Center for Scientific and Technical Information –

Library Services for Business and Science at Wroclaw Univeristy of Technology

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Abstract **- Wroclaw University of Technology is situated in Lower Silesia – the dynamically developing region of Poland. Focusing on adopting its own offer to the market needs had been selected as a strategy. Due to that, a synergy effect has been achieved with the development of segments strategic for the region. The University is strongly oriented to cooperation with the economy and industry. One of the key initiatives was establishment within the University structure the Center for Scientific and Technical Information on January 1, 2014. This is the unit responsible for collecting and providing scientific and technical information for the needs of performing scientific research and supporting didactics, as well as coordinating cooperation with the economy and technology transfer. Within the structure of the Center, the Traditional and Electronic Libraries were established, providing the library-information services and creating also the digital library, knowledge repository and the data base for scientific achievements. Besides the library resources, data bases and electronic periodicals, the Center makes available the patent and standardizing information, as well as the information on new technologies both, for the needs of scientific society and industry representatives. Tasks of the Center involve, among others, also collecting knowledge on technologies developed at the University, conducted projects, available scientific equipment and informing on opportunities for commercialization of the research results. In the paper, the genesis of formation of the Center for Scientific and Technical Information and its basic tasks directed in particular at cooperation of science with economy and industry have been presented. Changes in the library and information system of the University and establishment of the Center reveal the new role of libraries and centers of scientific and technical information.**

Keywords-digital libraries; Wroclaw University of Technology; open repository; electronic resources; library services; technology transfer; knowledge commercialization.

I. INTRODUCTION

Wroclaw University of Technology is one of the best technical universities in Poland. For many years it has been on top of Polish university rankings [1]. It was founded in 1946 in Wroclaw. The same year Wroclaw University of Technology Library was established. Ever since then, it has been the largest library in Lower Silesia region collecting and circulating materials in the area of technical and exact sciences. In 1970s, Wroclaw University of Technology Library became a pioneer library as far as automating and computerizing library and information processes and implementing new information technologies are taken into account. In that period, the Library conducted scientific and research work in the above areas. Thus, it developed pioneer solutions nationwide in terms of registration, collecting and circulating scientific-research information [2].

In 1990s, the first Polish Integrated Library System (APIN) was created and implemented here, too. Its role was to provide services for all library processes. Moreover, in 2004, one of the first digital libraries in Poland was founded here as well [3].

Activities in the area of digitization, development and providing access to modern electronic resources of information has been limited for many years due to space shortage and lack of appropriate equipment. Rooms which have been occupied by the Library in a historic building from early 20th century made it impossible to develop comprehensive patron services in the area of providing electronic resources of information.

II. BIBLIOTECH PROJECT

For many years, the University authorities and scientific circles were aware of the necessity of building a modern scientific library at Wroclaw University of Technology. Eventually, the university managed to obtain EU funds for building it and in 2007 within Operational Program Innovative Economy. The funds covered the costs of constructing and fitting a modern building of "Library of Exact and Technical Sciences for the purposes of Innovative Economy" (Bibliotech) [4]. Bibliotech building was finished and handed over to the university by the contractor in October 2013.

Specific nature of Wroclaw University of Technology as a technical university which closely cooperates with the industry and develops a number of solutions and technologies implemented in the industry defines yet another, additional role of the library. It is a place of collecting and providing access to scientific and technical information for students and academic teachers. Moreover, it's another role is to serve business entities and innovative entrepreneurs from the region of Lower Silesia.

New library, already at the stage of planning, was meant to be a modern, electronic unit. Electronic resources, such as e-books, e-journals and databases both shared and developed in modern and well-equipped laboratories were supposed to be the basis for its activities. It was decided that the Electronic Library will become the foundation for the university library and information system. Its activities will be supported by other university units, which collect and circulate standardization and patent information, as well as information on new technologies aimed in particular at business entities cooperating with the university within knowledge commercialization. All the above assumptions have been included in Bibliotech project.

It is an ambition of Wroclaw University of Technology Library to once more become a leader and a nationwide pioneer as far as implementing new technologies and modern IT solutions are considered. More than 10 modern buildings of scientific libraries have been built in Poland within the last several years. However, to a great extent, they moved their previous tasks, collections and services to new premises only. Within the Bibliotech project, we decided to move a step forward. We brought together in one place all library services, units of scientific and technical information, standardization, patent, new technologies information office, computer and multimedia laboratories, group work rooms, individual projects laboratories, and above all, new research laboratories working on data collection, warehousing, processing and sharing. All of the above will constitute a unit supporting research work in the areas of exact and technical sciences and improving access to scientific achievements by entrepreneurs.

III. THE CENTER FOR SCIENTIFIC AND TECHNICAL INFORMATION

On January 1st 2014, the university launched the Center for Scientific and Technical Information of Wroclaw University of Technology. It is a unit serving the whole university performing scientific, research and service-oriented tasks. The new unit includes departments included within the project and located in Bibliotech premises (Electronic Library, digital laboratory, Regional Patent Information Center, New Technologies Information Office and IT research laboratories) [4]. Furthermore, it includes also other units dispersed within the campus, yet providing similar services for the sake of academic environment (e.g. Department Libraries). The aim of this procedure was gathering within one structure the previously dispersed units, restructuring them and reintegrating their activities as well as improving their functioning. At present, the Center is being organized. The new Bibliotech building is being provided with new generation equipment and cutting-edge data center.

A. Library Services

The university library-information system in the form of Traditional Library and e-Library operates within the structure of the Center for Scientific and Technical Information.

Traditional Library is aimed at students in particular. Its main goal is to circulate printed sources (journals, books, academic text books) and providing basic information regarding library collection and electronic resources.

The e-Library is the basis for the university library-information system. Within the structure of the e-Library there will be units responsible for collecting and circulating electronic resources, testing and organizing access to databases and scientific information services, as well as providing comprehensive information services for users representing scientific and business environment. The Center, along with the Libraries, will also serve as an information center, where highly-qualified information brokers will collect, verify and prepare sets or resources in various areas for the sake of users. Within the e-Library, current activities connected with registering scientific achievements will be performed (bibliographic database – DONA). Furthermore, the Laboratory of Scientometrics will be performing research in the area of scientific achievements analysis and citation analysis.

The Center continuously expands its offer of electronic sources, data bases, standards and patent data bases to meet the needs of present and future users. In 2013, the then Main Library (the present Center) was providing access to over 90 thousand titles of electronic books, over 45 thousand of periodicals and 92 specialist data bases. About 37 thousand of registered users are making use of those resources [5]. The specialist data bases and electronic periodicals provided by the Center, serve preparing the comprehensive information services, thematic sets and elaborations.

The services are offered both, for workers, doctoral students and students of Wroclaw University of Technology, as well as other interested parties, such as economic entities and industry representatives.

The Center is a key venture for the University development which defines library as the institution linking various functional structures related to scientific and research activity of the University workers.

B. Knowledge Commercialization and Technology Transfer

Within frames of the Center operate also the units dedicated for cooperation of science with the economy such as the Center for Scientific Cooperation with Economy. Its activity is focused on tasks supporting and initiating undertakings of all types in cooperation with representatives of business environment. The Center is running also a Contact Point for Technology Transfer. By creating a network of mutual relations with business and industry representatives, it identifies individual needs of enterprises in innovation, enabling that way development of solutions facilitating functioning of mechanisms of knowledge commercialization and widely understood cooperation of the University with businesses [6].

An important agenda in the structure of the Center is also a Department of Intellectual Property and Patent Information, where the Regional Center of Patent Information incorporated into the European network PATLIB is operating. It is also consulting intellectual property issues, and provides legal services for the commercialization process.

Guidelines of the European Commission [7][8] and Polish national and regional strategies [9] underline the importance of cooperation between science and the economy. The aim is to introduce innovative solutions to enterprises, and on the other hand, directing the scientific research performed in universities to the market needs. In the elaboration „Program assumptions of the conference Science for Business, Business for Science" [10] of 2013, Andrzej Rabczenko says about necessary changes to be introduced by universities to meet the challenge. Most of the assumptions have already been implemented in the Wroclaw University of Technology just due to activity of the Center and its particular units. Rabczenko underlines the necessity of establishing the Knowledge Center, and within its structure the Knowledge Transfer Office. Units of the Center responsible for cooperation between science and business have already conducted actions defined as necessary. They stimulate research aimed at results commercialization, associate individual laboratories with enterprises and participate in evaluating the commercialization potential of projects [10]. The Center operates two-ways – on the one hand, it is observing results of scientific research and is taking care for their dissemination including finding specific applications, and on the other hand supports relations with interested enterprises by placing orders with the University for the specific solutions [6].

C. Knowledge Repository and Digital Library

A new unit established within the Center is the Knowledge Repository. Wroclaw University of Technology is open towards the idea of Open Access. This is expressed by publishing an open mandate and supporting the Berlin Declaration. As a result, the necessity to create a multi-functional platform to collect and archive university scientific achievements, to promote research done at Wroclaw University of Technology and to support research results transfer between industry appeared. The system developed in the Library currently exists in a beta version. It allows for archiving and searching scientific publications of employees, PhD students and degree students of Wroclaw University of Technology. It will also enable to personalize thematic search and full-text search. Moreover, it will include an expert search, helping to find and contact an author specializing in a given research area and doing particular research projects. Author profiles deposited in the Repository will include a scientific resume, list of publications, citation information, grant and project information. The Repository will be closely integrated with other databases developed at the University with the aim to support research commercialization, developed by the Center for Science and Business Cooperation among others: the laboratories, project database, key equipment database [11].

Within the Center there are laboratories of Lower Silesian Digital Library and the Laboratory of Digitization Methods. Lower Silesian Digital Library was founded in 2004 as The Digital Library of Wroclaw University of Technology. In 2006, on the basis of a contract with Ossolinski National Institute and other higher education institutions from Wroclaw and Lower Silesia, the library was renamed and a Consortium of Lower Silesian Digital Library was created. The Consortium constitutes the common, regional electronic resources [12]. For nearly 10 years, Wroclaw University of Technology Library and the Consortium have been scanning library resources using their own, not always professional, scanners. They also outsourced digitization services from other companies. In Lower Silesian Digital Library laboratory, as well so far have been only 2 scanners. One Minolta PS 7000 scanner is scanning in grayscale and a flat Flex 50i full color scanner is scanning using the so-called cold light. For modern laboratories of the Lower Silesian Digital Library in Bibliotech building, the cutting-edge digitization equipment has been bought. Twelve scanners and posts to take photographs of resources (using 3D technology, among others) will be used to scan library and archive collections of Wroclaw University of Technology and other Consortium Libraries, research project documents, doctoral dissertation, diploma papers and other documents which are created at the University. Digitization laboratories will provide services for other companies and institutions. The variety of digitization equipment will allow for digitization of cultural heritage resources, large scale maps and 3D objects. It will also enable the Library to perform mass digitization of current resources, doctoral dissertations, documents and academic text books, which will be partly accessible through the Lower Silesian Digital Library or the Repository.

D. Laboratories

A group of modern research laboratories has been provided within the structure of the Center:

- Laboratory of Remote Access to Digital Resources – conducts research related to development and implementation of new technologies, among others for safe and fast sharing of library resources, as well as access to digital repositories through computer network (including the wireless one).
- Laboratory of Protection and Safety of Digital Repositories – conducts research related to development and implementation of technologies (methods, equipment, procedures) for providing secure and confidential storing of digital data, as well as widely understood protection of digital repositories.
- Laboratory of Data Bases and Warehouses – is focused on research of data mining technology use,

among others for defining relations between user attributes and type of knowledge sought by him.

- Laboratory of Extraction and Acquisition of Knowledge – is designated for conducting research concerning development and implementation of new technologies for extraction of knowledge from digital resources, determining methods of collecting knowledge and application of knowledge extraction methods in e-learning.

- Laboratory of Exploration and Analysis of Digital Resources – conducting research concerning development and implementation of technologies (methods, procedures, applications) for providing control over plagiarism, as well as creating intelligent systems of searching for information in network and Internet systems.

- Laboratory of e-Learning Technology – aimed at development and implementation of new technologies in e-learning for the needs of university, companies and governmental sector.

- Laboratory of Utilitarian Quality of Information Systems – the Laboratory is designated for testing the quality in use (usability) of information systems. According to standards proposed in the ISO 9241 and ISO 9126 Standards the quality in use is being considered in the aspects of effectiveness and satisfaction. The Laboratory will enable application of tests with users both, in the subjective evaluation mode and recording of the selected physiological parameters during the tests. Innovative and unique in the world equipment for automatic recognition of human emotional behavior during operation of information systems will allow for inclusion of the laboratory to the world research trends in that field.

- Laboratory of Tyfloinformatics – conducting innovative in the country research over modern methods and techniques of making knowledge available to blind and partially sighted persons.

- Research and Development Laboratory for Multimedia – the reference laboratory designated, among others, for self-testing of various tele-information equipments in the functionality and suitability in creating wideband networks and services.

- Laboratory of Service Oriented Systems – the laboratory will develop and implement test methodology of service quality offered within SOA architecture (Service Oriented Architecture), participate in development of Polish standards of software quality and methodology of their use in practice, as well as creating own standards of product certification [4].

The Laboratories are to be run by scientific workers of the University, among others from the Department of Computer Science and Management and Department of Electronics. They will offer services and applications suitable for implementation by various economic entities

IV. CONCLUSION

The Center for Scientific and Technical Information of Wroclaw University of Technology has gone into development phase. Particular departments are gradually moving to the modern building. Tender procedures for the purchase of computer and digitization equipment, as well as research laboratories equipment are in progress. Official opening of the Center is planned in autumn 2014. It will then become the most modern academic and library institution this type in Poland serving collection, management and circulation purposes of knowledge produced at Wroclaw University of Technology.

At the basis of establishment the Center of Knowledge and Technical Information lay the need for cumulating in one place the whole knowledge and information both, acquired and produced at Wroclaw University of Technology. The Bibliotech building, where the key agendas of the Center are located, is to be a place where the scientific workers, doctoral students and students may come seeking for information sources for the conducted scientific research, as well as those looking for opportunities of commercialization of the innovative solutions developed by them. This is also to be a friendly place for entrepreneur, who is seeking in the university the innovative technology, a possibility of cooperation or a specific knowledge or information. So far, the tasks performed by the individual units of the Center were scattered and therefore the quality of that type services was insufficient. Project of the Center for Scientific and Technical Information redefines the role of library in the university of technology. The library of future integrates access to various type resources and provides services tailored to the user needs. Moreover, it is not only the unit disseminating knowledge but also cresting it

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