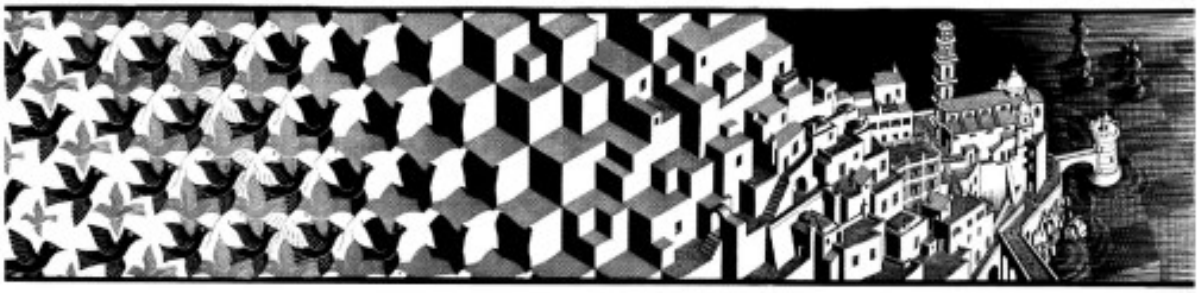

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al tempo delle Digital Humanities

Teaching and research
in Digital Humanities' era

edited by Stefano Allegrezza

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The Digital Repository Service of the National Documentation Centre in Greece: a model for Digital Humanities data management and representation

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ABSTRACT
Digital Humanities lie at the crossroads between technology and humanistic research. Contemporary technological advances significantly open up new avenues for humanities study and new ways to utilize the output of humanities endeavors for the communities that benefit from it, be it communities of practice, the education system, citizen scientists and society overall.
The following article describes the development cycle of a new cloud service the Greek National Documentation Centre (EKT) offers to the domestic cultural and science organisations. The National Documentation Centre (EKT) is one of the most important digital content stakeholders in Greece, facilitating Humanities research through robust e-infrastructures and widening access to digital collections.
The article describes the Digital Repository Service development from planning to delivery, describes the various components of the service and addresses the issues of engaging with the community of users to address their documentation needs and preferences. As part of designing the service and workflows, a survey was conducted in the GLAM sector organisations in Greece, in order to assess user needs and understanding of new and emerging technologies, as well as discern possible volume of digital content. Extensive literature and similar trends review took place and it was funneled into designing the documentation strategy used for the Repositories. The accompanying suit of services was developed (eLearning, eKnowledgeBase) and the project rolled out initially with some pilots, then managed to create 28 repositories with rich, varied content.
The Repository Service was developed through national and EU funding during 2012-2015 and aims to support knowledge producers (in the fields of culture, education, science and research) to organize, document and disseminate their content on an open access basis. Overarching goal of the project was to aggregate quality science and cultural content and disseminate through search portals and aggregators such as Europeana.

KEYWORDS
Digital Repositories services; Data management and representation; DH, learning and pedagogy; Technologies for cultural heritage information

INTRODUCTION
This proposal presents a robust cloud infrastructure of a Digital Repository Service (DRS) in Greece, developed by the National Documentation Centre (EKT) (http://www.ekt.gr/en) through the Operational Programme "Digital Convergence" (2011-2015). This Service supports Digital Humanities (DH) as well as other content (e.g. science, research) through its lifecycle and is offered as SaaS (Software as a Service) public service to a wide number of research, cultural, educational and memory organisations along with e-learning and support services.
The main objective of the DRS is first to meet EU priorities for open access and economies of scale through the dissemination and re-use of large amounts of data and second to focus on the organisations needs regarding administration and dissemination of content with proper licensing.
The proposal presents the methodology used to plan and implement the whole service, its key characteristics and components, the functionality and interoperability with other systems and services, some indicative DH repository applications and the main conclusions obtained.

METHODOLOGY
The methodology used to develop the DRS model built upon several factors: a) the National Documentation Centre long-term experience in developing data administration systems as well as collecting and maintaining high quality data for various purposes and users b) major past and current international practices and initiatives for managing and curating cultural and/or scientific data c) an extensive literature review on cultural ontologies

and vocabularies used in similar initiatives and d) addressing community needs, the restrictions and the variety of the material.

The National Documentation Centre has been developing digital repository services and applications since the start of the century to support - mainly but not exclusively - the scientific community. “Helios” repository (http://helios-eie.ekt.gr) started off in 2007 comprising research and scientific content produced by researchers at the National Hellenic Research Foundation (http://www.eie.gr/). DSpace is the platform of the repository but additional widgets and add-ons were developed by EKT to streamline the repository functionality. The schema is an application profile of Extended Dublin Core to incorporate scientific-related content. Pandektis (http://pandektis.ekt.gr/) is another digital repository of EKT, developed during 2000-2006, also running on DSpace. It uses Dublin Core and hosts rare Greek DH content.

Good international practices were also a major factor on planning the DRS. Similar implementations were studied[17][19][20] and major projects and standards were evaluated regarding the key implications when building cultural digital collections: the CARARE metadata schema[4] is quite characteristic on the cultural heritage sector since it drew on already developed standards such as: MIDAS, LIDO and CIDOC-CRM. These standards are a) highly conceptual b) event-centric[18] c) domain-specific[24] and d) as proven by the community analysis scarcely used (Fig. 2). Likewise there has been a discussion whether bibliographic conceptual models like the FRBR family[14][15][27][6] fit into all cultural heritage documentation settings or practically prove serviceable to users[6]. Major or smaller data ingestion initiatives like Europeana (https://www.europeana.eu)[12], DPLA (https://dp.la)[10] and the DM2E project (https://dm2e.eu)[1] were given particular importance in terms of their adopted schemes because of their holistic approach in managing heterogeneous collections.

To develop such a global service some key issues should be taken into account[22][23]: a) material heterogeneity, specifications and restrictions b) metadata semantic and structural viability and cohesion c) interoperability of data and systems d) data licensing e) data long-term preservation f) user/community studies and respective provisions.

To address the latter a carefully designed questionnaire was sent to various cultural organisations: libraries, museums, archives. The questionnaire would evaluate several aspects of the service: a) the community preparedness for it and most importantly for the sharing of their material b) the variety of material owned by different organisations c) the possible restrictions and problems posed by related mentalities. The feedback provided us with valuable information on the community content needs and expectations.

Among 114 organisations, 90 had digitized material, 89 documented, while only 56 disseminated their content openly via internet. The most obvious observation of the results was diversity, primarily in terms of material (Fig. 1), as well as of documentation schemes and vocabularies used (Fig. 2). Moreover, most organisations stressed the difficulty to search and easily retrieve their material. Another key observation was their reluctance to open access and the reuse of their digital material.

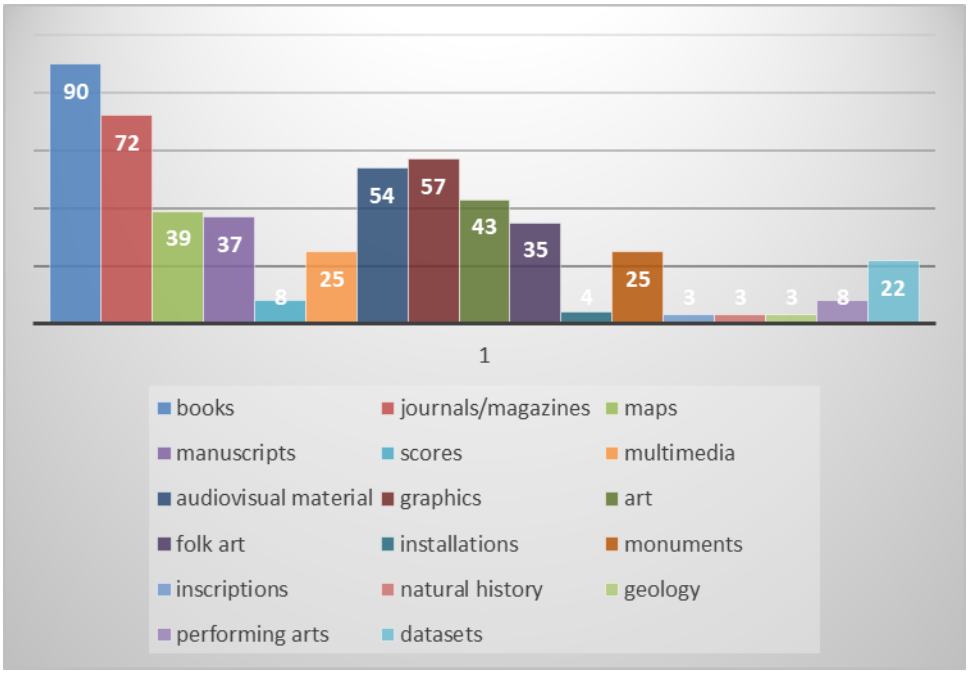

Figure 1. Material diversity among 114 organisations

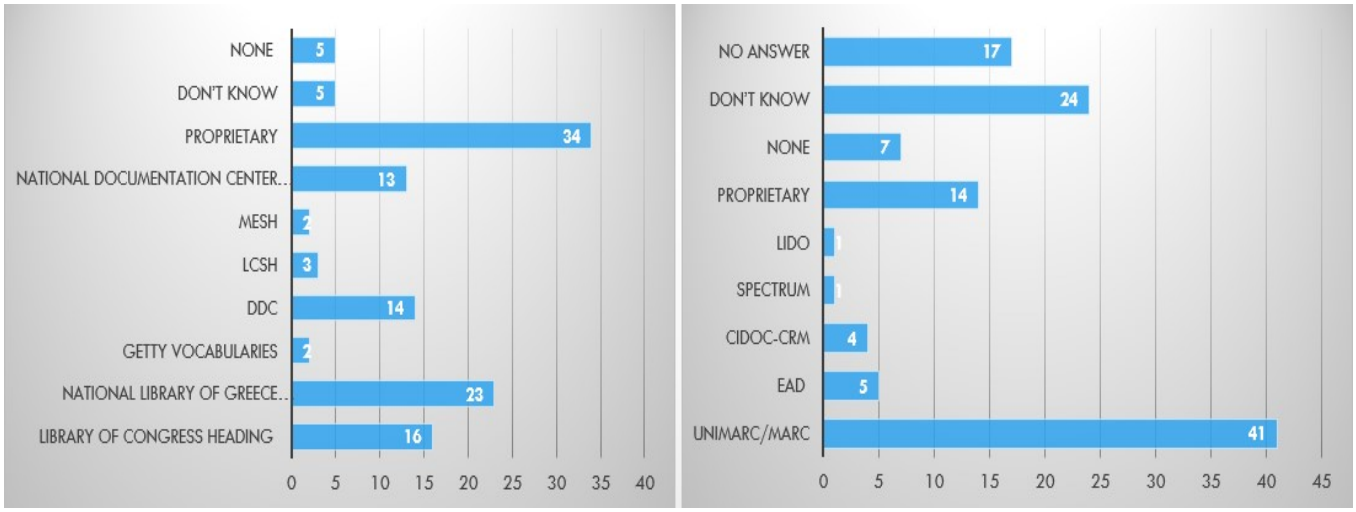

Figure 2. Ontologies and vocabularies used

IMPLEMENTATION

Implementation of the DRS was based on the conclusions drawn over the methodology process. The service is structured by five major components (Fig. 3): a) the cloud infrastructure[28][9] which supports and boosts the whole service, providing also the necessary scalability b) the DRS schema that comprises the spinal column for metadata structure[3] c) the Wizard Designing Tool (WDT) that collects and aligns all necessary specifications for creating a Digital Repository Application d) DSpace software for data management e) community engagement and support towards more customizable services.

The schema was based on the Qualified Dublin Core (DC), enriched with elements from different schemes. Apart from its popularity[21], flexibility[20] and interoperability with other schemes[18][3], DC is also OAI-PMH compatible which enlarges dissemination processes to other systems and services. For example EKT DRS schema has been mapped to EDM aggregator schema and data are disseminated to the Europeana portal. Its kinship to EDM would also allow for its extension into more classes in the future for describing concepts, places etc.

This approach was chosen because a global application profile should have a) sufficient rigidity for interoperability among data and b) adequate scalability and modularity to also include various types of material. In this sense the schema is a dynamic and modular corpus of elements that can adjust to different types of data needs and on the same time boosts up information retrieval by providing fixed elements with the same semantics to interoperate among different material forms[4] (e.g. type, creator, title, subject etc.).

Apart from DC, the schema was extended with properties of VRACore[26] and CDWA Lite[16] for the description of images, visual culture and artworks. For the description and evaluation of learning resources we used a set of elements from the Learning Object Metadata model (LOM)[13][19][21], while we consulted DataCite[7] to support datasets. Copyright issues were dealt with by providing information about the copyright holder, the copyright date and the CC license on the use of the digital object.

[3] Issues of picking up appropriate established vocabularies for certain fields were also addressed (e.g Getty Art and Architecture Thesaurus).

[4] The DRS supports eight basic material types: text, graphical, maps, video, sound, scores, 3D objects and datasets.

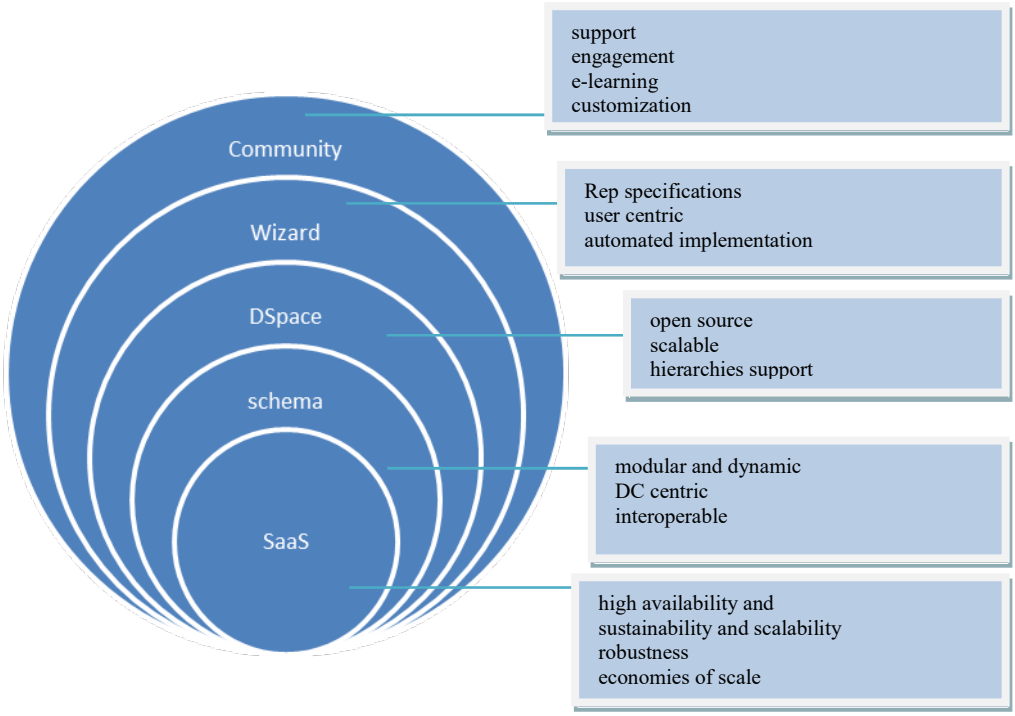

Figure 3. The Digital Repository Service model

DSpace software was selected as the data hosting and management system because it a) incorporates the well-established Dublin Core and its extended version[19] b) supports content dissemination processes with OAI-PMH protocol c) has flexibility in managing digital files as well as validation and migration files processes d) is open source and has a large interactive community e) supports content submission by various communities (researchers, scholars etc.) f) supports collection management (Communities--Collections—Items) as well as interconnection between resources supporting the complex relations of special material.

A very important module of the service is the Wizard Repository Designing Tool (WRDT) (Fig. 4). The tool is a functional dynamic procedure through which users can define all the specifications (communicational, metadata fields, vocabularies etc.) of their future Repository Application. As soon as someone fills in their specifications, the WRDT produces the Repository Application automatically. The tool provides also all the necessary instructions for the user to configure their future digital repository according to their needs.

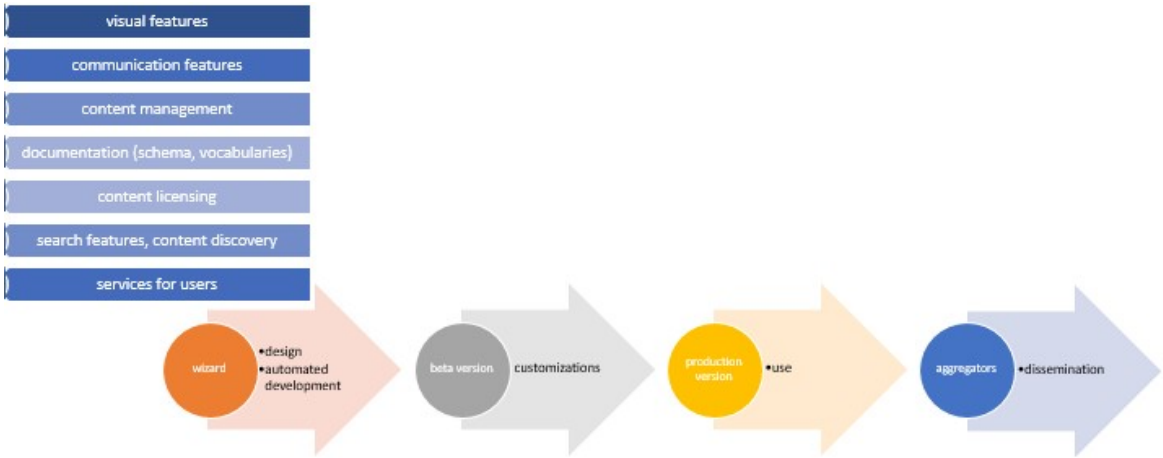

Figure 4. The Repository development process via the Wizard tool

Finally since the service is user-centric it could not live on without the community engagement and support. An extended e-Learning platform has been developed with appropriate material, guiding the user all the way through the service. More support material enriches the service feeding up its eKnowledgeBase and a stand-alone online service (e-HelpDesk) ensures that all problems are well cleared out.

DRS APPLICATIONS

So far, DRS applications were directed to different kinds of organisations and were applied to various DH contexts and purposes: learning, research-academic etc.

In the pedagogy field DRS applications may be considered as key DH tools to instructors:

Euterpe: Greek songs for schools - Digital Music Anthology: http://euterpe.mmb.org.gr/euterpe/?locale=en

The musical repository incorporates a unique digital collection of songs in order to support music teaching in Greece. Songs are represented in music notation (scores, finale) and sound recordings and are accompanied by musicological information and teaching suggestions.

Nicholas P. Goulandris Foundation - Museum of Cycladic Art: Learning Resources: http://repository-mca.ekt.gr/mca/

This repository offers valuable cultural resources for learning purposes as well as learning resources, material and ideas for educational activities related to the Museum' s permanent collections and periodical exhibitions, which can be applied to school groups, families and children with disabilities.

In the cultural field the DRS model has developed some very interested applications from various cultural perspectives:

Acropolis Restoration Service (YSMA): http://repository-ysma.ekt.gr/ysma/about?locale=en

The Repository disseminates original material from the restoration programs of the Acropolis of Athens. It is targeted to researchers, architects, archaeologists and scholars who are interested in the classical architecture and history, in Athenian Acropolis monuments or the management of cultural heritage. Data were migrated into the digital repository's infrastructure from an external database, after they were mapped to repository's metadata schema.

The e-stories chestbox-Oral history from Serres: http://repository-e-stories.ekt.gr/

The Repository records the experiential way in which a community of people recalls the past, setting the framework for reflection and mnemonic activity. The "e-stories chestbox" is a useful research tool for the multidisciplinary community of researchers involved in oral history, memory studies and social sciences.

"TECHNI" Macedonian Art Society: http://repository-tehni-thes.ekt.gr/

It showcases Thessaloniki's rich cultural production of six decades and offers an insight into the thinking and the work of major players in the arts and culture in the city.

RESULTS

So far the DRS have produced 28 repositories applications. A key and quantifiable result is that through the DRS a significant volume of digital content has been deposited (more than 100.000 records and 5 million visits), which has later been aggregated in EKTs Aggregators, SearchCulture.gr and OpenArchives.gr. Part of it has been ingested by Europeana, as part of a national effort to increase good quality Greek content in the European Digital Library.

More qualitative results include knowledge transfer and sharing technical know-how with a community of users not specialized in knowledge and data management, but who were able to use the accompanying Wizard, eLearning and eKnowledgeBase service components to raise their documentation skills. In addition, the aggregated material offers possibilities for new projects and services. It has promoted collaborative actions for re-use of Digital Humanities content and applications for learning purposes.

The DRS schema is also currently being modified so as to incorporate EDM classes and is intended to connect to EKT vocabulary administration service Semantics.gr (https://www.semantics.gr/), which will boost its potential to maintaining national and international Authority entities and vocabularies.

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