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THE ROLE OF DATA WAREHOUSE IN ENHANCING INFORMATION AND COMMUNICATION TECHNOLOGY

Abstract: Information is one of the most valuable resources available for improving public and private administration's system for achieving social development. Recent advances in information technology (IT) form the basis of an entirely new era in delivering of services. This paper aims at pushing back the frontiers of information society (IS), deepening its role of enhancing human life in this era, and ascertaining the importance of data warehouse (DW) in information and communication technology (ICT) in order that guarantee of data and information's quality can be reached. These latest technological developments argue a change in national policy. Therefore, the authors recommend maximizing the use of these technologies to facilitate information processing as a public and private sectors objective.

Keywords: information technology, information society, data warehouse.

1. Introduction

Recent advances in information technology (IT) form the basis of an entirely new era in delivering of services. IT has a broad support for the delivery of services. The use of computers in organizations has been growing since the appearance of the first applications of this information processing technology to support organizational work [Carvalho, Ramos 2006]. This growth is attributed to the diversity of organizational activities where computer-based IT are used, the applications of computer-based IT are currently unavoidable in modern organizations [Carvalho, Ramos 2006]. More recently IT developments, such as data warehousing (DW), data mining and other information systems that aim to promote knowledge dissemination in organizations, demand new and more powerful conceptual frameworks that support sturdy explanation of the roles played by information systems in organizations and might anticipate probable future developments of IT. Knowledge and information become either more commercialised in a knowledge-based economy or, if supported by public funding, more accessible for public use [Wierzbicki, Makowski 2000].

Acquiring and producing new information and knowledge are of ultimate importance in the life of a given community or organisation, whether it is a country, a company, a settlement, a region, or an educational institution [Holczer 2008, p. 93]. Enterprises, through high information flexibility, could be able to quickly respond and adapt to changes in the environment, integrate overall enterprise data and provide precise information to decision makers with high information resource visibility [Qiu, Li 2009]. This paper tends to focus on the role of DW in ICT, the implications of ICT policies for enhancing the quality of life, and introducing the concept of IS in public and private (business) environment.

2. The overview of IS concepts

What does the term IS mean? IS represents an extraordinarily diverse field which requires a multidisciplinary approach in order to begin to understand it [Pintér 2008b, p. 212]. The most obvious feature of IS are the ever-growing number, variety and complexity of technological instruments and their constant change at an unprecedented scale and at a barely manageable pace [Kincsei 2008, p. 47]. The IS is a new type of human society, completely different from the industrial society. The basis for this assertion is that the production of information values and not material values will be the driving force behind the formation and development of society. IS must be built within a completely new framework, with a thorough analysis of the system of computer-communications technology that determines the fundamental nature of the IS [Masuda 2004, p. 15]. Garnham [2004] defined the IS as a society in which the creation, distribution, diffusion, use, integration and manipulation of information are significant economic, political, and cultural activities. According to Gallon [2010] the IS is a model based on the accumulation of information. Pintér [2008b, p. 222] defined the IS in four different ways:

1. In terms of technology, ICT and various operations for processing knowledge and information play the central role in IS.

2. From the perspective of the whole society, the emergence of a network society and a network economy, of new types of community, of continuous adaptation to an ever changing environment, of new kinds of inequality, and globalisation are the main characteristics of an IS.

3. According to the political narrative, the term IS refers to a new paradigm which is transforming the late industrial epoch.

4. Finally, from a scientific perspective, there is a wide field of research called IS studies.

By the turn of the millennium the use of the concept IS had already become widespread [Karvalics 2008, p. 29]. For IS, which was the umbrella term used to describe the elemental social changes that took place in the second half of the 20th century, Karvalics [2008, p. 34] chose the following definitions from among fifty others: information strategies, that is, programmes aimed at building the IS, added

a series of contextual sciences into their own arsenal, and as a result of this freedom of information and information privacy have gained greater importance than before [Karvalics 2008, p. 42]. Targowski [2005, p. 1-2] considers the IS as a fuzzy concept where the fast development of the global economy, which is based on ICT, is supported by it. Targowski cited the most agreed upon characters of IS by authors as follows: widely applied IT, integration of different types of IT, a national economy dominated by the information sector (information economy), and special status of knowledge [Targowski 2005, p. 4].

There has been much debate over the idea of IS. Some thinkers have argued that information is becoming the key ordering principle in society, whereas others suggest that the rise of information has been overstated [Blom et al., 2004] though, most of the attempts to define the concept of IS were made from a technological point of view [Pintér 2008a, p. 23] posed a question 'What kind of new ICT was constructed in recent decades that determined the infrastructure of IS?' Although, the most important question is the one that focuses on the relationship between technology and society which is 'what is the optimum technological impact on social life that can achieve a qualitative change?' However, as this paper concerns itself with the technical aspect of IS and concentrates on the role of DW in ICT. The authors are bound by and all in favour of every concept regards ICT and various operations for processing data and information as the most important components of IS and play central role in it.

3. Organisational and social effects of ICT based information systems

ICT has increasingly become an integral part of society [Kurt 2010]. Hence the presence of ICT simplifies the communications with organizations, citizens and enterprises, enables them to offer efficient services through the developments and uses of new applications, promotes the modernization of local administration by using the most advanced information and IT-based tools to create information services and systems, spreads the benefits of the IS and encourage socioeconomic growth. As the management within organizations has gone through a lot of changes due to the development of the IS, and the new ITs have been a positive influence of the decision making domain [Ofelia 2007]. ITs, and especially the Internet and mobile technology, have given rise to the IS, enabled it to face the e-government, e-business, e-learning, e-health, and e-employment challenges, simplified administrative processes, and met the expectations of citizens and companies alike. Pintér [2008a, p. 7] argues that the challenges which are presented by the IS can be felt in every area of society, including, amongst others, culture, education and healthcare.

According to Ferrer [2009], ICT has been considered as an important element for economic growth and social development and recently been implemented in the public sector, which is a direct result of competitive advantages ICT has gained in

the private sector. As ICT has significantly contributed to improve the quality of public services, and commercial activities and from the technological perspective we live in an IS since ICTs play a constantly expanding role in all fields of social existence, which has shaken the foundations of social structures and processes and resulted in massive changes in politics, economy, culture, and everyday life [Pintér 2008a, p. 23], thereby society has drastically transformed into an IS [Kincsei 2008, p. 60], which needs a national information policy to allocate and coordinate organizational responsibilities where direct governmental involvement plays an important role in developing its information infrastructure [Targowski 2005, p. 22]. There is, in addition, one further point to assert that information strategy is fundamental to the creation of the IS [Juhász 2008, p. 131]. Juhász [2008, p. 132] claims that a comprehensive information strategy is indispensable for a country that aims to build an IS.

How to align corporate and IT strategies? Qiu and Li [2009] suggested that corporate strategies should be carried out by end users. Although a number of new concepts and expressions have originated in the field of IS, e-government has become an indispensable tool in reforming state administration and the work of local government, it is increasing the satisfaction of citizens regarding services, and creating a more flexible, transparent, public administration [Molnár 2008, p. 146].

4. ICT applications

As the most applications which are used in public sector institutions related to office automation and information management system, institutions still lack many applications. The development of ICT is not enough if it is not coupled with similar growth in IT and vice versa, as they complete one another in providing citizens wherever they are with high-quality services and easy access to data and information. Hence modernization of local administration requires the most advanced information and IT-based tools to create information services and systems which spread the benefits of the IS and encourage socioeconomic growth [Leproni 2010]. The e-government project contributes to the transformation of the concept of applications necessary in governmental institutions. Governments should greatly support ICT sectors by providing the necessary policies and strategies and laying the foundation for a partnership with the private sector. It also encourages the IS sector and its competitiveness in local, regional and international markets. [Jha et al., 2010] suggested that Government must decide on the lead agency to coordinate information management (IM). Although the agency will not control the use of ICTs in recovery and reconstruction, it may need to address constraints on their use. In addition to designate an IM coordinator.

Since online transactions involve sensitive and valuable information, public and private sector institutions are committed to preserving and protecting the sensitive information they acquire from intentional and unintentional damage, legal regulation

of IS, also known as IS law means all those regulated interactions that may arise in an IS. However, we use the expression IS law in a narrower sense, referring to the rules regulating the social relations and technological capabilities now founded on modern communications networks [Simon 2008, p. 114]. These institutions provide sensor and logical security systems to guarantee that the information is strictly accessible by its right holders. Padovani et al. [2010] investigated how human rights in the digital age can be considered as an overall frame accommodating fundamental rights and freedoms that relate to communication processes, and related challenges, in societies worldwide.

5. DW and ICT based information systems

The informative society transforms the way business, government, and citizens work. It is a community of developers and users who understand what data/information to process in order to achieve added value in decision-making, either at the personal or organizational level. The IS is the result of the merged data and computer societies based upon advanced software such as on line analytical processing (OLAP), DW, and data mining [Targowski 2005, p. 12]. These systems allow the analysis of corporate data [Ravat et al. 2010]. In the mid-1990s DW became one of the buzzwords of the ICT industry. However, it was invented by real companies to make use of vast volumes of databases. How to move from a computer-based business to managing a business based on information? This led to the concept of data mining in order to extract a new value of information in the business context [Targowski 2005, p. 12]. As OLAP and data warehousing evolve, more and more complex data is being used [Ravat et al. 2010] and many companies have made DWs the foundation of their decision support infrastructures, hence the lack of clean, accurate, timely, and integrated data [Ariyachandra, Watson 2010].

As more and more information is available on the web, it is a problem that many Web resources are not accessible and large amounts of accessible data are generated [Thomsen, Pedersen 2006]. How can we cope with such massive changes in our everyday lives? With regard to mass accessibility to information [Pintér 2008a, p. 17]. Data warehousing provides the foundation for the successful operation of a Web-based e-business environment [Inmon 2002, p. 297]. According to Inmon [2002], "when the second edition of his book-building the data warehouse appeared, the world was mad for anything of the internet. In order to be successful it had to be "e" something – e-business, e-commerce, e-tailing, and so forth. One venture capitalist was known to say: why do we need a DW when we have the internet? But data warehousing has surpassed the database theoreticians who wanted to put all data in a single database. Data warehousing survived the dot.com disaster brought on by the short-sighted venture capitalists."

To be able to use and access the web is getting increasingly important [Thomsen, Pedersen 2006]. Web environment is supported by the DW in a variety of ways

[Inmon 2002, p. 310]: the interface for moving data from the Web to the DW is fairly simple. The DW provides a place where massive amounts of data can be downloaded from the Web environment and stored. The DW also provides a central point where corporate data can be merged and integrated with data coming in from one or more Web sites into a common single source.

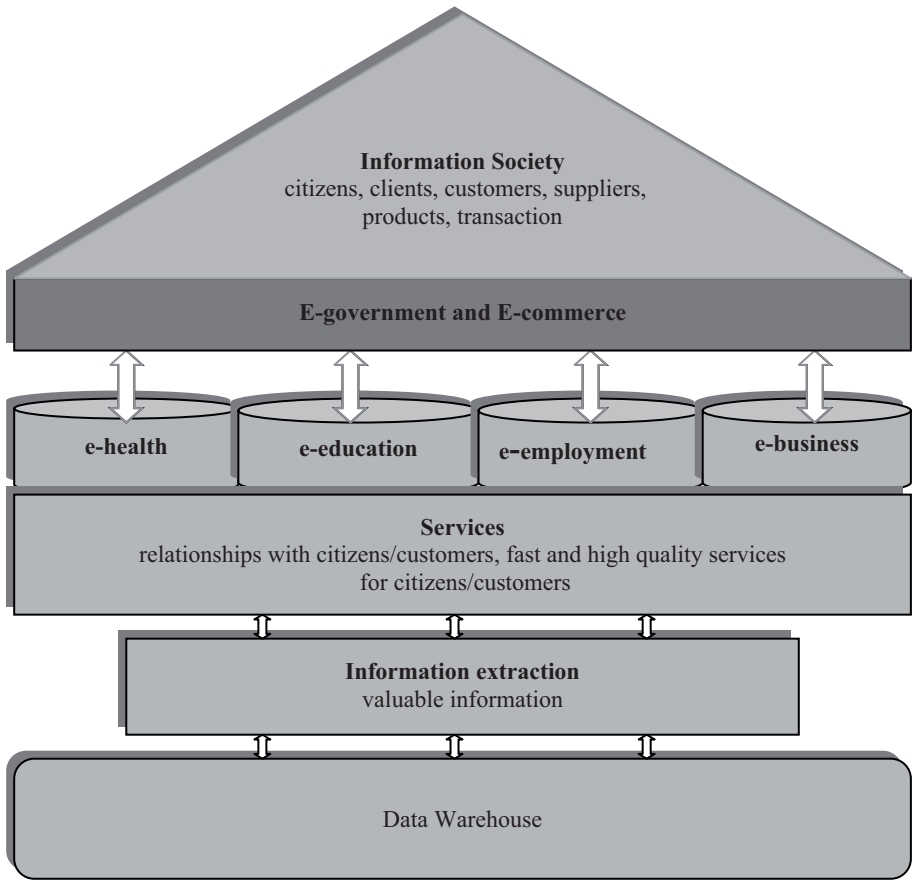

Figure 1. The components of IS

Through the interaction between the information systems on the network for the implementation of administrative decentralization using ICTs is shown in Figure 1. In public and private sectors organisations attempt to meet/satisfy their citizens and customers demand. In other words to give them whatever they are asking for that is to say the desire or need of citizens and customers for goods and/or services which they want to buy and/or use. In addition to this, they have to be responsive to citizens and consumers demand. What is the best way to improve responsiveness to citizens and consumers demands? How should services be distributed to improve workload

and consistency of outcomes? What is the best way to provide controlled, remote access to centrally managed information and data? Answering those questions one should take into consideration a number of things such as delivering better data and information, attaining sustainable compliance, and improving processes at the lowest cost. Those things and many others are easily attainable by designing and setting up DW and Business Intelligence services. These databases provide the foundations for different types of analysis and access tools, hence they contain sets of information that can be used for analyses and that can for the greater part be accessed in web mode.

However, in this paper the concentration is in delivering better data and information. Management should do number of things to contribute to results such as data processing, fact analysis, reporting, pushing daily-based information, setting expectations, and setting real-time facts which leads to increasing quality of services, closer relationships with citizens/customers, providing fast and high quality services for citizens/customers, preventing data duplication among institutions, etc.

6. Conclusions

This paper discusses the challenges that the public and private sectors face as the result of the recent appearance of phenomena such as the IS and the new economy, and the extent to which new technological developments in data warehousing can contribute to successfully meeting these challenges. As a result of the facts and arguments mentioned above, we believe that DWs and online transaction systems empower consumers/users of civil services to gain immediate access to data and information. The authors recommend maximizing the use of new technologies to facilitate information processing as a public and private sectors objective.

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ROLA HURTOWNI DANYCH JAKO ELEMENTU WZBOGACAJĄCEGO TECHNOLOGIE INFORMACYJNE I KOMUNIKACYJNE

Streszczenie: Informacja jest jednym z najbardziej dostępnych i wartościowych zasobów umożliwiających rozwój społeczeństwa poprzez doskonalenie systemów prywatnej i publicznej administracji. Ostatnie postępy w zakresie technologii informacyjnych tworzą podstawy dla nowej ery udostępniania usług. Artykuł ma na celu podkreślenie znaczenia tych technologii w poprawie jakości życia społecznego z uwzględnieniem roli hurtowni danych w rozwoju technologii informacyjnych i komunikacyjnych. Obserwowany współcześnie rozwój technologiczny przyczynia się do kluczowych zmian w narodowych założeniach. Biorąc to pod uwagę, autorzy postulują maksymalizację wykorzystania tych technologii w złożonych procesach przetwarzania danych w obszarze sektora publicznego i prywatnego.