New aspects and tasks of Knowledge Management in the e-business era

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Abstract: Rapid development of IT is the significant characteristic of the 21st century. It has also an impact on business and enterprises. Many enterprises have the distributed character thanks to the internet, mobile technologies and other IT (grid, web services, cloud etc.). Sometimes it is too difficult to connect a traditional perception of the management with a turbulent and very fast changing IT environment. The management should be connected with IT very effectively and here is a space for new tasks and aspects of Knowledge Management. The paper sketches the hidden aspects of Knowledge management, which should be oriented on right coverage of the knowledge life cycle by IT within the enterprise. Knowledge management should be organic part of every IT project in business. It shows what, how and why to do in the IT projects, because the software solutions (as a product) are a part of business in the e-business era. The flexible IT architecture with a web services, microservices and various relative new technologies are involved directly in the supply chains, in the customer requirements and it is difficult to use it without good IT orientation. So the main task of the Knowledge managers is „to be bridge between software and people" and to find the most efficient ways to be successful on the market.

Keywords: Knowledge Management; E-business; Software engineering; Knowledge Engineering.

1 Introduction

First quarter of 21st century is the era, with many new characteristics. The fast development of technologies and especially information technologies (IT) is one of the most important features. IT has an impact on everyday life in many countries. Thanks to IT, the turbulent changes are visible also in many enterprises, in business, in public sector and in the whole society at all. The development of IT brings the possibility to make faster decisions, to store a plenty of data, to connect the remote nodes of distributed enterprises, to share information all over the world, but brings also many challenges how to manage data, information and knowledge within enterprise. The technologies are faster than the ability of people to use them effectively in the business. It seems, that too much information and too many technologies kill the creativity. It brings a lot of patterns, what and how to do it by using IT as "best practices". Many people, also the managers prefer ready-made IT solutions to be fast and first on the market. What is a pitty, often it runs without deeper analyzing the current situation and IT possibilities.

So here uprise some very important questions concerning two main common issues not only in the business, but also for every day life:

- First question is concerning the quantity and quality of information, which is important in current situations, concrete decisions, for process efficiency and satisfaction of people. It means, not to be lost in the ocean of information.
- Second question is how to deal with information technologies, which IT are useful and valuable for current actions and processes. It means, how to swim in the IT ocean.

IT bring radical changes in the business and allow to work on customer demand, with a number of variants "just in time" strategies. There were a plenty of scientific articles and various new IT solutions for business and management (and knowledge management too). The knowledge management was in the focus of interest between 2000-2010 years. Many managers and scientists discussed about the problem, where is the line between information and knowledge from the practical point of view. In the field of IT, the relatively old concepts from artificial intelligence were shifted to the virtual web space and opened the gate for e-business and virtual enterprises. Knowledge management (KM) is not an easy understandable term, because here is the possibility to see it from various points of view [1,2,4]. The perception of KM is often perceived as combination of business management and IT. Authors in [1] wrote about a classification of KM based on various KM schools. Here are three main approaches to KM, which follow particular purpose in the enterprise and they are complementary [1]

- technocratic
- economic
- behavioral

Although at first it seemed, that in current time, is the most important technocratic approach, it is not true in any case. Sometimes too many IT combinations in enterprise can lead to dislike for IT use or the main goal (effectivity and efficiency in enterprise) is lost somewhere in the huge heap of technologies.

Each of the approaches should be important in a well-balanced business. Sometimes it is more "art" than engineering or management. It is still the “art” how to join all strategies, technologies and people in the well-organized and effective enterprise.

2 From automatization to e-business

IT technologies changed also the business environment in the last 20 years, mainly business processes, and shift them from automation to e-business. Yogesh Malhotra [13,14] made comparison of two eras in business environment. The Tab.1 shows these comparison of “old” era of Business Automation and “new” era of e-Agility, which belongs to e-business. Here we can see, that the most important change should be in the role of IT. Automation era is the IT focused (more technocratic) and whole effort of automation is oriented on digitalization of whole business process. Not only in the production, but also in the management and services. The philosophy of e-Agility should bring the more flexibility in the business processes. The flexibility comes from the decentralization. Today many enterprises involved such IT as distributed systems, cloud solutions, grid solutions or web services and service oriented architecture, which allow creative and flexible approach in production and in management too. The Tab. 1 shows us also very important transfer from “technology importance" (the focus is on the best practices by using IT and externalization of knowledge) to “human importance" (emphasis on Visions, Beliefs and Actions, so emphasis on tacit knowledge).

Tab. 1 Focuses in the changing Business Environment by Malhotra

OLD Focus on Information-Processing (Automation)	NEW Focus on Business Model Innovation (e-Agility)
Focus on 'right questions' and 'best answers'	Multiple views of the problems and related solutions
Emphasis on Information systems and databases	Emphasis on Vision, Beliefs and Action.
Digitized memory, experience and expertise	Creative conflict, Dialog, 'Questioning the Status Quo'
Technology is central, People are less important	People are central, Technology is also important

As indicated above, the e-Agility belongs to the term e-business. Some authors suppose, that e-business is "poorly understood phenomenon" [4] and they are right, when we do not look on the technological aspects only. Good starting point for exploring the interrelation between e-business and Knowledge management is characterization of e-business [15] "E-business (electronic business) is the conduct of business processes on the Internet. These electronic business processes include buying and selling products, supplies and services; servicing customers; processing payments; managing production control; collaborating with business partners; sharing information; running automated employee services; recruiting; and more." E-business is not only business process reengineering by using crisp cuts, rapid changes in whole enterprise. E-business is not only about new information technologies involved in the traditional business performance. It brings the changes in business strategies, business models and also in management [9,10].

Malhotra [13] offered also the other comparison of automation and e-Agility by using some chosen indicators. He showed the main distinguish between radical changes of Business process reengineering (BPR) in the era of automation and new e-Agile era. If we consider the relationship between e-business and Knowledge management, we can see some similarities between KM attributes and e-Agility indicators. They are shown in the Table 2. It is the best point for finding the new aspects and tasks of KM in e-business era.

Tab. 2 Comparation of features BPR, e-Agility and KM by some indicators

Indicators	BPR	e-Agility	KM
Level of change	Radical	Radical/incremental	Incremental
Start from	Clean Slate	Existing model	Existing model
Frequency	One time	Ongoing	Ongoing /continuous
Time Required	Long	Short/long	Long

Participation	Top-down	All levels	All levels
Typical Scope	Cross-functional	Cross-network	Cross-network
Risk	High	High-critical	Low
Primary Enabler	IT	IT/human capital	IT/human capital
Type of change	Cultural/Structural	„Re-everything“	Cultural/structural/re-thinking

The result from Table 2 could be very confusing, because it seems, that the e-business and the Knowledge Management have the same concept. It is not true. E-business should be a tool of Knowledge Management, when we stress on the Information Technologies. On the other hand, the Knowledge Management has impact also on e-business and forces other changes in e-business.

To understand this relation is not easy. A clear technocratic approach finish in the automation and business process reengineering. To find a bridge between technocratic approach and economic approach is very complicated. Although the new challenge for KM is to be bridge between people in enterprise and software engineers, who design the IT for business.

3 KM technologies in the concept of e-business

„E-business can comprise a range of functions and services, ranging from the development of intranets and extranets to e-service, the provision of services and tasks over the Internet by application service providers.“ [15]. This explanation of e-business brings us more details about IT covering the business processes. The business process is a core for creating and designing software in e-business. When we look on business process, we can describe the process by using the state space and inputs, outputs in each state. To change this process into the IT speech, we can speak about data as inputs and outputs (and describe the environemnt of process and backward the data affects the process). It describes not only external environment (new stimuli from the surroundings, outside random effects, etc.), but also internal environment (inside random effects, attribution of production activities e.g. time, strategic or tactic requirements etc.) of process. So what is then the power, which make data changes in business process? We can say, that the knowledge are dynamic operators of business processes and they have impact on the business environment (change data, produces new data, new attributes of environment etc.)

From this IT point of view, we need to handle with Data Management and Knowledge Management by choosing and creating IT combination for E-business. „Data management is a general term that covers a broad range of data applications“ [16], but always manage data to valuable resources by doing three main activities: data design, data storage and data security. „Knowledge Management is the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge.”on web [12]. E-business „lives“

in the web space in current time and this space has some specifics also in Data management and also in the Knowledge Management. Web space offers very strong technics for Data Management [15] as web metrics, web analysis, web statistics etc., which manipulate also with the digitalized data, so analysis and design of data is very fast and data storage is very easy. So often we can hear not only about E-business, but also about D-business (digital).

Concerning the digitalization of web space is a great challenge for IT professionals and Knowledge engineers find the right way how to manage knowledge in digital web space. Already in 2002 year raised up consortium dealing with term Web Intelligence [18] focused on the Intelligent Web-based Business. The consortium described and classified the IT used in web space to discover Intelligent Business [5]. As we see on Fig. 1, the Intelligent Web-based Business can be covered by electronic processes in every sphere of business. Here the authors viewed on E-business only as a part of Intelligent Web-based Business.

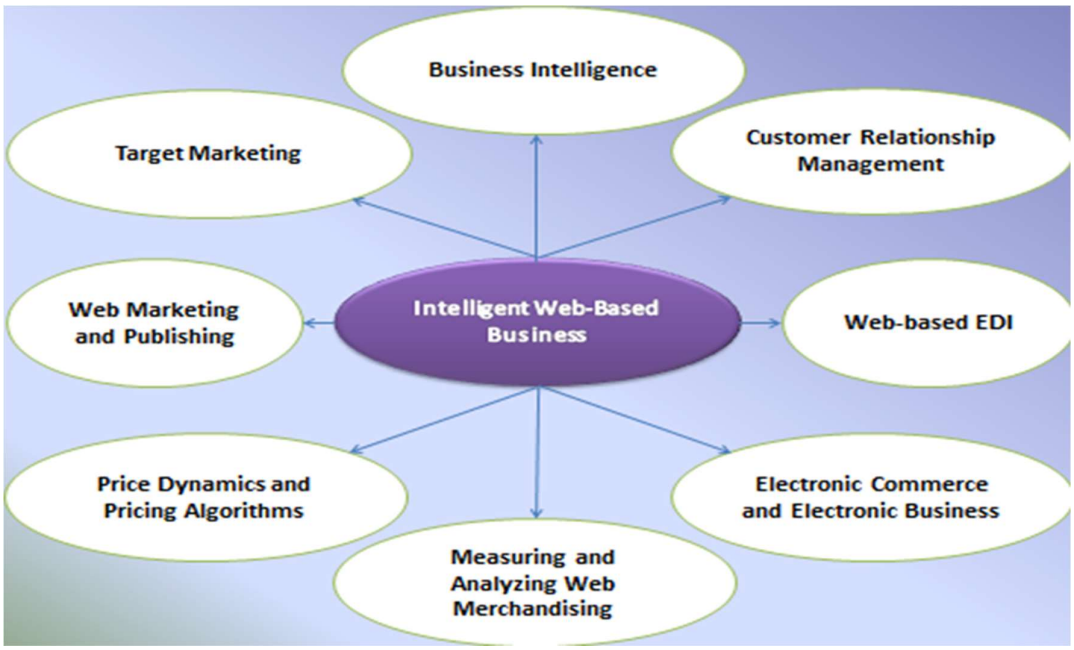

Fig. 1 Intelligent Web-based Business [5]

Today technologies shift the electronic business into the intellligent business, because the border between the knowledge technologies and web IT are wiped. Plenty of technologies are combination of KM technologies and web technologies. Here are some traditional groups of KM technologies [12]

- Groupware systems & KM 2.0
- The intranet and extranet
- Data warehousing,data mining, & OLAP
- Decision Support Systems
- Content management systems
- Document management systems
- Artificial intelligence tools
- Simulation tools

- Semantic networks,

which can be combined with web technologies such web mining, web farming, web information retrieval, web agents, inteligent ubiquitous computing etc. From this point, we can consider frequent characterization of Web Intelligence „Web intelligence is a combination of digital analytics, which examines how website visitors view and interact with a site's pages and features, and business intelligence, which allows a corporation's management to use data on customer purchasing patterns, demographics, and demand trends to make effective strategic decisions" [17]. All the changes in the e-business processes lead to the active web sites, when we can find some „wisdom elements" (personal or social agents, conceptual information extracting, ubiquitus computing etc.). This approach brings more flexibility by designing the KM systems in enterprises, but here is a risk that the system will not be set correctly. Specially, when the enterprises prefer the IT outsourcing (e.g.cloud solutions).

4 Interrelation between e-business and Knowledge Management

Many authors who have dealt with the Knowledge Management wrote their articles before five and more years. It seems that the interest in Knowledge Management in the E-business was stopped. The reason is very simply: the technologies "run" very fast, the development of new software solutions start to be "too agile" or "too rapid" and here are some new requirements on software and knowledge engineering. The projects of new software solutions are continuously included in the real just-in-time performance and in one moment we can have more open projects in one distributed enterprise. Projects are deployed very quickly, although they do not bring "big change at once". It is thanks to technologies like web services or microservices [11] and their flexible architectures. Martin Fowler describes, that the software development is not perceived as typical project "the aim is to deliver some piece of software which is then considered to be completed" [11], but more as a product. This approach involved also the developers into the business process and "development team takes full responsibility for the software in production" [11]. And finally he wrote also in [11] "The product mentality, ties in with the linkage to business capabilities. Rather than looking at the software as a set of functionality to be completed, there is an on-going relationship where the question is, how software can assist its users to enhance the business capability."

New development software philosophy shifts also the relation of technologies to business. Technologies are not only support system for business as before, but they are necessary part of business processes. With this new philosophy is necessary to shift also the role of Knowledge Management. Knowledge Management can in the distributed, fast changing business environment bring

- Determining the need for process transformation and understanding the context of process transformation
- Developing alternative process designs
- Work and performance assignment
- Create new knowledge sources about processes and software solution
- Shift the customers (customer as a competitive) to role of knowledge workers
- Shift the software developers to role of knowledge engineers (with deeper domain knowledge)
- Shift the internal processes to value net advantage

5 Conclusions

As was mentioned before, the technology evolution is faster then development in business and all other areas of enterprise. The business processes are often shifted from traditional enterprise information systems to systems based on the web technologies using cloud and grid technologies. The enterprises do not use their own servers and IT professionals, but prefer outsourcing solutions. IT firms are often to agile (they follow their own profit) and push enterprises to use their own solutions. Many times we can see bad IT solutions for enterprise (specially for SME). Here is a lack of people with interdisciplinary education, experience and skills in enterprises. IT professionals do not like study business and so their solutions are often based on their own opinion. The gap in communication between managers and the IT professionals is still a major problem. Fowler's description of changes in software engineering, where the IT projects should be involved directly in the business processes, shows that here is a place for knowledge managers with good skills and appropriate education in the IT area. Knowledge Management in the 21st century could not be cut from IT and from software engineering too. The main role of the knowledge managers should be in the future

- Know-what (to know how the business process is created, what it means in reality, not only as a process model; to know the impact of changes in the entreprise etc.)
- Know-how (to have a knowledge of IT tecnologies and projects in the enterprise; to be the member of the IT projects; to know what is necessary for organization to be adapt on e-business etc.)
- Know-why (to know why e-business is evolving as it is and what accounts for its impacts on competitive context, strategy, and operations).

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