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# EXPERIENCE OF SPACE – THE INFLUENCE OF MODERN TECHNOLOGIES ON THE PERCEPTION OF ARCHITECTURE AS EXAMPLED BY OBJECTS WITH A MUSEUM FUNCTION

# DOŚWIADCZANIE PRZESTRZENI – WPŁYW NOWOCZESNYCH TECHNOLOGII NA PERCEPCJĘ ARCHITEKTURY NA PRZYKŁADZIE OBIEKTÓW O FUNKCJI MUZEALNEJ

Abstract

The transfer of innovative solutions in architecture concerns both universal design involving primarily the functional aspect of objects, but also goes beyond the only practical and rational. A new perspective on the perception of the environment, associated with a break from habits regarding the reception of shapes, structures and recognizable styling, opens up new possibilities – first for designers and then for users of space. Technology influences our senses – intentionally directing and often deforming our perception. Manuel Castells introduced the concept of "(culture of) real virtuality", in which the real and the virtual intermingle so much that they become indistinguishable. This phenomenon can be experienced more and more often in spaces where the creation of such an illusion is particularly justified – in museum spaces – formerly created in stagnant, historical forms, nowadays attracting attention with the different shaping of the building's external style, its location, and, above all, realizing the goal of amazement and absolute novelty in the reception of the exhibition and the impressions accompanying it. The subject of the study are objects with a museum function – (interiors and external forms) in the context of the perception of architecture and art. Authors used the method of descriptive analysis of selected aspects of the studied problem.

*Keywords: museum architecture, space perception, modern technologies in architecture*

Streszczenie

Transfer innowacyjnych rozwiązań w architekturze dotyczy zarówno projektowania uniwersalnego obejmującego przede wszystkim aspekt funkcjonalny obiektów, jak i wykracza poza to, co jedynie praktyczne i racjonalne. Nowe spojrzenie na percepcję otoczenia, związane z oderwaniem się od przyzwyczajeń dotyczących odbioru kształtów, konstrukcji i rozpoznawalnej stylistyki, otwiera nowe możliwości – w pierwszej kolejności przed projektantami, a następnie użytkownikami przestrzeni. Technika wpływa na nasze zmysły – celowo ukierunkowując, a nierzadko deformując nasze spostrzeganie. Manuel

Castells wprowadził pojęcie „(kultury) realnej wirtualności”[1], w której to, co realne, i to, co wirtualne, przenika się tak bardzo, że staje się nieodróżnialne. Zjawiska tego można coraz częściej doświadczyć w przestrzeniach, w których wywołanie takiej iluzji jest szczególnie uzasadnione – w przestrzeniach muzealnych. Dawniej tworzonych w zastygłych, historycznych formach, współcześnie przyciągających uwagę odmiennością kształtowania stylistyki zewnętrznej budynku, miejscem jego usytuowania, a przede wszystkim realizując cel zadziwienia i absolutnej nowości w odbiorze ekspozycji i towarzyszących jej wrażeń. Przedmiotem opracowania są obiekty o funkcji muzealnej (zarówno wnętrza, jak i formy zewnętrzne) w kontekście postrzegania architektury i sztuki. Autorki zastosowały metodę analizy opisowej wybranych aspektów badanego problemu.

*Słowa kluczowe: architektura muzeów, percepcja przestrzeni, nowoczesne technologie w architekturze*

## 1. THE GENESIS OF MUSEUMS. THE EVOLUTION OF FORM

The idea of collecting and the related need to organize places for presenting works of art were already a domain of antiquity. Temples, palaces and libraries of Mesopotamia were the earliest forms of protection and transmission of knowledge.[2] The treasuries at Delphi and Hadrian's Villa in Tivoli are pointed to as the first pre-museum examples, where collections of valuable and recognised works of art were kept. In the Renaissance, the expansion of the Vatican (according to D. Bramante) can be considered the first museum. The form of buildings used for exhibition was usually borrowed from other objects, such as temples or palaces. At the same time, the spatial form of the gallery was used, and it became so popular that it became synonymous with the object presenting works of art. One of the oldest and specifically designed for this purpose was the Galleria degli Antichi by V. Scamozzi also known as the "great corridor" (the second largest after the Galleria degli Uffizi in Florence). Since the 17th century, painting or sculpture galleries accompanying residences were also popular in England, France and Italy. The archetype of museum halls in the second half of the 18th century became English auction houses. The idea of recognising culture and the testimony of the memory of the past as public values was a domain of the Enlightenment. The British Museum, founded in 1753, is considered to be the birth of the state public museum, and the first building erected as a public museum was the construction of the Dulwich Picture Gallery (1811).[3]

Since the second half of the 18th century, we can talk about a new type of public utility object – a museum. This involved the need to use spatial solutions, lighting and internal communication that were different from those used until that time. The first models of museum buildings are provided by theoretical treatises from the turn of the 18th and 19th centuries. Implementations based on classical models were characterized by rhythmic and calm monumentalism.[4] This architecture was characterized by elements such as long colonnades,

[1] A. Kiepas, *Filozofia techniki w dobie nowych mediów*, Wydawnictwo Uniwersytetu Śląskiego, Katowice 2017, p. 196, https://sbc.org.pl/Content/392416/filozofia_techniki_w_dobie_nowych_mediow.pdf (access: 1.08.2024).

[2] A. Marotta, *Typology: Museums* [in:] The Architectural Review, 19.12.2012, https://www.architectural-review.com/essays/typology/typology-museums (access: 10.08.2024).

[3] A. Kiciński, *Muzea – zagadnienia rozwoju i projektowania, polska perspektywa*, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2011, p. 21.

[4] M. Pabich, *O kształtowaniu muzeum sztuki. Przestrzeń piękniejsza od przedmiotu*, Instytut Architektury i Urbanistyki Politechniki Łódzkiej, Łódź 2004, pp. 36, 46.

a centrally located dome of considerable size, an axis-shaped entrance ending in a chapel or the founder's mausoleum, a rectangular courtyard or courtyards providing points of reference and facilitating movement through the building. The dominant motif of subordinating and organizing the entire building to a central rotunda, which was the "heart" of the whole, is repeated in the works of this period. The type replicating the pattern of the first museums based on the theory derived from the Enlightenment, including a long, rectangular gallery vaulted with collector's vaults of monumental character – was implemented almost until the middle of the 20th century.[5] Technological changes in construction also influenced the architecture of museums. Technology made it possible to erect tall, open-plan buildings using a post and beam system. Equipping them with elevators made it easier to overcome height differences. In addition to their exhibition and conservation functions, museums also gained additional attractions, such as restaurants, cafes and auditoriums. The International Style also left its mark on the shape of the museum's architecture – departing from the symmetry of the layout and regularity, clearly opening the building to the surroundings.

Over the centuries, different types of illumination of museum interiors have been experimented with – from roof skylights (the most popular and effective), through the use of windows just under the ceiling (the solution turned out not to be very practical in terms of viewing the exhibition) and completely glazed walls (making it difficult to arrange exhibitions).[6] The design of interior spaces serving the exhibitions was also explored – from modest arrangements that did not distract from the exhibits, to situating neighboring rooms as different from one another,[7] ending with those containing authentic objects and decor from the era.[8]

When trying to define the formula of the perfect museum, the location of the building was also taken into account – in terms of its accessibility for visitors (in the city center or on the outskirts), the inclusion of the landscape as an element of the exhibition and ensuring the possibility of future expansion of the object.[9]

R. Meier claimed: "I love designing museums because they offer the greatest range of spatial possibilities."[10] F. Johnson recognized a difficulty in designing museums, namely that they are a type of monument that has taken the place of churches or palaces. [11] And indeed, in the case of objects of this type, the expression of shaping form can be extremely varied. Le Corbusier came up with a museum resembling a stepped pyramid with a spiral-shaped path of confusion (Mundaneum).[12] The motif of a spiral ramp, but in an inverted arrangement (the shape of an inverted pyramid) was repeated by, among others, F.L. Wright when designing the Guggenheim Museum or O. Niemeyer in the Musee de la Terre.[13] The museum building can be a sculpture in space, as evidenced, among others, by the work of F. Gehry or Z. Hadid. If one of the functions of a building is to attract visitors, then any kind of action that makes the viewer interested and breaks him out of predictability is right. There are not many objects that are such a strong stimulator of movement as they are. In a sense, it was the

[5] *Ibidem*, p. 52.
[6] *Ibidem*, pp. 56, 69
[7] *Ibidem*, pp. 56, 64.
[8] *Ibidem*, p. 62.
[9] *Ibidem*, p. 65.
[10] *Ibidem*, p. 91.
[11] *Ibidem*, p. 88.
[12] *Ibidem*, p. 76.
[13] *Ibidem*, pp. 83–84.

distinctive architecture of the building, rather than the exhibition offerings, that became the factor determining the success or failure of the museum. On the other hand, as M. Pabich cites: "similarly to light, also silence and the possibility of full concentration speak symbolically about the museum function."[14] One thing is certain – a properly shaped environment can enhance or undermine the aesthetic experience.

## 2. MULTISENSORY EXPERIENCE OF SPACE

Museums are special objects in the context of providing a unique contact – both the perception of the building itself, but also shaping the perception of the presented works. Human-architecture and human-artwork interaction takes place with the participation of the senses, especially: sight, touch, hearing, smell, as well as the proprioceptive (balance) sense. In the case of the youngest users, also with the use of the sense of taste. We owe it to perception to understand everything that is not part of ourselves. In this sense, sensory perception defines our reality. And as a result, we are susceptible to manipulation, as long as our senses can be convinced of it.

Perception of space is not only a matter of what can be perceived, but also of what can be ignored, argued E. Hall,[15] while highlighting the cultural background of this property. Nevertheless, thanks to technology – virtual (VR) and augmented reality (AR), artificial intelligence (AI), mapping, we have the opportunity to participate more actively in the experience of spaces, including museum, and to focus on specific properties of the environment.

The simplest division of the senses includes a division into those that need direct contact with the stimulus – the sense of touch and taste, and those that relate to distant elements – the sense of sight, hearing and smell.[16] The latter are particularly important in terms of the experience of space modified by the newest technologies.

We receive about 82% of information about the environment using sight, while hearing about 11%, and smell less than 4%.[17] The other senses provide less data. E. Hall emphasized this quantitative advantage, pointing out that the eyes are actually as much as a thousand times more effective in catching information than the ears,[18] mainly due to the much greater effective range of the perceptual field. While the perception of smells is becoming increasingly weakened today, the property that smells carry the aspect of memories that they can evoke is still important. Combining smell with experience can also determine the positive perception of places on the basis of good associations in the explore of architectural space, or without referring to the past – influence the evaluation of the environment.

In the case of museum objects perception of information from the environment through the sense of sight, light and color – especially their variation and intensity – are especially important. Light is able to emphasize the new previously invisible structures, patterns, shapes revealed under its influence. Auditory space is completely different than visual space. Visual information is more clear and unambiguous than auditory information.[19] In the case of the

[14] *Ibidem*, p. 95.
[15] E.T. Hall, *Ukryty wymiar*, Muza, Warszawa 2003, p. 63.
[16] *Ibidem*, p. 59.
[17] Information on people with typical perception and a properly functioning sensory system.
[18] E.T. Hall, *op. cit*., p. 60.
[19] Information on people with typical perception and a properly functioning sensory system.

perception of sounds in closed spaces, the most important thing is the reverberation time and the ability to modulate and direct phonation. Its processing can intensify distraction and disorientation or, on the opposite, affect an increase in concentration and attention resulting from the visual aspects of the environment.

The sense of balance or deliberately knocking out of this state works on an analogous principle. The proprioceptive feeling helps to keep the body in proper orientation and equilibrium. Museum architecture obliges the experience of space in motion. Designing the tour route is intended to arouse and then maintain the viewer's attention, and if the subject matter of the exhibition demands it, also knock them out of their sense of balance and stability, forcing them to interpret reality in a new way.

## 3. MODERN TECHNOLOGIES AND THE MUSEUM EXPERIENCE

Modern technologies play a crucial role in shaping the experiences of museum visitors around the world. Their application not only allows for the attractive presentation of collections but also creates interactive spaces that engage visitors on multiple levels. Contemporary museums are increasingly using advanced lighting, acoustics, scent technology, and augmented reality to enhance the perception of exhibitions. Thanks to these solutions, exhibits become more immersive, enabling a deeper understanding and experience of the presented content. Three examples of museums engaging innovative technology to display their exhibitions are going to be presented below.

An example of a museum that fully utilizes the potential of technology while also showcasing an innovative approach to museum space design with numerous eco-friendly solutions is the Museu do Amanhã (Museum of Tomorrow) in Rio de Janeiro, designed by Santiago Calatrava. Movable photovoltaic panels are installed on the structure's overhanging ribs, generating electricity, illustrating the modern application of technology in resource management. Additionally, the building uses water from the nearby bay to regulate the interior temperature, allowing for efficient cooling and energy savings.

Ill. 1. Byron Prujansky – Museum of Tomorrow, source: https://museudoamanha.org.br/en/us (access: 7.08.2024).

One of the outstanding features of the museum is the "Us" pavilion, which forms the final part of the main exhibition. It showcases light and sound effects and is designed in the shape of a shell. The pavilion is made of wood, covered with quadrilateral panels that make reference to the traditional structures of Brazil's indigenous peoples. The interior is equipped with an advanced lighting system that simulates sunrise and sunset. Additionally, sensors placed around the pavilion automatically adjust the intensity of the lights and sounds based on visitors' movements, dynamically reflecting the impact of humans on their environment and enhancing the interactivity of the exhibit.[20]

Another example of promoting innovative technologies is the Museum of the Future in Dubai. This revolutionary institution goes beyond the conventional boundaries of traditional museums. Described as a "living museum," the space integrates elements of classical exhibitions, immersive theaters, and themed attractions to explore the future of society, science, and technology. The museum's exhibition space is constantly evolving and transforming, serving as a technological gateway to the future. The exhibits are the result of collaboration among creative designers, visionary artists, engineers, and technologists who combine their skills to create a modern environment. Through advanced digital solutions and interactive installations, visitors can experience visions of the future world.[21]

Ill. 2. Entrance to *Journey of the Pioneers* (Giovanni Emilio Galanello/Courtesy ATELIER BRÜCKNER), source: M. Hickman, *A decade in the making, Dubai's Museum of the Future opens to visitors* [in:] The Architect's Newspaper, 23.02.2022, https://www.archpaper.com/2022/02/a-decade-in-the-making-dubais-museum-of-the-future-opens-to-visitors/ (access: 7.08.2024).

[20] M.L.A. De Las Peñas, Mathematical sightings at the Museum of Tomorrow, "The Mathematical Intelligencer" 2020, vol. 42, pp. 24–28, https://link.springer.com/article/10.1007/s00283-020-09967-z (access: 7.08.2024).

[21] Museum of the Future: an architectural wonder and a great feat of technology [in:] Barco, https://www.barco.com/pl/inspiration/customer-stories/museum-of-the-future (access: 7.08.2024).

Ill. 3. OSS Hope photography by Giovanni Emilio Galanello. Inside the Museum of the Future, source: W. Barlow, *The museum of the future opens in Dubai* [in:] Interior Design, 6.04.2022, https://interiordesign.net/projects/the-museum-of-the-future-opens-in-dubai/ (access: 7.08.2024).

At the museum, visitors are greeted by a digital character named Aya, who uses modern technologies to deepen interaction with guests. The avatar also serves as a visionary technologist, telling visitors that "to reimagine the future, one must be open to new possibilities."[22] As a virtual guide, Aya employs innovative technological solutions to establish an emotional connection with visitors, stimulating their empathy and engagement with the exhibition content. Through personalized messages and interactive elements, the technology makes visitors get deeper understanding and appreciation of the presented topics. This is an example of how contemporary technological advancements can support museum visitors, enabling more advanced and personalized experiences.[23] The museum also offers an extraordinary space that depicts life on a massive space station in the year 2071, known as OSS HOPE. Visitors are introduced to an area designed to resemble the interior of a spacecraft, where metal walls and screens arranged around the space simulate windows, displaying spectacular visualizations of dynamic atmospheric phenomena related to liftoff. Behind the screens, fourteen Barco F90-4K13 projectors with UST lenses are installed, projecting an impressive 110 megapixels onto a curved RigiFlex screen measuring 21x4 meters, a record-breaking example of a curved projection screen in a single, continuous panel.[24]

Another area within the Museum of the Future that uses advanced technologies is *The Heal Institute*.[25] This zone focuses on the use of biotechnology and artificial intelligence

[22] A. Tesorero, *The future is now: A look inside the Museum of the Future in Dubai* [in:] UAE – Gulf News, 23.02.2022, https://gulfnews.com/uae/the-future-is-now-a-look-inside-the-museum-of-the-future-in-dubai-1.85952945 (access: 7.08.2024).

[23] *Ibidem*.

[24] Museum of the Future…, *op. cit*.

[25] *The Heal Institute* – a zone in the museum depicting an image of Dubai and the world in 2071. This space consists of two parts: *A digital Amazon* and *The Library* (also known as *The Vault of Life)*, source: A. Tesorero, *op. cit*.

(AI) in the context of protecting the environment, including ecosystems regeneration. On the fourth floor, there is an installation called *The Library*, also known as *the Vault of Life*. This space plays a key role in innovative efforts, employing advanced biological technologies to counteract the effects of climate change. The concept and design of the exhibition were led by Brendan McGetrick. The architectural and exhibition firm Atelier Brückner from Stuttgart played a crucial role in the project, overseeing its development from the design phase through to execution.

The Vault of Life exhibition transports visitors to the year 2071, a time when most of the world's ecosystems have been irreversibly damaged, and humanity faces the challenges of living in a radically new context. In this dystopian vision of the future, the Museum of the Future's *Superflux*[26] presents a hopeful scenario where global efforts focus on repairing, regenerating, and restoring lost resources. The Library features 2,400 glass containers, each housing images of life forms, creating a unique visual encyclopedia of biodiversity. Through advanced display technologies and precise arrangement of exhibits, the exhibition allows visitors to deeply immerse themselves in the richness of ecosystems, effectively combining education with aesthetics, and encouraging the exploration of the extraordinary aspects of life on Earth. The exhibition, showcasing an impressive array of "species," serves as a reminder of our role in global ecosystems.

Ill. 4. *The Library*, Inside the Museum of the Future, source: The Vault of Life in Museum of the Future [in:] Superflux, https://superflux.in/index.php/work/the-vault-of-life-in-museum-of-the-future/# (access: 13.08.2024).

Interactive elements, such as portable scanning devices, allow visitors to engage directly with *The Library*, transforming their experience of museum architecture through interactive solutions that enhance engagement and support ecological education.

[26] Superflux – a design studio founded by Anab Jain and Jon Ardern in 2009. The Museum of the Future in Dubai commissioned Superflux to design an exhibition that showcases efforts to improve the climate, source: The Vault of Life in Museum of the Future [in:] Superflux, https://superflux.in/index.php/work/the-vault-of-life-in-museum-of-the-future/# (access: 13.08.2024).

Another example of the use of technology in museums is mapping. This technique involves projecting images and animations onto three-dimensional objects such as facades, interiors, or sculptures, creating dynamic, moving installations. Mapping allows for a complete transformation of an object's appearance, introducing the illusion of movement and depth, which enhances the visual and emotional experience for visitors.[27] An example of mapping in use is the immersive exhibition of Vincent van Gogh's works. It uses advanced projection technologies that allow viewers to fully immerse themselves in the artist's world. Through large-scale projections, sounds, and animations, visitors can literally "step into" his paintings, experiencing them in a new, interactive way. The exhibition has been displayed in various locations worldwide, including the Metropolitan Transportation Authority of the State of New York, offering a unique experience of engaging with art through technology.[28]

Ill. 5. Immersive exhibition of works by Vincent van Gogh, Metropolitan Transportation Authority in New York, USA, source: I. Popko, *Oglądanie obrazów w muzeum to za mało. Nadchodzi era wystaw multisensorycznych* [in:] Rzeczpospolita, 12.02.2022, https://sukces.rp.pl/sztuka/art35680461-ogladanie-obrazow-w-muzeum-to-za-malo-nadchodzi-era-wystaw-multisensorycznych (access: 15.08.2024).

The immersive exhibition of Vincent van Gogh's works transforms the way visitors perceive art, turning traditional viewing into an emotionally charged experience. By participating in dynamically animated paintings, viewers are not only able to admire the works but also feel as if they are part of them. This form of engagement enhances emotional connection and deepens the understanding of the artist's creativity.

## 4. TECHNOLOGY AND SHAPING THE EXTERNAL FORM OF MUSEUM

Metaphorical soul of the museum is found in its showpieces and interior, however, it does not downgrade the value of its exterior appearance. The facade or the form of the building usually carry out a marketing task, they are used as an advertisement, which means they need to stand out and be unusual. Here, modern construction technologies and installations come

[27] Mapping 3D [in:] Svoboda, https://svoboda.com.pl/efekt-wow/3d-video-mapping-2/ (access: 15.08.2024).
[28] I. Popko, *op. cit.*

in handy. They are often needed already during the design process, when specific software enables the design of unusual exterior forms and matching structures.

When one deals with an already existing building, it can be used as a contrast to new creation, grant new function, attracting user's attention. A juxtaposition of a familiar form with a new structure, such as roof, bridge or even whole building changes the overtones of space, it becomes new even though it was there all this time. The usage of modern technologies in the construction process of new buildings is one of the methods to shock a passerby and create a vivid memory. There's a bigger freedom in form creation there. It allows to design something so far unprecedented, creation between a sculpture and a building, architecture that does not need a logo to become a symbol. Sometimes unconventional structure is needed, other time, distinguishing facade materials. The novelty of technology can manifest itself by not being used in this particular line of business but by being a daily occurrence in another field. Its adaptations become an innovation.

The great shock to its visitors is given by a.o. Kistefos Art Museum in Norway called "The Twist" designed by Bjarke Ingels Group (BIG) in collaboration with Ramboll in 2019. It is part of Kistefos Sculpture Park on the outskirts of Oslo.[29]

The museum has a form of a bridge stretching up to 80 meters, of which approximately 75% is suspended above the river. Distinctive feature is a titular twist of 90° in building section happening 24 meters from the riverbank.[30] It is highly advanced technological structure. The bridge designed in BIM technology (Rhinoceros, Grasshopper and Tekla Structures) rests on a truss girder. During the design process many construction problems were encountered, such as low construction stiffness of the twisted part, limited gap for structure between outer and inner cladding or adjusting the space to unusual function.[31]

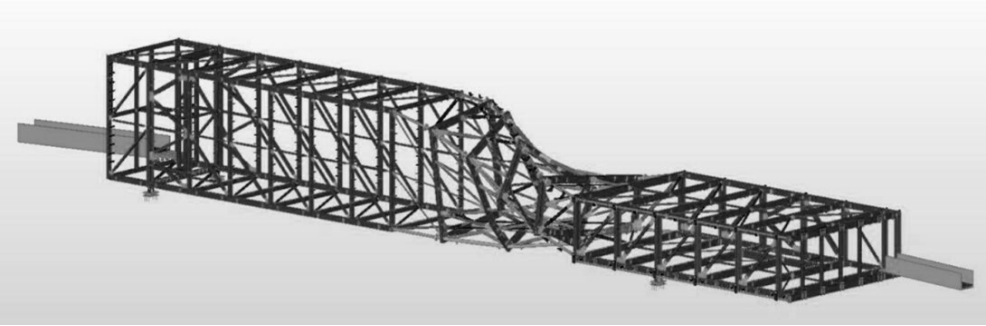
Ill. 6. Kistefos Art Museum – "The Twist"; source: The Twist [in:] BIG – Bjarke Ingels Group, https://big.dk/projects/the-twist-1337 (access: 7.08.2024).

[29] S. Sainani, *Influence of contemporaneity on museum architecture* [in:] ResearchGate, 07.2020, p. 5, https://www.researchgate.net/publication/342590555_Influence_Of_Contemporaneity_On_Private_Museums_Part_1 (access: 3.08.2024).

[30] N. Tornsberg, L.O. Møller-Hansen, *Kistefos Museum: Transforming great architecture into buildable project*, "ce/papers" 2019, no. 3(3–4), pp. 175–179. DOI: 10.1002/cepa.1044.

[31] *Ibidem*, pp. 175–177.

Bridges are not commonly used as exhibition rooms that require elements like toilets, cloakrooms, basements, inner stairs or recreational areas, as in this instance. The steel truss was drawn up using advanced software (Idea Statica Connection) that calculated parameters of designed joints.[32]



Ill. 7. Kistefos Art Museum – steel structure model, source: N. Tornsberg, L.O. Møller-Hansen, *op. cit*., p. 177.

The illusion of twisting in half the cuboidal box with windows was created – the visual effect similar to computer game error, not actual structure. From the outside, as well as while walking through, one can have an impression that it is a portal, space-time curvature to which are submitted paintings hanging on bent walls or floors and light streaming through longitudinal skylight.

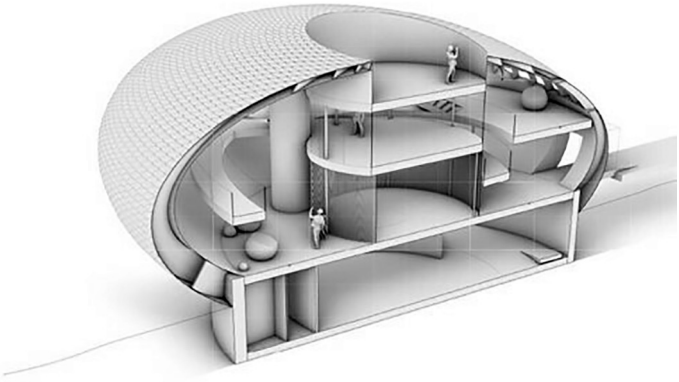
The building, despite its interesting form and materials does not radiate pompousness, but humbly harmonizes with surrounding nature.[33] The location has a positive impact on perception of the park. Bridge-museum emphasizes rapid river. Its popularity reached high level, which resulted in award of Museum of a Year 2019.

Ill. 8. Kistefos Art Museum – interior, source: The Twist [in:] BIG – Bjarke Ingels Group, https://big.dk/projects/the-twist-1337 (access 7.08.2024).

[32] N. Tornsberg, L.O. Møller-Hansen, *op. cit*., p. 177.
[33] S. Sainani, *op. cit*.

Similar process applied to Salmon Eye. It is an exhibition pavilion, science center, museum, art installation and restaurant.[34] The inspiration for its development was the location, but the most important condition for its existence was good contact with the surrounding nature. The museum was built in Hardanger Fiord in Norway in 2022.[35] This floating museum has an oval form covered with approximately 9500 stainless-steel plates. Inspiration for its shape came from the salmon eye, and for its cladding – from the fish scale. "The pattern and the dimensions of the plates create a perfect double-curved surface," said during an interview with Jane Englefield for Dezeen the representative of Kvorning Design, the design studio responsible for this project. "This material, the dimensions, and the reflection of light from the plates look very much like salmon skin at a distance."

Ill. 9. Salmon Eye; A.L. Reith, *The viral restaurant in Norway that's located inside a floating art installation* [in:] Architectural Digest India, 16.09.2023, https://www.architecturaldigest.in/story/the-viral-restaurant-in-norway-thats-located-inside-a-floating-art-installation-iris-review/ (access: 7.08.2024).



Ill. 10. Salmon Eye – model section, source: S. Utkum Ikiz, *Salmon Eye, a spectacular floating pavilion on Hardangerfjord* [in:] Parametric Architecture, 3.12.2022, https://parametric-architecture.com/salmon-eye-a-spectacular-floating-pavilion-on-hardangerfjord/ (access: 7.08.2024).

[34] Y. He, *A feast for eyes: Redirecting the dominance of visual effect toward gustatory perception within interior space*, MS thesis, Pratt Institute 2024, pp. 55–56.

[35] E. Nystrom, *Salmon Eye unveiled – a spectacular floating pavilion in Norway's Hardangerfjord* [in:] Åvontuura, 8.12.2022, https://www.avontuura.com/salmon-eye-kvorning-design/ (access: 5.08.2024).

Despite its form noticeable from air, the museum harmonizes with its surroundings. After arriving at the site by ferry, one can explore a 4-level multifunctional space of a total height of 15m. In spite of functioning as a building, it has been registered as a boat, does not have foundation and is anchored to bed by 3 long cables.[36] Ballast tanks stabilize the structure floating 300m above the bottom, designed to withstand 4-meter waves.[37] Although technically being a boat, Salmon Eye is perceived as a building. Rolling on big waves is not registered, while one can still enjoy benefits of being on the water: the smell, the breeze, the sound, the view, and even the taste of local fish.

Ill. 11. Salmon Eye – interior: view of acoustic panels, source: S. Utkum Ikiz, *Salmon Eye, a spectacular floating pavilion on Hardangerfjord* [in:] Parametric Architecture, 3.12.2022, https://parametric-architecture.com/salmon-eye-a-spectacular-floating-pavilion-on-hardangerfjord/ (access: 7.08.2024).

[36] Restaurant IRIS at Salmon Eye – Kvorning Design [in:] Archilovers, 6.10.2023, https://www.archilovers.com/projects/319299/salmon-eye.html#info (access: 5.08.2024).

[37] E. Nystrom, *op. cit*.

The interior is also flooded with innovative technology. The walls of ellipsoidal structure are one continuous surface lined with Soft Cell acoustic panels. Covering them with a custom-made fabric from a local factory to visually unify the walls resulted in a uniform gradient and effective soundproofing of the closed space that eliminates the echo inside. 250 unique shapes were used to finalize the structure.[38] By entering the building visitors have an opportunity to take part in a 'linear journey' moving by ramps through exhibitions, multimedia displays, a dining room or an observation deck. Main communication for guests is provided by ramps bent to curvature of walls and staircase leading to the roof terrace.[39]

Salmon Eye splendidly becomes a part of the landscape full of nature, but it has a certain facilitation: it does not have to coexist with existing architecture nearby. This was not the case for the Buffalo AKG Art Museum, which went through many stages of development while always staying within the campus boundaries.

The museum sprung up in 1862 as the Buffalo Fine Arts Academy, while its first neoclassical headquarters by E.B. Green were built in 1905, making it the 6th oldest building of this function in the USA. In 1962, a contemporary addition of an auditorium and courtyard by G. Bunshaft contributed to the name change to the Albright-Knox Art Gallery. In November 2019, the newest expansion officially started, which was finished in 2023.[40]

The construction process was particularly complicated by its diversity, scope and the existence of buildings listed in the National Register of Historic Places. Modern lighting technologies and unusual means of creating shade in exhibition interiors came in handy. Efficient LED lighting, digital frit and imprint on the new building (cooperating with heating ensuring thermal comfort and natural shade inside) were applied.[41] Surrounded by a glass façade, the building offers a view from 2-storey high gallery around the 2nd floor. People admiring the art inside can be seen from afar. The architecture comprehensively integrates the interior and exterior.[42]

However, according to the Buffalo News, it was not the reason behind its sudden increase in popularity just a year after reopening. Time magazine hailed it as one of the 'World's Greatest Places of 2024.' The credit goes to the conversion of the courtyard, which later became a free of charge museum attraction.[43] Jillian Jones says that, inspired by the Museum of Art in Cleveland, which, surrounded by historical buildings, turned its outdoor space into an indoor area, the designers decided to cover the contemporary atrium with the art installation 'Common Sky.'[44] It resembles a steel-glass tree. 'There's an element of social consciousness' says Eliasson (architect) in Amy Serafin's interview 'and of bringing the outside and the weather in, and all of that kaleidoscopically'. Such action not only intensively affects sense of sight, but also changes the perception of space. The light refracting in segments of the structure disorients the passerby, to show its true value a moment later.

[38] Salmon Eye I Eide Fjordbruk [in:] Kvadrat, https://www.kvadrat.dk/en/kvadrat-acoustics/projects/salmon-eye (access: 5.08.2024).
[39] Y. He, *op.* cit. pp. 55–56.
[40] Buffalo AKG Art Museum [in:] OMA, https://www.oma.com/projects/buffalo-akg-museum (access: 4.08.2024).
[41] *Ibidem*.
[42] *Ibidem*.
[43] Town Square [in:] Buffalo AKG Art Museum, https://buffaloakg.org/building-buffalo-akg-art-museum/about-project/town-square (access: 4.08.2024).
[44] *Ibidem*.

Triangular and hexagonal panels of diverse inclination show the outside world or reflect the space below them. People walking inside and nature outside the museum create a constantly modified mosaic that not only looks different from every corner of the atrium, but will never look the same twice.[45] All is supported by the perforated steel structure. Among thin tubes lamps are hidden. The curved roof has two layers: outer (glass cover) and inner, holding up the mirrors. The truss girdle at the junction of the new and old architecture and the funnel-like column are the only support points for the art installation. The whole structure is asymmetrical and stretches up to 30m in both directions, yet it is unusually light and weatherproof, which proves the enormous knowledge and skills of designers.[46] This example shows that sometimes an artistic vision can be so technologically demanding that it creates new ways of solving problems, a technological gem in the art world.

Ill. 12. Common Sky, source: Town Square [in:] Buffalo AKG Art Museum, https://buffaloakg.org/building-buffalo-akg-art-museum/about-project/town-square (access: 4.08.2024).

## 5. SUMMARY

Museums are generally recognized as having changed for the better over the past generation, moving from rigid, sterile and boring to entertaining, interactive and stimulating. The key seems to be to increase participation and open up museums to audiences who actually want to interact. As the data shows, visitors prefer fun, interactive collections to rigid, distant and monotonous displays of artifacts in glass cases.[47] The process of modernization and evolution of museums is continuing – especially in terms of accessibility, sustainability and the incorporation of new technologies.

[45] M. Katsikopoulou, *Studio other spaces' 'common sky' complements buffalo AKG art museum renewal by OMA* [in:] Designboom, 9.06.2023, https://www.designboom.com/art/common-sky-ola-fur-eliasson-buffalo-akg-museum-oma-06-09-2023/ (access: 12.08.2024).

[46] E. Karanci, *Buffalo AKG Art Museum – common sky art gallery extension* [in:] Thornton Tomasetti, https://www.thorntontomasetti.com/project/buffalo-akg-art-museum-common-sky-art-gallery-extension (access: 12.08.2024).

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