform.

The first project submitted, and the first grant application that we developed was POSDRU 39352, entitled "eMaster for Project Management (PM) and Information Systems and Technology (ITS)", in 2008 for the 1.2 axis. The project has not received funding, but it was the first experience in this area, and in 2009 I have submitted a new application form POSDRU 59756, entitled "Alternative professional training using IT solutions - a solution for re-conversion of the Labor Force in the mining industry ", which was implemented by the University of Petroșani, in the period October 2010 - September 2013, being one of only two projects that the University has implemented as applicant, and achieving an absorption rate of about 70 % ie about 3.5 million lei. In 2013 I have submitted a new draft POSDRU 141118, in the 2.1 axis, entitled "Practice is not ephemeral, but a step in the career", as a coordinator in the project management team, project achieved 9th place of 514 projects evaluated and receive the required financing support and is in the implementation at this time.

Relying on the experience of over six years in the development and implementation of European projects, I believe that besides to the quality of teaching master students in the field of Engineering and Project Management, I hope that I could prepare PhD students, as specialists that can coordinate public administration, as production and research specialists whom I met in the master's program, and have implemented or would implement European projects in order to improve the setting of the objectives for a better project implementation.

Modern management of SMEs. "Even small businesses today consist increasingly more of people applying knowledge, not manual dexterity or physical strength to work"

The personal perspective on the Romanian business environment, and the 20 years experience in the Romanian business market allows me to guide future specialists in these field. So I set up my first company in 1992, when the business environment in Romania was during his pioneering stage. After more than 15 years of continuous activity in trade en - retail and IT services I have managed to develop a network of stores and create a lot of jobs in this area. The 20 years of practice gives me a completely different view of the business field, than I could have only as a teacher, teacher that can use a series of concepts and notions that are not necessarily connected to reality.

I have focused on the SME's area, having the belief that any business man must adapt the information gathered to any size of company that hopefully will lead in the near future. In this area I intend to develop managerial skills and knowledge needed by PhD students, for starting a business in a management positions in a small or a medium enterprise.

There is an very serious problem at the Romanian macroeconomic level, because in counties with 400.000 - 500.000 inhabitants, the fifth company in the rank of the number of employees, has only 100 employees, So there is a very low absorption capacity of young generations offered every year in the labor market. A solution for this situation could be represented by an entrepreneurship and IT skills profile of the younger Romanian generation, but nevertheless supported by active measures of the Romanian govern, but also by a high-level of training, for PhD students in the field of engineering and management.

I am in contact with over 100 SME managers from the Jiu Valley, which should certainly improve their managerial and technical performance, because more than 60% of these managers are working in the manufacturing sector and services sector. This improvement can be achieved only through a deep understanding of the link between Engineering and Management.

Designing of information systems

Even if in our days the design of information systems is an attribute of software houses, two opportunities remain open for as niche activities in this area. The first could be the design of small customized applications for which the major IT companies are not oriented, and the second one could be a smart user training for the existing software solutions. PhD students could offer the best solutions for these opportunities.

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