

SOLUTIONS AND POLICIES FOR THE
IMPLEMENTATION OF BUSINESS
INFORMATION SYSTEMS

Abstract

The present paper is focused on the identification of the tendencies in introducing Information Technology and Communications in enterprises. It is investigated how the European Union policies sustain the adoption of the information systems by its financing instruments. The trends in business information systems development are reviewed in order to identify the way in which the factors that influence the adopting of Information Technology and Communications in enterprises. The goal of this research is to identify solutions for business information systems development that accomplish the need of the enterprises and contribute to the increase the implementation rate.

Keywords: Management Information Systems, policies, methodology, Value Analysis

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SOLUȚII ȘI POLITICI PENTRU IMPLEMENTAREA SISTEMELOR INFORMATICE PENTRU AFACERI

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Rezumat

Lucrarea urmărește să identifice tendințele în introducerea sistemelor informatice în întreprinderile din România. Se investighează modul în care Uniunea Europeană, prin instrumentele sale, susține întreprinderile în acest demers. Pentru a identifica factorii care influențează introducerea tehnologiei informației și comunicațiilor în întreprinderi a fost făcută o analiză a evoluției informatizării deciziei în întreprinderi, sub diverse aspecte. Scopul acestei lucrări este să identifice soluții noi pentru dezvoltarea unor sisteme informatice care să corespundă necesităților beneficiarilor și care să contribuie la creșterea ratei de implementare în România.

Cuvinte cheie: Sisteme informatice pentru management, politici, metodologie, Analiza valorii



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1. INTRODUCTION

In order to survive in the knowledge-based economy, companies should be able to adapt quickly to the continuous changes that occur in the increasingly dynamic business environment, which is characterized by the emergence of new types of relationships between suppliers, clients and their competitors as they join efforts to develop or open new markets and to respond quickly to the opportunities that may arise. The success of companies is determined by access to information in due time and the ability to communicate with the outside world by connecting to information and communication systems that are becoming increasingly complex. The effort of adapting the companies' information systems to the requirements of the economic environment has resulted in the automation of operations regarding the information collection, recording, processing, storage and transmission. As a consequence of using the information technology, as Nicolescu (2005) mentioned, it is witnessing an unprecedented increase of execution speed of these operations, aspect which was regarded as one of the causes of technical and technological type that have led to the knowledge revolution. Consequently, the level of business management systems development is also assessed taking into consideration the computer system share in the information system. On the other hand, the application of information technology in companies is often regarded as the best solution for the removal of economic processes malfunctions.

A method that can ensure substantial reduction in costs, while maintaining or even improving the products' technical and functional parameters is the value analysis. Due to the interaction of the technical criteria with the economic and social ones, the Value Analysis encourages professionals' creativity in order to achieve an optimal balance between the user's requirements and the quality of goods, on the one hand and their implementation costs on the other. The Value Analysis is fundamentally different from the conventional design methods that are currently used to reduce costs. While most of these methods start from a physical object, for which the most economical manufacturing solutions are looked for, in case of Value Analysis the goods are studied starting from the customers' needs, from the characteristics they should have in order to satisfy the end-users requirements. Unlike the classical methods of design that improve something which already exists, the Value Analysis designs or redesigns the product/service as required, it aims at accomplishing a function by ignoring current constructive solution. There should be a proportional balance between the importance level of the function in accomplishing the general use value and that of cost required to accomplish it.

2. METHODOLOGY

- Previous literature and empirical studies related to information systems design was reviewed. Also, some documents which draw the policies for introducing the technical and technological progress in Agriculture were reviewed. Based on these reviews was introduced the succession of a product's stages that have to be covered in order to design the information systems by using the Value Analysis.

3. TRENDS IN BUSINESS INFORMATION SYSTEMS DEVELOPMENT

3.1 Policies for the Implementation of Business Information Systems

In the last years, the European Union, through its instruments, supports the introduction of the Information Technology and Communications in enterprises, as manner of increasing the efficiency of the activities performed. These programs open new financing opportunities for informatics solutions for Romanian business and online projects. In Romania, the Sectoral Operational Program for the Increase of the Economic Competitiveness (SOP IEC) is one of the most recent programs which include measures that support the introduction of Information Technology and Communications (ITC) in enterprises. Starting with 2011, within SOP ICE, Axis 3, were launched measures 331 and 332 destined for the financing of the implementation of software systems for micro-enterprises and small and medium enterprises (SME's). Through measure 311 is supported the access to broadband and connected services.

Through Measure 331 - Support for the implementation of integrated informatics systems and of other electronic applications for business management and Measure 332 Support for the development of electronic trade systems and of other electronic solutions for business. The funds managed through measure 331 are destined for purchasing internal informatics systems: the implementation or expansion of the ERP systems, implementation or expansion of systems for CRM customer relations, implementation of software solutions for design and/or production, for improving the life cycle management of products, implementation of the economic analysis and decision support informatics systems (BIS - business intelligence systems) and of other electronic applications for business management. The funds managed through measure 332 are destined for purchasing informatics applications for external customers (implementation of informatics electronic trade systems, implementation of informatics systems for electronic bids, implementation of informatics systems for secured electronic transactions, e-payment informatics systems, e-learning systems). Also, the

expenses for ITC and for measures aimed at increasing economic efficiency are eligible for financing within the following programs: Regional Operational Program (ROP) National Rural Development Program (NRDP), Sectoral Operational Program – Human Resources Development (SOP-HRD), Sectoral Operational Program Environment, Sectoral Operational Program – Administrative Capacity Development (SOP – ACD), Sectoral Operational Program Transport, Fishery Operational Program.

3.2 Trends in Business Information Systems development on the European level

Software for state-of-the-art business, designed to meet the business decision requirements aim at combining all distinct types of applications developed to automate the information system activities (Transaction Processing Systems, Management Information Systems, Decision Support Systems, Expert Systems) into an integrated one, where information is shared and the communication between departments is open and unlimited known as Enterprise Resource Planning (ERP). ListenRead phonetically If are analyzed the benefits of implementing ERP solutions, could be concluded that they address the needs of the market segment consisting of large companies, mainly multinationals. However, many of the facilities provided by ERP sites are useful to companies, regardless their size, but the sale price is often prohibitive, limiting their accessibility.

The latest trend recorded on the European level in developing integrated business computing applications, consists of customizing the management needs of small and medium enterprises (SMEs). Nevertheless, it must be noticed the recognition on the European level of the fact that SMEs management displays certain information requirements and in order to meet those requirements certain solutions should be developed. There are more than 25 million SMEs operating in the European Union (EU) having over 100 million employees, thus constituting an attractive market for suppliers of integrated solutions.

3.3 Trends in Business Information Systems development on national level

The Romanian market for business software should be taken into consideration due to its products diversity on the one hand, and to its remarkable increase potential on the other. The potential market for ERP solutions and services in Romania is without doubt one of the most significant in the region. Except for 2009, the ERP market in Romania has increased steadily. The need for business management solutions is very high, both for public and private institutions. One of the criteria influencing the market structure is the size of the companies for which the products are intended. The recipients' classification of business software is based on the amount of turnover. If the data provided in Table 1 are analyzed, should be noticed that more than half of customers are represented by multinational companies. On the

opposite side there are small companies that have a market share of only 2%. Moreover it is noticed that even micro-enterprises are not even included in the statistical studies, although, as the National Institute of Statistics notices, in Romania they have a market share of 93.11% of total active companies, which entitles us to say that this market segment has not aroused ITC solutions developers' interest leading to repercussions on both sides. It could be spoken about a mature market in the future when small and medium-sized companies represent the most ERP implementations. From this point of view, the Romanian market is on its way to maturity. Table 1 shows the market structure for ITC solutions, grouped according to the size of the companies that receive the information systems.

TABLE 1 - ROMANIAN MARKET STRUCTURE ACCORDING TO COMPANIES' SIZE THAT HAVE PURCHASED ITC SOLUTIONS

| Type of company | Big Companies | Medium Companies | Small Companies | Multinational Companies |
|-----------------|---------------|------------------|-----------------|-------------------------|
| Market Share | 28 | 15 | 2 | 55 |

Source: IDG Romania, 2008

TABLE 2 - ROMANIAN MARKET STRUCTURE DEPENDING ON THE AS ITC SOLUTIONS PROVIDER

| Denomination | SAP | Siveco | Oracle | Small and medium sized companies |
|--------------|------|--------|--------|----------------------------------|
| Market share | 28.3 | 19.3 | 17.4 | 35 |

Sursa: IDG Romania, 2008

Based on data provided in table no. 2, the main providers' market position is analyzed. It is noticed that the market leader is SAP, with 28.3% market share, followed by Siveco, with 19.30% and Oracle with 17.40%. The difference of 35% of market share is held by small and medium-sized companies which are mainly Romanian.

The business solutions implementers which are active in Romania can be divided according to the national membership criterion into two broad categories: international companies, which own 45.7% market share and local companies with 54.3% market share. If is draw a parallel between the beneficiaries' structure and the developers' structure, it can be noticed that multinational companies prefer international developers' solutions, while Romanian companies prefer solutions provided by local developers. For international companies that are active in Romania and develop business software, there is a tendency to change products addressability. Currently, it is witnessing the gradual change of interest from multinationals to medium-sized companies with turnovers up to 25 million euros. The big domestic companies that produce software mainly focus on the local SME segment (regardless of their profile), which have at least 50 employees and a turnover of at least 5 million euros. Local companies which produce ITC solutions cover the market of small and medium-sized companies whose turnover is

below 5 million euros by offering cheaper products and faster to implement, thus making them more attractive for mid-market segment, where ITC investment budgets information are rather limited.

As a result of an analysis of the companies that benefit from ITC solutions in relation to the size of providers, some similarities are pointed out:

- multinational companies prefer corporate level-implemented solutions, mainly due to the need for a uniform reporting;
- regarding the Romanian companies, the delineation is more difficult to accomplish, however Romanian solutions are preferred as they adapt easily to market specifics, taking into account the continuously changing legislation.

4. THE CURRENT STAGE OF MANAGEMENT INFORMATION SYSTEMS DESIGN METHODOLOGIES

Since the beginning of information technology, the information systems design and analysis methods have been continuously improved, reaching over one hundred methods (Oprea et al., 2002). The continuous developments of the information technologies, of the information systems and of the enterprises, are the main elements which sustain the progress of the design methods. The first software were developed in the 60's, at that time the accent being put on the programming, all these in the detriment of analysis and design. In 1967, the need of ITC products quality development drew attention to NATO's research group, which, at the same time with the introduction of the programming engineering concept, proposed that the development of the software to be accomplished similarly to any other product that is the result of an engineering project (Lethbridge and Laganieri, 2001). The evolution in this direction was marked by the effort made for the formalization of the activities specific to software development. The result of these steps is the development of a methodological line, known as hard system approach for information systems projections. In their development succession, the most used methods from the category of those included in the first methodological stage can be classified in three large categories: function-orientated methods, data flows-orientated methods and object-orientated methods. The main forward step is the concentration on improving the design and analysis activity. However, the purpose was to improve the efficiency of programmers' activity. This orientation, because the lack of concern for the adequate defining of information systems requirements, represents the main reasons for which the information products, despite the progresses done in systematization programming activity, proved to be qualitatively critical, showing a deficit; more precisely these weren't answering in a satisfying manner to users' demands and economical environment (this one more and

more dynamic). In the measures taken for improving the projection methods, the specialists directed their attention to some factors whose influence wasn't correctly appreciated. Through the inclusion of some social and organizational aspects, the bases of a new orientation were put: soft system approach for information systems design. Compared with the hard system approach, the new trend, whose promoter was Checkland (2004), must be considered under the aspect of complementarities, without denying first one's acquisition. The great progress consists in crossing from the software as the product itself, as the final purpose of the design methods, to its development as part of the information system and the concentration on the final destination of the information system: serving to the enterprise's information system. Furthermore, it's made a difference between the perception of the enterprise's information system depending on the position of those who make the appreciation and on the involvement level – beneficiary or developing one. The evolution of soft system approach bases on the growth of methodology elaborated by Hauser and Clausing, known as House of Quality (Flynn, 2000). It is for the first time when, in an information system design methodology, it's confirmed beneficiary's role as a success element of the information system projects.

In the new trend it is subscribed the approach based on value, which has materialized itself using two development directions. The first one (having a pluridisciplinary nature, including in the software engineering concepts belonging to Value Engineering, quality management, risk management, human resource management) it is promoted by Biffi et al. (2005). The second line is developed by the observers Faulk, Raffo, and Harmon R. (2005), which take over some of the vital concepts of Value Engineering that they transpose into the software engineering. The research is concentrated mainly on finding the information systems' requirements. In the framework developed by these ones, for the first time it is pointed out the difference between the internal perception of the companies developing information systems on the use value assigned by the beneficiary, and the manner how the beneficiaries perceive it. Also, it is pointed out the existence of some different perceptions on the value of the information system inside the identified group.

In Romania, there are no applicative implementations in the software engineering domain. Thus, as Ionita (2000) mentioned, Value Analysis was used to realize some practical applications in domains such as investment objectives and technological processes for which there were elaborated specific applying methods, which represent an innovation on international level. The Standards of Value Analysis issued by Romanian specialists (STAS 11272/1-79, 1979; STAS 11272/2-79, 1979), doesn't name the information systems as a possible object for Value Analysis, but it doesn't limit the use of the method to the enumerated objects, either. The European Standard EN 1325 - 1:1996, Value Management, Value Analysis, Functional Analysis Vocabulary (1996), appeared after 17 years, to which

Romania aligned, although it doesn't name the informational systems as possible study object; this includes some of their basic elements: hardware and software.

The possibility to include the information systems in the category of that Value Analysis's study objects it is mentioned by Ionita (2000). The recommended methodology is the one applied to products, which must be particularized depending on the specific elements belonging to information systems. This matter is sustained by Radu, Ursacescu and Ionita, (2001) who propose introducing Value Analysis to determine information systems' specifications. This way, one step forward has been done in applying value analysis methodology in the design of information systems through the determination of the social need that these have to satisfy: providing the management system with the required information in the structure, quantity, quality and at the proper moment for decision making.

It has been ascertained by us the fact that the specific potential of using Value Analysis to increase the quality of the decisional process by introducing the informatics in the information system, in Romania, it was noticed by two categories of research workers: specialists in the Value Analysis/Engineering and, on the other hand, by specialists in information technology. The researches done until this moment have marks on themselves left by the preparation of each of the named categories, until the time being existing no centralization and standardization of the achieved acknowledges and experience, under the shape of a unitary information systems projection methodology using Value Analysis, as well as this exists in applying the Value Analysis method on the information system, treated as a product, and on the transfer of these concepts to the enterprises that develop information solutions for companies' information systems.

By using Value Analysis it is proposed to remove one of the major differences of the information systems, namely the lack of a bond between their use value and management objective of the beneficiary enterprises. The proposed approach allows you to eliminate the non-concordance between beneficiaries' expectations and the characteristics of the delivered information systems, as the main drawback brought by using traditional methods, by the position of beneficiaries' demands in the methodology's center. The research represents a innovation, from the point of view of the functional approach in design information systems, and this has a specific technical and methodological utility by changing thinking mode of managers, software developers and specialists, too, by passing from the constructive approach (from what it is the information system), to the functional one.

5. VALUE BASED METHODOLOGY POTENTIAL FOR INFORMATION SYSTEM DESIGN

The research that has been conducted so far revealed that within these companies there still are several groups that have different viewpoints, namely developers, product managers, marketing department, sales agents and service-providing employees. Frequently the perceptions of the above-mentioned categories are the only ones to be found in products at the expense of beneficiaries and end-users expectations. The employment of the proposed methodology allows compensating these deficiencies by supplementing the specialists' opinion that is trained in ITC with the opinion of the groups identified among beneficiaries and end-users. The third stage deals with the reconciling the internal perception on the use value in companies that provide information systems with that of the beneficiaries/users.

In this stage the greatest discrepancies occur between the design-team opinion and of the stakeholders' expectations regarding the use value. The results thus obtained have a significant impact upon the aligning process of the design team objectives to the use value expected by the beneficiaries. Listen

The lengthy discussions on the own-products requirements that take place in software-developing companies frequently focus on the product characteristics, performance, cost and potential competitive advantages compared to similar products. Nevertheless the internal discussions that focus on the benefits customers will have as a result of using the product or the key factors identification in the purchasing decision occur rather rarely. Moreover to these points of view, it is considered it appropriate to add another factor which should be taken into account when formulating the information system requirements, namely the legal framework. This should be the proper approach to be taken into account in companies' decision-making process that develop and implement business-design information systems.

Another significant particularity of the proposed methodology emerges during the stage of economic ranking of information system functions. It is about the production cost structure, where considerable differences may occur compared with the product-specific cost categories. For information systems, the main categories that involve costs are the following: hardware, operating system, software, implementation and maintenance. In case of information systems, the cost of raw materials and materials is replaced by the expenses incurred to purchase the necessary equipment and operating system. Operating systems also involve a situation which is specific to information systems.

The price-cut can be substantial, as there is the possibility of purchasing open source solutions. The effect of employing these solutions is twofold, affecting both the manufacturing overhead cost of application software developers, who will not purchase licenses for operating systems, databases and

servers used. Regarding the labour cost, it should mention that it is generated by the main activities of system implementation: the application program (software) development process, in which case it can be included in the production costs, the actual implementation period, in which case it is classified as consulting expenses and during the operation stage (maintenance) when it is included in the expenses dedicated to post-implementation service.

6. CONCLUSIONS

More information systems proved to be unsuitable from the qualitative point of view; more precisely they did not successfully meet the users' demands, respectively the more and more dynamic economic field's demands. In the intercessions made in order to improve the design methods, the specialists aimed at some factors whose influence on the final product wasn't adequately appreciated.

Using the value based approach will allow the elimination of the discrepancies between the beneficiaries' expectations and the characteristics of the delivery information systems – as main shortcoming caused by the use of the traditional methods – by placing in the centre of the methodology the beneficiaries' demands. The initiative is considered an innovation from the perspective of the functional approach in the design of the information systems of the enterprises, and is also technically and methodologically highly useful because it changes the managers, designers, specialists and executors' way of thinking, from the constructive approach (from what the information system is) to the functional one (to what the information system does).

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