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Library Network in Science and Technology: Brazilian experience in innovation in strategic areas of national development

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Abstract

The Library Network of Research Institutes of the Ministry of Science, Technology and Innovation of Brazil, created at the beginning of 2009, is a pioneering initiative to increase efforts towards the access and dissemination of national scientific and technological knowledge. Each of the specialized libraries primarily delivers their focus of research which links with, and includes the effort to define the technologies and methodologies that facilitate access to research knowledge in order to give greater visibility to the results achieved across society. The initiative encourages cooperation in the creation of the Integrated Union Catalog, the definition of free library management software, digital repositories and digital preservation. This work will specifically address the Open Book Portal in Science, Technology and Innovation, which aims to collect, disseminate and preserve official publications in science, technology and innovation. The selected themes are: aerospace, biodiversity, biotechnology,

information science, industrial complex defense, renewable energy, pharmaceuticals and the industrial health complex, productive and social inclusion, improving science education, climate change, nanotechnology, nuclear, oceans and coastal areas, oil and gas, popularization of science, information and communication technologies, technologies for sustainable cities, structuring programs and activities of the national strategy of science, technology and innovation. Ensuring the rights of authorship, the Portal aims to help give visibility to Brazilian official publications, in accordance with the precepts of the Open Access Manifesto of the Brazilian Institute of Information Science and Technology, for the democratization of access to public information. It is worth mentioning that the coordination of the Library Network is the responsibility of the Institute, which has for a long time invested in technical documents and exhaustive scanning technology for documents published only in print.

Keywords
Libraries Network in Science and Technology. RBP. Open Book Portal in Science, Technology and Innovation. Open Access.

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1. INTRODUCTION

The Libraries Network of Research Institutes of the Ministry of Science, Technology and Innovation of Brazil, created at the beginning of 2009, is a pioneering initiative to increase efforts towards the access and dissemination of national scientific and technological knowledge. Coordination of the Network is by the Brazilian Institute for Information in Science and Technology (IBICT), whose mission is to promote professionalism and the development of information resources in science and technology to meet the knowledge demands and new scientific and technological challenges posed by society.

As IBICT turns 60, it celebrates significant achievements throughout its history. From the academic perspective, the Institute introduced the first graduate program in Information Science in the country, Master's courses (since 1970), PhD (since 1994) and postdoctoral (since 2013), graduating high-level research professionals committed to the advancement of knowledge in the area. Research and disciplines of the Graduate Program are structured with a focus on; "Information and Social and Technological Mediations for Knowledge", organized in two research lines: "Communication, Organization and Information Management and Knowledge" and "Socio-cultural settings, Political and Economic Information". In the early years foreign teachers of the highest international recognition participated in its faculty, including Tefko Saracevic, Wilfrid Lancaster, LaVahn Marie Overmyer, Bert Roy Boyce, Jack Mills, Derek Langridge, John Joseph Eyre, Engetraut Dahlberg, Suman Datta, as well as Derek de Solla Price.

From the point of view of the editorial launching the Information Science Magazine in 1972, it would be the first scientific journal in Latin America dedicated solely to discuss generation problems, control and information transfer at the frontier of this science. In the 1970s, the most recurrent themes of the journal were: information systems, bibliometrics, selective dissemination of information and information science. Following the evolution of the information science discipline, the magazine addressed in the next decade, with greater emphasis, issues related to bibliometrics, information policy, scientific communication and representation of information. Information management, information science theory, information technology and information network systems were the most common themes in the journal during the 1990s. By the first four years of the 21st century, the most discussed topic was information technology, followed by articles dealing with information policies. A detailed study can be found in "Information Science: 32 years (1972-2004) the course of history and horizons of a Brazilian scientific journal." The potential for spread and Magazine resources for universal access has been expanded since 1982, when several indexing services, national and international, began to insert the Journal in their databases. In 2004, it launched its fully electronic edition on the construction and management platform of electronic periodic publications developed by University of British Columbia entitled Open Journal Systems, software that was translated and customized by the Institute which recieved the Electronic System recognition for Journal Publishing.

From the perspective of the first products, and scientific and technological information services produced in cooperation, we highlight the creation of the National Collective Catalog of Scientific Journals, the Bibliodata Network and the Bibliographic Commuting Program, all intended for bibliographic exchange in Brazil in the 1950s, a milestone that today is noted in libraries and general information units.

From the 1990s, IBICT initiated a most successful cooperative initiative by way of, the Brazilian Digital Library of Theses and Dissertations. Brazilian universities and research centers took part in the initiative, adding over 200,000 theses and dissertations now stored for consultation on open access to the entire international community. The Base uses Open Archives Initiative technologies (OAI) and adopts the model based on consolidated interoperability standards in a distributed network of digital libraries' theses and dissertations. In this network, educational and research institutions act as data providers and the IBICT operates as aggregator, collecting theses and dissertations of metadata providers by providing information services on this metadata and exposing them to be accessed by other service providers, particularly the Networked Digital Library of Theses and Dissertation (NDLTD).

On the technological information scene is the Brazilian System for Technical Answers, which invested in systems and networks to disseminate information to micro and small

business. The database developed for Industrial Product Life Cycle Assessment is contributing to sustainability and environmental preservation policies. Investment in information services such as translating of scientific texts into accessible language is aimed at popularizing science through the Science Channel.

From the point of view of social inclusion, it took on the challenge of facing the historical liabilities of the country with marginalized populations and implemented several initiatives in the digital inclusion area through Digital Runner which is designed to include segments of the population whose socioeconomic status makes access to the benefits of new technologies of communication and information difficult.

The object of this research is the initiatives mentioned above which the Library Network of Research Institutes (RBP) of the Ministry of Science, Technology and Innovation of Brazil (MCTI) established in order to provide integrated operation, optimizing the use and management collections of libraries in order to meet the informational demands of its users.

The first meeting of RBP happened in 2009, at the headquarters of MCTI, in order to initiate an action for unified acquisition of scientific journals. That is, in terms of management, rather than each of the 15 research units performing individual purchases of the necessary journals for their research in conjunction with publishers, only one, by approval of all, would be responsible for this action. The institution responsible for unified purchase was IBICT. Their authorities were present at the time, in clear demonstration of support for the effort that began.

The second meeting took place in IBICT headquarters in Rio de Janeiro, with even more significant number of participants, 35 people including officials and members of the Network. The agenda was ambitious. It was the routing of the planned acquisition and Magazines system, access to the portal journals of Capes, the Selective Dissemination Service Information (Sonar) and Institutional Repositories, among others.

For unified acquisition of journals, the discussion revolved around the difficulties encountered by IBICT for the joint purchase and corrective actions to be taken. There was the need to raise awareness among publishers about current shipping prices and the application of strict criteria to restrict the participation of companies that have impediments with any public institution, including restrictions on technical qualifications. In addition, expanding the commitment to streamlining the human, material and financial, the software *Revist@s*, developed by CNEN, was ceded to IBICT to be used as a tool in implementing the Planned Acquisition Policy Journal of Research Units (CNEN, 2010).

In this same context, it evaluated the possibility of incorporating new databases of interest to MCTI Sonar service selective dissemination of information offered by CNEN, including the care of full-text copy requests. At that time, the service aimed to have

their users updated with the technical and scientific documents of publications according to their profile of interest and for that monthly subscribers receive by email the document references and, where available, direct access to the full text.

References are taken from the processing of Inspec databases, Inis and Energy, by subscription of CNEN and made available to Network. The proposal was to incorporate, throughout subscription performance by MCTI, other databases of specific interest to the other search units.

About access to the Journals Portal of the Ministry of Education a note is required before presentation: It's a virtual library that collects and provides teaching and research institutions in Brazil with international scientific production. It has a collection of over 37,000 titles with full text, 126 referential bases, 11 bases exclusively dedicated to patents, as well as books, encyclopedias and reference works, technical standards, statistics and audiovisual content. It was created in view of the deficit of access of Brazilian libraries to the international scientific corpus, from the perspective that it would be too expensive to update this collection with the purchase of printed journals for each of the universities of the federal higher education system. It was also developed in order to reduce regional unevenness in access to this information in Brazil. Globally it is considered a unique library consortium model because it is entirely funded by the Brazilian government. It is also for this kind of initiative the largest on the planet, covering the entire national territory (CAPES, 2015).

For RBP to access the Portal the mediation of IBICT through server is a necessary means to act as an intermediary in the consultations with the Portal. Technologically the use of proxy is necessary, (term used in computing to set an intermediary between you and your server). It performs the function of connecting local computer to the external network. Briefly, all query requests made to the Journal Portal starting from the libraries of research units of IBICT pass through the proxy.

On the institutional repositories, IBICT gave a talk on the subject and stressed the importance of open access initiatives at the international level and the advantages of using open-access tools available for creating electronic journals and institutional repositories. The adoption of such initiatives by the research units will lead to greater visibility of the scientific production of the MCT UPs. In this discussion, the space agency presented its deployment experience and operating institutional repositories, highlighting the data import facilities and scientific production indicators generation.

This is the beginning of RBP. The meetings which followed and the day-to-day networking gave effect to the discussions listed above and is adjusting to the new demands of users. The dominant role of technology is replaced from the year 2013, when several actions conducted by IBICT gained strength and consolidation in the country, such as the Open Book Portal in Science, Technology and Innovation.

2. DEVELOPMENT

2.1 THE RESEARCH INSTITUTES

The contribution of the research institutes of the Ministry of Science, Technology and Innovation to Science and Technology in Brazil is significant. In addition to the primary mission of formulating the national policy on scientific, technological research and innovation throughout the national territory, it also has a duty to develop, from their units, specific applied research to assist Brazilian society. To this end, the Ministry has, in its organizational structure, a diverse set of institutions geared to meet the demands arising from the different segments that make up the national socio-economic scenario.

Investment in C&T today reaches 1.64% of PIB, placing Brazil among the twenty countries that invest most in P&D. And not only from the MCTI, but also other development centers, such as Petrobras, with the discovery of technologies and exploitation of oil deposits in deep water and subsalt; such as Embrapa, with intensive farming technologies and development of new cultivable species, making Brazil one of the two largest producers in the world grain; like Fiocruz, with vaccines and drugs, performing invaluable work for the health of the population; and Embraer, with the manufacture of aircraft, placing the country among the four largest producers (OITI, s / d).

Highly qualified human resources now record a significant share of contributions to scientific progress, which led Brazil to be well placed in the ranking of nations with the largest volume of world scientific production - in 13th position among the countries that produce scientific papers in the world.

Specifically for the units that are part of the MCTI, there follows a brief description of each of them and the contribution of their respective libraries, in chronological order of foundation. The country's first Research Institute is the National Observatory (ON), founded by D. Pedro I in October 1827. It is one of the oldest institutions devoted to science in Brazil. It played a key role in establishing the bases of astronomy, geophysics and metrology of time and frequency in the country. Its mission is conducting research and development in these areas, training of researchers in their post-graduate courses, training professionals, coordinating projects, and they create, maintain and disseminate the Brazilian legal hour. The recognition of their specialized activities, with an average annual publication 80 articles in scientific journals, goes beyond national boundaries. The Library of ON is considered one of the best and most specialized of Brazil and has a specialized collection of inestimable value. There is a section of rare books dating back to the nineteenth century.

In 1866, 39 years later, Brazil inaugurated the Goeldi Museum, for the scientific study of natural and socio-cultural systems of the Amazon, as well as the dissemination of knowledge and collections related to the region. Its mission is to conduct research, promote scientific innovation, training of human resources, conserve collections and communicate knowledge in the fields of natural sciences and humanities related to Amazon. Lines of research are the following: Earth sciences and ecology, botany, zoology and human sciences (anthropology, archeology and indigenous language). In 2014, the scientific output of MPEG was 346 publications, with 156 of those in scientific journals. The Museum's Coordination of Information and Documentation mission is to manage, preserve and disseminate information and documents on the areas of action of the Goeldi Museum and the Amazon. The Library's collection specializes in human and natural sciences and Amazonian affairs. The Special Collection, with editions since the sixteenth century, keeps a valuable collection of rare old and valuable books of great importance to the Amazon.

The first research unit created in the early years of the next century, in 1921, is the National Institute of Technology. Founded as the Experimental Fuel and Minerals Station (EECM), the Institute came up with the task of investigation and disseminate the industrial processes of use of fuels and minerals of the country. Its mission is to participate in the sustainable development of Brazil, through technological research, transfer of knowledge and promoting innovation. It acts specifically in the energy, health industrial complex, oil and gas, defense, renewable energy, green chemistry and social technologies. It has 23 laboratories organized in accordance with strict standards of industrial quality and in addition highly trained professionals. The INT turns increasingly to the interaction with the productive sector through technology transfer, in order to generate innovations in companies or public organizations. Over the past three years, INT authors published an average of 34 articles per year in specialized journals. Their library stores, preserves, disseminates and provides access to more than 49,000 items, contained in its collection, and disseminates information generated by the workforce and researchers of the Institute.

In the middle of that century, in 1949, the Brazilian Center for Physics Research emerged whose mission is to develop activities in basic science, technology research, development of human resources and promotion of science to the general public. The scientific production of CBPF is one of the largest in the country. With about 70 researchers, the institution annually produces 300 scientific articles, on average, published in indexed journals of high impact. The CBPF has one of the best equipped experimental parks in the country, with various multi-user laboratories which are open to the community. The institution also maintains strong social inclusion through various programs that mostly cater to public school teachers and students. The Library is a reference in the field of physics.

Then, in 1952, to conduct scientific studies of the physical environment and living conditions of the Amazon region to promote human welfare and the regional socio-economic development is the National Institute for Amazon Research (INPA), which is a global reference in tropical biology. Their main challenge is to expand sustainable use of the natural resources of the Amazon. Most research has focused on topics of ecology, zoology and botany. The INPA library, created in July 1954, has an information collection based on the pure and applied sciences with emphasis on biological sciences and has one of the largest national bibliographies on the Amazon. The library consists of the particular collection of the eminent botanist João Barbosa Rodrigues (1842-1909), founder of the Botanical Museum of the Amazon and director of the National Museum of Rio de Janeiro.

Two years later, in 1954, the Brazilian Institute for Information in Science and Technology comes in on UNESCO recommendation meant to create a national center of bibliography. Since then, its mission has been to promote the development of the information sector by proposing policies, research implementation and dissemination of innovative ways to contribute to the advancement of science and competitiveness of Brazilian technology. The Institute works with programs that contribute to digital inclusion and implementation of open access to scientific knowledge projects in Brazil, so projects that promote the record and the dissemination of scientific production. It coordinates networks, systems and scientific and technological information services in the country. Its Library has specialized collection in library science, information science and related areas, consisting of monographs, serials, conference proceedings, reports, technical memory, electronic documents, multimedia and reference works.

In the same period, two years later in 1956, the situation demanded the establishment of the National Nuclear Energy Commission (CNEN); the body responsible for regulating, licensing and overseeing the use of nuclear energy in the country and at the same time, engaged in activities of development, research and application of nuclear technology to benefit society. It operates in nuclear technology, energy and nuclear research, radiation protection and dosimetry. Its Library Network is comprised of seven decentralized units. Consultation with specialized collections is integrated through a web system, improving the quality of services provided to users. The Network aims to provide the integrated operation of technical and administrative processes, management of bibliographic collections, expanding the scope of services to the scientific community.

Following installation of the research units, the National Institute for Space Research is founded in 1961 to fulfill the mission of producing science and technology in the space areas and the terrestrial environment and offer unique products and services for the benefit of Brazil. Scientific and technological skills INPE focus on the following areas: space and atmospheric sciences, environmental and meteorological sciences, and

engineering and space technologies. The development of their research and projects provides to Brazilian society, various contributions, such as generation and distribution of satellite images, collection and distribution of meteorological data, deforestation estimates and human resource training. In the last three years, the INPE published an annual average of 488 scientific articles in specialized journals. The INPE Library has one of the most important collections in the area of space science in Brazil and has considered drive for excellence by the importance of its collection, for services rendered, availability of products and services with high added value directed to technical and scientific community.

The Mineral Technology Center began operations in 1978 and its mission is the development of technology for the sustainable use of Brazilian mineral resources, focusing on technological innovation for the mining and metallurgical sector. The benefits of research conducted at the Center are used for the benefit of the Brazilian society, contributing to the growth and development of the country. The research, development and innovation are focused mainly on mineralogical and technological characterization of industrial minerals and minerals processing, extractive metallurgical processes, including the biohidrometalúrgica route. In the environmental area, research and development activities are carried out in environmental management, focusing on the recovery of degraded areas, assessing the impacts of activities and their liabilities, metal recovery, recycling and treatment of waste and industrial effluents, clean technologies and bioremediation. The Centre has an extensive library designed to support all research activities at the institution. It is a reference library specializing in mineral technology, ore and metallurgical processes and environmental technology.

The National Laboratory for Scientific Computing (LNCC) was created in 1980 with the mission to carry out research, development and training of human resources in scientific computing, especially in the construction and application of models and mathematical and computational methods to solve scientific problems and technological and available computing environment for high-performance processing, with the purpose of the advancement of knowledge and meeting the demands of society and the Brazilian state. The research lines are: computational modeling, numerical methods, systems, and control signals, computing, computational biology, oil, water and gas, assisted medicine for scientific computing. In the last three years, LNCC published an annual average of 75 scientific articles in specialized journals. Its Library has a specialized collection in the laboratory practice areas. It aims to provide bibliographic support necessary for the development of activities in LNCC as well as the spread of this collection for the technical-scientific community.

Then, the Center for Information Technology Renato Archer (CTI) was established in 1982 and has since engaged in research and development in information technology.

The intense interaction with academia (through various partnerships in research), and the industrial sector (through various cooperation projects with companies) keep the CTI in the state of art with its main focuses of activity, such as: microelectronics, electronic components, systems, displays of information, software, IT applications, robotics, computer vision, 3D printing technologies for industry and medicine, and decision support software. The CTI brings together expertise in qualifying products and processes, engineering prototypes and products of information technology, in special projects of research and development, computerization of socioeconomic environment systems and infrastructure and internet applications. The institution has made available a library with 6,100 books and 280 journal titles.

The year 2015 celebrates 30 years of the foundation of the Museum of Astronomy and Related Sciences, created in 1985. Its mission is to increase the company's access to scientific and technological knowledge through research, preservation of collections, distribution and history of science and technology in Brazil. Researchers and Technologists Museum conduct research in the fields of history of science and technology in Brazil, science education in non-formal spaces, museology and heritage of science and technology. There is also applied research in the areas of dissemination of science, preservation and restoration of metal objects and paper, tourism and information technology. The bibliographic collection in the custody of the Library specializes in the history of science and technology, education and dissemination of science, preservation of collections, museology and cultural heritage.

In the same year 1985 the National Astrophysics Laboratory was established as the first national laboratory implemented in Brazil whose mission is to plan, develop, provide, operate and coordinate the means and the infrastructure to foster, in a cooperative way, Brazilian observational astronomy. To fulfill its mission in an environment as rapidly changing as the science, the Laboratory has exercised its priority role of sophisticated services provider for the scientific community. Its unique position in the national scientific landscape has been continuously improved in order to create optimal conditions for scientific and technological growth in Brazil registering Brazilian astronomy internationally. Over the past three years, LNA authors published an average of 16 articles per year in specialized journals. Since 2008, the LNA publishes its own electronic magazine with news related to their relevant scientific areas and results obtained with telescopes data managed by the Laboratory.

Then, in the 21st century, the last two units were created: The National Institute for the Semi-Arid in 2004 whose mission is to facilitate inter-institutional solutions for conducting research, training, dissemination and policy for sustainable living in the Brazilian semiarid, from the socio-economic and environmental potential of the region. Its areas of research are: ecosystems, agriculture, water resources, biodiversity and social inclusion technologies. Its Office shall perform, propose and promote projects

and scientific research programs, established for that, and any exchanges that may be necessary with regional, national and international institutions.

The last to be created, the Strategic Technology Center of the Northeast, was established in 2005 to support the technological development of Brazil's Northeast region promoting the integration between knowledge, development and society. Its mission is to develop, introduce and improve technological innovations that have strategic importance for economic and social development in the northeast, promoting cooperation based on knowledge networks and agents of the Northeastern economy. Given priority to meet the demands of society, the Centre acts to articulate scientific and technological knowledge and access to development, promoting, in this way, products of technology transfer and processes that contribute to the socioeconomic development of the northeast region.

2.2 THE BRAZILIAN MANIFESTO OF SUPPORT TO FREE ACCESS TO SCIENTIFIC INFORMATION

It can be said that the dissemination of the results of scientific research is an essential part of the generation of future research cycles. Once the researcher has access to the results of a previous research they will have informational input for the development of new studies. However, access to these scientific results are not always presented as a simple process, since some barriers are identified along the way, especially those related to the costs for the acquisition of scientific journals. The exorbitant and rising prices stipulated by scientific editors triggered dissatisfaction among researchers' communities. Even the libraries and information centers of the world-renowned institutions started to have difficulties in buying subscriptions to scientific journals. Thus communication and scientific validation have been negated. It is known that in order for the research to be recognized they must be published in scientific peer-reviewed journals. Scientific journals are, by tradition, the main vehicle of communication for researchers.

The advent of new information technologies and communication also impacted on the processes related to the generation and dissemination of scientific production. Thus, the use of the Internet was seen as a potential mechanism for scientific communication and dissemination of research results.

Against this backdrop was the reaction of researchers towards the difficulties that presented, and information and communications technology has mobilized and created the Open Access Movement for Scientific Information (MAA). The basis of this movement were drawn by the Budapest Open Access Initiative (BOAI 2002), which according to Costa (2014) defined two strategies for action and guided the development in order to follow interoperability standards systems. The two strategies

cited concern the publication in open access journals (golden road) and the self-archiving of scientific production in institutional open access repositories (green road). In terms and international reach, again from Costa (2014), two other statements were created which MAA regarded as the pillars of the Declaration of Bethesda (2003), which was fundamentally the right of access through the use of use and distribution licenses and the Berlin Declaration (2003), which advocated the importance of formalization of information policies for open access.

In Brazil, the Brazilian Institute of Information Science and Technology, aware of the importance of the MAA for access and dissemination of scientific production, launched the Brazilian Manifesto of Support to Open Access to Scientific Information (2005). The objectives to be achieved by this Manifesto relate to the promotion of registration and promoting dissemination of the scientific production in line with the paradigm of open access to scientific information; the establishment of a national policy of open access and for support of the scientific community towards open access to scientific information.

After the release of this Manifesto, Brazil is increasingly aware of the importance of open access to scientific information and has been organizing and using the strategies advocated by the MAA principles becoming a leading country in the international arena in actions and results that promote a greater visibility and access to its scientific production.

2.3 THE CURRENT INITIATIVES

From 2013, several intense initiatives in technology took place in RBP following the Brazilian Manifesto of Support Open Access to Scientific Information. Among them, the use of the Library Management Software Koha (Koha Integrated Library Management System), a library management system and documentation center.

Upon development of Koha, the team was premised on the idea that, rather than purchasing a ready software, they would like to get a fresh experience and defined as one of the design principles that the software would be free and open, ensuring in this way other libraries could benefit from the work and also cooperate in the future development of the system (FERNANDEZ, 2013).

The main features are free and open software, distributed by General Public License (GPL) which operates in a Linux environment using Apache web server, MySQL database and Perl programming language. All these elements used for the operation of Koha are free to use. Koha is divided into two distinct interfaces according to the level of access of users to the system: OPAC and Staff. It has the following modules: circulation of materials, cataloging, acquisitions, periodic control, user registration,

issuing stamp certifications and labels, as well as other features of interaction between library staff and users.

From the 2000s, new features have been incorporated into Koha, as language option on customization. The significant contribution of Nelsonville Public Library should be noted, which incorporated the use of international standard MARC and Z39.50 cataloging and Crawford County Federated Library System that included support for Zebra, a textual database of high performance which increased speed searches on Koha. Today, it is installed in approximately 800 libraries and information centers, and maintained by a global community of specialized companies, libraries and programmers.

In RBP as expected Koha is installed at the Brazilian Center for Physics Research in the Mineral Technology Center in Strategic Northeast Technology Center, in the Technology Center for Information Renato Archer, the Brazilian Institute of Information Science and Technology, the National Institute for Amazon Research at the National Institute for Space Research at the National Institute of Technology, the National Semi-Arid Institute, the National Astrophysics Laboratory in Paraense Emilio Goeldi Museum and the National Observatory. The other units are served by the library management systems Aleph, PHL and Sophia.

Another ongoing initiative is the development of the Integrator Interface Catalogs of RBP. To realize this possibility there emerges in the technological landscape the open source software Vufind, a search engine of open source library that allows users to search and navigate beyond the capabilities of a traditional OPAC. Developed by the University of Villanova, Pennsylvania, in partnership with its Falvey Memorial Library, version 1.0 was released in July 2010, after two years in beta test version. The features of the discovery and delivery system developed adapts very well to RBP needs to facilitate an interface that integrates all the catalogs to search in a single environment.

In addition, the Vufind allows users to search and browse all library resources, replacing the traditional Online Public Access Catalog (OPAC) or simply library catalog to search for other library resources, including but not limited to: magazines, items in digital library institutional repository and bibliography.

The software is completely modular, in order to facilitate the use: either only uses basic system, or all the available components. Apache Solr used an open source search engine that offers performance and scalability enabling response to search queries in milliseconds of time. The catalog can be distributed, if necessary over multiple servers. It is offered free to the open source GPL license. In 2012 it was possible to account for a total of 64 institutions using the software.

The Digital Preservation segment is also being considered between the actions of the RBP. The Network Digital Preservation Cariniana, coordinated by IBICT, promotes the

storage of digital objects for long-term, collaborative infrastructure database with use of free LOCKSS software (developed by Stanford University) and digital techniques that ensure the sustainability of information and its accessibility. Whereas digital preservation needs to be a shared responsibility, especially the large volume of digital information being produced and the nature of digital technology, the network needs in the coming years to actively engage in ongoing initiatives. At the moment, only a lecture was given in early 2014, with the activities of the Network Cariniana in partnership with six Brazilian universities with the support of their respective information and computer centers.

Another issue that takes place in the Network is the open data management of scientific research from new collaborative practices and new ways to publish and disseminate scientific data. This is considered the new frontier between the libraries of RBP. According to the OECD, 'science is factual records as primary sources used in scientific research, and are generally accepted in the scientific community as necessary to validate research results (OECD, 2007), assuming various forms: text, numbers, still images, moving images, etc. and dimensions. They represent a valuable resource in the long term and share them and make them publicly available is essential for their potential value can be realized' (SWAN; B. cited SCHROEDER et al, 2008).

Reuse of research data is included in the genesis of open science as the ideal knowledge sharing, educational and informational resources that are made possible by powerful electronic infrastructure, crossing institutional boundaries of scientific disciplines and nations. Currently, the open data of scientific research are central in the discussion, recognized as an input value and essential product for the creation of a new sector of economic and social activities, widely discussed in the reference framework of open science.

For open data of scientific research shall mean "those which are freely available on the public internet, permitting any users to download, copy, analyze, reprocess, to capture by software or use them for any other purpose without other financial barriers, legal or technical as well as those concerning the Internet itself. To this end data that give rise to scientific publications must be explicitly placed in the public domain"(MURRAY-RUST et al, 2014).

In this regard, the General Committee recommendations of the European Union encourage the development of collaborative infrastructure, agreements and alliances for publicizing the survey data, highlighting the need to find the right balance between regulation and the invention, control and freedom, performance and cost, public and private, international and local (MORAIS PIRES, 2014).

In addition, from the perspective of everyday actions of the Network, other initiatives are underway, with the EurekaInfo report, the Portal of RBP and thematic seminars, the latter characterized as a chance to relate the information science with the theme of the research units. The first event took place last May, the Museum of Astronomy and Related Sciences and the program included a discussion i) of Information Science and the Museum collections and ii) Preservation and Research Institute.

2.4 The Open Book Portal in Science, Technology and Innovation (PLACT&I)

In particular, among the ongoing initiatives, it highlights the Open Book Portal in Science, Technology and Innovation (PLACT&I). We have said, open access is intrinsically focused on the dissemination of results of scientific research through the Internet, free of monetary cost and access barriers. However, with arising technologies for enabling interoperability between systems and the availability of full texts of research results, other systems also began to be developed in order to give visibility to other document types. These document types, although they are not themselves scientific informational sources are important for building new knowledge. In this context, official publications also offer these informational sources.

Official publications can be defined as documents generated within the government in its different spheres, federal, state and municipal. However, in this article are not characterized as administrative documents, such as memos or letters. It is considered as official publications in this context as documents produced and published by government institutions within a specific theme. Particularly this study, official publications considered here relate to the themes of Science, Technology and Innovation.

Thus, in order to give visibility to scientific and technological publications in general and intensify action in the Library Network of Research Units in particular, in 2013 the Brazilian Institute for Information in Science and Technology, with support from the Financier of Studies and Research (Finep) launched the Portal of Open Book in Science, Technology and Innovation, whose aim is to collect, preserve and disseminate the Brazilian official publications in Science, Technology and Innovation. In this context, the selected themes are: aerospace, biodiversity, biotechnology, information science, industrial complex defense, renewable energy, pharmaceuticals and the industrial health complex, productive and social inclusion and improving science education, climate change, nanotechnology, nuclear, oceans and coastal areas, oil and gas, popularization of science, information and communication technologies, technologies for sustainable cities, structuring programs and activities of the national strategy of science, technology and innovation.

Following the precepts of the Open Archives Initiative and the philosophy of the Open Access Movement, the portal provides official publications in full text, free from barriers to entry, except those sheltered by copyright. Quantitatively, the portal currently provides just over 470 publications related to science, technology and innovation. Also part of the Portal of Open Book Science, are publications on information produced by the Brazilian Institute of Information in Science and Technology (IBICT). There are a little more than 60 documents available in full text on that subject.

The Portal was developed through free software DSpace. According to the Directory data of Open Access Repositories (OpenDOAR) (2015) DSpace is the most widely used software for creating institutional repositories. The choice of software is primarily due to its technological characteristics, enabling interoperability with other open access information systems, and also for its ability to internal management. The latter is related to the fact that the DSpace enable a decentralized power, with different possibilities for assigning profiles. Each process within the system, as deposit, review and approval of content, can be performed by different profiles.

In this way, through the PLACT&I, IBICT expects to contribute a larger organization and dissemination of valuable information, not always known by researchers and society.

3. CONCLUSION

The pioneering initiative of the Network of Libraries of the Ministry of Science Research Units, Technology and Innovation of Brazil is gradually being consolidated in the research and national development scenario. The effort, begun in 2009, can already present some optimistic results in the use of open access technologies.

The Open Book Portal in Science, Technology and Innovation is what today best represents the coordinated effort to increase access and improve the visibility of the actions of the research units. So you can get an idea of the breadth of topics covered in the RBP environment, the following are its main areas of action: agriculture, anthropology, archeology, astronomy, assessing the impacts of activities and their liabilities, biodiversity, Biometallurgy, biology computational, bioremediation, botanical, mineralogical and technological characterization of industrial minerals and minerals processing, environmental and meteorological sciences, earth sciences and ecology, space and atmospheric sciences, industrial complex, electronic components, scientific computing, defense, socio-economic development of the northeast region, dosimetry , ecosystems, science education in non-formal spaces, energy, renewable energy, engineering and space technologies, physics, geophysics and environmental management, history of science and technology in Brazil, indigenous language, assisted by scientific computing medicine, numerical methods, metrology time and

frequency, microelectronics, computer modeling, museology and heritage of science and technology, energy and nuclear research, oil and gas, mineral processing, extractive metallurgical processes, chemistry, radiation protection and recycling and waste treatment and industrial waste, areas of recovery degraded, recovery of metals, water resources, Amazon, robotics, health systems, and control signals, systems, displays of information, software, decision support software, mineral technology, nuclear technology, 3D printing technologies for industry and medicine, social inclusion technologies, clean technologies, social technologies, computer vision and zoology.

Coordination of the Network is the Brazilian Information Science and Technology Institute (IBICT), the body responsible for scientific and technological information in the country. Thus, methodologies, technologies and developing border areas of Information Science are timely available to the Network and society as a whole.

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