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The role of managers and users in the information systems development

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Abstract
Managing information system is a critical skill for success in today´s business environment. All levels of managers and users are involved in process of decision making and managing information system in their firms and organizations. The main two questions we are dealing with are why and how to develop information competencies of our graduates - future managers and advanced users of information systems. We try to integrate many aspects of the ICT use into the education. The goal of our new manner of education is to assist future managers in becoming knowledgeable participants in information systems development.

Key words: Information system, manager, user requirements, education

1. INTRODUCTION

The changes of the economic environment started by scientific and technical progress in the first half of 20th century and followed by the continuous speed development, massive spread and the extent of computers use as well as the extensive conglomerate of technical means and technologies, especially information and communication technologies (ICT). ICT and information systems (IS) participate in making huge amount of information available, which is very important in getting new knowledge. They enable effective and targeted analysis of enormous databases. They support and enable quick, cheap and quality communication between people, institutions; they help decentralize research and manufacturing activities. [8]

ICT, IS, and computer networks penetrated into all aspects of human life where they enable us to work by absolutely new ways and create new values. Computer and the Internet have brought to people, companies, and organizations unprecedented opportunities of mutual connection and partnerships building. Economists, politicians, publicists still more often talk about a new economy as of a new system of organization of financial, enterprising and business activities based on intense work with information and knowledge. Knowledge economy is a hierarchy of networks, in which opportunity and ability is becoming a part of knowledge intense relations determines socio-economic position individuals and companies.

In the environment of knowledge economy the customers and users play an important and active role in manufacturing process, in which information has become a part of it, knowledge and thoughts serve for specification of manufactured product or provided service. Products are distributed in so called

„personalized shape“, which means it is adjusted to individual requirement of a customer. The gap between manufacturer and customer is getting smaller.

As Figure 1 shows, for stimulation of knowledge economy growth are very important economics basis, such as efficient education politics, economic competition, open markets, direct foreign investments etc. The development of knowledge economy depends on four main pillars: innovation, new technologies / at first ICT and IS, human capital and company's dynamics. Globalization is a factor, which affect all four of these pillars. Nowadays it is strengthened by expert’s mobility, ICT, quick and cheap transport, liberalization and market globalization and capital markets. For deepening of the benefits of knowledge economy it is vital to develop social capital of organizations, new practices of knowledge management and organizational innovations. Investments into ICT, research and development are without knowledge management and appropriate organizational structures less profitable. The mentioned structures present team cooperation, flat managing structures and stronger delegation of competences and responsibilities onto employees. [8]

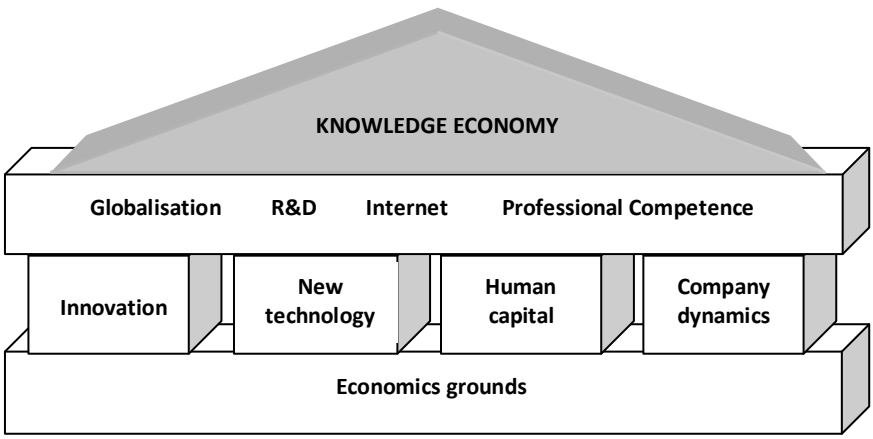

Figure 1. Knowledge economy pillars [8]

2. WHY DO MANAGERS NEED TO UNDERSTAND AND PARTICIPATE IN THE INFORMATION SYSTEMS DECISIONS?

It is common to think of technologies, especially of the ICT and IS, in terms such as machines, computers, or highly advanced electronic gadgets. However, technologies embrace a lot more than just machines. Any technology consists of four interdependent, co-determining and equally important components:

- Hardware: the physical structure and logical layout of the equipment or machinery that is to be used to carry out required tasks.
- Software: the knowledge how to use hardware in order to carry out required tasks.
- Brainware: the reasons for using the technology in a particular way. This may also be referred to as know – why.
- Know – how: the learned or acquired knowledge of or technical skill regarding how to do things well. Know – how may be a result of experience, transfer of knowledge, or hands-on

practice. People acquire technical know-how by receiving formal or informal education or training or by working closely with expert in a certain field. [2]

Technology has become entwined with all the classic functions of business – operations, marketing, accounting, finance – to such an extent that understanding its role is necessary for making intelligent and effective decisions about any of them. Therefore, understanding basic fundamentals about using and managing information is worth the investment of time. Furthermore, a general understanding of key IS concepts is now possible without the extensive technological knowledge required just a few years ago. [10]

As we can read in [9], new information system is built as a solution to some type of problem or a set of problem the organization perceives it is facing. The problem may be one where managers and employees realize that the organization is not performing as well as expected, or it may come from the realization that the organization should take advantage of new opportunities to perform more successfully. The activities that go into producing an information system solution to an organizational problem or opportunity are called systems development. Systems development is a structured kind of problem solving with distinct activities. These activities consist of systems analysis, systems design, programming, testing, conversion, and production and maintenance.

Figure 2 illustrates the systems development process. The system development activities depicted here usually take place in sequential order. But some of the activities may need to be repeated or some may take place simultaneously, depending on the approach to system building that is being employed. Each activity involves interaction with the organization. Members of the organization participate in these activities and the systems development process creates organizational changes. Each of the core systems development activities entails interaction with the organization.

Figure 2. The systems development process [9]

An improvement of IS and enterprise processes is currently necessary for a company to stay on a market. During the last 20 years it has become obvious for companies to improve there is and business processes - they are made to do so by the customers who demand better quality products and services. If a customer doesn't get what he wants, he can choose from a lot of competitive companies. This creates a pressure of competitive environment - the primary value of market economy. [11]

Today, 60% of managers believe that the current ICT opportunities limit their development and are not able to fulfill their requirements to business changes in the required time, cost and quality. On the other hand, 60% of IT workers believe that business managers do not know what they want; they do not know what they can demand from ICT and are not able to define their requirements clearly. [1]

Based on a sharp development in ICT area and globalization of market the companies are made to make a continuous improving of the management systems using the newest ICT. The evolution of new products is happening daily, each day in shorten life cycle. [12]

As Hammer and Champy show in [7]: The companies are pushed by three separately and together influencing forces deeper and deeper on the ground that is for their managers and leading employees something frightening and unknown. We call these forces the three "C": customers, competition and change. They are not new of course, but their characteristics are significantly different from their past forms.

ICT is a critical resource for today´s businesses. If a majority of a firm´s business is online, as it is for all banks, airlines, most manufacturers and retailers, and many insurance firms, the company´s business strategy suddenly becomes totally irrelevant when the network and ICT is down. Technology both supports and consumes a significant amount of firm´s and organization´s resources. The trends show that high-growth firms are increasing their investment in ICT. These resources must return value, or they will be invested elsewhere. The business manager, not the ICT specialist, decides which activities receive funding and develops metrics for evaluating the performance of the investment. Therefore, the business manager needs a basic grounding in managing and using information and information systems. A manager must know how to mesh technology and people to create effective work. Technology facilitates the work that people do. Correctly incorporating IT into the design of a business enables people to focus their time and resources on issues that bear directly on customer satisfaction and other profit-generating activities. But adding IT to an existing organization requires the ability to manage change. The skilled business manager must balance the benefits of using new technology with the cost associated with changing existing behaviors of people in the workplace. [10]

3. THE ROLE OF MANAGERS AND END USERS IN ESTABLISHING INFORMATION SYSTEM REQUIREMENTS

„Your ability to gain, process and use information decides whether you will belong to winners or losers" wrote Bill Gates in 1999. [5] Since then, the meaning of his words has been constantly increasing.

Managers are no longer able to afford the luxury of abdicating participation in information systems decisions. Managers who choose to do so risk having their business compromised. With the proliferation of Internet, ICT, web and e-business information systems are the heart of virtually every business interaction, process and decision. Managers who let someone else make decisions about their information systems are letting someone else make decisions about foundation of their business. The explosive growth of ICT, especially personal computers and Internet has highlighted this fact, since together they form the backbone for virtually all new business models. A manager who doesn´t understand the basics of managing and using information cannot be successful in the business environment. [10]

User information requirements drive the entire systems-building effort. Users must have sufficient control over the design process to ensure that the system reflect their business priorities and information needs. Working on design increases users´ understanding and acceptance of the system, reducing problem caused by power transfers, intergroup conflict, and unfamiliarity with new system function and

procedures. Insufficient user involvement in the design is a major cause of system failure. Faulty requirements analysis is a leading cause of systems failure and high systems development costs. A system designed around the wrong set of requirements will either have to be discarded because of poor performance or will need to undergo major modifications. Requirements analysis is very important part in IS development. It carefully defines the objectives of the new or modified system and develops a detailed description of the function that the new system must perform. Perhaps the most challenging task of the systems analyst is to define the specific information requirements that must be met by the system solution selected. At the most basic level, the information requirements of a new system involve identifying who needs what information, where, when, and how. [9]

As [10] said, decisions about IS have direct impact on the profits of a business. Adopting the wrong technologies can cause a company miss business opportunities. Inadequate IS can cause a breakdown in servicing customers, which directly impact sales. Inefficient business processes sustained by ill-fitting IS increase expenses. Failure to consider IT strategy when planning business strategy and organizational strategy leads to one of three business consequences:

- IS that fail to support business goals;
- IS that fail to support organizational systems;
- Misalignment between business and organizational strategies.

IS are often a major investment for any firm in today´s business environment. If the IS do not allow the company/organization to realize its goals, or if the IS lack the capacity needed to collect, store, and transfer critical information for the business, the results can be disastrous. Customer will be dissatisfied or, worse, lost. Production costs may be excessive. And, worst of all, management may not be able to pursue desired business directions that are blocked by inappropriate IS.

4. ABILITY OF STUDENTS TO WORK IN THE FIELD OF IS

Using the questionnaire administrated in the first semester on the first seminars of subject Informatics I at Faculty of Economics, Technical university of Košice we searched for real state of students´ ability to understand basic concepts and work in the field of IS. The main question asked in the particular part of the questionnaire was: “Have you met the following terms on the informatics/computer science lessons?”:

- Information system - definition, importance, usage, …;
- Types of IS - management IS, executive IS, …;
- Life cycle of IS;
- Modeling - mainly in the field of IS development;

We evaluated 644 students’ answers. As we can see in the Figure 3 students’ answers evaluation has shown that in average less than 20 % of the students have had experience with IS and less than 1% specified dealing/working with modeling as a method of simplifying and recognition of real objects. Less than 10 % of students recognize the types of IS and less than 1 % recognize other terms.

To improve this situation we included a chapter called Information Systems in the subject Informatics II in second semester. We started from the basic theoretical concepts in the field of IS, their modeling in general, business processes modeling using ARIS and UML. By solving practical problems, students become familiar with available features helping them work with a lot of available information. For teaching in this area we created two studying texts:

- Information systems for economists, which was divided to the following chapters: Development in the information area, Basics terms and their meaning, Information systems, Specification of user requirements, Modeling using the UML.

- Basics of business process modeling with content: Information and knowledge society, Business processes, Business process modeling methodology, Business process modeling standards, Business process modeling tools.

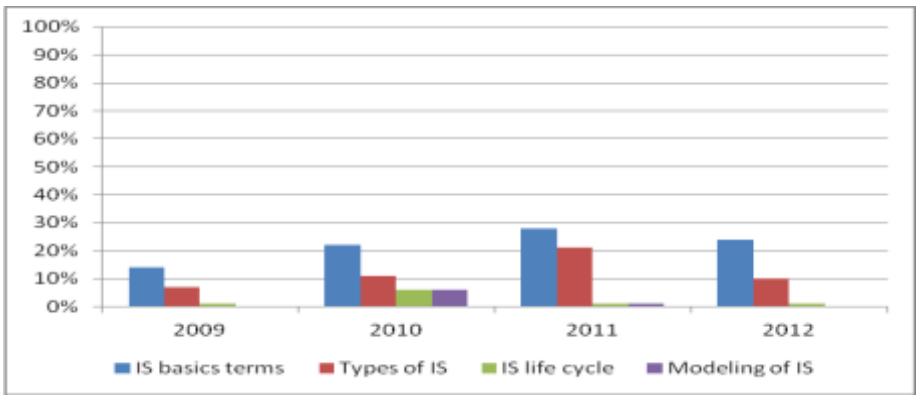

Figure 3. Percentage comparison of students answers in the field of IS

We intended to provide our students with a foundation of basic concepts relevant to managing all phases of information system life cycle, especially initial - formulation of user requirements and system analysis.

5. CONCLUSION

The information aspects of the management have very important function in increasing competitiveness and management quality of economic systems. [6] The efficiency of investments into technologies depends strongly on users, their motivation, interest and education. The goal of proper education is to provide the foundation for making the general business manager a knowledgeable participant in IS decisions, since any IS decision in which the manager does not participate can greatly affect the firm/organization´s ability to succeed in the future. Effective participation requires a particular set of managerial skills.

We assume that the importance of the proposed education in this area will grow, because few years ago the "information" work has participated on GDP in developed countries with more than 50-60 %. [3] It is expected that in year 2020 the ratio of manual workers will only be of 10 -12.5 % of the whole. [4]

Higher education institutions should be encouraged to improve the quality and relevance of the courses they offer. It is very important to prepare students for challenges of knowledge economy. It is necessary for all graduates to understand functions, possibilities, advantages and disadvantages of the IS and ICT.

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