IMPLEMENTATION INFORMATION SYSTEMS FOR THE SMALL AND MEDIUM ENTREPRISES – GENERAL SCHEMATICS

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Abstract

This paper presents mainly the project making techniques needed for integrating information systems into SMEs and tries to identify the appropiate software resources. As for the project making techniques, the paper presents elements for the analysis of the existing information system, the structure of the future system, a flexible scenario for implementing an IT system, steps to follow for generating a solution, methods of management and estimation of the project's economic efficiency.

Introduction

Any human activity is influenced by three basic factors: matter, energy and information. The study object of the economics students is information – more precisely, the information flows associated to different activities within entreprises. Any information flow has two main components: a persective component (related to prognoses, programming and planning of the activities) and retrospetive component (related to supervising and controlling activities).

The main object of any information flow is to supply "raw materials" for the decisional process, but any decision – at all stages, from the start to the feetback – needs accurate and in time data and information. The management information System is a solution for controlling the information flow of small and medium entreprises (SMEs).

The main implementation schematics

The implementation project is regarded as the main instrument for coordinating the whole implementation process. Within the Implementation Project there can be distinguished six diffent parts. The introductory part; The analysis of the existing information system; The structure of the future system; A flexible scenario for implementing the information system; A checklist of the steps to be taken; The management solution.

The introductory part should state the objectives of the project, explain the need for the suggested solution, present information system's components and show the final goals.

The analysis of the existing information system is made using specific techniques, such as identifying the domanins and local domanins on which the system works, identifying the main information flow of the domains, studying the data collections and the local and global information of the entreprise, assigning scores to the decision processes involved, creating an inventory of the present IT resources (hardware, software and comunication capabilities), identifying the main features and restrictions of the new information system. For this section the designing team works together with the management team of the entreprise in order to choose the best solution. The third part of the implementation Project describes the structure, technical data, layout of the software components, description of the data resources. At this stage it is also decided the functional structure of the future system, while deciding on the necessary qualified personnel, setting the priorities of the identified domanis and displayning the structure of the future system's costs (fig. no. 1).

The flexible scenario consists of a detailed functional preview of the future system's organizational structure. It also sets the responsabilities of the communications center, the shared memory system,

individual compartments and the purpose of each software component. The technical layout of the system – the Client/Server type – describes the workgroups by type, the shared memory server (File Server) and the communication server. These are all linked together in a network. The technical layout will serve an open information system and will include the following types of workstations (fig.no.2):

- **Type O (Office):** designed for secretary work. These should offer support for: desk work, e-mail, report printing, database query, electronic scheduling
- **Type C (Data Collection):** designed for data input. These workstations shoud offer service for: gathering data, verifying and processing data, document processing, querying, database update, data transmission;
- **Type D (Decision/Dispatch)**: design for management activities. These workstations should have capabilities for: word processing, printing, dispatching, query/update databases, data transmission (incuding an Internet connection);
- **Type U (User):** these workstations should support current use of the required software, including services for: query/update databases, document information, local processing, report printing;
- **Servers (The file server and the communication server):** these posts should offer services for: managing the system's shared data, managing communications, e-mail, file transfer, query on external databases by means of the communication server, report printing.

The workstations will be installed upon the present management system. They will be used by the present personnel who will attend training courses as needed. The number of workstations of each type will be set according to the volume of information, frequency of queries and response terminal needed for supplying information. The system will be an open one – i.e. from the same terminal someone can access the local resources of the workstation, the resources of the LAN or the resources of the firm's global network. Descriptive charts of these workstations will be enclosed in the proposed IT solution, together with the description of the hardware and software platforms.

The apllication layout (the Client/Server component) should describe the applications used in the two levels of the system – the server level and the client (workstation) level. The following types of applications will be included: deskwork applications, database applications, database management, networking and communication systems, applications for assisting specific activities of the firm.

The layout of the system's data resources includes databases and applications designed to offer services for: processing information – i.e. data input, data save, data processing, data transmission, data storing -, administration of databases and the system's resources, development and maintenance of applications.

The IT solution represents the firm's strategy in integrating an information system with specific activities. IT contains a binding between the elements of the projected system's layout and the conclusions resulted from the analysis of the existing system (regarding projects being carried out, proposed projects, projects raising conditions on each other and priorities set by team designated to implement the project). The IT solution will be presented as a flexible scenario, structured by domanins, each of which divided into sub-domains and within these by applications.
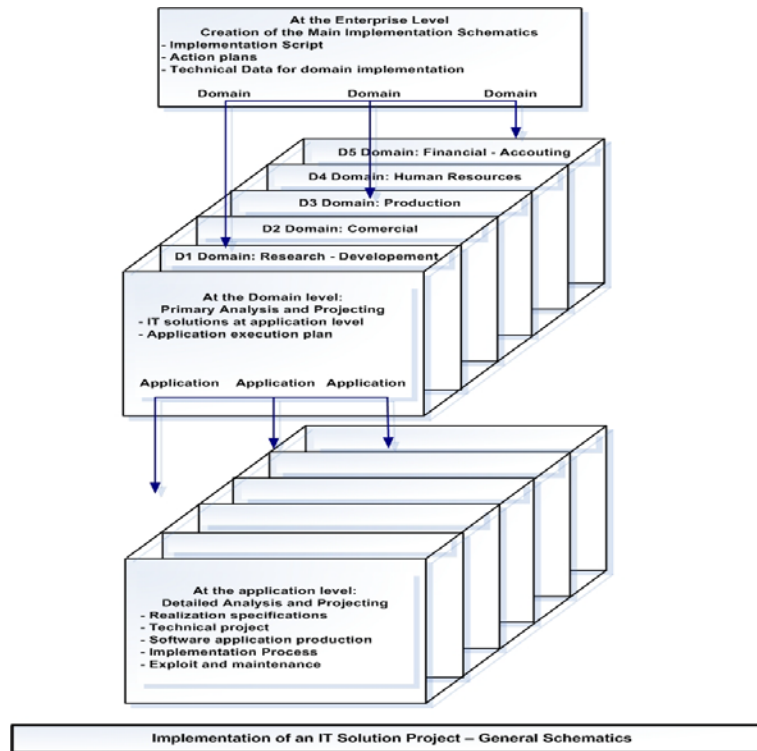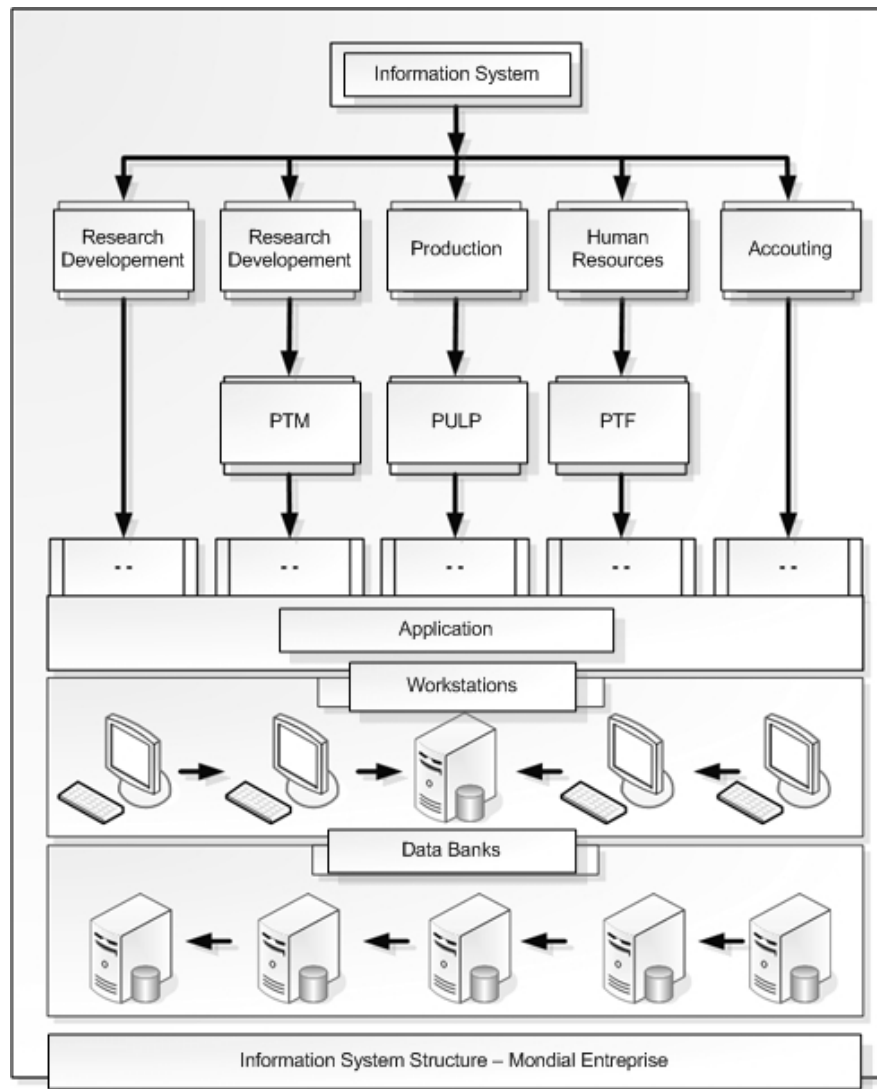
At the Enterprise Level
Creation of the Main Implementation Schematics
- Implementation Script
- Action plans
- Technical Data for domain implementation

Domain   Domain   Domain

D5 Domain: Financial - Accouting
D4 Domain: Human Resources
D3 Domain: Production
D2 Domain: Comercial
D1 Domain: Research - Developement

At the Domain level:
Primary Analysis and Projecting
- IT solutions at application level
- Application execution plan

Application   Application   Application

At the application level:
Detailed Analysis and Projecting
- Realization specifications
- Technical project
- Software application production
- Implementation Process
- Exploit and maintenance

Implementation of an IT Solution Project – General Schematics
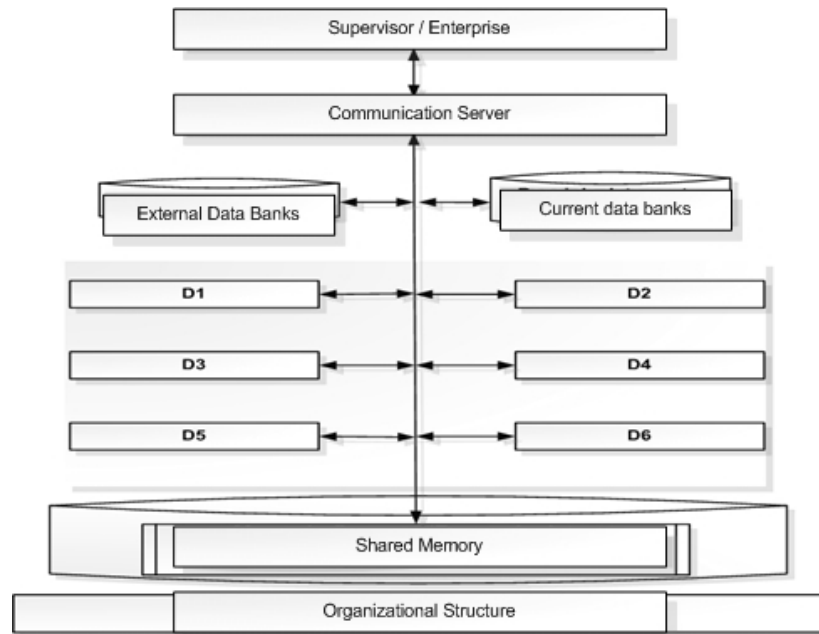
Fig. No. 1

Fig. No. 2

Fig. No. 3

For the efficient implementation of the projected solution it is necessary that the following steps should be taken, in a top-down order:
- Identifying the necessary applications for each domain: estimating the number and types of necessary workstations; setting priorities by applications, (see fig.no1 and fig.no.2);
- Building descriptive charts for applications; these charts will be starting points in developing the applications;
- Estimating the efforts, resources and time necessary for developing, information subsystems, by step (logical project, technical project, procedure development, implementation);
- Building the network graph for the new project and setting the implementation schedule, according to the priorities set above;
- Configuring the hardware platform of the new system;
- Configuring the all-purpose software platform.

The project's management consists in coordinating the actions taken by different entities involved in the implementation – i.e. coordinating the actions taken by: the firm's managers, harware and software suppliers, application developers, users within the firm. To ensure that the project's objectives are reached, the folowing actions are to be taken: creating the technical platform (hardware, software, communications), creating the software applications, collecting data, assuring good communications within the implementation team, good communication between the team and individual compartments, training personnel as needed, following the guidelines of the Implementation Project. To estimate the economic efficiency of the new system, a cash flow analysis will be conducted.

It has been statistically observed that the average of the management information system has a lifetime of about 3 to 4 years. This is mainly due to frequent changes in the firm's structure and activities and to the rapid development of new hardware. For this reason, the creation of the Implementaion Project (which is actually a project of projects) shoud not take more than two months and the implementation should not take more than one year. This is partly possible by implementing the system as a sequence of modules that starts working as soon as they are ready. Thus, the

Implementation Project is an activity that is carried out periodically, aiming to redesign the information system while keeping usefull components from the existing system.

All the above techniques refer to the economic student, user of New Information Tecniques (NIT). For the student preparing to become an information system designer, this basic knowledge should be completed by a thorough understanding of operating systems, ability to use at least two programming languages, ability to operate at least three database systems, knowledge of analysis – projecting-developing techniques for developing information systems and applications, understanding of computer networks, expert systems and the methods to create the Implementation Project.

**Identification, Development and Implementation of
Reusable Business Aplications**

It is known that the human activity is subject to three factors: matter, energy and information. The student in economics, regadless its major, is concerned with information. Studying employment opportunities in Romania as well as abroad, frequent requests can be found for economists speaking a foreingn language, capable of operating a computer and having a driver's license. Specialized knowledge is not sufficient nowdays. The world has involved rapidly especially in people's mobility, ideas circulation and the information flow. This has brought about the necessity to asses specialized knowledge as well as other basic knowledge , which can be considered the ABC of the specialist who wants to work in the Information Society. It is for this reason that the student in economics (even from the junior years) should know how to use office applications, be able to perform deskwork, first during college and then at work . As the student understands economic concepts, the student should learn how to work with reusable software for specific activities, such as: general accounting, resources management, managing fixed assets, human resources management, computing salaries, managing transport activities, etc. Economies worldwide have been showing a tendency towards e-business and consequently using relational databases. This has encouraged the implementation of general database concepts and database managemant systems such FoxPro, ACCESS, ORACLE, SYBASE etc using microcomputers technologies, IBM compatible. In the following subsections we will suggest a few improvments to the economics student curricula, concerning his study of information systems.

The Office Infioration Systems class includes the information systems designed for managing information and transmitting it across different economic and social organizations. Microsoft OFFICE is an object oriented application package that includes a number of information systems designed for office work: WORD (designed for text processing) , EXCEL (designed for table computation), ACCESS (database management system), POWER POINT (designed for creating presentations). The four information systems have been designed to work together and they offer a series of common features such as the main program structure, dialogue boxes, buttons, icons, etc. and the facilities of the Internet are included. These services are used as support for developing informing and documenting capacities and for improving learning processes. Gradually, these systems have become a real support for some activities such as documenting, archiving and dispatching, lab courses. They will also become tomorrow's economist's best tool. The features that Java and HTML offer for creating and administrating web sites cannot be missing from the economics student's curricula, especially when studying information systems. This knowledge will be succesfully used , given the general trend to convert business into e-business.

Reusable Business Systems

Implementation of management information systems in economic activities has lead to a rapid development and diversification of DataBase Management Systems (DBMS). It has also provided grounds for the development of a very large number of database applications. Once can say without a

doubt, that economic information systems have been the main engine in developing distributed programming. Databas systems and applications are now being used in all activities, of which an important one is business.

While understanding the basic economic concepts, the economist student learns the main information flows within a firm. They understand that the success of the firm depends much on the efficient and fluent management of information. If in what concerning the directly productive area, increase in work productivity implies speeding the flow of materials, energy and cash, then the information flows related to these activities have to keep the same acceleration, in order to keep the business efficient. This is a must of modern management and it is granted by distributed economic programming. Distributed, non-centralized and open economic information systems offer the solution to the problem of correlating material and energy flows with information flows. Development efforts have concentrated on economic systems, seeking to create a reusable software component, similar to Microsoft OFFICE, for the use of economic agents. These efforts include a series of programs with large reusable capabilities. The functions that programs target, as well as domanins on which the apply are:

General Accounting (The package's functions)

➢ bookkeeping using any currency, based on primary documents;
➢ ability to import data from other applications (salaries, resource mangement, fixed assets);
➢ ability to keep records for any organizational structure, while being able to generate a consolidated balance sheet;
➢ calculation of profit tax and generation of a related document;
➢ automatic balancing of accounts and computation of exchange rates variations;
➢ generating several primary documents, such as payment orders, receipts, etc;
➢ correlation of accounts and paterns; generation of cash reports and bank account statements;
➢ ability to supply detailed information on each account;
➢ reports on credits and debts, budgeting.

Resource management (The package's functions)

➢ managing material resources by department;
➢ reports on material inputs, outputs and processes;
➢ reports on products and materials in stock;
➢ records of partners (i.e. suppliers and clients); automatic invoice generation;
➢ storage reports, with related inflows and outflows;
➢ products listing; VAT journals for products bought/sold;
➢ recalculation of stocks; ability to use bar-codes; daily cash reports;
➢ records of sales and income by agent;
➢ generating data packages to be used in other applications.

Fixed Assets (The package's functions)

➢ managing fixed and financial assets;
➢ automatic computation of depreciation for fixed assets;
➢ generating data packages to be used in other applications;
➢ generation of several documents related to the management of fixed assets.

Human Resources management and Computing Salaries

- ➢ computation of salaries in different manners (by hours, by project, etc.)
- ➢ projecting medical assistance from our own funds or social security funds;
- ➢ computation of salary taxes and deductions;
- ➢ records of personnel (including military status); automatic update of salaries according to legal regualtions;
- ➢ automatic printing of payment orders for salaries and generation of data package to be used in other applications;
- ➢ several reports and forms, as required by government regualtions.

Transport Activities (The package's functions)

- ➢ records of available trucks, route charts and fuel used; records of drivers and time worked;
- ➢ records on national and international transport; records on fuel used.

We have mentioned only a few of the existing applications that the economics student should understan, in order to meet the increasing demands of the Information Society. Lab activity and individual projects should target mainly on this type of database applications (usually integrated systems). This helps us meet some ambitious objectives of the masters' community: to teach the student how to learn, to teach the student how to integrate into industrial society.

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