Visibility of Open Acces Repositories of Digital University Libraries:

A Case Study of the EU Visegrád Group

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ABSTRACT

For scientific research institutions, as well as for scientists individually, the degree of accessibility of a given institution's and of an individual researcher's scientific achievement is of growing significance in this world of the internet: i.e., it is vitally important to know about and to have easy access to what research is conducted in what fields and with what results in the different institutions. In this study I intend to survey the present situation concerning the homepages of leading universities of the so-called Visegrad Group inside the European Union and the extent to which the present situation serves or fails to serve the cause of the philosophy of open access. My aim is twofold. (1) I will consider whether the scienetific-knowledge repositories built by universities are accessible or not, and/or how easy or difficult it is to access them. Provided that those repositories exist at all, because, in spite of the fact that the Berlin Declaration is generally adopted in principle, the homepages of a good number of the surveyed Visegrad Group universities or libraries do not make their research databases easily accessible or accessible at all, or they can be accessed in the given national language only. (2)

Keywords: case study, European Union, Visegrad Group, universities, visibility, open access repositories, linked homepages, scientific information

I. THE EU AND OPEN ACCESS

The open access movement was initiated in the field of natural sciences, to facilitate accessibility, among other things, with making free access to research studies and articles as its main concern. At the back of it was the crisis of journals: journal subscriptions were rising to the degree that made financial affordability more and more problematic for universities, research institutions, and libraries. Creating charge-free document archives by developing EPrints software was the next step. Open Archives Initiative (OAI) was launched in 1999, granting full access to metadata; moreover it secures the protocol for simultaneous server-search. In 2000 the Public Library of Science addressed an online petition to publishers, urging them to make their published papers available online. In 2001 the Open Society Institute was set up, and issued its Budapest Open Access Initiative later the same year, thus officially formulating open access for the first time. The 2010 Berlin Declaration shared the same philosophy by assigning a crucial role to internet in making scientific publications accessible and scientific communication possible. [1] More and more universities and research institutes embrace open access philosophy and permit access to scientific documents by building repositories based on self-archiving. There are several well-functioning repositories in Europe, like EUA Open Access Working Group (especially in Germany – Open-Access.net – and the United Kingdom – SPARC Europe). Furthermore, Recolecta (National Open Science Harvester – Spain); RCAAP (Portuguese Open Access Scientific Repository); and the open access initiative of the publisher RSC (Royal Science of Chemistry) must be mentioned. Within the OpenAIRE[1] project framework (OpenAIRE was launched in December 2010 by Ghent University, Belgium on the European Commission's initiative) gives access – in seven areas of science – to the reviewed publications of 38 partner institutions of 27 European universities. It is coordinated by three universities: the National and Kapodistrian University of Athens, the Georg-August-Universität Göttingen, and the Pisa laboratory of the Italian Consiglio Nazionale delle Ricerche. The participating institutions had worked jointly on DRIVER[2], a predecessor project of OpenAIRE. Of the countries discussed in this paper, the Czech Republic was represented by VSB-Technical University of Ostrava; Poland by the Centre for Open Science, ICM, University of Warsaw; Slovakia by the University Library in Bratislava in the OpenAIRE project. Hungary was not represented. [2]

II. THE BERLIN DECLARATION AND THE VISEGRAD GROUP

340 of the 448 signatory institutions of the Berlin Declaration are European. Of the signers of the so-called Visegrad countries (hence V4) 6 were Czech

- ✓ University of Economics, Prague, 2012;
- ✓ Association of Libraries of Czech Universities, 2012;
- ✓ MAGNANIMITAS, 2011; Masaryk University, 2010;
- ✓ Czech Science Foundation, 2008; Academy of Sciences of the Czech Republic, 2009;

3 were Hungarian

- ✓ University of Debrecen, 2009;
- ✓ Hungarian Scientific Research Fund [OTKA], 2008;
- ✓ Central European University, 2003;

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[1] Open Access Infrastructure for Research in Europe.

[2] Digital Repository Infrastructure Vision for European Research.

3 were Polish

- ✓ Collegium Artium, 2010;
- ✓ Interdisciplinary Centre for Mathematical and Computational Modelling, University of Warsaw, 2009;
- ✓ Wikimedia Polska Association, 2007.[3]

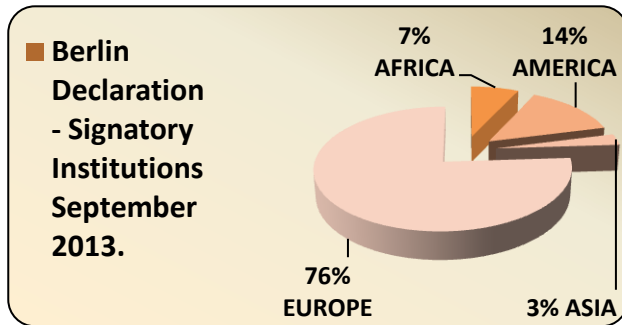No signatory institution from Slovakia. [3]

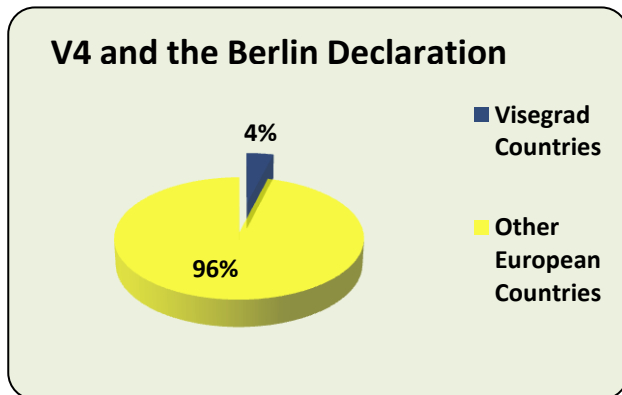**Figure 1.** Signatory Institutions of Berlin Declaration – September 2013.

Figure 2. V4 and the Berlin Declaration

As these data indicate (12 V4 signers out of the 340), the higher education institutions and research institutes of the Visegrad countries do not distinguish themselves in this respect. Only two of the major Hungarian universities (University of Debrecen and Central European University) and one research fund (OTKA) signed the Declaration.

The present research intends to establish to what extent the scientific activity of research institutions is really accessible on the internet in general; also, if open access methodology is in place in the case of the signers of the Berlin Declaration at all? As only few V4 institutions signed the Declaration, the research has been extended to include V4 institutions that did not sign it. This could be the commencing stage of such an investigation, to be followed by further extensions to include larger European regions, and,

eventually, all the 28 member countries of the EU. My source for the list of major V4 universities is: http://eu-egyetem.lap.hu/ . [4]

III. ISSUES AND AIMS

Besides raising the issue and surveying the present scene, the contribution of the present study is meant to be the contention that the digital networking of open access digital university libraries would be needed, on the platform of a common language. Attempts to supply answers to the following groups of questions will be adopted as the method of investigation.

-How can it be achieved that researchers of any given institution upload their publications into the institution's repository? How can this requirement be satisfied without compromising copyrights? How are tasks and responsibilities divided between the researcher who uploads the data and the library that builds the database?
-To what extent are existing and continuously expanding databases accessible for researchers of other institutions? After all, if no well-placed link is in sight on a university homepage, to link to the publications-database (which, optimally, is accessible on the university-library homepage), the degree of accessibility is reduced.
-Besides the general methodology of approach, and taking the author's V4 home institution (University of Debrecen, Hungary) as an example, the question will be posed: what is the degree of accessibility of the DEA repository, one with a relatively excellent level of uploading, from the university homepages of other V4 universities? Which is (also) as much as to ask: to what extent is that repository accessible for the universal community of science? Are there links on other V4 university homepages pointing to DEA and vice versa?
-The issue relating to the common language of the digital library depositaries of V4 universities will also be raised. These pages need to be userfriendly, not only in a technical sense, but also regarding their mediating language.

Finally, the author proposes *a 3D link-combination*, to facilitate an easy and mutual access of the involved repositories with *the least possible number of clicks*. It must be remarked that the present one is not the only possible approach to visibility and the accessibility of scientific results. National repositories could indeed fulfill the same role, but they cannot, at this point. The majority of potential users have no idea HUNOR[5] exists, and none of the Hungarian university home pages the author knows of provides a link to HUNOR. Again, visibility and accessability can be evaluated from points of view other than accessing repositories through home pages and links. General and specialized search engines (BASE, Google Scolar, OpenDOAR Search, OAIster, Science Gate, Scientific Commons, Scirus) could also be investigated. But this could be a subject of another study. Thus the primary goal of the 3D link-combination is to make it clear on the home pages of the involved universities that these repositories – whether in or out of operation – do exist. This does not exclude the possibility that those repositories (be they national ones or made available by a given institution) can be accessed via a different route too; e.g., with the help of the search engines just mentioned.

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[3] 2013 data.

[4] [15.06.2013] only the main page
[5] HUNgarian Open Repositories

IV.   THE V4 COUNTRIES AND THEIR UNIVERSITIES

The Visegrad Cooperation was created in 1991as a means of forming a common economic, diplomatic, and political platform for representing the interests of those four countries (the Czech Republic, Hungary, Poland, and Slovakia). [4] These Central European countries have 28 universities in operation, enlisted by the source mentioned above—but the actual number is, in fact, much higher. EUROSTAT data indicate 73 higher education institutions in the Czech Republic, 128 in Poland (add 35 private ones), 70 in Hungary, and 33 in Slovakia. [5]

In what follows, the quality of the individual English-language homepages will be examined; also the accessibility of the library from a given homepage. Does the library have a functional homepage in English? Does the institution have a publications database (repository) of its own?

The Czech Republic

ACADEMY OF FINE ARTS IN PRAGUE (http://www.avu.cz/); only the main page works in English (http://www.avu.cz/english), with minimal information. Practically no information that matters is available in English.

BRNO UNIVERSITY OF TECHNOLOGY (http://www.vutbr.cz/) has a homepage that functions well in English (http://www.vutbr.cz/en/), and the university library is easily accessible through a link, which is distinctly in view. The library's homepage works satisfactorily in English; open access (http://www.vutbr.cz/en/uk/eir/open-access) is indicated, but there is no full-value content behind it: DSpace search field works superbly, the abstracts of the matches found are available in both Czech and English, but the the full-text version is not always there.

CZECH UNIVERSITY OF AGRICULTURE IN PRAGUE (http://www.czu.cz/cs/), with an English version that works fine (http://www.czu.cz/en/). It is difficult to access the library homepage, though (http://infozdroje.sic.czu.cz/en/), and open access is available only in Czech, and registration is needed.

JANÁCEK ACADEMY OF MUSIC AND PERFORMING ARTS (http://www.jamu.cz/); not available in English.

MASARYK UNIVERSITY IN BRNO (http://www.muni.cz/?lang=cs); available in English (http://www.muni.cz/?lang=en), in good operating condition. But it is difficult to find the library – the various faculties have separate libraries of their own, and there is no joint search-surface. No open access in sight at all.

UNIVERSITY OF ECONOMICS IN PRAGUE (http://www.vse.cz/); its English version (http://www.vse.cz/english/) works perfectly well. There is no university publications-database among the library's (http://ciks.vse.cz/Default-en.aspx) services.

Poland

ACADEMY OF FINE ARTS, CRACOW (http://asp.krakow.pl/index.php/pl/strona-glowna); the English version (http://asp.krakow.pl/index.php/en/strona-glowna) provides no information of merit behind the headings. It is troublesome to reach the library homepage (http://bg.asp.krakow.pl/bg/), and it operates in Polish only.

ACADEMY OF FINE ARTS, WROCLAW (http://www.asp.wroc.pl/index.php) ; it has no English version.

ACADEMY OF MUSIC, CRACOW (http://amuz.krakow.pl/); functions well in English (http://www.amuz.krakow.pl/en/29/2/7/History). It offers no link to the library.

ACADEMY OF MUSIC, WARSAW (http://www.chopin.edu.pl/pl/) bears the name of Frederic Chopin; it has an English version (http://www.chopin.edu.pl/en/). It is a high-standard homepage, but has no link to the library.

CRACOW UNIVERSITY OF TECHNOLOGY (http://www.pk.edu.pl/); it is available in English (http://www.en.pk.edu.pl/). Its library homepage (http://www.biblos.pk.edu.pl/) contains a CUT Repository link, with the following quotation on its open access page: *"An old tradition and a new technology have converged to make possible an unprecented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of their research in scholary journals without payment, for the sake of inquiry and knowledge".* [Budapest Open Access Initiative, 2002]

JAGELLONIAN UNIVERSITY, CRACOW (http://www.uj.edu.pl/); it works fairly well in English (http://www.uj.edu.pl/en_GB/), but it tends to switch to Polish amidst a search in progress. The author did not find a link to the library, and there is no repository.

MEDICAL UNIVERSITY OF LODZ (http://www.umed.pl/pl/); its English-language homepage (http://www.umed.pl/eng/) works fine, it makes all important information available. It links to the library easily, but the library homepage is available in Polish only.

MEDICAL UNIVERSITY OF WARSAW (http://www.wum.edu.pl/); its English version is cumbersome (http://www.wum.edu.pl/en), with mixed-language content. The author found no link to the library.

WARSAW SCHOOL OF ECONOMICS (http://www.sgh.waw.pl/index.html); its English homepage (http://www.sgh.waw.pl/index_en.html) works very well. Its library link is distinctly in sight (http://www.sgh.waw.pl/ogolnouczelniane/library/informacje_ogolne-en?set_language=en) , and works fine in English. It provides a "Distributed Catalogue of Polish Libraries" link, which makes simultaneous search in all of Poland's libraries possible.

WARSAW UNIVERSITY has a homepage (http://www.uw.edu.pl/) which operates well in English (http://www.uw.edu.pl/en/). Its library homepage can be accessed with the help of a search box only (http://www.buw.uw.edu.pl/en/) – no repository.

Hungary

CORVINUS UNIVERSITY of Budapest (http://www.uni-corvinus.hu/index.php?id=35058), has an English-language homepage (http://portal.uni-corvinus.hu/?id=44509), and it works perfectly well. Its link to the library (http://portal.uni-corvinus.hu/index.php?id=44529) is easy to find, an institutional

repository is in place, easily accessible; the totality of the services offered can be used in English too. ("Corvius Research Archive")

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS (http://www.bme.hu/); its English homepage (http://www.bme.hu/?language=en) works well. The link to the library can be found easily, but it works only in Hungarian (http://www.omikk.bme.hu/). Under the E-services there are no available data about repository.

UNIVERSTY OF DEBRECEN (http://unideb.hu/portal/); available in English (http://unideb.hu/portal/en), works fine, although the content is often in Hungarian behind a tab. It is difficult to find the link to the library – 3 cliks (http://www.lib.unideb.hu/en) – DEA and UD Publication Database are easily available under Information Resources.

EÖTVÖS LORÁND UNIVERSITY, Budapest. Its homepage (http://www.elte.hu/); works very well in English (http://www.elte.hu/en). The author found no link to the university library. The university has no central library. The joint homepage of the faculty libraries works well in English (http://konyvtar.elte.hu/en/node/971-), but contains no repository.

UNIVERSITY OF KAPOSVÁR (http://www.ke.hu/); its English homepage (http://english.ke.hu/) aims at completeness, but its link to the library is hard to find and contains one static page only.

CENTRAL EUROPEAN UNIVERSITY (http://www.ceu.hu/hu/kee); its English homepage works perfectly well (http://www.ceu.hu/). The link to the library is distinctly in view, clear, logical. The library's English homepage (http://www.library.ceu.hu/cat/#&panel1-1) contains the ETD Collections repository.

UNIVERSITY OF PÉCS (http://www.pte.hu/); its English homepage (http://english.pte.hu/) functions fine, accommodating the library, but in Hungarian only.

UNIVERSITY OF PANNONIA (http://www.uni-pannon.hu/); its English homepage (http://englishweb.uni-pannon.hu/) is tight-lipped, with little information that counts. No link to the library.

Slovakia

COMENIUS UNIVERSITY IN BRATISLAVA (http://www.uniba.sk/index.php?id=965); its English homepage (http://www.uniba.sk/index.php?id=921) works fine, but contains scarce information on its simple surface. The link to the library can be easily found, but its homepage (http://www.uniba.sk/index.php?id=2156) provides only minimal information regarding the library and the services it offers. But there is a link, on the right-hand side, to the university repository (DB of publication activities).

CONSTANTINE THE PHILOSOPHER UNIVERISTY, NITRA (https://www.ukf.sk/); its English homepage (http://www.en.ukf.sk/) functions adequately. The repository can be found under the Research tab. Only the bibliographical data of the research contributions are provided, with no full texts behind them. It is not difficult to find the link to the library, but it does not work in English, and the menu (full of abbreviations and, perhaps, mixed-language) is very confusing.

SLOVAK UNIVERSITY OF AGRICULTURE (http://www.uniag.sk/sk/); the English homepage (http://www.uniag.sk/en/) works very well. It includes no link to the library, but there is a Publications tab under Science and Research, from which the university repository can be accessed (with full texts also available, unless the publication dates back to earlier than 1950).

UNIVERSITY OF ECONOMICS IN BRATISLAVA (http://www.euba.sk/?lang=sk); homepage works well in English (http://www.euba.sk/?lang=en); links to several universities and organizations appear on the main page in the form of moving links, with high visibility (probably all of them close partner insitutions of the university). The link to the library is also allotted privileged position (http://193.87.31.4/arl-eu/en/search/), leading straight on to the library's OPAC. Outputs Publications Activities EU comprises the institutions repository.
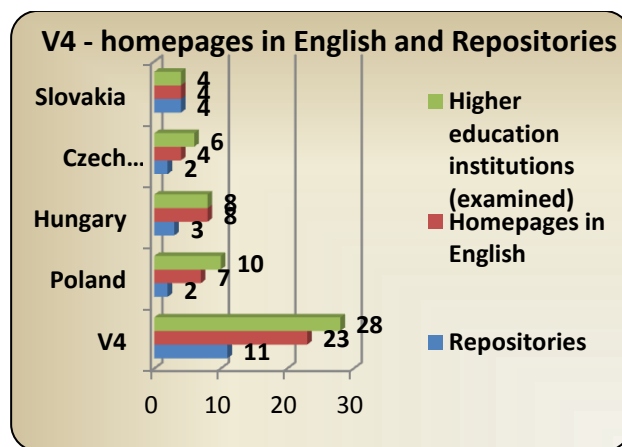

Figure 3. University homepages in English and existing Repositories (V4)

All in all, it is safe to say that the first priority should be the good working condition of English-language homepages. As long as this issue is not taken care of, no networking of V4 science repositories would yield good results. The language of international communication in the 21st century is English. Possible user-environment is limited to speakers of the given national language (Czech, Hungarian, Polish, Slovakian) if the language of the repository is not English or at least one of the generally known international languages (e.g., German). Since the main goal is international sharing of scientific achievement conveyed by research repositories, an enlargement of the targeted user-environment is vital. Most of the universities examined here do have English homepages, but very few of them operate it with an aim at totality of services.

The second priority would be building institutional repositories in accord with the directives of the Berlin Declaration. Where there is one already in place, further refinement of the details would be necessary; and the university leadership should launch the repository project where there is none yet. Institutional libraries are suitable for the purpose.

The third step should be to develop a link-combination of 3D-capability which would combine all V4 institutions into one single virtual network, through which the repository of any university could be reached with a fews clicks. It would serve the purpose if these databases would be collected in a single, joint search surface in the future, so that one could conduct searches in all of them at one and the same time. Fourthly, each and every involved university should

post on its homepage (centrally positioned, easy to sight) a link to this link-collection.

The author checked the Hungarian consortium HUNOR (HUNgarian Open Repositories – mentioned above), a joint project of Hungarian higher education institutions and the Library of the Hungarian Academy of Sciences to see what members it had. HUNOR set itself the goal to put open access in practice and to coordinate it in that country. It is their intention (among other things) to put in place a nation-wide infrastructural network for open-access repositories as well as to foster international networking. HUNOR also defines itself as a centre for methodology that also coordinates international linkages. HUNOR could become one of the important network nodes since it is a V4 network near completion. The author deems it most important, for the sake of "visibility," to develop the 3D link-collection that would make accessing repositories from university homepages much easier.

Members of HUNOR at present are: Corvinus University of Budapest, Budapest University of Technology and Economics, Central European University, University of Debrecen, Eötvös Loránd University, Eszterházy Károly College, University of Kaposvár, Károli Gáspár University of the Reformed Church in Hungary, Károly Róbert College, Franz Liszt Academy of Music, Hungarian Academy of Sciences, University of Miskolc, Moholy-Nagy University of Art and Design, University of West Hungary, University of Pannonia, Pázmány Péter Catholic University, University of Pécs, Semmelweis University, Széchenyi István University, University of Szeged, Szent István University, University of Theatre and Film Arts, Zrínyi Miklós National Defence University (23 institutions). [6]

As can be seen, 22 higher education institutions and the Academy of Sciences participate in this project while only two universities and the Academy signed the Berlin Declaration. The website that I used as my resource (http://eu-egyetem.lap.hu/) for a starting point, lists only 8 of these institutions. On the other hand, while OpenDOAR[6] also specifies 8 Hungarian institutions with 9 repositories, these include institutions that are not listed by http://eu-egyetem.lap.hu/; they are:

- ✓ Central European University,
- ✓ Corvinus University of Budapest,
- ✓ Hungarian Academy of Sciences (with 2 repositories),
- ✓ National Széchényi Library,
- ✓ Szent István University,
- ✓ University and National Library of the University of Debrecen,
- ✓ University of Miskolc,
- ✓ University of Szeged. [7]

It must be noted that the OpenAIRE network system is based on what is a grouping of EU countries into European regions according to how advanced they are regarding open acces. Regions do not correspond to geographical location in this case, but reflect the stage of development of open access culture. All four Visegrad countries can be found in the third group of four. [8]

Figure 4. OpenAire East Region [8]

According to the 2013 University of Nottingham data Hungary has 10, the Czech Republic 7, Poland 68 (!) institutions with repositories. There are no data related to Slovakia. It is also relevant that, in intercontinental comparison, Europe takes the leading role in this respect with its share of 49%. [6]
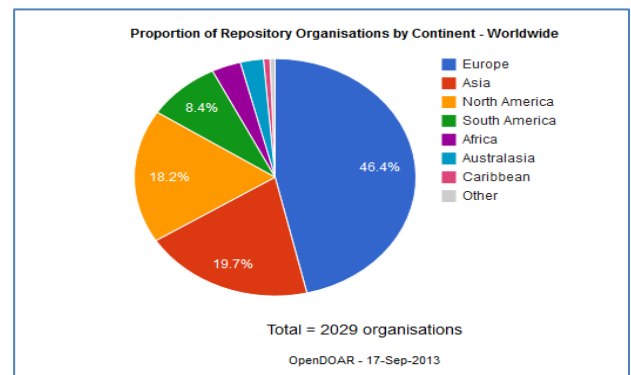

Figure 5. Proportion of Repository Organisations by Continent

V. POSSIBLE ANSWERS AND A POSSIBLE MODEL

One of the significant points Albert-László Barabási's scale-freee network theory makes is that the measure of accessibility in networks is distance. Any given document on the web is at 19 click's distance from any other. [10] Having now seen where the relevant universities are in relation to the issues raised early in this paper, and taking Barabási's 19-clicks theory into consideration, this study will be concluded with some thoughts concerning those main issues, and a possible way to realize the proposed project will also follow.

- ✓ It must be a university-leadership level decision that research faculty upload their publications into the repository which is managed by the library. A presidential

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[6] Directory of Open Access Repositories

decision requires it at the University of Debrecen. Compromising copyrights can be avoided by the manner in which the publications are made public. It means that if a faculty does not consent to making his or her full text publicly available, only the bibliographical data will come into view for the visitor of the database, and permission will be needed to access the full text stored in the repository. The bibliographical data of the publications uploaded into the database by the research faculty will be controlled and corrected by professional librarians—any given study can make its way into the repository through such screening.

✓ In the course of the present research it was found that the existing databases are not "visible" for the other institutions. Moreover, the route to them is often complicated, difficult. Therefore, the next (also presidential level) decision could be that the webmasters of the university place a clearly seeable link on the university homepage to the library database. That link should be positioned (in a preregulated fashion) to be in the same place and with the same eye-catching technology on every participating institution's homepage. This would greatly enhance the degree of accessibility. Although it is obvious that library systems, including repositories, should be linked for better information services and recource sharing, the unique aspect or challenge is designing and implementing the system proposed in this paper.

✓ But one should sweep before one's own door, so let the author return to her home institution for one moment. The open-access repository built by the University and National Library of Debrecen (DEA) works well, its level of uploadedness is outstanding in the examined region, but it does not take us far if no link to the database can be found. Nor are links to other universities found on the university's main page.

✓ The possible model the author wishes to suggest to realize the big project proposed in this paper could be the network in the figure below. Jumping on towards other universities from any V4 university, any other university's repository could be reached with only a few clicks (the number of clicks depending on the length of the route). In order to reach this stage, the problems outlined in the foregoing three paragraphs must be solved.
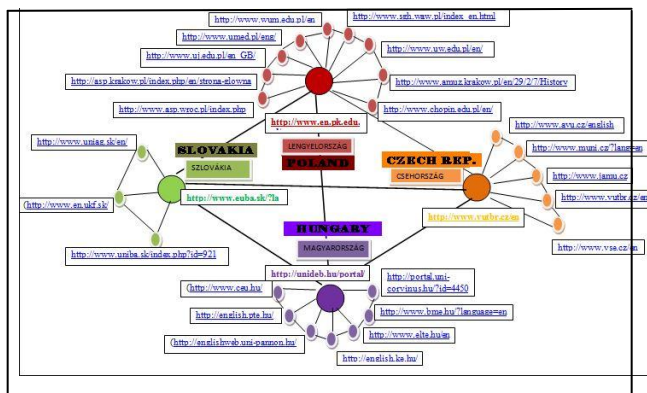

Figure 6. The possible 3D-model

VI. THE 3D-MODEL

The VirCa platform is the result of the developments of the Hungarian Academy's Institute of Computer Science and Control. It is an important tool in the service of EU's Future Internet program. The platform's technique of visualization and its new philosophy earned several prizes (fet11 – The European Future Technologies Conference and Exhibition). [11]

The developers of VirCa summed it up as follows.

„The main concept of VirCA can be expressed with the underlying technologies: it is a mixture of computer graphics, distributed systems, and a modularitiy framework. This makes VirCA a unique, loosely coupled modular, 3D Internet based interactive virtual environment for collaborative manipulation of robots and other hardware or software equipment. Four key technologies of VirCA are represented by three widely used open source implementations:

OGRE (Object-Oriented Graphics Rendering Engine) is a scene-oriented, flexible 3D engine written in C++ designed to make it easier and more intuitive for developers to produce applications utilising hardware-accelerated 3D graphics.

RT-middleware (Robotics Technology Middleware) is a common platform standards for Robots based on the distributed object technology. RT-middleware supports the construction of various networked robotic systems by the integration of various network enabled robotic elements called RT-Components. The specification standard of the RT-component is discussed / defined by the Object Management Group (OMG).

Bullet is an open source physics engine featuring 3D collision detection, soft body dynamics, and rigid body dynamics. It is used in games, and in visual effects in movies.

The Internet Communications Engine (Ice) is a modern object-oriented toolkit that enables you to build distributed applications with minimal effort. Ice allows you to focus your efforts on your application logic, and it takes care of all interactions with low-level network programming interfaces. With Ice, there is no need to worry about details such as opening network connections, serializing and deserializing data for network transmission, or retrying failed connection attempts (to name but a few of dozens of such low-level details)."[12]

István Boda, associate professor of the Faculty of Informatics, University of Debrecen is working on the 3D display of the accessibility model introduced here. (Dr. Boda has another such project, already realized: the Library of Alexandria. [13]) He placed four cabinets in the VirCa room, representing the virtual space of the four countries. The rooms and their contents can be described by a well documented XML-file. Dr. Boda has created a predefined arrangement of cabinets. A program in Java language can convert the selected content (home pages) into a VirCA-based XML representation. The input will be the textual description of the selected home pages. The output will be the XML description of the 3D projects in a virtual room.

Figure 7. Room with 4 cabinets (the V4 country)

What can be found in the four cabinets are the home pages of the examined universities. The cabinets intercommunicate.

Figure 8. Front view of the room

By zooming in on a selected university home page, one can access its content to which the open access repository can then be added.
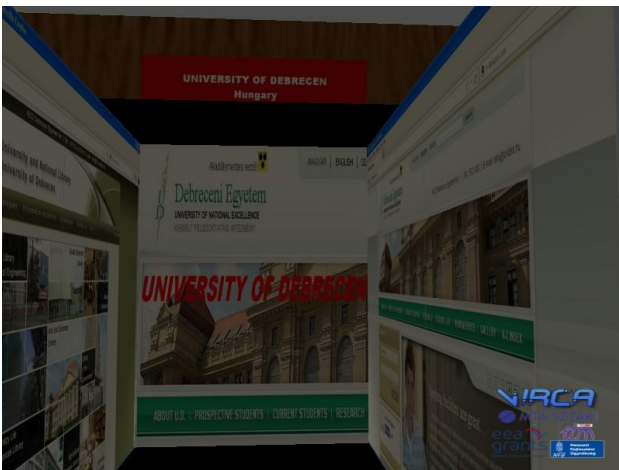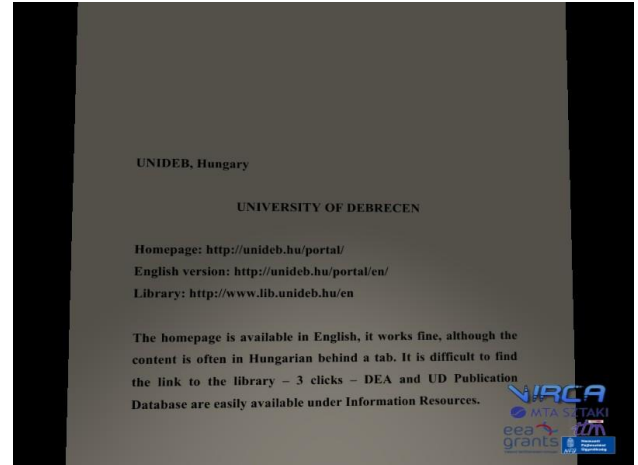

Figure 9. The Hungarian cabinet

Figure 10. The future place of the repository-link

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