

I. VORONKOVA*, V. PROSKURYAKOV**

Architectural metamorphoses in libraries of the future

Abstract

Throughout their history, all civilized states have built buildings for libraries in line with their needs, possibilities, and imperatives. Every time any dedicated structures were designed and built to host a library, they incorporated the sense for their further use by future generations. Thus, there evolved a basis for a library of the future.

The presented cases from modern international practices in library design and construction illustrate a broad range of expanding possibilities in architecture and design in this new thematic area. The use of modern structural systems, finishing materials, and lighting fixtures enable interesting and unique features in library buildings, while new spatial organisation changes the layout structure and architectonics of libraries.

What is this library of the future? What particularities make it different from the libraries of the past and present? What are the key criteria of a high-quality library functioning in the future? These are major questions explored in the paper that, when answered, provide clear conclusions.

Keywords: library of the future, architectural form of libraries, flexibility of a library design, digital technologies in libraries

One of the many criteria for a democratic society is free access to information. One of the features of a well-governed country is its high level of education, science, and culture. Architecture is also a reflection of a country's success. It includes housing and business centres, but also theatres, museums, exhibition facilities, educational establishments, etc. An important place on the list belongs to a LIBRARY. The library type is not crucial here, since its architecture reflects the overall level of the country's development and culture—the higher the level, the more contemporary the library architecture (Voronkova, 2013, p. 111).

A library is a unique place. In a time of rapid growth of computer and information technology, it seems to be a sort of public facility that should have vanished due to the loss of physical relevance. In other words, why build a library when you can connect to the Internet—a global network—anywhere and everywhere and access the information you need? But then no! Not only have the libraries not lost their relevance as a type of facility—they expanded the scope of their operations, activities, and services offered. They have crucially changed their architectural styles and transformed their architectural spaces.

At the turn of the twenty-first century, we can see a turning point for library architecture and library operations in general. Major causes come from the changes in the awareness of the meaning of a library in society. The current generation has challenged the old library to create a brand new library space where work and entertainment run together, where new technologies and creativity live, where studying and learning about the world are merged with meeting places, venues for communication, and the implementation of joint projects. The characteristics of such space include openness, accessibility,

convenience, multi-functionality, self-service, fast information processing.

The new approach in working with modern users is now more demanding to libraries—it requires more focus on creating a customised architectural image. Prestige then grows in the eyes of the library's permanent and prospective users. This has produced results: today, library buildings include different new functionality, whereas their architecture reflects new paradigms, such as informational and social ones.

Present-day libraries are so different from the past that you naturally ask the question: 'What comes next?' What awaits libraries in the future? Is there any limit to their architectural metamorphosis?

Before answering the questions, we need to specify what the 'FUTURE' is and how to interpret it.

According to Wikipedia, the future is a part of the timeline that consists of events that have not taken place yet but will do so¹. As we can see from this definition, it is a somewhat relative notion, and hence, it can be interpreted in different ways. The future is often seen as a remote and unknown thing, but rather progressive and technically developed.

What if we try to combine the two concepts of a 'library' and the 'future'? Does their 'summary' correspond to the notion of the 'library of the future'? If we consider a library of the future from the present-day perspective, we can see an image of a multifunctional centre that focuses on users and their needs and requirements rather than on information, its accumulation, storage, or dissemination. Visualising the image is possible, however, not in a wild fantasy but as deduced from the analysis of the state-of-the-art libraries emerging in the last

* Ph.D., As. Prof. I. Voronkova, Institute of Architecture, Lviv Polytechnic National University, ORCID: 0000-0003-2711-166X, e-mail: ivanna.che@gmail.com

** Prof. D. Sc., Ph.DArch V. Proskuryakov, Institute of Architecture, Lviv Polytechnic National University, ORCID: 0000-0003-1022-8984, e-mail: proskuryakov_das@ukr.net

decade all over the world. Most of them are considered to be established 'libraries of the future'.

One such case that needs to be distinguished among other facilities of the future is the Tianjin Binhai Library in China, designed by the Dutch firm MVRDV and completed in 2017. It is a cultural, educational space with an area of 33,700 m², with a light spherical room in the centre, and a cascade of bookshelves radiating from it, from the ground up to the ceiling. The wavy bookshelf is a critical spatial element of the library building. It is used as a framing for space, and also to create the building's staircase, seats, its multilayered ceiling, and even the window shutters on the façade (ill. 1).

The library building consists of six levels: one underground level, and five levels above grade. Technical rooms, book storage, and large archive spaces are located underground. The above-mentioned levels are mostly occupied by spacious learning areas and spaces for rest. Upper floors are occupied by conference rooms, offices, computers, and audio rooms, as well as two inner courtyards on the rooftop.²

Tianjin Binhai Library has the role of an urban front room—a public space accessible to all categories of visitors. Such uniqueness is typical also for many other modern libraries. This peculiarity in being open and accessible is rapidly spreading within the library world. What is important, in addition to the sources of information that used to be open before, a space to gather information is also opening up. The library of the twenty-first century assumes certain personalised features: architectural design competitions are announced, well-known architects are engaged, a genuine style is selected for each library, as well as character, and form.

Analysis of the previous generations and their contrast with present-day cases prompts three key categories that need to be taken into account when designing a library of the future: architectural image, space planning, and digital technologies. At the same time, we need to remember that all the criteria are equally valid and important: it is hardly possible to imagine a library with

a beautiful façade but with an uncomfortable space inside. It is impossible to imagine a library without a computer, the Internet, or other recently introduced technologies.

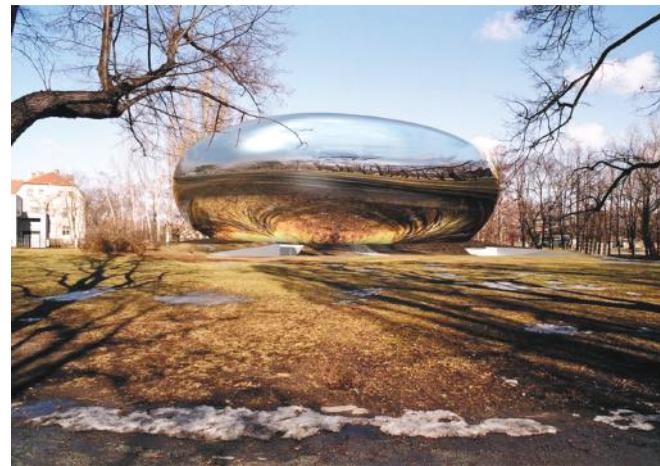
Architectural image. One essential component of an attractive architectural space of a library is its aesthetic expressiveness which is about the use of such key architectural and design means as form, expression, colour, and material—the means in competition projects where the fantasy has no limits and goes ahead of its time and reality; it engages the brand-new technologies and bold creative experimentation.

One great example of a search of form in a library building was a call announced in 2007 in the Czech Republic to design the National Library in Prague. In addition to the usual and conventional architectural requirements, the competition set the criteria where an architectural form was to stand out due to its deep philosophical meaning. For example, the winning project authored by architect Jan Kaplický & Future Systems impresses with its unusual configuration (ill. 2a). It does not have walls or a roof, only a flexible form that flows around the entire spatial structure of the building like dough, hardly touching the ground. 'Simple, modern, exciting, progressive, colourful and unique'.³ Even though the idea of the Future Systems team has never been implemented, it changed the conventional view of Czech citizens on the architecture and construction of such public buildings as libraries.

The proposal that took the third place of honour in the competition for the design of the National Library in Prague impresses with its aesthetic form and sculptural extravagance (ill. 2b). Although the building's shape resembles a quicksilver bead after a fashion, the prototype is a cell structure that makes its nucleus the central depository, while the entire library space is engulfed in the cellular membrane of a translucent shell.⁴

ill. 1. The Tianjin Binhai Library in China source: <https://www.archdaily.com/882819/tianjin-binhai-library-mvrdv-plus-tianjin-urban-planning-and-design-institute> (accessed on 4.02.20)





ill. 2. Designs of the National Library in Prague, 2007: a) by Jan Kaplický & Future Systems source: <https://www.e-architect.co.uk/prague/national-library-prague> (accessed on 4.02.20); b) by HSH architekti source: <https://www.archiweb.cz/en/b/soutezni-navrh-na-narodni-knihovnu-cr-3-cena> (accessed on 4.02.20)

Whatever the bizarre form of the library building, all of its authors use their principles of aesthetic expression in architecture. All of them intend to provide a high-quality and comfortable environment for their users.

Space planning of libraries has undergone immense transformations over the entire period of its existence, starting with the ancient coffer and ending with the modern multifunctional facility. Most of the time, libraries played the role of gathering and storing information. Thus, the book depository has played the role of a key element in library planning for a long time. Later, when the library became accessible to more visitors and developed an additional function of disseminating information, the structure began to include a reading room, a book loan check-out, and administrative facilities.

Today, all over the world, innovative and multifunctional models of libraries have been established. They are based on the integration of various cultural, educational and entertaining functions into the library environment. Those are the functions of a museum, a theatre, an exhibition, an information centre, a media café, a bookstore, a public space, etc. One typical sign of a modern information space is its flexible universal layout, where one function flows into another, and any of them can be easily modified. On the other hand, the rejection of the well-established organisation of the internal space in favour of free planning—a 'one-room library' idea—encourages users to benefit from the entire library building, rather than its separate parts (Samotyj, Voronkova, 2010).

The design principles that need to be used for designing libraries of the future shall primarily focus on perceiving the library as a physical space open to interaction and books:

- a space for fundamental academic research, study lectures and workshops, business meetings, or individual work;
- a space where one can read and communicate, meet new people, and share experience;
- a space with organised leisure and fun intellectual activities.

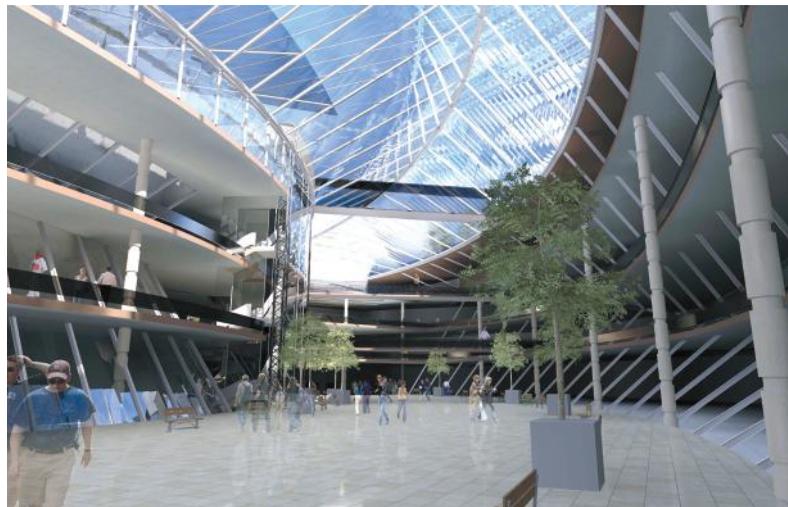
It can be reached through key physical properties of the space:

- *flexibility* (the need to provide the feeling of fluid flow and of the links between different types of spaces);
- *universal nature* (space shall be fit for use for various activities and events);
- *adaptation* (space shall have the ability to adjust on a structural level, to provide for the possibility of future changes);
- *modification* (there shall be a possibility to expand or contract the space) (Samotyj, Voronkova, 2018, p. 77-96).

Digital technologies. When designing an architectural space for the library of the future, we need to take into account the factors that are actively implemented into any modern library and enhance its working processes and improve services. These factors include the following: automation of working methods and individual workplaces, Wi-Fi availability, use of audiovisual materials, and means.

Automation of work processes implies the use of technical means intended for the enhancement and facilitation of user interactions related to the search, order, and return of books. It simplifies the procedure of taking stock of available books by the library staff, issuing the ordered books, and administering control, etc. Integration of automated contactless object identification into library operations, with the help of the radio frequency identification (RFID), allows greater user access to the library's collection. It reduces the floor area of the closed book depository, and simplifies the search for requested references, as well as shortens the path a book takes from the closed depository to the user.

Automation of individual workplaces implies providing users and staff with the necessary technical equipment (desktop and portable computers, copying equipment, etc.), and the adaptation of workstations for the convenient use of various



ill. 3. Designs of the International Student Centre of the NU Lviv Polytechnic on St George's Square in Lviv, authors V. Proskuryakov, I. Voronkova, M. Zhyhaylo

technical devices. The use of desktop computers with varied software for learning and research needs of users enables the creation of separate spaces within the library for individual and group work, divided by interest areas, such as for some creative occupations, computer sciences, etc.

The wireless communication network provides open access to online resources. It serves as a means of social interaction, by using the fast exchange of messages due to mobile phones, laptops, tablets, etc. With the help of wireless networks and laptops, users can access e-databases, order materials online, exchange information with each other at any time and any place in the library.

The use of audiovisual materials and means crucially reduces the floor area needed to store information; it welcomes the expansion of library functions and services, and creates new opportunities to use the library space. The planning structure of the library contains specially arranged sites for various purposes: from watching and listening to video and audio products, to creating video-conferencing or lectures, or viewing scientific films. In some libraries, one can find sound recording studios or radio broadcasting facilities.

The introduction of modern information technologies into library operations requires spatial organisation and the improvement of functional planning and three-dimensional structure. To create an entire new library architecture, today or in the far future, one needs the relevant experts. Training architecture talent for library areas requires expert research, studies, and exercise and exploration of design. Such research has been conducted at the Department of Architectural Environment Design at the Institute of Architecture (Lviv Polytechnic National University) since 2005. The students of the Department, under the supervision of Professor V. Proskuryakov and Associate Professor I. Voronkova, produced a series of study projects, experimental research, and futuristic designs for various libraries of higher educational establishments in Ukraine. Architectural and planning solutions are produced in close

cooperation with librarians and take into account key principles for making a modern library space, and the library of the future.

One interesting and unusual project is the St George's Square near the student library of NU Lviv Polytechnic (this city square is historically known for hosting miscellaneous fairs) designed by V. Proskuryakov, I. Voronkova, M. Zhyhaylo (ill. 3). There was a peculiar foundation for the project. Because the number of students is continuously growing and the quality of education requires a new high level, we came up with the idea to create an international student centre on the premises of the NU Lviv Polytechnic. The site to be designed is located on the territory of the city square. Since it is used not only by the university students but by the city inhabitants as well, the student centre building was suggested to be put underground to the indicator—13.5. On the outside, the building comes forth with two lantern lights of different dimensions, the form of which imitates the circular Shape of the square.

The centre's space planning is organised by the principle of a single open overflowing space with the minimum usage of partition walls. The only exception are the spaces for conference halls, film theatres, and auxiliary facilities that comprise a separate bloc. The centre is to be used for educational, recreational, cultural, exhibition, and informational functions (Proskuryakov, Voronkova, 2013, p. 5-10). *Conclusion.* Today, the library is perceived as something more than a place for book storage. It is associated with being an open and free-to-access public facility that offers information and documents on various storage media. Thus, it implies an architectural environment of a modern library as a flexible structure intended for various kinds of changing needs and functions. Such awareness helps to clearly outline the image of the library of the future, as a place fit for the third millennium, with beautiful

and elegant architecture, free bright forms, with a flexible comfortable space where people and books shall be an integral part of the accomplished library setting.

ENDNOTES

- ¹ <https://uk.wikipedia.org/wiki/Future> (accessed on 4.02.20)
- ² <https://www.archdaily.com/882819/tianjin-binhai-library-mvrdv-plus-tianjin-urban-planning-and-design-institute> (accessed on 4.02.20)
- ³ *The eye above Prague: a library for the third millennium.* – 1st ed. – Prague: National Library of the Czech Republic, 2007. – 80 p
- ⁴ <https://www.archiweb.cz/en/b/soutezni-navrh-na-narodni-knihovnu-cr-3-cena> (accessed on 4.02.200)

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- [5] Renata Samotyj, Ivanna Woronkova, *Kształtowanie przestrzeni bibliotecznych współczesnej Ukrainy: problemy i wyzwania: Ewolucja nowych przestrzeni bibliotecznych. Od założeń do praktyki / pod red. nauk. Scholastyki Baran i Katarzyny Bikowskiej.* – Olsztyn, 2018. – S. 77-96.
- [6] *The eye above Prague: a library for the third millennium.* –first ed. – Prague: National Library of the Czech Republic, 2007. – p. 80: ill.
- [7] <https://uk.wikipedia.org/wiki/Future> (accessed on 4.02.20)
- [8] <https://www.archdaily.com/882819/tianjin-binhai-library-mvrdv-plus-tianjin-urban-planning-and-design-institute> (accessed on 4.02.20)
- [9] <https://www.archiweb.cz/en/b/soutezni-navrh-na-narodni-knihovnu-cr-3-cena> (accessed on 4.02.200)
- [10] <https://www.e-architect.co.uk/prague/national-library-prague> (accessed on 4.02.20)