VIRTUAL REALITY AND PUBLIC ADMINISTRATION

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Abstract

This study serves as an introduction to how virtual reality systems could be applied in public administration and what research tasks would be necessary to accomplish a project. E-government solutions began to emerge in public administration approximately a decade ago all over the developed world. Administration service facilities via the Internet did not attract many customers, because of the digital divide. E-government solutions were extended to mobile devices as well, but the expected breakthrough of usage has not ensued. The virtual reality form of public administration services recommended in this study has the most attractive outlay and the simplest navigation tools if compared to 'traditional' Internet based e-government. Thus, in accordance with the worldwide amazingly quick spread of the virtual reality systems of Second Life and 3 D types of entertainment, virtual reality applications in public administration could rely on a wide range of acceptance as well.

Keywords: virtual reality, public administration, real time dialogue, e-government, avatar, workflow procedure.

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1. Space in the information society

The emergence of ICT in the last decade quite transformed spatial structure and workflow of economic processes. Distance has been decreased or even disappeared with the appearance of remote, a-typical work and online shopping. The space of information society offers favorable conditions for overcoming the disadvantages of disability like bad, limited or expensive transportation, illness, and maternity leave.

According to the expectations mainly pertaining to entertainment services of the information society there is an overwhelming demand for the enlargement of physical space by creating new dimensions. Today these are represented on the highest level by the systems functioning in the 3D virtual spaces of ICT.

According to the definitions collected by Jakobi (2007) the space of the information society is multilevel. Behind real space there is the ICT infrastructure as the cyberspace. It is the Cartesian world of electronic networks, wires, broadcasting coverage, servers, and programs (Mészáros, 2003). Also, the mental space can have two faces, like the virtual space and the real space in which some virtual elements emerge, which is referred to as the hybrid space. Its application, however, is yet as questionable as the famous science-fiction movies Matrix, Surrogates or Avatar.

2. Virtual reality

Virtual space was defined two decades ago, as an interactive 3D environment generated by electronic systems into the characters of which users can project themselves (Aukstakalnis and Blatner, 1992). In Hungarian professional literature, Nemeslaki (2012) summarizes the characteristics of the economy functioning in virtual space. According to this concept, virtual reality is an artificial environment created by computer systems and in which virtual identity (avatar) of the user can obtain real time connection with the symbolic representations of real things.

Let us think of a futuristic idea here. Professor Goldberg (2010) gives the accounts of his patients in his book about their mental journey they take into the future by hypnosis. The most astonishing report is given by a patient about a mental visit to the 30th century. She could neither understand nor interpret the remote future in which she tried in vain to communicate with humans, the mental orientation of whom might have been via biophysical remote control. Though this situation can rather be applied to a movie screen than taken seriously, the representatives of the users' intelligence who can do sensing and communicating do exist even today and not only in the artificial environments of video games, but in the virtual spaces of e-business, too. Through our virtual representatives we can visit web shops and banks, university classrooms or concerts in real time. Our virtual representatives (avatars) will be able, sooner or later, to enter the real space, transforming it into a hybrid one. This might be the environment of the future in the 30th century.

We may smile at the above; however, we should not forget we can do things today through the Internet that used to be considered futuristic 20 years ago. In the USA for example, it is getting more and more popular for leaders of a company to hold a meeting in the virtual version of their office without being present physically. Or perhaps,

university students attend virtual seminars with both the students and the lecturers being elsewhere in reality.

When we speak about higher education and research we cannot neglect the potential of 3D virtual spaces. It is known that the global economic crisis striking the last years of the first decade of the 21st century spared only those companies that were engaged in innovation oriented business (Agg, 2012). The catalysts of the emergence of innovation are higher education and scientific research. Within public administration, Estonia is giving us a good example of it. After the political transition, Estonia invested a lot of resources in higher education, high above the EU average (Potucek, 2003). Think of the E-Government Academy of the Estonians, and of the well functioning Estonian public administration, being obtained in a decade after the political transition.

Those countries who do not wish to be lagging behind the developed ones cannot permit themselves to ignore the new ITC based devices. Virtual space is yet closed in front of public administration all over the world. Now it is the time to open up the doors of the virtual reality for public administration by introducing the first content development elements into the 3D space.

3. Public administration contents in virtual reality

According to Choi *et al.* (2003) the elements of virtual reality are the symbolic representatives of artificial and physical things. When we try to build virtual reality the sample services have to be copied from the actual services of real life. During the building of virtual public administration space the actual real conditions have to be copied, modeled as a front office or the workflow steps of a service.

According to professional literature (Nemeslaki, 2012) there are three conditions prior to building virtual reality and, if they are modified from business to government context, they are the following:

1. a three dimensional administration (office) environment generated electronically;
2. the real time interactive ability of the symbolic characters of the virtual administration reality (customers and clerks); and
3. the possibility of total users' self-projection (full administration workflow) which would meet the requirements of the sophisticated transformation level of public administration[1].

In the light of the above outlined criteria the virtual space or reality of public administration ought to include the 3D graphic models of the office building and the customer management desks. They should reflect the actual images of the ones in reality. The graphic controllers have recently been developed to solve this task easily. The rooms of the virtual office and all the available information have to be exactly coordinated to the real rooms and up-to-date information available in the actual office.

1 The sophisticated level of transformation follows the levels of information, transaction and interaction enabling the customer to have full access to administration without being present physically in the office – as it is defined in EU Directive 1999/93.

Picture[2] 1: In virtual reality the customer is entering the Town Hall of Budaörs[3]

Real time interactivity with all the characters of the virtual space is necessarily including all the symbolic representatives of all the other customers having entered simultaneously the virtual reality of the office.

Picture 2: Our virtual customer can see the representatives of all the other virtual customers entering the virtual office of Budaörs, simultaneously.

It is not only the detailed 3D model of the realistic office environment that has to be created, but we cannot neglect the 3D avatars of the customers either. Unlike 3D video games these customer representations have to be available from a pre-formed, nationwide choice in order to preserve a certain solemnity and dignity of public administration. One aspect of info-sociology is dealing with the motivations and experiences influencing the choice and the creation of personal avatars (Castranova, 2005). Therefore to avoid unwanted deviancies and individualism in e-government and public administration, the available 3D characters of both clerks and customers have to be regulated by law. It can also be recommended in e-business like banking with the exceptions of the entertaining systems.

2 Source of picture copyright is *Virtual Planet Hungary* Ltd. 2012.

3 Budaörs is a gateway town of circa 10,000 inhabitants just West of Budapest, capital of Hungary.

An important difference between virtual space and reality is the possibility of the symbolic 3D customer to be present in several virtual spaces at the same time. The 3D customer character can enter interactivity with other 3D characters or gather information. Thus the time of the customer can be multiplied without having to travel physically. The customer friendly administration of the 'good state' can be best manifested through a virtual service like this.

4. The content and structure of virtual public administration

The elements of the virtual reality include players (clerks, customers) products (services) and procedures (workflows) according to Füleki *et al.* (2008). In an administrative context these players belong either to the front office or the back office as the parts of a uniformed 3 dimensional collection of figures.

Picture 3: The customer's avatar can change its position at the reception desk of Budaörs Town Hall by the movements of the cursor.

Picture 4: The customer's avatar figure can see the same information and office equipment and furniture like at the real reception hall of the Budaörs Office.

Picture 5: The information boards can be situated and used the same way as in reality at the Budaörs Office. The customer can have a call number as well.

Services contain front and back office workflows. The knowledge of the exact workflow steps as described by Almásy (2012) is essential for building up a virtual space of public administration, just like in the case of modeling processes for e-government systems. The CLBPS[4] of the European Union, as a recommendation for the introduction of e-government, can be applied too, when trying to model public administration in virtual reality, too. The CLBPS includes the most frequently used workflow types in public administration, twelve types for citizens and six types for companies.

Picture 6: The avatar figure of the customer can enter a real time dialogue with the 3D representation of the clerk in the Budaörs document office, who can also see the virtual customer. Depending on the possibility of electronic identification complete administration procedures can be performed.

Managers and staff meetings can be placed in the virtual back office reality as well, thus achieving cost savings and efficiency.

4 Common List of Basic Public Services.

Picture 7: In back office processes the staff of the office can have real time meetings, can attend lectures or post graduate courses via their symbolic representatives in virtual reality.

The building of the virtual reality has to take advantage of creating a uniform office environment with the same workflows all over a country, according to the exact steps required by the law on public administration procedures. In this sense, the uneven applications of e-business do not serve as examples. On the part of the citizens, the accessibility of virtual reality has to be free of charge through a free program to be downloaded from the Internet.

Building up the 3D virtual reality for public administration has to be a step by step process. From among the sophistication levels of e-government the information, the transaction and the interaction levels can be applied. After the solution of electronic identification of the customer the transformation and the targetization levels can also be developed. On these levels the whole procedures of e-government can be modeled and run simulated in the virtual reality, too.

Among the interpretations of the relationship of the real and virtual administration there is a transition level of the augmented virtual reality (Milgram and Takemura, 1994). This is a mixed space, different from the 'real' virtual or fantastic reality so that in the augmented reality the pictures of the real environment are used to build up the actual office or business environment. This is a basic criterion for virtual public administration as it has already been mentioned in order to make the customer feel that he or she is entering the office at his or her own town. So in virtual public administration the 3D picture of the real physical office environment gives the framework in which the combination of virtually registered information and characters make up the augmented virtual reality (Vallino, 1998).

The information basis of augmented (extended) virtual administration reality and its internal processes is provided by the Massively Multiplayer Oriented Role Playing Games (MMORPG). Content development relies on such knowledge of MMORPG.

According to the interpretation of Nemeslaki (2012) the role players and systems of the virtual reality are quite suitable to simulate the workflow steps of very complex economic and social systems including that of public administration as well. The survey conducted by Füleki *et al.* (2008) shows that 80 % of the most active Internet user com-

panies, the Fortune Top 500 apply some kind of virtual or augmented virtual systems. Also, in the system of the Second Life Universe there are several hundreds of companies and almost 200 universities applying virtual offices and classrooms respectively. The growth and increasing popularity of these synthetic spaces urge their legal regulation in as much as they simulate and generate real economic or educational processes. The demand for legal regulation is even stronger, once the real time modeling of public administration procedures are to be introduced.

Within a decade the solutions supported by Internet are going to be replaced by the solutions supported by virtual or augmented virtual realities. Browsing web pages will probably be also replaced by finding information, entertainment, products and services in virtual realities.

5. Residential acceptance

There is a frequent reasoning to support e-government because it helps the disadvantaged social groups to solve their administrative problems without going to the local government offices in person. At the same time, researchers of the information society found that bridging the digital divide between the netizens and the netless is not a question of generation change, not even in the well developed countries (Budai, 2009). The disadvantaged are the unemployed and the elderly people. The opinion of the head officers in document administration shows that in Hungary a small number of people initiate e-government procedures. Electronic administration services, apart from the ones that are made compulsory and exclusive by the law (like VAT return), are used to the extent of making office appointments only. This is also true for the young generation, much more connected then the older ones.

The administration facility in virtual reality, however, is interesting enough to focus the attention of the netizens on the virtual offices. On the other hand its operation is simple enough to encourage the netless as well to try to use it. The recent development of graphic cards has already supported the 3D virtual reality or second life applications in all up-to-date personal computers, including net books, tablets and smart phones as well.

Information warfare has changed a lot during the last decade. Information attacks have been aiming at information systems so far, but today their prior target is the human mind. So, besides the old ways of attacks (like flyers, loudspeakers etc.), the high technology weapon is in the virtual space itself, because it can lead to addiction and impressionability like drugs (Sik, 2009). When entering an office in the form of avatars, customers may find this kind of administration enjoyable, so virtual reality application may lead to the spread of e-government, which has been long awaited. Security issues of the planned virtual reality applications in public administration rely on the same pin code protection as e-banking. It means that the customers first have to register themselves with the office to be able to use the virtual reality services which requires their pre-identification. Thus this new application will require similar security demands as either using 'traditional' e-government or e-banking services. However, in the first

stage, the virtual reality pilots focus on asking for and giving information that does not require special security steps as can be seen in the Budaörs experience in Pictures 1-7.

The existence in the post Internet, synthetic virtual worlds is not only going to be a video game to entertain us, but an everyday activity, as natural as using our notebook, the Internet or a smart telephone (Nemeslaki, 2012). In conclusion, the above mentioned devices only accelerated the rhythm of our lives, and have not led to general social alienation. The application of virtual realities will likewise serve our comfort.

6. Virtual reality and the offices of regional administration

It is very inconvenient for professional policy makers to explain the advantages of the 'good state' when in the name of cost efficiency and economies of scales, some administrative services of the local authority have to be centralized into the centers of the micro regions and thus the buildings and document management functions are taken away from a number of town halls. This situation requires some customers to make farther trips to the office. In case there are virtual versions of the micro regional offices established in the augmented reality, this concentration process can be interpreted for the public rather as a development, than as a cut down of expenses. During the orientating virtual visits and tours taken to the micro regional virtual offices, the potential customers can obtain all the information that is needed for administration, and after entering into a real time dialogue with a clerk, the customer can initiate, or what is more, even can finalize his or her official procedure. During the time spared from traveling the virtual customers can save time and expenses, by doing their job at home or elsewhere. To install 3D virtual offices augmenting the reality of the real micro regional ones is the duty of the state administration. Content development has to be started with R&D projects. Citizens ought to have access to the virtual offices through a free downloadable program. So the responsibility of establishing the customer friendly public administration of the 21st century belongs to or ought to belong to the state.

7. Conclusion of the virtual reality application in public administration

The aim of this study is to illustrate the nature of virtual reality (VR) applications in public administration. Since VR is not operating anywhere in practice, the research and development stages of such a project have to be outlined as a conclusion and subject of this study.

Table 1 lists 13 research steps in the application of VR in public administration, out of which number 3 to 6 have been realized in the Pilot Project of Budaörs. It is important to state that the Budaörs Pilot was not supported by any central or local government R&D sources. It was financed by the developers (Virtual Planet Hungary) on their own expenses solemnly. The Budaörs Local Government offered the site and their clerks' contribution. It has to be stressed to see that research tasks requiring extra costs like for example joining the VR system to operating appointment registry systems (step number 7) could not be performed or started without a considerable R&D project in the background.

Table 1: The proposed research stages of virtual reality (VR) application in public administration

Tasks to solve	Front office context	Back office context	Notes
1. Entering VR system			Simple to navigate, free to download
2. Choosing avatar figures			Restrictions of choice is required
3. Entry and navigation in the virtual office			Realized in the Pilot at Budaörs Municipality Office, Hungary
4. Down- and uploading information	Downloading	Uploading	
5. Entering real time dialogues: asking for and giving information	Asking for	Giving (remote work is also possible for the clerk on duty)	
6. Attending public meetings			
7. Making appointments	Choosing	Recording	Access to existing appointment registry systems
8. Initiating administration procedures	Applying for certificates for example		Simple cases that do not require official identification of the customer in advance
9. Application of security issues	Registration in VR system		Pin codes, users' names for e-identification of the customer
10. E-administration	Front office procedures of services		Detailed workflow modeling required
11. E-administration		Back office procedures	Access to official data bases required
12. Attendance		Official meetings, post graduate courses	Remote full time work is possible
13. E-payment	Fee, tax, fine		Access to e-banking systems required

Administration from research step number 9 requires preliminary electronic identification of the avatar of the customer. The research cost therefore increases here a great deal. Workflow modeling (in research step number 10), access to the data bases of central administration (in step number 11) or access to electronic banking systems (in step number 13) also require high expenses and information technology job to pay. Thus Table 1 stands for a screenplay of any R&D intending to apply VR in public administration. Pictures from number 1 to 7 show that this intention is not missing the chances to realize.

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