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Editorial

Christian Hanus

This issue of Architecture Papers of the Faculty of Architecture and Design STU once again deals with a remarkable and diverse collection of current research topics in the building industry, from urban planning scale with the question of the development of the river banks after the Danube River regulation in Bratislava, through visual art in public spaces, the application of artificial intelligence in architecture and methods of analysis in historical buildings, to the question of the colour scheme in the built environment for the ageing population. The apparent heterogeneity of researched topics is united by the fact that they are all particularly topical in their own way and bear particular relevance for competent and responsible planners today. The different contents embody thematic "mosaic stones", which are of decisive relevance in the processing of complex planning tasks. This statement will be clarified below.

Architectural alchemy: Leveraging Artificial Intelligence for inspired design – a comprehensive study of creativity, control, and collaboration by Lenka Petráková and Vladimír Šimkovič

The tools available to planners also have a central influence on the planning and realisation of architectural projects. The use of artificial intelligence represents at least as significant a change as the switch from fabric drawings to CAD in architecture. The influence of these tools is not limited only to the design work process, but also has a significant impact on the planning results, i.e. not just the visualisation, but also the influence on the creative thought and development process. This technology is still in its infancy; however, it is already necessary to learn how to use it responsibly at this stage.

Colour in the environment for older adults by Monika Hencová and Veronika Kotradyová

Responsible planners are aware that their activities must take into account the needs of the society. In an ageing society, the need for an age-appropriate design of architectural spaces is also becoming increasingly relevant. Colours and textures of materials and surfaces play a central role here. These not only have aesthetic, visual, acoustic, and haptic qualities, but their texture is also pertinent to orientation and accessibility. The built environment is characterised by an age-appropriate living space design. Direct interactions—be it synergies, conflicting objectives, or tensions—with the aforementioned "mosaic pieces" of urban planning, artistic design, and analytical methodology of historic buildings are obvious.

Fine art as an integral part of architecture: Political and social aspects of the formation of this synthesis in the 20th century by Peter Mazalán and Katarína Morávková

It is particularly important for planners to analyse the role of visual arts in architecture. Not only in public discourse but also in professional debates in planning circles, the intentions behind the use of art in public space are rarely addressed. All too often, the discussion of the topic is limited solely to formal and aesthetic aspects. However, the influence exerted by clients, architects or even the public, the intentions and needs being pursued, the content being conveyed or the aesthetic requirements being satisfied are central questions in planning. The enclosed article impressively demonstrates the changes in this interplay and thus provides a critical illustration of this question for the current approach to art in public spaces and its reception.

Rise of container structures along the Danube River in Bratislava: Transformation of the embankment after the river regulation by Monika Bočková

The changing times with their economic, political, and social structures and values have a significant influence on how public urban spaces are dealt with and on ideas for its design. The planner's room for design and his role in carrying out his work are subject to different framework conditions over time. This change is impressively demonstrated by the example of the banks of the Danube in Bratislava, Slovakia, a city with a very special historical dynamic. The spectrum ranges from free-standing individual palaces in the interwar period to utopias with container-like building structures and the neoliberal, property market-driven project developments of today. These are exciting reflections on the analytical positioning of today's world.

Presentation of older layers and findings on historical architecture using the method of analytical presentation: Example of the Old Town Hall in Bratislava, Slovakia by Andrej Botek

The design of urban and rural spaces always interacts with existing buildings. These are often of historical, aesthetic, and urban planning significance. Treatment of these identity-forming testimonies is also subject to change over time. An important prerequisite for dealing with these buildings appropriately is to analyse their condition, their historical layers, and the abundance of traces they contain or leave. This forms an essential basis for decisions on their preservation, use, and urban contextualisation. New methods may provide important assistance here. This is another important "piece in the mosaic" of planning expertise.

These exemplary "mosaic stones" illustrate the ever-expanding and increasingly complex picture of the competences of responsible planners. Therefore, may they be invited to constantly engage with the content of all these different topics and incorporate all of this into their work. Researchers and teachers have the responsibility of constantly creating new milestones and communicating these to planners, thereby contributing to the high-quality design of our living spaces. In this way, may this issue of Architecture Papers of the Faculty of Architecture and Design STU make a further contribution.

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Architectural alchemy: Leveraging Artificial Intelligence for inspired design – a comprehensive study of creativity, control, and collaboration

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Abstract: The research paper contends that Artificial Intelligence (AI) serves as a collaborative partner in architectural design, rather than merely a utility tool. To substantiate this argument, a three-phase, nine-test investigation evaluating the strengths and limitations of two prominent AI platforms: Midjourney AI and Stable Diffusion was undertaken. These platforms synergize human creativity and AI capabilities through features like text prompts and image references, thereby fostering innovative avenues in architecture. Our analysis indicates that Midjourney AI is proficient in generating initial design concepts, largely thanks to its extensive data libraries, but is deficient in design refinement and user control. Conversely, Stable Diffusion empowers designers with greater control via features like ControlNet but sacrifices visual clarity due to its smaller generative models. Both platforms share a common flaw: an overemphasis on aesthetics and shape at the expense of functional understanding. Building upon these empirical observations, the paper outlines strategies for designers to reasonably leverage AI in optimising workflows. It confirms two key hypotheses concerning the interplay of creativity, control, and collaboration, emphasising that both human architects and AI systems benefit from iterative feedback and continuous adaptation. In summary, the study posits that AI is not just an adjunct technology but a transformative force with the capacity to fundamentally alter architectural design processes, paving the way for a new paradigm where human expertise and machine capabilities converge for enriched design outcomes.

Keywords: design, architecture, artificial intelligence, AI, creativity

INTRODUCTION

Traditional architectural design provides a human-centric and intuitive way of creating spaces based on personal creativity, experience and cultural history. The final design usually unfolds linearly with predetermined approaches set in the early stages. Sometimes, the experience can overshadow objective evaluation. In contrast, the design approach enhanced by Artificial Intelligence (AI) leverages technology to expand the boundaries of inspiration and creativity, offering new ways for exploration and innovation. AI enhances creativity by allowing architects to experiment with novel forms, structures, and ideas at an unprecedented pace. This fosters an environment where architects can explore and innovate more freely and faster without the typical constraints of manual design.

This evolution of AI began in the 1950s, and since then, it has been an ever-evolving field of research that has impacted various industries, including architecture. The term "Artificial Intelligence" (McCarthy, Minsky, Rochester, Shannon, 2006) and its meaning, the use of the human brain as a model for machine logic, were defined in 1956 at the workshop titled the Dartmouth Summer Research Project. The development of AI has faced numerous doubts from the general public and private sector over the years. However, in the 1990s and 2000s, the research gradually embraced machine learning (ML) methods, and with the rapid development of the Internet, data collection and learning capacity significantly improved. The spread of AI would not be possible without further technological advancements – GPUs (Graphic Processing Units) that allowed the operations to run in parallel rather than subsequently allowing many previously unfeasible AI projects to become a reality. The 2000s hardware change democratised the use of computation power and made AI more accessible even in user laptops, and in the 2010s, the era of deep learning emerged. The "depth "describes the increased complexity of models and the increased number of artificial neurons (Chaillou, 2022). Understanding the context of technological development and data collection is essential to appreciate that today it is the first time we, as designers, have access to such a broad library and AI-generated inspiration.

For architects, this technological leap provided exciting opportunities, such as creating entirely new designs using algorithms and machine learning based on user preferences, materiality, or experience. AI's predictive capabilities allowed for enhanced building performance and sustainability. They facilitate design-

ers in tasks such as initial concept generation, design optimisation, building performance prediction, evaluation of potential effects on energy efficiency and occupant comfort, and simulation and visualisation of the final structure (Hegazy, Saleh, 2023). An example of such objective usage in architectural design can be seen in a study of Generative conceptual design via deep learning (As, Pal, Basu, 2018), where a deep neural network (DNN) approach generated conceptual designs in architecture. The generation was based on a system evaluating and scoring designs, decomposing them into building blocks and recombining them into novel compositions.

Fig. 1. AI-generated image in version 3 (left) and version 5.2 (right). AI's understanding of floor plans is improving over time. In the latest 5.2 version, the connection of the spaces is quite logical, although it still lacks technical understanding. Text to Image generation, paid version. Prompt Floor plan of a villa. (Author: Lenka Petráková using Midjourney AI platform – paid version, 2023)

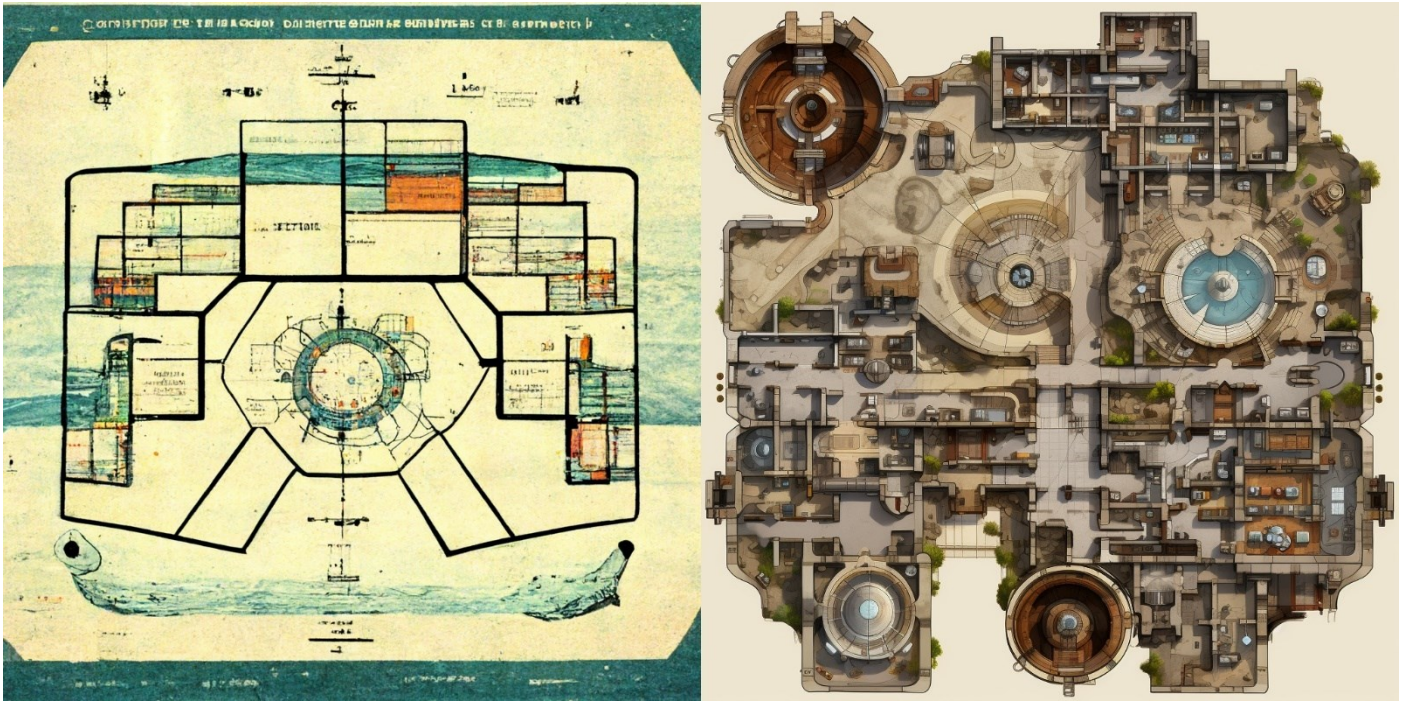

Fig. 2. AI-generated image in version 3 (left) and version 5.2 (right). We can see that the image generation was better in Fig. 1, where the language model had better historical data on spatial requirements for the villa. Text to Image generation, paid version. Prompt Floor plan of The 8th Continent, Ocean Cleaning and Research Station (Author: Lenka Petráková using Midjourney AI platform – paid version, 2023)

Within this context, two distinct AI platforms that will be examined in this paper, Midjourney and Stable Diffusion, have emerged as powerful tools in visual-driven design processes. Both platforms use AI image generation that involves previous training based on instructions and training data. This type of algorithm is called Generative Adversarial Networks (GANs). GANs help access the appearance and can be used for image generation, among others in floor plan generation (Fig. 1, 2). The GAN architecture comprises two models trained simultaneously: a generator to produce the data and a discriminator to establish the origin of the data (factual or generated) (Goodfellow, Pouget-Abadie, Mirza, Xu, Warde-Farley, Ozair, Courville, Bengio, 2020). Despite their shared foundation, both platforms differ in the results, style, and ability to be controlled by the user. Visual-driven platforms can help in the early design stages for formal inspiration before the design is optimised and developed for its functional needs. Arguably, as the platform is taught on previous data, we could compare their proposals to designer sketches based on previous experience.

This paper delves into the effectiveness of AI-driven design approaches, exploring new ways of inspiration and innovation in the architectural sector while researching how we can control AI in the design process and use it as a tool instead of an autonomous designer. When working with the two platforms (Midjourney AI and Stable Diffusion), the questions are multifaceted and require careful consideration: How do text-to-image and image-to-image generation algorithms contribute to a more vivid visualisation of designs? How can we enable greater control and flexibility in the design process? What are their comparative strengths and limitations within the context of architectural design? How can AI's role be moderated within the design process to ensure it functions as a collaboratively interactive tool rather than an autonomous designer? By focusing on these questions, the paper aims to investigate the mechanics of these platforms, evaluating their relative capabilities and providing insights into how they can be effectively harnessed in modern design practices.

The study conducts a comparative analysis of design exercises using both Midjourney AI and Stable Diffusion. It examines the effectiveness of AI-driven design approaches in the architectural sector, ultimately transforming how architects work while recognising its limits and discussing how we could enjoy the help of AI while controlling the design process. This study adds to the expanding field of knowledge concerning the fusion of machine learning and image processing within architecture. It offers valuable insights and practical applications for design professionals and researchers in this area.

VISUAL INSPIRATION AND CREATIVITY

Human creativity is something of a mystery, not to say a paradox. One new idea may be creative, while another is merely new. What is the difference? (Boden, 2009) Human creativity can be described as our ability to develop new ideas and solutions to problems and can affect any aspect of our lives. As Boden mentioned, creativity is essential for architects, but we do not understand where it comes from. If we do not understand its origin, how can we expect AI, based on our algorithms, to introduce creativity? However, while AI may not directly produce creative solutions, it can offer diverse perspectives that might stimulate our own creativity. Essentially, it is the mental spark AI provides rather than the direct result.

AI is often defined as a tool that tries to imitate human intelligence. Margaret Boden states that AI tries to enable computers to perform operations like the human mind (Boden, 2016). It is one of the reasons why the arrival of AI and its use also brings a range of opinions on the emerging developments in artificial intelligence and machine learning and whether these technologies are beneficial or detrimental to the creative process. In architectural design, however, AI's potential to serve as an extension of human cognition or a collaborative teammate may tip the scales towards favour of enhancement rather than hindrance.

Architects often begin a design with an abstract concept and an indistinct vision of its form, forming a foundation from which a wide array of solutions can emerge (Castro Pena, Carballal, Rodríguez-Fernández, Santos, Romero, 2021). The inherent visual nature of architecture means it leans on visual cues to express ideas that might be harder to articulate verbally. Simultaneously, visual stimuli that spark creativity often inspire ideas and concepts. With technological advancements, visual inspiration extends beyond static images into interactive simulations, virtual reality, and AI-generated visuals. These tools expand the scope and depth of visual exploration, enriching the design process.

Machine learning has become increasingly popular among architects in recent years, with GANs standing out as powerful design tools. Renowned architects such as Refik Anadol and Daniel Bolojan have embraced GANs in their work, demonstrating the potential of these machine-learning frameworks that specialise in processing image-type data (Mostafavi, Tahsildoost, Zomorodian, Shahrestani, 2022). Within this technological context, AI's generation tools provide architects with a direct and innovative way to transform abstract ideas into visual representations. AI can incorporate information from various fields, including art, science, and sociology. Consequently, architectural designs are enriched with insights from cultural, ecological, technological, and social perspectives.

AI's illustrations are not confined to realism. They can act as creative symbols, encapsulating a particular sentiment or idea a space should invoke (Berg, 2022). These multifaceted visual instruments pave the way for more insightful and inventive architectural design, bridging historical and contemporary insights. Moreover, AI-generated visualisations assist in decision-making, enabling architects to harness AI as an extension of imagination rather than merely a tool for realistic rendering (PA Next Team, 2022). Balancing AI's capabilities remains challenging, especially in generating images that align with specific requirements. There are too many interpretations when the text description (prompt) lacks details. However, when the description is more detailed, the visuals could be too concentrated around them and lack the overall structure of the image, or it creates similar outcomes without available variations. This was also described by Yousif and Bolojan as prompting challenges with domain and context specificity. Despite acceptable visual outcomes, their output variety sometimes suffered, leading to similar results. Due to AI models pre-training on large datasets, not domain-specific ones (Yousif, Bolojan, 2021).

The abstract use in conceptual design often faces issues like over-concentration on details or lack of variations, which was critical primarily in the first versions of the platforms. In the early language models, the libraries used for “training” the AI were so limited that the language of all designs, no matter the input preferences, resulted in repetitive patterns. (Fig. 3) Design strategies are routed in creating new and learning from previous iterations. Therefore, unlike in other disciplines, getting the same or similar outcome twice is a failure. Designers must rigorously oversee the selection process for final outputs. However, AI holds promise in augmenting architectural creativity. Architects can innovate and refine design techniques by integrating human ingenuity with AI capabilities. As AI's role in architecture expands, it is essential to balance its potential with

its limitations, preserving the unique human touch. This paper delves into two AI platforms, Midjourney and Stable Diffusion, to explore AI's practical implications and future in architectural design.

Fig. 3. Left: Midjourney version 1 AI-generated image of a villa in the rainforest. The design is abstract, lacking material and environmental specificity. Prompt: fluid organic futuristic biologic wooden villa, futuristic shape render in V-Ray, in the Amazon rainforest, sunset hyperrealistic scene. Right: AI-generated image in Midjourney version 1, prompt: The 8th Continent Ocean Cleaning and Research Station. There are significant similarities in the architectural language compared to the villa. (Author: Lenka Petráková using Midjourney AI platform – paid version, 2022)

MATERIALS, DATA AND METHODS

This research is situated within the broader context of investigating the role of artificial intelligence in transforming natural inspiration into architectural designs. The study conducts a comparative analysis of two AI platforms, Midjourney AI and Stable Diffusion + ControlNet. The experimental framework relies on visuals from The 8th Continent, Ocean Cleaning and Research Station, which is a crucial project of extensive research on nature's influence on design. Some introductory images diverge from the project but still focus on natural inspiration, highlighting each platform's capabilities and limitations. The following hypotheses are being investigated: 1. Text-to-image and image-to-image generation algorithms will enhance the visualization of designs by providing a vivid representation, thus aiding the creative process. 2. AI's role within the design process can be moderated and managed to function as a collaborative, interactive tool rather than an autonomous designer, preserving the critical human elements of creativity and innovation.

The exploration and testing of these expectations will contribute to a nuanced understanding of how AI can be effectively harnessed in modern architectural practices, offering a balanced perspective that recognises both the promising capabilities and the inherent limitations of AI-driven design approaches. To increase the understanding of the experiment, we need to introduce the two tested platforms and the functionalities we will use.

MIDJOURNEY AI INTRODUCTION

In April 2022, a company based in San Francisco established MidJourney-AI, an extension integrated within a chat server known as "Discord®" (Salkowitz, 2022). Soon, the artists, designers and even architects shifted towards experimenting with it (Radhakrishnan, 2023). The web platform is accessed through an online chat room where one can type the command "/imagine" followed by a verbal prompt describing what one wants the AI to create. The AI quickly analyses this, filters relevant data from the database, and generates four, often abstract images, bridging the gaps in the description. While there is no strict format for "/imagine", being specific enhances accuracy. It is essential to be specific, use only positive words, describe the style of the image, reference artists, and describe the camera lens, rendering engine, or image ratio for increased precision. A single word can significantly influence the design outcome. (Fig. 4). The strength of Midjourney is in creating captivating visuals from a text; the resolution, definition, and high realistic value are hard to match today by other AI platforms due to the size of data sets it operates on.

Fig. 4. AI-generated images depict varying interpretations. On the left, the image captures flower-shaped organic domes with the prompt: "flower-shaped domes." Meanwhile, the right image, prompted with "flower domes," more closely resembles greenhouses than the intended flower-shaped structures. This difference highlights the prompt's specificity. (Author: Lenka Petráková using Midjourney AI platform – paid version)

Fig. 5. On the left is an architectural massing study created by the author. In the middle is an AI-generated image for style reference of the blend function created in Midjourney AI based on the author's prompt. On the right is a blended image of massing and style reference as an inspiration for future development. (Author: Lenka Petráková using Midjourney AI platform – paid version, 2023)

Over the last year, the Midjourney AI considerably developed by introducing various new tools. Today, designers can insert or blend images as part of their workflow. This allows inputting work-in-progress 3D models and using AI as a library of future options for the design. Describing the prompt with an image reflecting the current state of architectural projects allows for better accuracy of the models and better reading of the scale and definition of the aesthetics one seeks. (Fig. 5)

STABLE DIFFUSION INTRODUCTION

Stable Diffusion, a text-to-image deep learning model launched in 2022, stands out as an open-source model that enables end users to manipulate its code. It provides various functionalities for user control within its main interface. Although the construction of input text prompts in Stable Diffusion does not vary significantly from Midjourney AI's language structure, it offers custom models trained on various files. This increased the customisation significantly and enhanced the accuracy of the visuals in a particular style or when using one's libraries, compared to Midjourney AI. At the same time, using a data set instead of multiple libraries reduces the quality of visuals in some cases, as the data set available for generation is comparatively smaller than the one Midjourney operates on.

Stable Diffusion incorporates ControlNet, which enhances user control through additional conditions and inputs based on image recognition. While ControlNet improves the precision of the generated images, it does so at the expense of flexibility since it is designed to adhere to a particular set of parameters. To utilise ControlNet, a reference image must be loaded onto the canvas, and then a control type must be used to determine what information to extract from it. Various options include Pose, Depth Mask, Line Art, Reference, Canny Edge Detector, Normal Maps, Scribble, Segmentation, and Colour Grid. Depending on the chosen control type, the reference image is processed by ControlNet to form a foundation that is subsequently altered according to the provided text description. Within each control type, the amount of information extracted can be fine-tuned by selecting the model type. With depth mask generation, different models can generate varying levels of detail from the original image (Fig. 6) or by adjusting the control weight of ControlNet concerning the text prompt. This gives the designer flexibility to concentrate on a desired option.

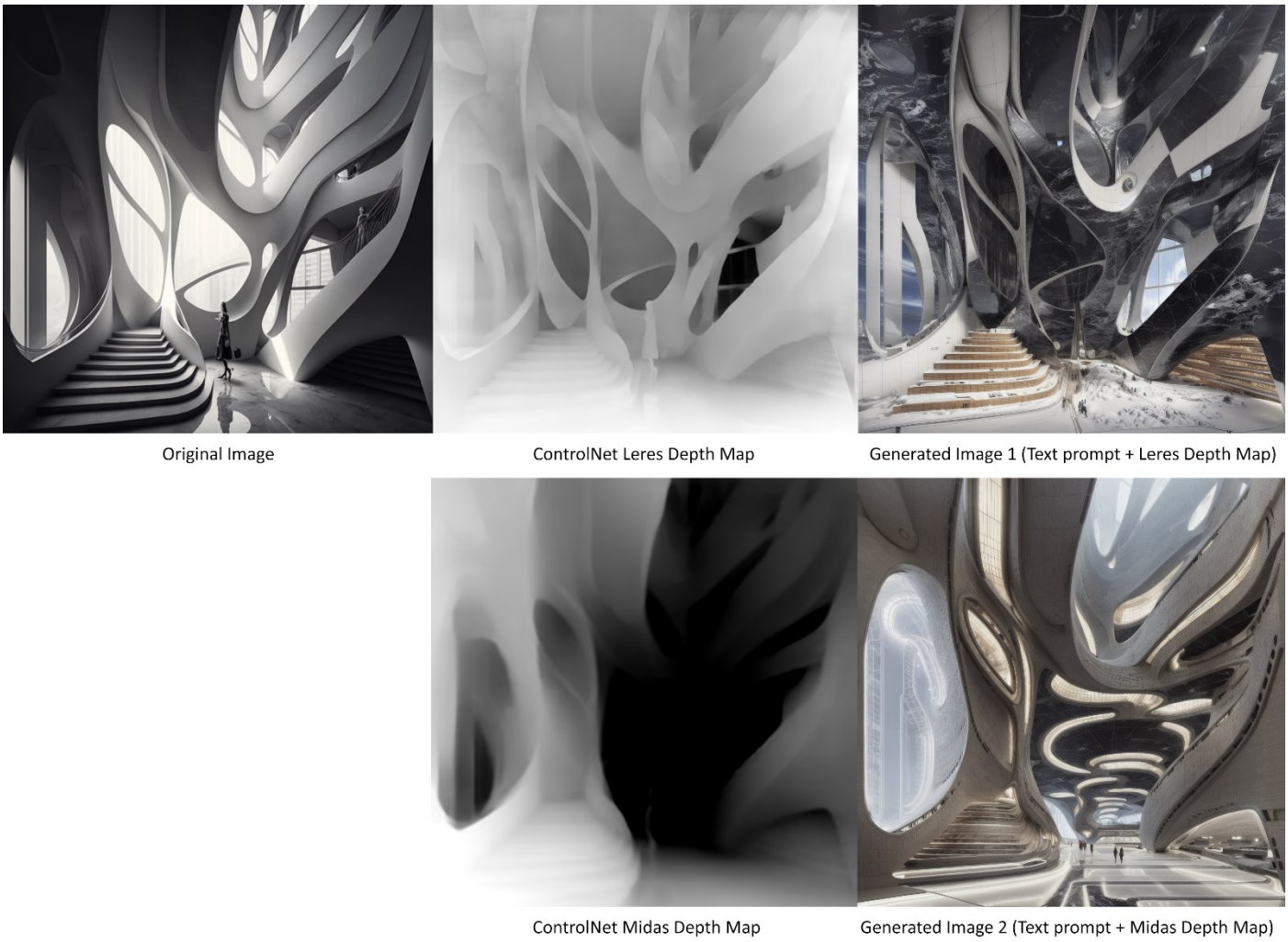

Fig. 6. Test with Depth Control Type in ControlNet. Two depth masks were generated from the original image – Leres (detailed depth map) and Midas (limited depth map to foreground). We can see that the less information extracted from the original image, the more freedom is given to AI to suggest possible designs. (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

EXPERIMENT

The design experiment integrates visuals of interiors with elements inspired by nature, exploring whether AI has the potential to expedite the design process by harnessing and adapting this inspiration within predefined geometries. To assess the strengths and weaknesses of this approach, three distinct natural inspirations were evaluated: **Environmental**: incorporating green spaces into the design. **Formal**: introducing shapes inspired by nature into the design. **Material**: integrating the material quality of wood into the design. The experiment is conducted on two distinct AI platforms, utilising the same input data – an image of an interior (Fig. 7) and corresponding descriptions of the references. By reason of differences in the workflows of the two platforms, the steps in the experiment vary between them.

ENHANCED INSPIRATION BY MIDJOURNEY AI

In Midjourney AI, we must employ the blend function to use a reference image as an input. This particular function prohibits the addition of further text, accepting only images. To encapsulate the natural inspiration through this function, we need to initially generate three distinct text-to-image outputs that carry the visual essence of the inspiration. However, the blend function does not permit us to control the influence of each reference on the final result.

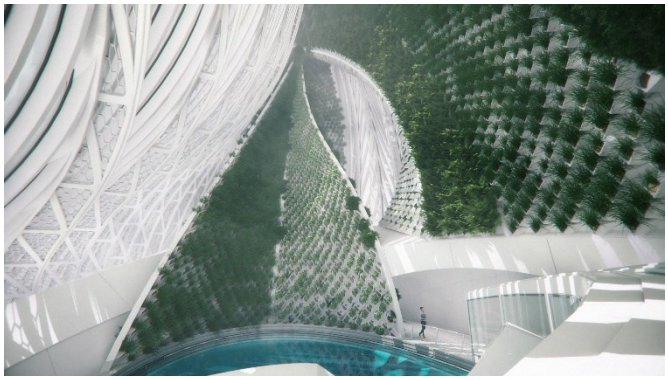

Fig. 7. Interior Render of the Greenhouses in the project The 8th Continent, Ocean Cleaning and Research Station. (Author: Lenka Petráková using Midjourney AI platform – paid version, 2023)

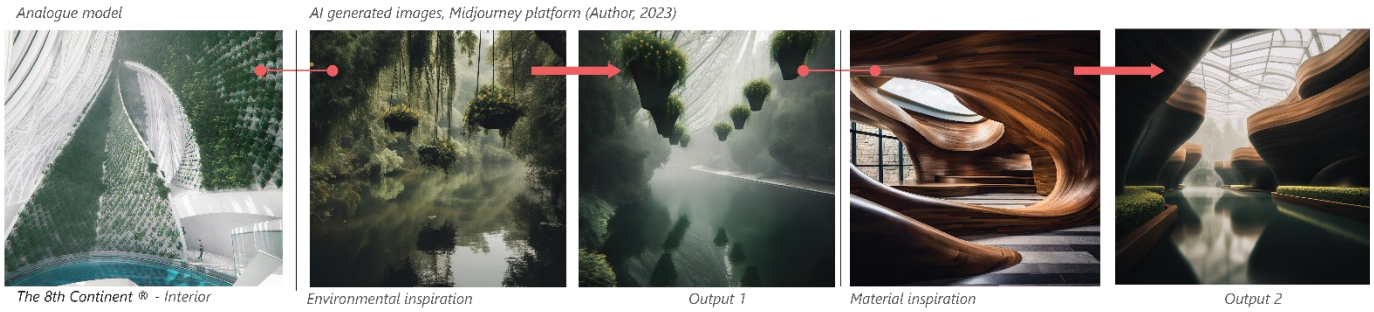

Fig. 8. Steps of Test 1 of environmental inspiration incorporated in interior design by blending the designed interior with AI references. (Author: Lenka Petráková using Midjourney AI platform – paid version, 2023)

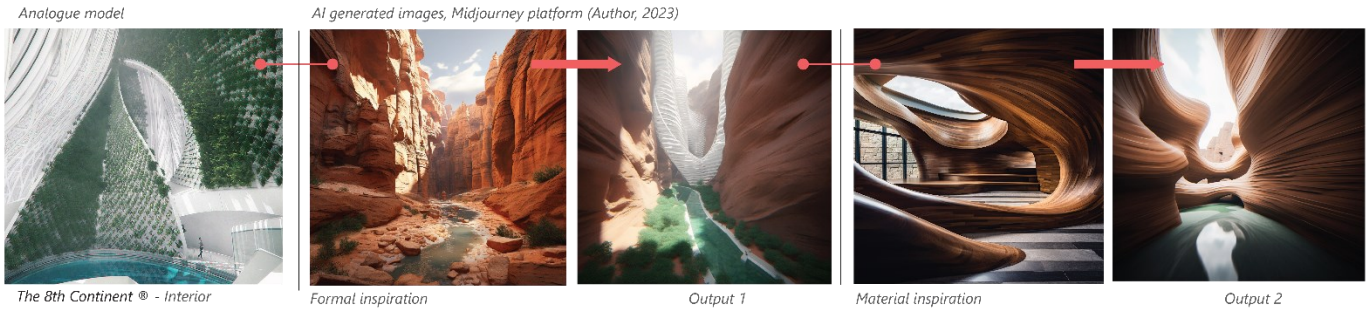

Fig. 9. Steps of Test 2 of formal inspiration incorporated in interior design by blending the designed interior with AI references. (Author: Lenka Petráková using Midjourney AI platform – paid version, 2023)

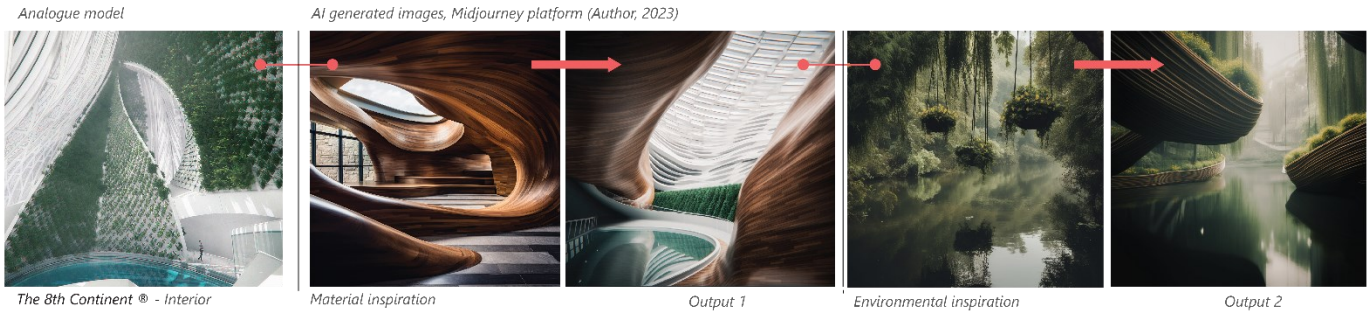

Fig. 10. Steps of Test 3 of material inspiration incorporated in interior design by blending the designed interior with AI references. (Lenka Petráková using Midjourney AI platform – paid version, 2023)

In **Test 1 – Environmental Inspiration** (Fig. 8), an environmental reference image was created based on the prompt "lake between hanging plants," reflecting the intention for the greenhouse to incorporate a pool and green walls in the interior. The initial result of merging the interior and environmental references predominantly reflects the environmental aspect, with only the facade elements representing the interior. The resulting image from the initial test run does not incorporate the material or formal aspects of the interior. To address this, a second generation was executed, wherein the first output was blended with another natural inspiration reference image – in this instance, a material reference. The second output reveals more detail, such as the striation of the wooden elements and the pool appearing more man-made than organic. However, the image lacks an understanding of the original scale of the interior.

In **Test 2 – Formal Inspiration** (Fig. 9), a formal reference image was created based on the prompt "canyon with smooth stone walls," This reflected the desire for the greenhouse to embody a language of fluid shapes in the interior. A second blend was executed to better integrate architectural elements into the final result. Here, the first output was blended with another natural inspiration reference image, specifically a material reference. However, the second output did not significantly improve. The composition remained heavily influenced by natural resemblance and failed to incorporate sufficient architectural qualities from the interior input or the material reference.

In **Test 3 – Material Inspiration** (Fig. 10), a material reference image was crafted based on the prompt "modern interior photography, wooden details." This depicted the intention for the greenhouse to include wood elements significantly since the original proposal did not demonstrate any specific materiality. The first output skilfully integrated both references, forming a feasible alternative for the interior with elements from both references present. However, the image lacked natural references, such as planting. To address this, a second test was conducted, incorporating the natural reference that had been previously generated. Unfortunately, the natural imagery supplanted the architectural qualities in the second output.

ENHANCED INSPIRATION BY STABLE DIFFUSION

To test the abilities of Stable Diffusion accelerating the design process by offering inspiration, we will use a combination of text prompts with the ControlNet depth map and segmentation control types to allow us to reference the image of a Greenhouse (Fig. 7). Stable Diffusion utilises the interior image (Fig. 7) solely for depth map or segmentation information in its image recognition process, unlike Midjourney, which can incorporate elements from the existing image and blend them with the text description. As a result, it becomes necessary to define some of the architectural elements in the Prompt to avoid losing all the architectural features. As previously discussed, Stable Diffusion operates using models ("checkpoints"). These checkpoints are pre-trained weights tailored for generating either general images or those of a specific genre. For this experiment, we will utilise two models: "Architecturerealmix," trained on architectural databases, and "Deliberate," designed for a general style.

DEPTH MAP TESTS

Test 4 – Environmental inspiration. (Fig. 11) In this experiment, two models were evaluated: "Architecturerealmix" (Fig. 11, first row) and "Deliberate" (Fig. 11, second row). To prepare the depth map for the subsequent test, we trialled two preprocessors: "Midas" (Fig. 11, third row, two images on the right) and "Leres++" (Fig. 11, third row, two images on the left). The Prompt "Green walls, mixed plants, Hydroponic planting, lush green, artificial lake, greenhouse, glass facade" was used to align environmental inspiration with architectural components. The ControlNet's control weight was adjusted to 0.5 and 1 for each generated output. This was done to analyse how the AI interprets interior details from the source image. Based on the initial test results, it was observed that "Midas" allowed the AI a relatively greater degree of freedom at both control weights, 1 and 0.5. The "Architecturerealmix" model incorporated shapes and details that were comparatively more relevant and intriguing for our study. Therefore, we focused exclusively on the "Midas" preprocessor and the "Architecturerealmix" model in subsequent tests.

Test 5 – Formal Inspiration. (Fig. 12) Formal inspiration was guided by the prompt "Stone details, canyon geometry, stone canyon, Hydroponic planting, lush green, man-made lake, greenhouse, glass facade." It is observable that although the geometric massing aligns with the original interior thanks to the depth mask, there is not much innovation in the geometry itself, with changes mainly in material replacement. To explore further possibilities, the control weight of the depth mask was reduced from 1 to 0.5. This adjustment allowed the canyon-like structures to become more dominant, leading to formal inspiration produced by the AI.

Test 6 – Material Inspiration. (Fig. 13) Material Reference utilised the prompt "Wood details, modern interior, Hydroponic planting, wooden, lush green, artificial lake, greenhouse, glass facade." The geometry was consistently maintained throughout the generations. However, the materials and mainly the greenery were applied randomly, as the only references derived from the image pertained to depth and geometric massing. In a subsequent step, the control weight of the depth mask was reduced from 1 to 0.5. Although some interior elements were protected, the image changed the character from interior to exterior, reducing the relevance of the interior design inspiration.

SEGMENTATION TESTS

The prompts on tests 7, 8 and 9 are identical to the corresponding tests 4, 5 and 6. The difference is that the referenced image is being switched from Depth Mask to segmentation control type in the ControlNet. In all tests, the Ofade20k preprocessor defines the colour map for segmentation in the first step. The subsequent three tests are carried out on custom-made colour maps, with the colour mapping following the prescribed uses for segmentation. Only the categories that AI initially recognised in the image were used for this experiment. R 230, G 230, B 230 (Bright Grey) – Windows; R 204, G 255, B 4 (Green) – Plants; R 120, G 120, B 120 (Dark Grey) – Wall; R 61, G 230, B 250 (Blue) – Water; R 80, G 50, B 50 (Purple) – Flooring. From the colour definition, we can see that the data set recognises objects rather than individual materials. The materiality can be defined further by the Prompt.

Test 7 – Environmental inspiration (Fig. 14). The segmentation map generated by the Ofade20k preprocessor from the interior image (Fig. 7) is relatively simple, categorising the image into three main elements: wall, plants, and water. However, the generated image in the first step captures the primary material and geometric elements but lacks detail. Therefore, the segmentation mask was manually edited in Adobe Photoshop to refine the result. Initially, we separated all windows from the wall category and kept only the solid areas around the pool

under the wall category. Subsequent edits added finer details to the glass facade to align it with the initial design. Among all results, the environmental inspiration was correctly managed, and the planting references are of the correct type and scale and applied on the correct surfaces.

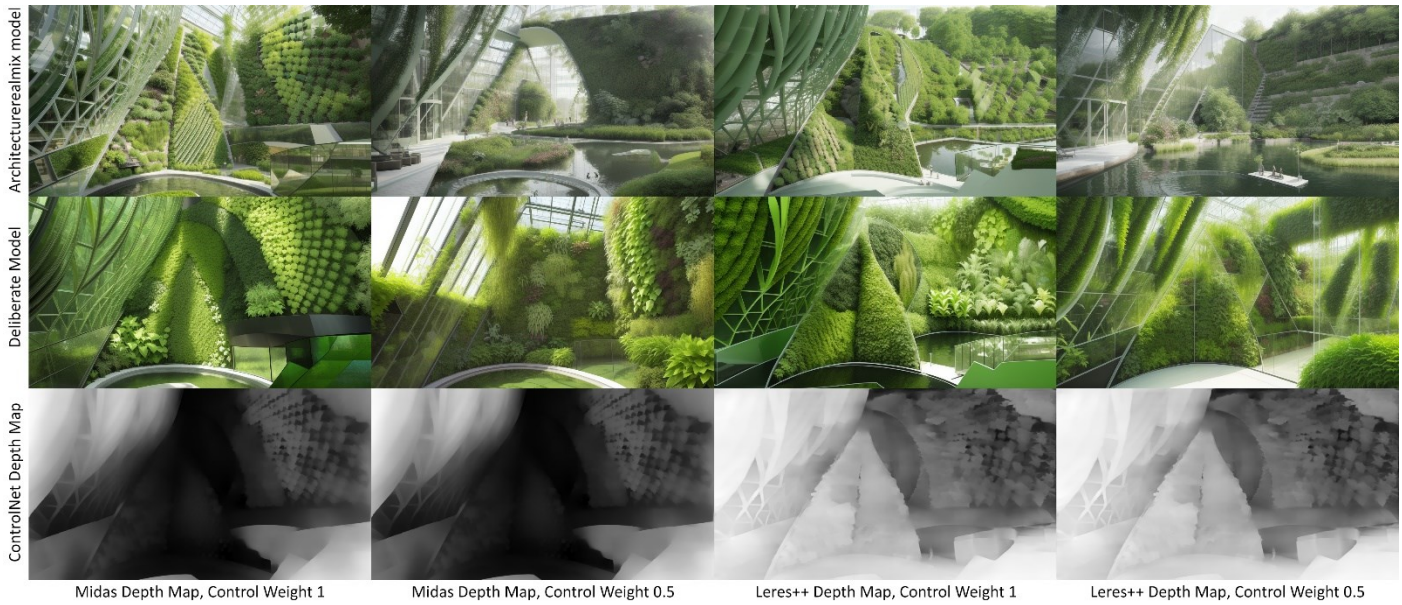

Fig. 11. Steps of Test 4, Environmental inspiration. Incorporating blending the interior design reference as a depth mask with a text description of the environmental inspiration. (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

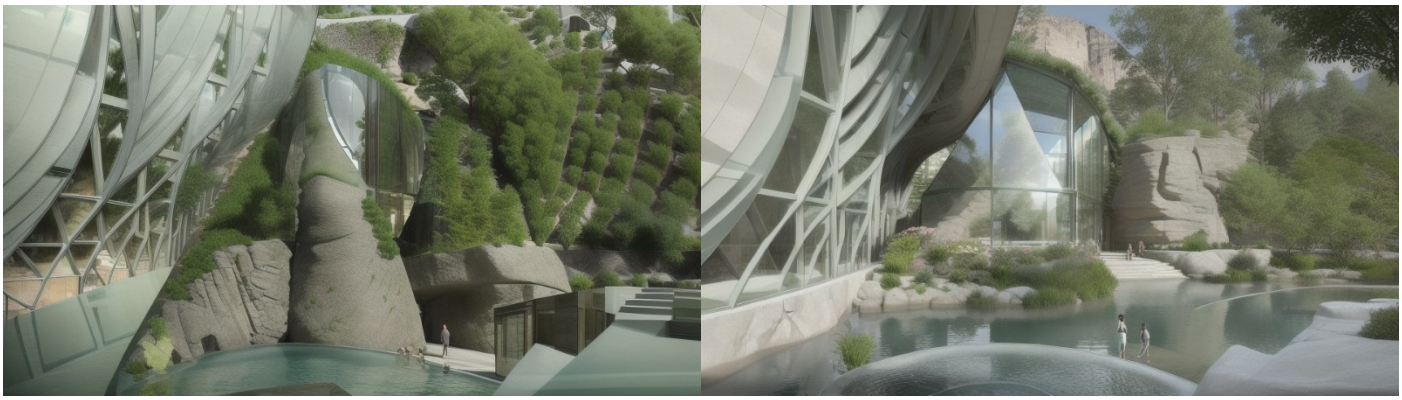

Fig. 12. Steps of Test 5, Formal inspiration. Incorporating blending the interior design reference as a depth mask with a text description of the formal inspiration. Midas preprocessor, control weight 1 (left) and control weight 0.5 (right). (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

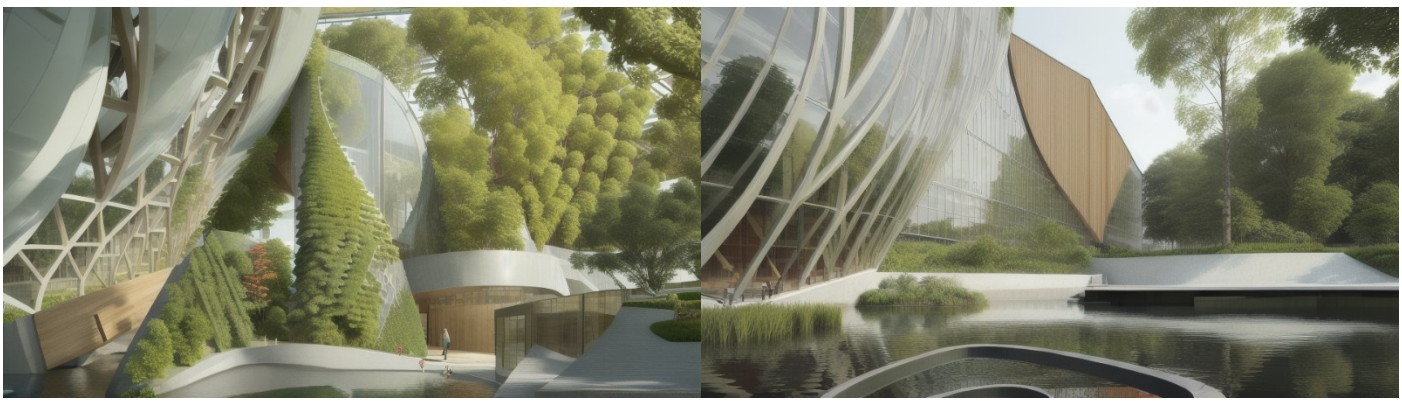

Fig. 13. Steps of Test 6, Material inspiration. Incorporating blending the interior design reference as a depth mask with a text description of the material inspiration. Midas preprocessor, control weight 1 (left) and control weight 0.5 (right). (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

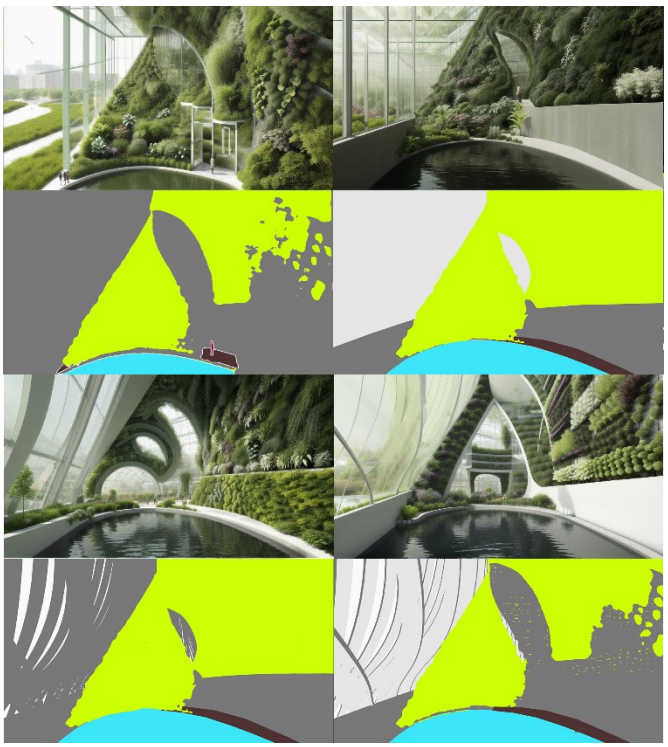

Fig. 14. Steps of Test 7, Environmental inspiration. Incorporating blending the interior design reference as a colour map defining the geometry types with a text description of the environmental inspiration. (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

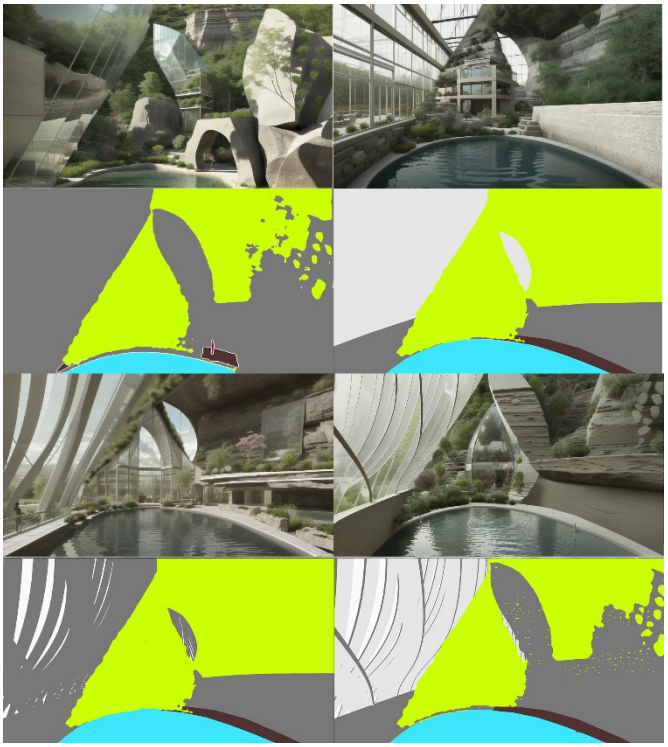

Fig. 15. Steps of Test 8, Formal inspiration. Incorporating blending the interior design reference as a colour map defining the geometry types with a text description of the formal inspiration. (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

Test 8 – Formal Inspiration (Fig. 15). The same segmentation masks were used as in test 7. We can observe a good understanding of the water and facade references in all the results. However, concerning the formal inspiration, the material is an applier on flat surfaces and lacks 3D definition.

Test 9 – Material Inspiration (Fig. 16) employed the same segmentation masks as Test 7. Interestingly, when wood was specified as the interior material, the AI replaced the original plant types with forest foliage and ignored the Prompt description of the hydroponic planting. Despite this change, the AI still adhered to the basic geometric outlines from the segmentation map and applied the materials accurately following the given descriptions.

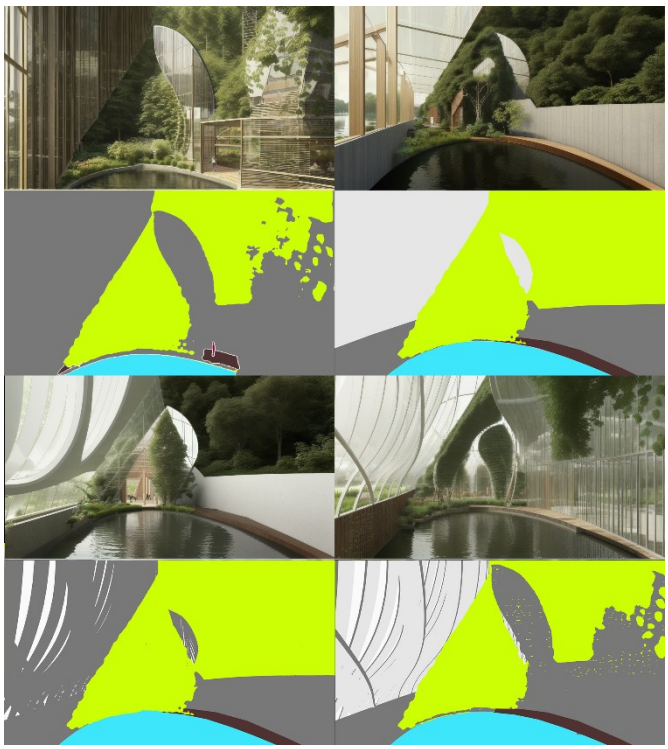

Fig. 16. Steps of Test 9, Material inspiration. Incorporating blending the interior design reference as a colour map defining the geometry types with a text description of the material inspiration. (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

RESULTS

Nine tests were conducted to establish the effectiveness of AI tools in architectural design and designers' ability to control the AI to achieve bespoke solutions for particular conditions. The aim was to investigate the possibilities and limitations of referencing natural inspirations within a predefined interior context. The nine tests were categorised into three distinct groups. In tests 1 to 3, where the Midjourney AI platform was employed. The process commenced with generating natural inspiration references through text Prompts. Tests 1-3 used Midjourney AI to generate images from text prompts. Tests 1 and 2 used simple prompts without architectural context, leading to perspective and image quality issues. Test 3 specified wood material for the interior, resulting in better proportionality in Output 1. A second blending in Tests 1 and 2 improved details, while in Test 3, a second blend using an environmental reference resulted in Output 2, which augmented the architectural qualities in the given example.

Several conclusions can be drawn from executed tests. While the platform excels in generating vivid imagery from text descriptions, the blending operations tend to diminish resolution. Moreover, it is not possible to adjust the weight between the references. Despite diverging from the original references, the

images met the intended objectives. The Midjourney AI suggested formal, material, and environmental modifications to the provided interior sample. Although the inspiration could not be fully utilised, elements of it could be subsequently integrated, considering the appropriate scale and context. The platform offers benefits in idea generation but is deficient in allowing the designer to control or apply the outcomes precisely. This underscores the platform's value in conceptual development while highlighting areas for potential refinement in implementation.

In Tests 4-6, we utilised the Stable Diffusion platform, incorporating ControlNet, depth map controls, and various models. This setup permitted both image and text inputs with the flexibility to adjust their respective weights. Initially, a depth mask control weight of 1 resulted in rigid and inaccurate outputs, revealing the AI's tendency to follow shapes strictly. To counter this, we standardised the control weight to 0.5 across all tests, which improved the creative output. Our findings showed that Stable Diffusion offered greater control compared to Midjourney AI. Using models trained on architectural libraries made the output more relevant and valuable for interior design. While we had the flexibility to adjust input weights, the AI still misunderstood the function of the space, focusing mainly on shapes. Despite this, the geometry, scale, and the text prompt, were more accurately captured, making Stable Diffusion better suited for case-based inspiration. However, additional designer involvement is needed to filter the results for the final application.

In tests 7–9, we used the Stable Diffusion platform along with ControlNet's segmentation control type. This setup allows specific functions to be applied to different image parts based on a designated colour map. Using a generic colour map, our first test resulted in poor comprehension of the reference spaces. To improve this, we manually refined the colour map in later tests, enhancing the depiction of interiors and material application. Achieving a balance between detail and AI's creative freedom is crucial. Over-specifying details could make the AI's unique contributions negligible, diminishing its value for inspiration. In our tests, we maintained a level of abstraction in the colour maps, which led to innovative suggestions for interior development regarding materials, form, and environmental aspects. While the generated images showed high applicability, further designer oversight is required to assess the feasibility of the proposed shapes for future design stages.

In summary, AI tools offer promising architectural design possibilities, serving as inspiration generators and collaborators that can extend human capability. However, they are not without limitations – most notably, there is the inability to fully comprehend functional spaces and offer designers complete control. Despite these constraints, both platforms have unique strengths and can significantly contribute to different design development phases.

DISCUSSION

Regarding contributing to a more vivid visualisation of designs, the text-to-image and image-to-image generation algorithms can generate robust imagery from text descriptions. However, the quality may vary with the weight and control of references. To enable greater control and flexibility, we found that adjusting the control weight of depth masks or using the ControlNet segmentation control type can offer different levels of influence over geometry, materials, and overall design. Comparatively, Midjourney AI demonstrates strength in generating ideas but may lack specific application control, while Stable Diffusion with ControlNet segmentation enables more targeted control over functions within the referenced image. The comparative study of these platforms highlights the potential of AI as a collaborative, interactive tool in architectural design rather than an autonomous designer. It provides insight into the balance between creative freedom and control, aligning AI's role with specific design intentions and encouraging the exploration of unfamiliar design patterns.

A novel approach could lie in combining the strengths of both platforms. This can be achieved by creating sketches from text-to-image or a blend of images in Midjourney AI and exporting these as image references within Stable Diffusion (Fig. 17). By doing this, designers may incorporate more realistic materials and details. This approach can enhance geometry readability while preserving the creative flair of Midjourney AI. Various control types, such as depth masks, allow designers to define the desired information level and control, balancing inspiration and precision. However, as evidenced during our design experiments, striking this balance requires careful judgment. Designers must decide how much control to cede to AI and how much alteration to accept. Although AI may not always align with human intentions, its creative freedom could be vital, spurring new design suggestions. This contrasts with conventional visualisation tools, which might only replicate what is already planned. Integrating Midjourney AI and Stable Diffusion could lead to a more balanced and enriched architectural practice. By augmenting the strengths of human intuition with AI's vast possibilities, designers can create more vivid design sketches with greater control and rapidity. This hybrid approach offers a pathway toward visualising designs, exploring unfamiliar territories, and breaking through conventional design patterns. It underscores the potential for AI to function as a collaborative, interactive tool, contributing to a dynamic interplay between creativity and control in architectural design.

CONCLUSION

Technology is evolving rapidly, and we can experience its progress on a daily basis. Soon, we could have more ways in which we benefit from the use of AI in architecture. However, we should not forget to review, analyse and continue working with the AI results to achieve the quality control and the development we seek. As McQuillian argues, there is no intelligence in artificial intelligence. Even though its technical name is machine learning, it is simply mathematical minimisation (McQuillian, 2018). This paper delved into various methodologies for integrating AI within the architectural realm, discussing its potentialities and constraints. We identified potential roles and implementations for platforms like Midjourney AI and Stable Diffusion. Each of these platforms presents distinct advantages in the domain of design visualisation. The tests revealed several nuances:

1. Stable Diffusion image-to-image algorithms offer greater control over design iterations, especially when combined with ControlNet and some control types like depth map or segmentation control types. This allows for geometry adaptations, aligning more closely with architectural intentions and providing a more practical framework for design exploration. 2. Adjusting control parameters, like the depth mask weight, can effectively bridge the gap between creative freedom and design precision. 3. A synthesis of the two platforms' capabilities suggests a promising avenue: taking initial, often avant-garde design outputs from Midjourney and refining them in Stable Diffusion for more grounded, practical, and detailed design solutions.

These tests underscore the indispensable role of human discernment, selection, and iterative adjustment in harnessing AI's capabilities. The term 'extended intelligence' resonates today, echoing the synergistic potential between AI and human cogni-

tion, where AI functions in tandem with human thought, effectively becoming an extension of it (Leach, 2021). Finding the balance between AI and human touch is essential to fully utilising the potential of AI in architecture. Design is likely the most sophisticated aspect of human intelligence (Gero, 1991). Our investigations suggest that a well-calibrated AI can amplify human creative instincts, inspiring without overshadowing the design process. Despite the challenges, tested platforms Midjourney AI and Stable Diffusion offer innovative visualisation pathways, pushing the boundaries beyond conventional human sketches.

Both research hypotheses were corroborated by our tests, which spotlighted the harmony of creativity, control, and collaboration. The proposed hybrid workflow mirrors traditional processes, emphasising goal-setting, iterative refinement through feedback loops, and oversight. Learning remains a two-way street as we navigate this digital transformation: designers adapt to platforms, and algorithms evolve through iterative feedback. In conclusion, the integration of AI, as exemplified by platforms like Midjourney and Stable Diffusion, is not merely a technological advancement but a creative catalyst that redefines the architectural process. However, creativity is a quality that cannot be automated. (Mello-Klein, 2022) By aligning computational capabilities with human intuition and creativity, we foresee a future in architecture that is as artistically profound as it is technologically advanced.

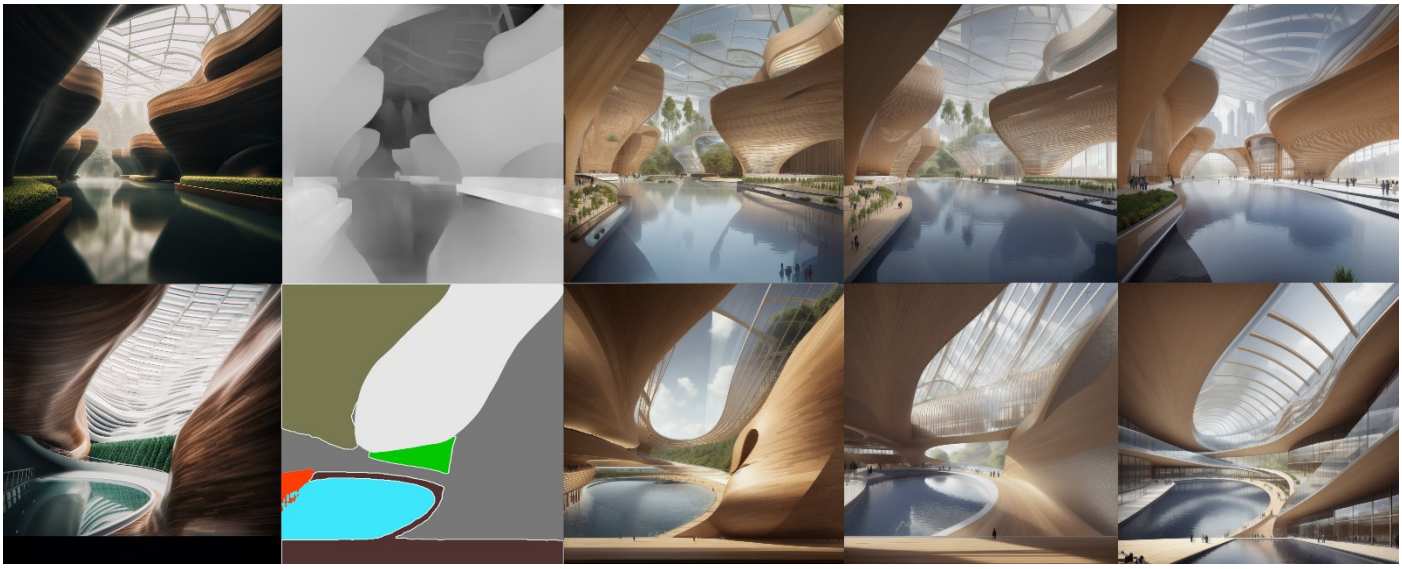

Fig. 17. Using Midjourney AI output image as input for Stable Diffusion. In the first row, use of Depth Map control type; in the bottom row, use of Segmentation control type. Both types were tested on three control weights – 2, 1 and 0.5 from left to right. (Author: Lenka Petráková using Stable Diffusion Platform a111 for PC, 2023, CC0 1.0 Universal Public Domain Dedication)

References

As, I., Pal, S., Basu, P. (2018) "Artificial intelligence in architecture: Generating conceptual design via deep learning", International Journal of Architectural Computing, 16(4), pp. 306–327. https://doi.org/10.1177/1478077118800982

Berg, N. (2022) "AI tools like DALL-E 2 and MidJourney are helping architects—and their clients—design new buildings", Fast Company. [online] Available at: https://www.fastcompany.com/90780871/ai-tools-like-dall-e-2-and-midjourney-are-helping-architects-and-their-clients-design-new-buildings [Accessed: 28 Aug 2023]

Boden, M. A. (2009) "Creativity in a nutshell", Think, 5(15), pp. 83–96. https://www.doi.org/10.1017/s147717560000230x

Boden M. A., (2016) "AI: Its Nature and Future", Oxford University Press, New York, USA.

Castro Pena, M. L., Carballal, A., Rodríguez-Fernández, N., Santos, I., Romero, J. (2021) "Artificial intelligence applied to conceptual design. A review of its use in architecture", Automation in Construction, 124, 103550. https://doi.org/10.1016/j.autcon.2021.103550

Chaillou, S. (2022) "Artificial Intelligence and Architecture, From Research to Practice", Birkhäuser Verlang, Basel, Switzerland. https://doi.org/10.1515/9783035624045-fm

Gero, J. S. (1991) "Ten problems for AI in design", presented at Workshop on AI in Design, IJCAI-91.

Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., Courville, A., Bengio, Y. (2020) "Generative adversarial networks", Communications of the ACM, 63(11), pp. 139–144. https://www.doi.org/10.1145/3422622

Hegazy, M., Saleh, A. M. (2023) "Evolution of AI role in architectural design: between parametric exploration and machine hallucination", MSA Engineering Journal, 2(2). https://www.doi.org/10.21608/msaeng.2023.291873

Leach, N. (2021) "Architecture in the Age of Artificial Intelligence ", Bloomsbury Publishing, London, UK. https://www.doi.org/10.5040/9781350165557

McCarthy, J., Minsky, M. L., Rochester, N., Shannon, C. E. (2006) "A Proposal for Dartmouth Summer Research Project On Artificial Intelligence, August 31, 1955", AI Magazine, 27(4). https://doi.org/10.1609/aimag.v27i4.1904

Mello-Klein, C. (2022) "Artificial intelligence is here in our entertainment. What does that mean for the future of the arts?", Northeastern Global News. [online] Available at: https://news.northeastern.edu/2022/09/09/art-and-ai/ [Accessed: 28 Aug 2023]

Midjourney (2023), San Francisco, California, USA. [online] Available at: https://www.midjourney.com

Mostafavi, F., Tahsildoost, M., Zomorodian, Z. S., Shahrestani, S. S. (2022) "An interactive assessment framework for residential space layouts using pix2pix predictive model at the early-stage building design" (ahead-of-print), Smart and Sustainable Built Environment, Emerald Publishing. https://www.doi.org/10.1108/SASBE-07-2022-0152

PA Next Team (2022) "A (Mid)Journey To The Virtual World Of Hassan Ragab", Parametric Architecture. [online] Available at: https://parametric-architecture.com/a-mid-journey-to-the-virtual-world-of-hassan-ragab/ [Accessed: 28 Aug 2023]

Radhakrishnan, M. (2023) "Is Midjourney-Ai the New Anti-Hero of Architectural Imagery & Creativity?", Global Scientific Journals, 11(1). [online] Available at: https://www.globalscientificjournal.com/researchpaper/Is_MidJourney_AI_a_new_Anti_hero_of_Architectural_Imagery_and_Creativity_.pdf

Salkowitz, R. (2022) "Midjourney Founder David Holz On The Impact Of AI On Art, Imagination And The Creative Economy", Forbes Media, Business, Hollywood and Entertainment. [online] Available at: https://www.forbes.com/sites/robsalkowitz/2022/09/16/midjourney-

founder-david-holz-on-the-impact-of-ai-on-art-imagination-and-the-creative-economy [Accessed: 28 Aug 2023]

Stable Diffusion (2023), Stable Diffusion Online. [online] Available at: https://stablediffusionweb.com/

Yousif, S., Bolojan, D. (2021) "Deep-performance - Incorporating deep learning for automating building performance simulation in generative systems", In: A. Globa, J. van Ameijde, A. Fingrut, N. Kim, T. T. S. Lo (eds.) (2021) PROJECTIONS - Proceedings of the 26th CAADRIA Conference, Vol. 1, Chinese University of Hong Kong and Online, Hong Kong, China, 29 March - 1 April 2021, pp. 151-160. https://www.doi.org/10.52842/conf.caadria.2021.1.151

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Colour in the environment for older adults

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Abstract: Demographic changes, the growing number of people with disabilities, and the demands on architecture and design are posing new challenges for designers. The space in which older adults live should be safe, not only from a legal point of view but especially to facilitate their daily activities. Modern society prioritizes the integration of older adults into everyday life so that as people grow older, they are not forced to abandon their daily routines because of obstacles in the space. It is said that a person is not handicapped because of their illness, but because society fails to prepare conditions for them to be able to move and live without restrictions. Moving in space is a multisensory experience. People use most of their senses such as sight, hearing, smell, and touch in addition to moving their bodies. How we feel indoors depends on the indoor climate, lighting, surface colours, air quality, floor plan, and furniture layout. Studies show that the materials and colour of products have an impact on how we navigate a space, how we feel and, in some cases, they can even have healing effects. The aim of our study is to investigate the association between colours in the environment and the orientation of people, especially older adults, in the space they live in. Several studies, experiments, and observations of foreign researchers serve as the basis of the paper. The analysis of case studies proved that colours in the environment have a significant impact on orientation in space and can be an effective tool for spatial orientation and drawing attention to a particular place. In surveys that have been conducted with older adults, warm colour tones such as yellow, orange, and red are preferred over cold ones. Red tones are some of the most easily recognizable for older adults who suffer from loss of colour recognition. They have lower cognitive abilities as a result of aging. Therefore, the achromatic environment does not sufficiently stimulate their brain function, leading to longer reaction times. Colour and contrast indoors play a big role in the perception of space and can help in drawing attention to a particular place.

Keywords: social inclusion, older adults, health, interior, furniture, colours

INTRODUCTION

A large part of public and residential interiors is not designed for or adapted to the needs of older people. The trend of aging population is a demographic phenomenon, but its consequences affect the entire society. "*According to European statistics, there are 127 million people in the European Union who have limited mobility, orientation or are unable to perform normal activities. In the context of projections of an aging population, the percentage of people with mobility and orientation impairments is set to increase. According to the European Statistical Office, the number of people over 65 in the EU countries is projected to rise from 17% today to 30% by 2050.*" (Rollová, Čerešňová, 2010) These facts prepare challenges for designers to suggest solutions for appropriate integration and to create an environment for the growing tendency. One of the priorities of the modern society is to address the issue of social integration of people with disabilities. Many professional articles and publications have been published, which have led to the development of guides and documents related to barrier-free accessibility. It should be a new standard to level the visiting opportunities for all types of people. Accessibility is an essential part of new buildings, but also of the renovation of older architecture. It is not only people with health, hearing, visual, or other disabilities who encounter problems in the public environment but social inclusion also concerns other vulnerable groups of the population – children, mothers with strollers, neglected people, and older adults. The vision is to improve the quality of life without discrimination. (Rollová, Čerešňová, 2010)

METHODOLOGY AND LITERATURE REVIEW

The purpose of this study is to find the relationship between colours and the perception of older adults, to understand the association and influence of colour choice in private and public settings through multiple studies and literature reviewed. The complexity of the situation required ongoing data collection. Firstly, the problems most encountered by older adults were observed and defined. Among health disadvantages, vision loss, visual impairment, and the resulting disorientation in the environment

were nominated as the connecting factors. A literature review was also conducted on this topic.

Secondly, a review of literature and scientific articles was conducted on the topic of colour, colour in the environment for older adults, colour in the environment in social service settings, colour from the perspective of environmental gerontology, studies on the impact of colour on humans, and the impact of colour and materials on humans in a broader spectrum. This basis for research included resources dealing with the aging population, the challenges older adults face in the indoor environment, and the adaptability of the indoor environment with respect to aging and physical health. In addition, a literature review was conducted to gather information on the role of colour and materials in influencing the well-being and safety of older adults. The cited studies were selected based on relevance to the topic. Preference was given to studies that dealt directly with colour and material in public and private settings in which the target group or the group involved in the experiment was composed of older adults.

Next, two different experiments were examined to provide specific insights into the impact of colour on older adults. The first experiment involved a survey of 150 older adults equally composed of men and women living in different settings. The purpose of the experiment was to assess their preferences and perceptions of colours and materials in interiors. The survey included a variety of scenarios that allowed participants to choose colours and materials that made them feel safe, comfortable, and independent. The second experiment used eye-tracking technology to investigate how colour affects older adults' visual attention and safety. A sample of 75 older adults was observed interacting with color-coded items within a simulated living environment. The aim of the experiment was to measure the speed of focus on different elements and their effect on perceived safety. Other experiments dealt with the topic of colour in conjunction with older adults, art therapy, and the perception of wood as a colour in the environment.

HUMAN-CENTRIC DESIGN

Inclusion of older adults and finding suitable accommodation and care is a challenge, at the outset of which we need to determine their needs, capacity, size, and standard of housing. At the same time, older adults are encouraged to fend for themselves and provide for their basic needs. A model where older adults still have responsibility for themselves but also professional help is available to them should their health suddenly deteriorate or where they have no relatives is an effective option that should be expanded in the future. Unlike living in a standard hospice, the older adult is still active, which also increases their prospects for mental and physical health. Deinstitutionalization is the transfer of citizens with disabilities or older adults from traditional social service settings, where they are often physically and mentally isolated from mainstream life, to services that create equal citizenship conditions similar to mainstream society. (Rollová, Čerešňová, 2015)

When designing nowadays, a designer has to be very careful about the versatility of their design. Just as a furniture designer is concerned with ergonomics and human anthropology, an architect must also consider the broader context, in the sense of the Design For All method – designing for all. In designing, the diversity of people, their needs, and constraints must be considered so that all users feel equal and have the same opportunities to be an active part of the community. Approaches to designing environments that address the diversity of people's needs and requirements are called human-centred design, which encompasses universal design, design for all, inclusive design, user-friendly design, design for all ages, and accessible design. (Rollová, Čerešňová, 2015) Living in their own home for as long as possible is one of the most important requirements of aging people. Their desire is to be as self-sufficient as possible. The living space for older adults with mobility impairments needs to be adapted to allow sufficient room to manoeuvre and change directions. Their main need is for safety, functionality, and comfort. Furniture doors should be easy to open and all items should be reachable at arm's length. Fitting the bed, mattress, nightstand, or sofa is also important. (Beer, Olenska, Zbiec, 2017)

Fig. 1. Wooden Lotte armchair designed by Sarah Hossli helps people with age-related impairments rise and sit unassisted. (Photo: Severin Stark. Source: Griffiths, 2022)

Materials and colours for the interior of older adults

We are now seeing the connection of human-centred design to environmental psychology and neuroscience in architecture, which draws attention to the psycho-social aspects of design, the impact of the environment on people, their health, and their sense of well-being. For a wide range of people, physical, sensory, and informational accessibility, visitability, adaptability, and flexibility of the environment is also linked to the human-centred design. Humanizing the environment means an overall universally accessible design that manifests itself in kindness and can be likened to saying You are welcome here. (Čerešňová, 2017) People's affection for natural materials stems from man's natural environment and his affection for nature. Natural materials and biophilic elements are close to our nervous system. Thus, our body does not have to expend additional energy in recognizing and perceiving them.

On the contrary, it could be said that natural materials recharge us with energy. They are part of our traditional culture and it is appropriate to use them as they are timeless. In addition to the aforementioned advantages, wood also has haptic, olfactory, and acoustic qualities. The preference for the textures of natural materials is also justified by the fact that people's perception of black and white is better than that of colour. (Kotradyová, 2016) A 2022 study entitled Perception and Evaluation of (Modified) Wood by Older Adults from Slovenia and Norway, authored by Dean Lipovac, Solvi Wie, and Michael David Burnard confirmed that older adults prefer wood to other materials. One hundred older adults were involved in the workshop, and a number of samples of treated and raw wood and other materials were collected. The product tested was door handles. Wood was favoured over other materials in both the blind and visual tests. The study also showed that coated wood was preferred more than raw untreated wood. (Lipovac, Burnard, Wie, 2022)

"Environments created with natural materials, and wood in particular, have a regenerative effect on the nervous system, helping to

create a supportive environment for reducing stress and accelerating the healing process in patients, as evidenced by several global studies." (Kotradyová, 2016) The colour of the wood also plays an important role in the interior. The environment can make its texture more noticeable, or suppress it and accept it as just one of the shades. Different factors influence the wood colour, such as the type of wood species, climate, age, and finish. Wood studies show that the colour results of the forests studied are in the +a and +b quadrants, which correspond to red and yellow. Based on the results from the research, the colour corresponds to shades ranging from beige to dark brown and brown with the presence of saturation of yellow. (Ramírez, Fajardo, Escovar, Villamil, 2022) In addition to its visual qualities, wood is a quality and long-lasting material suitable for interior and exterior furniture. It is one of the most suitable materials for indoor use by older adults.

Visual perception

As we age, our visual perception changes, but so does our sensitivity to certain colours. Age-related changes in vision occur in all layers of the eye and can have different effects. First of all, the change in vision is caused by the tissues of the eyelids and the muscles around the eyes becoming flaccid. The biggest changes affect the lens of the eye, which hardens, thickens, and becomes less flexible. Changes to the lens allow less light to enter the eye and make it harder to recognize the environment a person is in. (Loredan, Sašek, 2023) The most common problems associated with vision loss are loss of central vision, which allows us to see fine details and colours, blurring of the eye, reduced sensitivity to contrast, reduced ability to see in low light or at night, difficulty seeing objects up close, loss of normal vision, and also increased sensitivity to glare. The most common eye diseases that affect older adults include macular degeneration, cataracts, diabetic retinopathy, dry eye, glaucoma, retinal detachment, and blindness. (American Optometric Association, 2021) Visual acuity alone is not the only indicator of a person's visual difficulties. Even a person with good visual acuity may have difficulty functioning and have trouble performing everyday tasks.

Adaptation of the interior

Whether it is adapting existing rooms in the home or designing a public service space, colour plays an important role in the space. When used purposefully, colour is a powerful tool that can not only enhance design aesthetics but also greatly help older adults feel independent and safe. Elements that can compromise our safety should be designed in contrasting colours. Moving through space is a multisensory experience. People use most of their senses such as sight, hearing, smell, and touch in addition to moving their bodies. Disorientation and unfamiliarity with the environment can increase fear in people and have a negative impact on their overall well-being. Flooring in areas designed for older adults should be designed in contrast to the walls and should be complemented with relief features such as artificial guidelines of different textures and colours. Older adults may be disoriented or feel unsafe if the space blends before their eyes and they cannot determine where they are walking. Alternating the colours of floor coverings, marking the purpose of rooms with embossed signs, or other wayfinding signs are helpful in helping older adults with orientation.

In circulation areas, there should be no obstacles on the ground that restrict the movement and safety of older adults. Safe floors should be solid, uniform, and protected against abrasion and slipping. The choice of solid floor coverings or tiles that do not shimmer is appropriate so as not to impair spatial orientation. If a carpet is used, it is advisable that it is low pile and passable by wheels. Carpeted floors have several major advantages. Carpets transmit fewer pathogens to the hands than vinyl or rubber floors, and some serious pathogens survive for a shorter time. They reduce noise and glare, make walking easier, reduce the likelihood of falls and subsequent injuries, and prolong visits with family and friends (increasing social support). (Kotradyová, Lipovac, Hencová, 2023)

Fig. 2. Home for dependent elderly people and nursing home in Orbec, France. The red colour de-structures the space and adds dynamics. Architects Dominique Coulon & associés avoided using the conventional colours of the hospital environment. (Photo: Eugeni Pons. Source: Orbec, 2017)

Contrast and colours

The interior design of the apartment should be based on the contrasting design of the apartment's spaces or furniture elements. The colour scheme of the individual zones in the apartment can be a good aid to spatial orientation. Furniture elements or doors, for example, should have a contrasting colour to the wall on which they are mounted. Contrasting or different colours should also be used for elements or objects that may pose a safety risk to users. Warm and pleasant to the touch colours are preferred for furnishings. The interior should create a pleasant and welcoming atmosphere. Users should be able to furnish the interior with their own furniture; they can choose the wall colours so that their space receives a distinctive character. Several studies have shown the disadvantages of all-white architectural spaces. The monotony and lack of sensory stimuli in interiors can hinder users' orientation as they lack the visual cues needed to identify architectural elements. Colour contrasts in interiors need not be limited to walls and floors; the contrast between stair arms and walls, and colour-coded highlighting of important points and zones is also appropriate.

Other vital elements are switches and electrical plugs, which can be distinguished by graphic elements. Room entrances should be colour-coded, ideally at eye level. Aging eyes lose the ability to distinguish bright colours, making yellows and other pastel colours appear white. Shades of blue, green, and purple are classed as cool colours and can be seen as grey. People with colour deficiency are best able to perceive bright colours at the warm end of the spectrum, such as red and orange. (Moore, 2018) For cognitive reasons, colour is an essential cue for discriminating visual information. (Sloan, 1980) Equipment and furniture in the home designed in warm tones of the colour spectrum is more pleasant to the touch. The interior for older adults should have an open, welcoming feel. Older adults who live in facilities outside their homes should also be able to make their own living arrangements and adapt them to their own character. (Kotradyová, Lipovac, Hencová, 2023) A large number of colours can overstimulate our sensory perception. It is therefore important to review the choice of elements in our environment as we age.

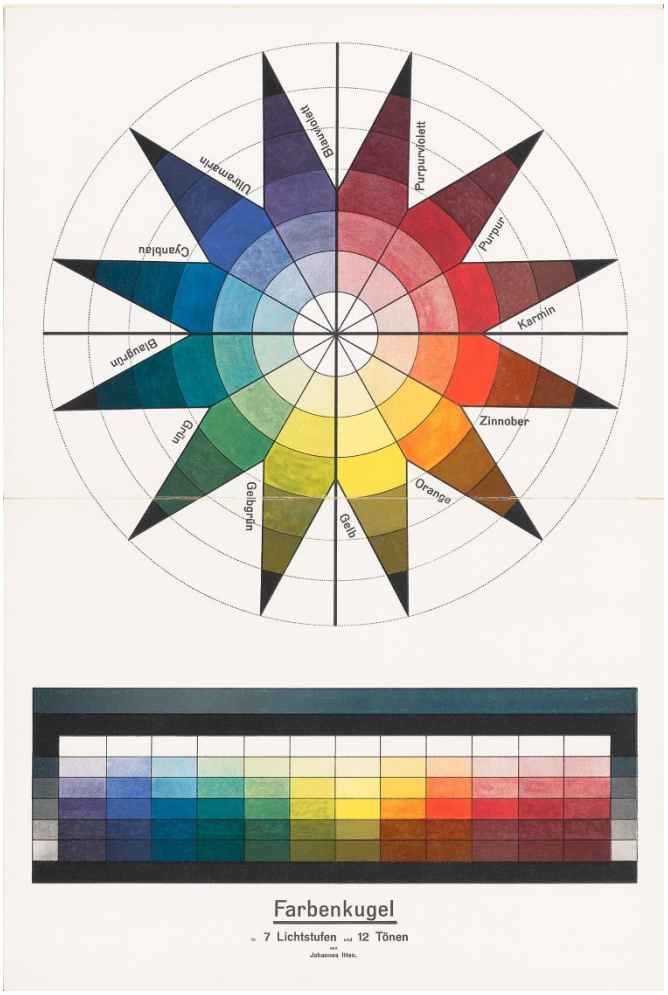

Fig. 3. *Farbenkugel in 7 Lichtstufen und 12 Tönen* (Colour sphere in 7 light values and 12 tones). (Source: Itten, 1921)

MATERIALS, DATA, AND METHODS

Colour in association with older adults was addressed by researcher Roswiyani in her dissertation. In her publication Older Adult's Well-being, Art Activity and Qigong Exercise in a Nursing Home in Indonesia, she writes about active aging and maintaining well-being. In her study, she mainly focuses on art therapy, which is also a form of self-presentation and expressing one's feelings. Art activities and working with colours present an opportunity for social communication with other people, establishing interpersonal relationships, and actively suppressing depression and feelings of loneliness. (Roswiyani, 2019) The topic of anxiety in older adults has become a widespread health problem. Health institutes have estimated that the global prevalence of anxiety disorders in older adults occurs in up to 28.3% of the population. (Balsamo, Cataldi, Carlucci, Farfield, 2018) Other research conducted at a centre for older adults in Taiwan also investigated the effect of art therapy. The experiment involved randomly assigning four art activities to older adults and measuring their anxiety levels. At the end of a set amount of time, they were asked to write their most recent negative experience on an A4 sheet. Significantly lowest levels of anxiety were measured in the group that worked with paint and painted a pre-drawn mandala. Members of this group felt calm, safe, relaxed, and satisfied. (Koo, Chen, Yeh, 2020) Based on this study, it can be deduced that uncontrolled handling of colour can be disturbing for older adults. On the contrary, tidy, precise colour assignment within a defined framework improves their psychological and physical well-being. This important aspect can be regarded by the designer when designing their housing.

Colour can significantly help with spatial orientation, but it is the architect who addresses the core principles. Spaces for the elderly should be organized, clear, and allow natural movement. Orientation in space is also closely related to the navigation system integrated in it. A wayfinding system in spaces for older adults helps with spatial orientation and navigation. A good navigation system is clear, understandable, intuitive, and non-verbal. (Čerešňová, Filová, 2023) Many studies can now be found that examine the impact of physical elements on well-being in health care settings for older adults, but few are concerned with colour. These homes often have neutral to hospital-style facilities. Instead of institutional aesthetics, one should begin to think about adding more of a sense of home, and colour may be one of the most useful elements for this purpose. In addition, colour can be used to emphasize the difference between rooms designed for relaxation and those designed for activities. (Torres, Serra, Llopis, Delcampo, 2020)

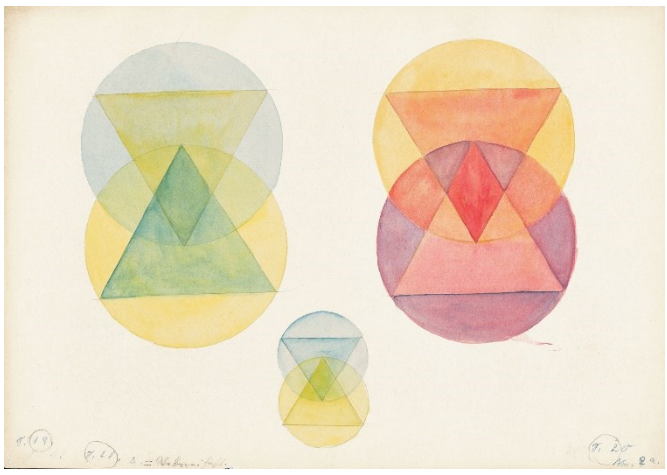

Fig. 4. *Farbenstudien* (Studies of colours). (Source: Willers, ca. 1922–1925)

Spanish researchers Ana Torres, Juan Serra, Jorge Llopis, and Anna Delcampo conducted two experiments with 134 older adults aged between 75 and 97 years in different activity rooms, during which they measured the level of arousal elicited by different colours. They conducted the first experiment in a nursing home and the second one in a laboratory using virtual reality. In both cases, they evaluated 6 colours in two groups: warm (red, orange, yellow) and cool (purple, blue, green). The conclusions of their study show that preferences depend on the type of room. In rooms used for social activities, people preferred warm to cool colours, with yellow – the shade in the middle of the colour spectrum – being the most preferred. For bedrooms and rooms designed for relaxation, older adults chose colours from the cool

visual spectrum, with green being the most preferred colour. The level of arousal by each colour was measured by the HRV instrument to measure the state of the autonomic nervous system. (Torres, Serra, Llopis, Delcampo, 2020) In publications and articles devoted to colours and emotions, the blue colour is usually cited for relaxation, peace, and tranquillity, while red tends to symbolize fire, activity, and excitement. Colour preferences may also differ between men and women, or between ethnic groups, but this was not confirmed in this study. The authors suggested that gender differences in colour preferences may also be due to biological differences in colour vision. However, this conjecture is also not confirmed.

The second experiment examined was conducted by researchers Ze-Yu Wang and Ji Young Cho from Korea using eye-tracking technology. In their study, they investigated whether the use of colour in residential environments affects the visual attention of older adults. In the first experiment, they observed the gaze behaviour of older adults when viewing images consisting of nine colour arrangements of door frames. Based on the results of the first part of the experiment, images of simulated environments with two door colours were created in the second experiment. Eye-tracking technology can conveniently capture eye behaviour without the participant being aware of it, so it does not cause any psychological or physical discomfort. The results show that participants paid more attention to pictures in which red or the red-black colour combination was used. In the experiment, the reaction time required to focus on a particular door was measured, with focusing on the white door being the slowest overall. (Wang, Cho, 2020) The results of this study confirm that colour can improve the visibility of features that can affect safety and improve their quality of life in older adults' living environments. Contrasting colours used in the environment makes the environment easier for older adults to remember. Older adults have lower cognitive abilities as a result of aging. Therefore, achromatic environments do not sufficiently stimulate their brain function, leading to longer reaction times.

Fig. 5. Experiment using virtual reality. Measuring stimuli and excitement while projecting three warm tones and three cold tones into the living space. (Source: Torres, Serra, Llopis, Delcampo, 2020, CC BY-NC-ND)

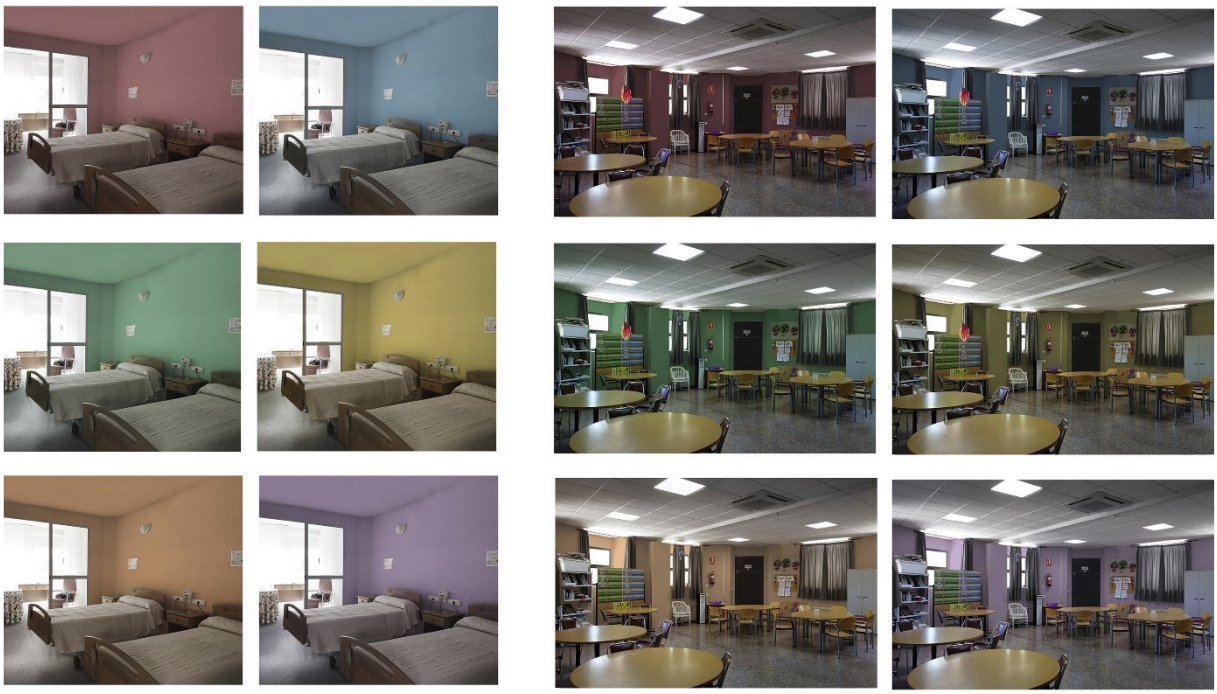

Fig. 6. Stimuli shown for (a) the bedroom and (b) the activity room, with the colours arranged from top to bottom and from left to right: red, blue, green, yellow, orange and purple. (Source: Torres, Serra, Llopis, Delcampo, 2020, CC BY-NC-ND)

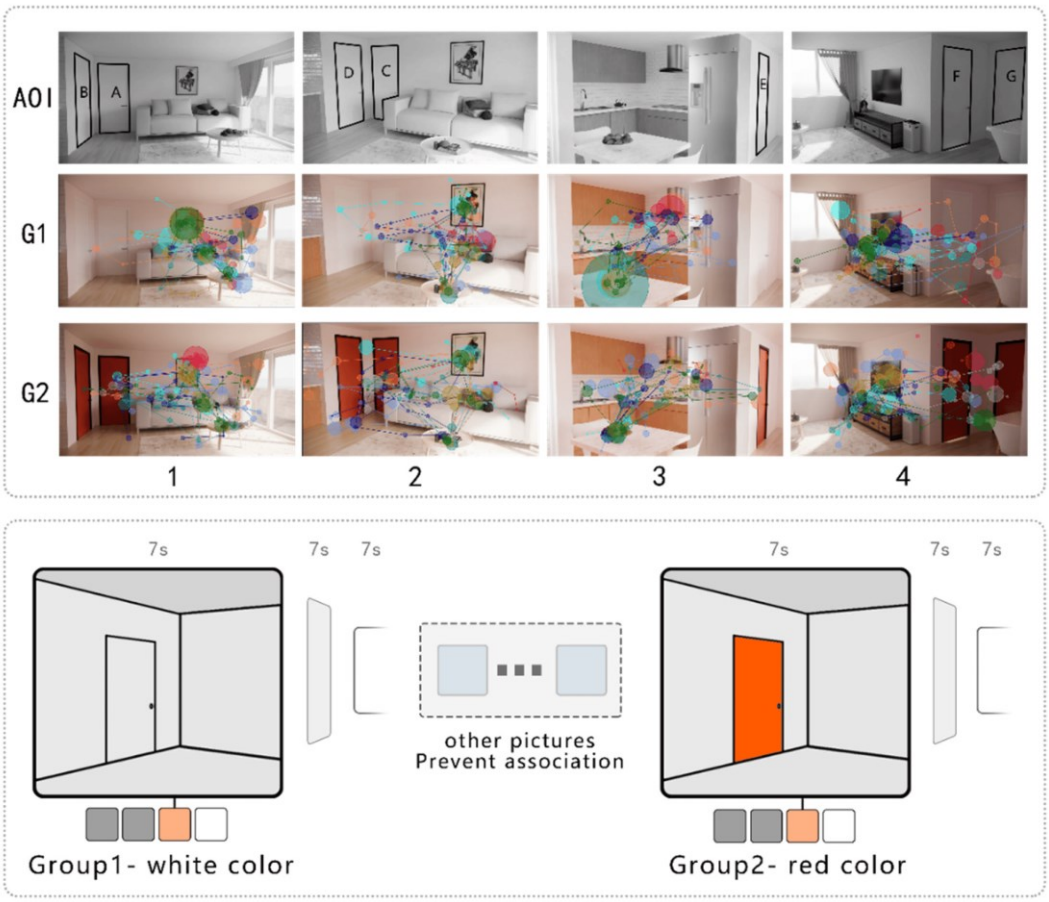

Fig. 7. Simulation of living environment and examining the older adults' gaze behaviour at the door colour with high visibility and with low visibility. In addition, it was intended to explore the differences in gaze behaviour between older adults with normal and low cognitive states. (Source: Wang, Cho, 2020, CC BY)

DISCUSSION AND CONCLUSION

The trend of aging population poses a major challenge to the modern society, requiring innovative solutions to address the needs and well-being of older people. The demographic shift is affecting various aspects of society, making social integration and accessibility essential priorities. In this context, human-centred design, which encompasses inclusive design, universal design, and user-friendly design, is crucial. It emphasizes the importance of considering the diverse needs and constraints of older adults and of promoting their active participation in society. People spend most of their free time indoors, the amount of which increases with age, making it even more necessary to be mindful of the environment in which we live. Sensory simulations in living spaces encourage the senses and motivate people to move and explore their surroundings. The choice of materials and colours plays an important role in creating an environment that supports the well-being of older adults. Natural materials, especially wood, are preferred for their restorative effect on the nervous system and timeless appeal. They play a role in cognitive stimulation, orientation, and emotional well-being, while warm colours promote relaxation.

Visual perception changes with age and sensitivity to certain colours may decrease. Common age-related visual problems, such as reduced sensitivity to contrast and difficulty distinguishing fine detail and colour, have important implications for design. Older people often face health problems, including various eye conditions, which need to be considered when planning accessible and inclusive environments. Adapting interior spaces is a critical factor in supporting the needs of older adults, and promoting their independence, safety, and comfort. Contrast and colour are essential tools to help orientation, enhance safety, and create an inclusive atmosphere. Designing spaces that are easy to navigate and that use contrasting colours where appropriate can reduce disorientation and improve overall well-being. Although the benefits of using colour when designing environments for older adults are obvious, there are some subtleties to consider.

Colour preferences may vary depending on the type of room and the activities being performed. Individual reactions to colour are complex and include emotional, cultural, and even gender factors. However, the use of colour can help older adults feel more relaxed, secure, and happy in their living environment. Despite the valuable insights gained from previous research, the impact of colour on older adults' well-being is still a developing area of study. Researchers continue to explore the complex relationships between colour, environment, and the mental and physical health of older adults. More research is needed to improve our understanding of the nuances of colour use in different settings and among different populations of older adults. Integrating the colour theory into the design process remains an important avenue for future research as it may lead to better-designed, safer, and more inclusive environments. Ultimately, the goal is to create living spaces that meet the specific needs and promote the well-being of the aging population, supporting their desire for self-sufficiency and continued active participation in society.

Incorporating colour sensations and natural materials in living spaces improves physiological and psychological indicators of human well-being. Human-centred design is also currently focusing on psychology and neuroscience in architecture, psycho-social aspects of design, and the impact of the environment on people, their health, and their sense of well-being. Creating a suitable environment for people to live in their housing from birth to old age is a transformation that the residential interior designer,

especially the designer, must grasp. Adaptability of space is a clear requirement of older adults. When designing, designers must be familiar with guidelines for adapting design and architecture for people with special needs and older adults. This includes interdisciplinary training with a focus on ergonomics, anthropology, gerontology, and sociology. Analyses show that architecture and design for people with disabilities and older adults is a market that will expand in the coming years to meet their needs. Whether it is adapting existing rooms in the home or designing public service spaces, colour plays an important role in space.

Colour contrasts do not have to be limited to floors and walls; they can draw attention to any important point of interest. When used purposefully, colour is a powerful tool that can not only enhance the aesthetics of a design but can greatly help older adults feel independent and safe. Vision impairment is not the only ailment of aging adults, but it can limit them in performing common tasks. Elements that can compromise our safety should be designed in contrasting colours. Shades of cool tones such as blue and green may be perceived as grey by the aging eye. Monotony and lack of sensory cues in interiors can hinder users' orientation as they lack the visual cues needed to identify architectural features. Warm tones at the warm end of the colour spectrum can still be seen even by people with colour deficiencies. In addition, these warm tones have a positive effect on their bodies, and feel warm and energizing. Studies show that furniture designed in warm tones is more pleasant to the touch. It can also be inferred from some studies that people perceive wood as a colour on the warm side of the colour spectrum. Shades of wood from beige to dark brown are mainly composed of a combination of shades of red and yellow. This may be one of the reasons why even older adults prefer wood in interiors over other different materials.

Tab. 1. Implications of Colour in Relation to Demographic Factors. (Source: Authors, 2023)

Demographic Factor	Implications of Colour in Interior Design for Older Adults
Age	Older adults may have reduced ability to perceive certain colours, making warm tones more preferable for improved visibility
Sex	Preferences for specific colours may vary between men and women, but further research is needed to confirm this variation
Type and Degree of Disability	Individuals with higher degree of disability may benefit from colours that enhance cognitive stimulation and orientation, such as contrasting colours
Health and Dependency	Colour choices can affect the mental state and well-being of individuals with health issues or dependencies, with warm colours promoting relaxation and cool colours aiding in a calming environment
Socioeconomic Level	Colour preferences may be influenced by socioeconomic factors, with further research required to understand the specific correlations
Other Environmental Factors	Colour choices should be adapted to the specific environmental conditions, taking into account lighting, noise levels, and the type of residence (urban or rural) to create a harmonious and visually appealing living environment

Tab. 2. Implications of Colour in Interior Design for Older Adults. (Source: Authors, 2023)

Aspect Analysed	Implications of Colour in Interior Design for Older Adults
Cognitive Well-Being	Use of warm colours can promote a calming and reassuring atmosphere Colour contrast can improve memory and orientation Cool colours can enhance relaxation spaces
Emotional Well-Being	Colours can influence emotions and mood Warm colours can promote a sense of warmth and energy Cool colours can create a soothing and tranquil environment
Physical Comfort and Safety	Contrasting colours on important elements enhance visibility Colour choices should consider potential safety risks
Orientation and Navigation	Colour aids in wayfinding and helps older adults in their orientation Colour coding can designate the purpose of rooms
Personalization and Adaptation	Colour choices should allow residents to personalize their living spaces Residents can choose colours that make their space distinctive

As our society continues to age, the design of living spaces for older adults is becoming an increasingly important aspect of social integration and well-being. The role of colour in this context is both an art and a science and if designers, architects, and researchers delve deeper into its potential, it can contribute to a brighter and more accessible future for older adults. By embracing the principles of human-centred design and harnessing the psychological and aesthetic power of colour, we can create living environments that are not only functional but also beautiful and supportive, enhancing the quality of life for older adults. Promoting inclusivity and ensuring that these environments are accessible to older adults is an important step towards a more equitable society. It is our shared responsibility to design with empathy, creativity, and a deep understanding of the needs and preferences of older adults. By embracing these principles, we can create living spaces in which every person, regardless of age, can feel truly welcome and thrive. Any biases identified in this research need to be further explored and addressed to ensure the findings are as objective and reliable as possible. In addition, the limitations of the study should be acknowledged. These may include factors such as sample size, demographic characteristics, or cultural aspects that could affect the generalisability of the results.

Identified biases and their impact on the results

A study may experience cultural bias in its results. Colour preferences, perceptions, and their impact on well-being may be influenced by cultural factors. The study does not explicitly address the diversity of cultural backgrounds and how this may affect the relationship between colour and well-being in older adults. This bias could lead to results that are not generally applicable.

Sampling bias: The study may not adequately represent the entire population of older adults. The impact of skin colour on well-being could vary based on factors such as age, gender, socioeconomic status, and health status. If the sample used for the study is not sufficiently diverse, the results may not be generalizable to all older adults.

Confirmation bias: There may be a bias in favour of positive findings. If researchers or designers have a preconceived notion that certain colours are beneficial to older adults, they may subconsciously interpret or present the results in a manner that confirms this belief. This could lead to overemphasizing the positive aspects of colour use and neglecting the potential drawbacks.

Publication bias: A study may be affected by publication bias when only studies with positive or significant results are published. This may lead to an overrepresentation of studies supporting the positive impact of colour on well-being, while studies with neutral or negative results may remain unpublished.

Cognitive bias: older adults' responses to colour stimuli may be affected by recall bias. Due to limited memory or other cognitive factors, they may not accurately recall or indicate their emotional or well-being responses to specific colours.

Future research could look at the intersection of colour psychology, neuroscience, and design for older adults to provide more comprehensive guidelines on and insights into how to use colour effectively. Studying the impact of colour in different cultural contexts and environments could also provide valuable insights into tailoring design approaches to different populations. In conclusion, the journey towards creating better living spaces for older people continues, and understanding the complex relationship between colour and design in this context is an important part of this process. It is an area ripe for exploration, innovation, and continuous improvement, with the ultimate goal of improving the well-being and quality of life of older adults worldwide.

Possible research directions

Longitudinal studies: Conducting a longitudinal study to understand how colour preferences and their impact on older adults' well-being evolve over time. This could provide insights into the changing needs of this demographic as they age in place.

Cross-cultural research: Exploring how colour preferences and their impact on wellbeing vary in different cultural contexts as this may inform more inclusive design practices.

Health-focused design: Focusing on designing living spaces that accommodate older people with specific health issues including dementia, visual impairment, and mobility problems.

Gender-focused studies: Exploring whether gender plays a role in older adults' colour preferences and responses, leading to gender-specific design recommendations.

Cognitive and psychological aspects: explore in more depth the cognitive and psychological aspects of colour perception and its relationship to well-being, possibly integrating findings from psychology and neuroscience.

Technology integration: Exploring how modern technologies, such as intelligent lighting systems, can be incorporated into the design to optimize the wellbeing of older adults.

As society continues to age, addressing the well-being of older adults through design remains a dynamic and evolving area. By expanding research along these lines, designers and researchers can contribute to more holistic and effective approaches to creating living spaces that truly enhance the quality of life for older adults.

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References

American Optometric Association (2021) "Senior Vision: Over 60 Years of Age", American Optometric Association, USA. [online] Available at: https://www.aoa.org/healthy-eyes/eye-health-for-life/senior-vision?sso=y

Balsamo, M., Cataldi, F., Carlucci, L., Farfield, B. (2018) "Assessment of anxiety in older adults: a review of self-report measures", National Library of Medicine: National Center for Biotechnology Information, PubMed Central, pp. 573-593. https://doi.org/10.2147/CIA.S114100

Beer, P., Olenska, S., Zbiec, M. (2017) "Design for AAL Integrated Furniture for the Care and Support of Elderly and Disabled People", hrčak, pp. 185-193. https://doi.org/10.5552/drind.2017.1642

Čerešňová, Z. (2017) "Interakcia človeka s prostredím, Humánno-centrické navrhovanie v USA" [Interaction of man and his environment: Human-centered design of the built environment in the United States], Architektonické listy Fakulty architektúry STU, 22(3-4). (in Slovak)

Čerešňová, Z., Filová, N. (2023) "Desire, Module 3, Unit 1, Age friendly built environment – architecture", SPEKTRUM STU, Bratislava, Slovakia. ISBN 978-80-227-5272-5

Griffiths, A. (2022) "Lotte Archmchair by Sarah Hossli", Dezeen. [online] Available at: https://www.dezeen.com/2022/10/20/sarah-hossli-lotte-elderly-armchair/

Itten, J. (1921) "Farbenkugel in 7 Lichtstufen und 12 Tönen" [Color sphere in 7 light values and 12 tones], Lithograph. From: Bruno Adler (ed.), Utopia: Dokumente der Wirklichkeit I/II (Weimar, 1921), foldout from inside cover. Getty Research Institute, Los Angeles, USA. 85-B9544-2

Koo, M., Chen, H., Yeh, Y. (2020) "Coloring activities for anxiety reduction and mood improvement in Taiwanese community-dwelling older adults: A randomized controlled study", National Library of Medicine: National Center for Biotechnology Information, PubMed Central. https://doi.org/10.1155%2F2020%2F6964737

Kotradyová, V. (2016) "Kolokvium Interakcia človeka a dreva: Colloquium Interactions of Human ad Wood", STU, Bratislava, Slovakia. ISBN 978-80-227-4640-3. Available at: https://www.bcdlab.eu/udalosti/pdf_kolokvium_clovek_drevo_19_07.pdf

Kotradyová, V., Lipovac, D., Hencová, M. (2023) "Desire, Module 4, Unit 1, Complex comfort and age-friendly interior design", SPEKTRUM STU, Bratislava, Slovakia. ISBN 978-80-227-4640-3

Lipovac, D., Burnard, M.D., Wie, S. (2022) "Perception and evaluation of (modified) wood by older adults from Slovenia and Norway", Wood and Fiber Science, 54(1), pp. 45-59. https://doi.org/10.22382/wfs-2022-05

Loredan, N.P., Sašek, M. (2023) "Desire, Module 2, Unit 1, Ageing process and related changes in body systems", SPEKTRUM STU, Bratislava, Slovakia. ISBN 978-80-227-5271-8

Moore, B. (2018) "How color and design affect environments for the aging", American Institute of Architects. [online] Available at: https://www.aia.org/articles/178406-how-color-and-design-affect-environments-fo:36

Orbec (2017) "Home for dependent elderly people and nursing home | Dominique Coulon & associés", archilovers. [online] Available at: https://cdn.archilovers.com/projects/5a7b1e3a-adb1-4b7a-8a67-d2d3dfce878b.jpg

Ramírez, A., Fajardo, C., Escovar, J.C.B., Villamil, J.L. (2022) "Colors catalog for wood identification", South Florida Journal of Development, 3(2). https://doi.org/10.46932/sfjdv3n2-048

Rollová, L., Čerešňová, Z. (2010) "Prostredie bez bariér" (Environment without barriers), CEDA, FA STU, Bratislava, Slovakia. ISBN 978-80-970177-4-3 (in Slovak)

Rollová, L., Čerešňová, Z. (2015) "Univerzálne navrhovanie objektov komunitných sociálnych služieb" (Universal design of objects of community social services), Implementačná agentúra Ministerstva práce, sociálnych vecí a rodiny Slovenskej republiky, Bratislava, Slovakia. ISBN 978-80-970110-4-8. Available at:

https://www.ia.gov.sk/data/files/np_di/publikacie/Univerzalne_navrhovanie_objektov_komunitnych_socialnych_sluzieb.pdf (in Slovak)
Roswiyani (2019) "Older adult's well-being: Art activity and qigong exercise in nursing home in Indonesia" (doctoral thesis), Behavioural Science Institute, Ipskamp Printing, Enschede, Netherlands. ISBN 978-94-028-1567-2
Sloan, A. (1980) "Housing for the elderly: Cognitive considerations", Environment and Behavior, 12(4), pp. 451-466. https://doi.org/10.1177/0013916580124003
Torres, A., Serra, J., Llopis, J., Delcampo, A. (2020) "Color preference cool versus warm in nursing homes depend on the expected activity for interior spaces", Frontiers of Architectural Research, 9(4), pp. 739-750. https://doi.org/10.1016/j.foar.2020.06.002
Wang, Z., Cho, J.Y., (2020) "Older Adult's Response to color visibility in indoor residential environment using eye-tracking technology", Sensors, 22(22), 8766. https://doi.org/10.3390/s22228766
Willers, M. (ca. 1922–1925) "Farbenstudien" (Studies of colors), Watercolor and graphite on paper. Bauhaus Student Work, 1919–1933. Getty Research Institute, Los Angeles, USA. 850514

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Fine art as an integral part of architecture: Political and social aspects of the formation of this synthesis in the 20th century

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Abstract: The theme of the connection of visual arts with architecture, or the cooperation of visual artists with architects in post-war Europe, basically follows two lines: a theoretical line and a political-institutional line. Just as knowledge of the history of art and the history of architecture is necessary in the analysis of this period, knowledge of the political-economic circumstances is necessary in the field of realisations in architecture, because by definition, this public art is a political affair and is not an independent creation. Art in architecture was promoted not only in communist countries (for ideological reasons), but also in Western Europe as an aesthetic cultivation of contemporary architecture. From the mid-1950s onwards, visual art in architectural space appeared more and more frequently, which led to the adoption of legislative measures that regulated and supported this practice. A gradual transformation in the understanding of the task can be observed over the period under review, or the position of public art, presented as part of architecture or public space. This is naturally due to social development. If at the beginning of the 1950s it was a mission to convey ideology and indoctrinate it, in the next stage the focus shifts more towards design with the task of cultivating the environment and creating a certain atmosphere. The study also peripherally explores forms of arts support in the context of other European countries. The idea of integration between art and architecture dates back to the very origins of both disciplines. During the avant-garde movement at the beginning of the twentieth century, it acquired a new meaning and social purpose and became one of the most defining characteristics of modernism. Modernism arose from the expectation of moral and material reconstruction of the world devastated by war, which served as a tool to strengthen collective identity and, consequently, to forge the bond between the city and its inhabitants. Our study traces the development and contexts of the relationship and funding of visual arts in architecture in the Slovak and European context in the 20th century.

Keywords: fine arts, politics, synthesis, architecture, history

INTRODUCTION

Especially in Eastern European architecture and socialist construction, art had specific conditions for its emergence between 1950 and 1989. Two terms arose in the German environment that are also used in principle in translations in other parts of Europe: the term "architekturbezogene Kunst" (architecture-related art), used by the Bauakademie as an official technical term in the German Democratic Republic, and the phrase "Kunst am Bau" (art in architecture) referring to the same concept in the democratic Federal Republic of Germany, however, the term was intended to have a primarily educational function. Aesthetic education thus had the function of conveying socio-political messages (Necker, 2021). Art in architecture was promoted not only in communist countries for ideological reasons, but throughout Europe as an aesthetic cultivation of architecture. In Czechoslovakia, the number of these works increased as a result of the targeted cultural policy of the state. From the mid-1950s onwards, fine art appeared more and more frequently in architectural space, which led to the adoption of legislative measures that regulated and encouraged this practice. Our study traces the development of the relationship and funding of visual arts in architecture in the Slovak and European context in the 20th century.

FINE ART AND ARCHITECTURE – THEORETICAL FRAMEWORKS

The idea of integration between art and architecture dates back to the very origins of both disciplines. During the avant-garde movement at the beginning of the twentieth century, it acquired a new meaning and social purpose and became one of the most defining characteristics of modernism. Modernism arose from the expectation of moral and material reconstruction of the world devastated by war, which served as a tool to strengthen collective identity and, consequently, to forge the bond between the city and its inhabitants. Professional development in the Bauhaus movement was characterised by what Argan calls a "methodological-didactic rationalism" that promotes the unification of all the arts through the "Gesamtkunstwerk" (Argan, 1992). This collaboration was expected to take place even on site, bringing together intellectual and manual labour into a shared experience.

On a different scale, the integration between art and architecture through the incorporation of objects, as in Mies van der Rohe's iconic Barcelona Pavilion, is also important. The sculpture "Der Morgen" by the German sculptor Georg Kolbe, is not essential to the pavilion. As Claudia Cabral explains, *"in Mies' delicate balance,*

guided by partial asymmetries and a system of compensations, the sculpture is the only element that has no counterpart [...] Mies chose to place only one sculpture, the only figural element in his abstract plane. Within the play of pavilions with reflections, transparencies and parallels, the only possible partners for the bronze figure are we, the flesh-and-blood people, the visitors." (Cabral, 2009) As Rino Levi once said, architecture is not secondary, but neither is it the mother of all arts. There is only one art and its value is measured by the emotions it evokes in us. Painting and sculpture may be independent, but when applied to architecture they become part of a whole. This lesson about collectivity and shared experience begins during the development of a project and touches every single person who has the opportunity to visit an architectural work (Chowdhury, 2023).

The most significant definitions of art associated with architecture took place in the context of the political and social situation in Czechoslovakia in the 1960s and 1970s. The theme of the connection of visual arts with architecture, or the cooperation of visual artists with architects in post-war Czechoslovakia, basically follows two lines: a theoretical line and a political-institutional line. Just as knowledge of the history of art and the history of architecture is necessary for analysing this period, knowledge of the political-economic circumstances is necessary in the field of realisations in architecture, because by definition this public art is a political affair and not independent creation. The texts of that time often described the relationship between architecture and the artwork in architecture so as not reduce it to a mere decoration or solo ideological agitation. The new structural and material character of contemporary architecture had to be reflected in the way the artwork was applied and in the use of new materials in artistic practice (Fig. 1). Even with the standard seriality and prefabrication in construction at the time, artwork had to retain its artistic individuality (Honzík, Kotík, Sychra, Lamač, 1959).

An important part of the theoretical insight into the relationship of art in architecture is the transformation of terminology, which reflects a certain historical development, corresponding to the changes in cultural policy over the two decades under review. Among the most frequent words in contemporary discourse and reflection was the word "realisation" as a creation, execution. In the 1960s and especially in the vocabulary of the younger generation of artists, this word replaced the terms such as "decoration", "artwork in architecture", "collaboration between architect and artist", or "monumental art", as well as the term discussed below – undoubtedly because of its neutrality (Klivar, 1969).

"Creating the environment" was another established contemporary term, which appeared in the discourse in the late 1970s and remained applied until 1989. In order to understand the logic behind this somewhat unexpected outcome of theoretical considerations, we can use the contemporary definition of the theoretician Zdenek Kostka, traced by the architectural theorist Pavel Škranc (Škranc, 2017). Kostka attempted to achieve continuity by merging the ideas of "synthesis" and "creation of the environment": *"The contemporary call for a synthesis of artistic culture with the environment is therefore not only a call for some synthesis carried out in solitary unique architectural objects, but for a wider-ranging interest. It is an interest and a necessity to restore that balance which was inherent in all pre-capitalist formations and which was characterised by the intermingling of art with the whole of man's environment. (...) The formal stylistic fusion of different kinds of art is thus not the starting point but the result of the artistic mastery of the synthesis of art with life, with all its life-processing modes and ideals."* (Kostka, 1985)

A gradual transformation in the understanding of the task can be observed over the period under review, or the position of "public art", presented as part of architecture or public space. This is naturally attributed to social development. If at the beginning of the 1950s the mission was to convey ideology and indoctrinate it, in the next period the focus shifted more towards design with the task of cultivating the "environment" and creating a certain atmosphere. "Socialist" art is fundamentally opposed to individualism, yet exceptions to the rule also appeared in the period (Vicherková, 2022).

Fig. 1. Auditorium, Technical University in Zvolen, Slovakia by Vladimír Dedeček (architecture) and Jaroslav Nemec (interior), realized in 1977 - 84. (Photo: Katarína Verešová, 2023; Seminary paper to the Public Interior course, Faculty of Architecture and Design of the Slovak University of Technology in Bratislava, Slovakia, Summer Term 2021–2022)

MODELS OF SUPPORT FOR THE VISUAL ARTS IN ARCHITECTURE IN EUROPE IN THE 20TH AND 21ST CENTURIES

Many European countries support art in architecture not only through recommendations but also through legislation. Numerous regulations, such as the French one, came into force for the first time after the Second World War, along with the building boom. However, the first ideas of state support originated in Europe in the 1930s, with other reasons being the decline of patronage as a funding mechanism for the arts and that not only in architecture, and the need to replace this system. In another European country, Germany, the application of art in architecture at the federal level is an "optional provision". According to it, art on buildings should be implemented on buildings that are particularly important in terms of their architecture and/or function or are located in a particularly significant site. The substantial establishment of art on buildings in other European countries since the 1970s cannot be overlooked.

Like Germany, a number of European countries also apply a system of subsidies, which in a number of cases (officially and unofficially) is called accordingly: "Percent for Art" (Great Britain), "Per Cent for Art scheme" (Ireland), "Percentagere" (Ireland), "Percentageregeling" (Netherlands), "1%-artistique" (France). The amount and the basis for the assessment of state subsidies vary, while internationally, the actual resources spent are at a comparable level. In practice, it is on average 1% of the construction budget (Seidel, 2012). There are many fundamental similarities in the European comparison, including the question of criteria according to which art should be applied to buildings (new buildings, conversions, and total renovation) and which buildings and building typologies should be supported in this respect. The intention not to regulate art is also clearly visible everywhere. It is also noteworthy that the European regulations are mostly silent on the relationship between art and architecture for which they are intended. Often there are no recommendations or models for collaboration between artists and architects (Seidel, 2012). Art related to building projects is public art and an expression of a democratic attitude, and therefore requires special mediation and work with the public, for example through publications and Internet documentation, also through exhibitions. In

Denmark, the "Statens Kunstfond" reviews its activities annually in user acceptability surveys.

Several countries, or more precisely the relevant government bodies, are currently systematically inventorying and documenting their holdings. They are subjecting them to further scientific scrutiny. The organisation "BIG Art" in Austria has been searching for works of art in various buildings for years. The results are collected in an art database with more than 5,000 entries. An important concept is presented by Sweden. In 1937 the Public Art Agency Sweden, Statens Konstrad, was founded as a government agency to promote public art. In recent years, the agency has moved from supporting permanent public art towards temporary art interventions, educational and participatory art projects with different schools, but also towards urban development and comprehensive projects in the development of public space as a whole. In addition, the agency acts as a repository for artwork, which it distributes mainly to schools or other public institutions. The complexity and reach of the institution's operation makes it one of the most sophisticated models for supporting art, education, culture, creativity, and urban development. All departments are staffed by professionals who are selected through a public selection process. Financial support comes from the state, but the agency is otherwise independent. Works and authors go through a public competition and are selected by the agency. A similar system operates in Norway and Finland (Seidel, 2012).

FINE ARTS IN ARCHITECTURE IN SLOVAKIA

In 1965, Government Resolution No. 355/1965 was adopted in Czechoslovakia. Art in architecture was considered to be a work that constitutes an integral part of architecture and its design is already part of the project documentation. In practice, these works were placed in public spaces, in the interiors of buildings or in the immediate vicinity of buildings' exterior, or were part of the design of a housing estate. The works are often fixed into the architectural framework, which means that they cannot be manipulated in any other way, they can only be destroyed (Jankovičová, 2014).

The funding of these works was provided by certain rules, the basic regulation being Title V of the Construction Budget Summary in the Czechoslovak Building Code. An equation with several given coefficients was used to calculate the amount of money to be spent on a work of art in a particular building, basically taking into account the social significance of the building and the type of building. The higher the aggregate budget, the lower the percentage of the total budget that was allocated to artwork; the amount ranged from 0.5 to 2%, as stated in the 1978 methodological guidelines on the application of artwork in capital construction: *"for buildings of exceptional social importance (theatres, government buildings, etc.), the percentage of the total budget for artwork was 1.6 to 2%, for buildings of social importance (cultural buildings, hotels, universities, etc.) 1.0 to 1.5%, and for other buildings (secondary vocational schools, research institutes, libraries, shops, services, etc.) it was 0.5 to 1.0%"* (Jankovičová, 2014).

The works were judged by expert commissions set up by the Fine Arts Fund, but significant realisations with political significance were still subject to the control of the ideological commission of the Ministry of Culture (Jankovičová, 2014). Depending on the actual conditions, the possibilities of placing works in public spaces also varied. After the rigid 1950s, the situation depended on the degree of ideological control. In the art of the 1960s, there was a gradual loosening of conditions as socialist realism was replaced by progressive forms of art and abstraction found its place. Works from the 1970s and 1980s reflect the plurality of forms in the visual arts: from descriptive idealised realism, through diverse forms of modernism and abstract decorativism, to works representing the free creation of artists.

Ideological control was exercised by the Ministry of Culture, mostly for politically significant monuments. The artistic quality of the works created during the last twenty years of the former regime might be therefore questionable. On the other hand, many of the works are characterised by attributes of the then modern and progressive trends and it is difficult to draw a firm line between "socialist-realist political kitsch" and "artistically high-quality documentation of the regime and art of the time" worthy of preservation (Čierne diery, Repka, 2015). There were two ways in which artists could obtain such a commission. Usually there was a tendering process, but the architect of the building in question recommended a particular artist in advance. In addition, the Fine Arts Fund approached other two or three artists. Since the architect had the main say in the selection committee, the candidate chosen by the architect usually won in the end.

The other option was actually open public competitions, but these were considerably fewer in number and were only announced by the state for the most prominent sites. They were not international, however, and usually only local artists entered them. For over 15 years, art historian Sabina Jankovičová has been mapping the works of leading Slovak artists who were created between 1948 and 1989. Maroš Schmidt, a designer and director of the Slovak Design Centre, initiated the nationwide inventory. The age and value of some of the works intensified the interest of both the professional and lay public, which declined after 1989, as there were mainly ideological prejudices against such works. There is no inventory of these works because, according to Jankovičová, no one was assigned this task. For example, by the Ministry of Culture, which should also take care of this cultural heritage and conceptually address how to preserve and document it (Barát, 2021).

Fig. 2. Ceremony house – Zichy Palace in Bratislava, Slovakia by Anna Tomašáková (monument restoration) and Oľga Janáková (monument restoration and interior), and Rastislav Janák (interior), project and realisation in 1980 - 89. (Photo: Dušan Kočlík, 2023)

In her research, she focuses primarily on the best artists of the alternative scene and traces what they have been doing within the official art, created for architecture since the 1970s. According to Jankovičová, the visual art associated with architecture can be found with certainty in the typology of a marriage hall, which was built almost in every village (Fig. 2). Other frequently preserved types of interiors are various ceremonial halls (Fig. 3). Programmatically, they have been built since the 1970s (Fig. 4, Fig. 5). It is in them that one can find rare works by important artists, which today, among other things, have an extraordinary financial value on the market. It is these halls that are designed as complex wholes, refined down to the smallest detail. In Pernek there is an outstanding work by Anton Čepka. A number of wedding halls, such as the hall in Plavecký Štvrtok, present works by Milan Dobeš. Numerous artworks were created by Erna Masarov-

ičová. Marián Mudroch made the front wall in the hall in Láb. Imrich Vanek worked on the wedding hall in Nové Zámky, Jozef Jankovič in Veľký Ďur (Barát, 2021) - all mentioned towns in Slovakia.

Fig. 3. Civil registry office in Vranov nad Topľou, Slovakia by Jozef Maňuch, Ján Mokriš, Michal Czupil et al. realized in 1979 – 84. (Photo: Petra Grošíková, 2023)

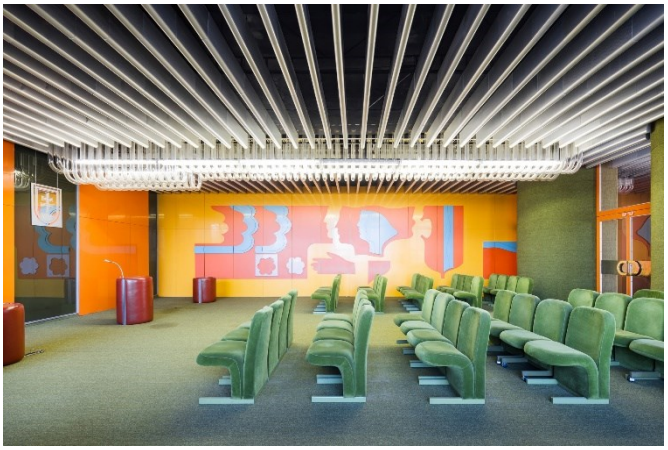

Fig. 4. Wedding hall in Šoporňa, Slovakia realized in 1976. (Photo: Matej Hakár, 2023)

Fig. 5. Wedding hall in Podbrezová, Slovakia. (Source: Sabina Jankovičová, 2023)

CONCLUSION

Over the last decades, quality art in public space across Slovakia has been gradually displaced and often replaced by empty attractions. The towns and municipalities thus find themselves without an important cultural layer. After the revolution, it was expected that art in public space in Slovakia would be provided by private investors and the market. However, semi-public or private public space often disregards the historical and cultural continuity of a town or city and the surrounding buildings. What is more, we live in the times when art can continue to be destroyed. In the 1970s, abstract sculptures were removed from several places in Slovakia as part of the normalisation process. Probably the most serious relocation concerned the sculpture Victims Warn by Jozef Jankovič, moved from the Slovak National Uprising memorial in Banská Bystrica to the village of Kalište (both in Slovakia).

Attitudes of people and experts towards such art are changing nowadays. Different initiatives are emerging in towns and cities. Conversely, a work of art can be ignored and, in case of disinterest, easily destroyed. This was the case of the climbing frames by Alexander Bilkovič, Viktoria Cvengrošová and Virgil Droppa, which were located in the pull-in area where the Triblavina junction on the D1 motorway is being built today. In the context of Slovakia, Section 8 of Act No. 201/2022 regulates the relationship to the artwork and relevant financing. However, the regulation still contains many disputed and unfinished aspects. The art pieces of the Normalisation era are not usually protected objects. However, it is a legitimate cultural layer of architecture that should be protected and preserved. There are many initiatives, associations and organisations in Slovakia that strive to achieve this.

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References

Argan, G. C. (1992) 'Arte Moderna' (Modern art), Cia das Letras, São Paulo, Brazil, p. 30. (in Portugal)

Barát, A. (2021) 'Historička: ide sa spisovať umenie, ktoré sa ignorovalo 30 rokov' (A historian: Art that has been ignored for 30 years is to be catalogued). [online] Available at: https://zurnal.pravda.sk/rozhovory/clanok/590655-historicka-ide-sa-spisovat-umenie-ktore-sa-ignorovalo-30-rokov/ [Accessed: 1 Sep 2023] (in Slovak)

Cabral, C. C. (2009) 'Arquitetura moderna e escultura figurativa: a representação naturalista no espaço moderno' (Modern architecture and figurative sculpture: naturalistic representation in modern space), DOCOMOMO Brazil, Rio de Janeiro, Brazil, p. 50. (in Portugal)

Chowdhury, P. (2023) 'The close relationship between art and architecture in modernism', Hayes Hall Gazette. [online] Available at: https://desis.osu.edu/seniorthesis/index.php/2023/01/19/the-close-relationship-between-art-and-architecture-in-modernism-2/ [Accessed: 15 Sep 2023]

Čierne diery, Repka, R. (2015) 'Upadajúcim slovenským uliciam má pomôcť povinné umenie' (Mandatory art is supposed to help the decaying Slovak streets), Denník N. [online] Available at: https://dennikn.sk/272154/vrati-sa-hlava-v-povinne-percento-na-umenie/ [Accessed: 21 Sep 2023] (in Slovak)

Grošíková, P. (2023) 'Matričný úrad' (Civil registry office), Repreint. [online] Available at: https://repreint.sk/interiery/matricny-urad/ (in Slovak)

Hakár, M. (2023) 'Svadobná sála Šoporňa (1976)' (Wedding hall in Šoporňa, 1976), Čierne diery, Facebook. [online] Available at: https://www.facebook.com/photo/?fbid=707860168040886 (in Slovak)

Honzík, K., Kotík, J., Sychra, V., Lamač, M. (1959) 'Spolupráce architektury, výtvarného a užitého umění' (Collaboration of architecture, fine and applied arts), Výtvarné umění, 9(2), pp. 54 – 63. (in Czech)

Jankovičová, S. (2014) 'Výtvarné dielo v architektúre: podpora umenia u nás neexistuje' (A work of art in architecture: there is no support for art in our country), ASB.sk. [online] Available at: https://www.asb.sk/architektura/vytvarne-dielo-v-architekture-podpora-umenia-u-nas-neexistuje [Accessed: 21 Sep 2023] (in Slovak)

Jankovičová, S. (2023) 'Wedding hall in Podbrezová, Slovakia', Resculpture.sk, Facebook. [online] Available at: https://www.facebook.com/photo?fbid=219063537360101

Kočlík, D. (2023) 'Dom obradov – Zichyho palác' (Ceremony house – Zichy Palace), Repreint. [online] Available at: https://repreint.sk/interiery/dom-obradov-zichyho-palac/ (in Slovak)

Klivar, M. (1969) 'Realizace v architektuře' (Realizations in architecture), Výtvarná práce, 17(3–4), p. 1. (in Czech)

Kostka, Z. (1985) 'Problémy syntézy výtvarných umění' (Problems of the synthesis of visual arts), Výtvarná kultura, 8(4, 5, 6). (in Czech)

Necker, S. (2021) 'Kunst am Baud oder Architekturbezogene Kunst?' (Art on the building or architecture-related art?), zeitgeschichte online. [online] Available at: https://zeitgeschichte-online.de/geschichtskultur/kunst-am-bau-oder-architekturbezogene-kunst-wie-auch-immer-jedenfalls-ein [Accessed: 20 Sep 2023] (in German)

Seidel, M. (2012) 'Kunst am Bau in internationalen Vergleich' (Art in architecture in international comparison), Bundesamt für Bauwesen und Raumordnung. [online] Available at: https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/ministerien/bmvbs/bmvbs-online/2012/DL_ON152012.pdf [Accessed: 20 Sep 2023] (in German)

Škranc, P. (2017) 'Výtvarné umění jako součast architektury 60. a 70. let 20. století' (Visual arts as part of the architecture of the 60s and 70s of the 20th century), National Monument Institute, Czech Republic. [online] Available at: https://www.ma6070.cz/pamatky/architektura-60-a-70-let/ke-stazeni/wkshp2017/1_NAKI2_workshop_2017_Teoreticky-ramec_Skranc.pdf [Accessed: 25 Aug 2023] (in Czech)

Verešová, K. (2023) 'Technická univerzita vo Zvolene' (Technical university of Zvolen), Repreint. [online] Available at: https://repreint.sk/interiery/technicka-univerzita-vo-zvolene/ (in Slovak)

Vicherková, V. (2022) 'Výtvarné umění a architektura: Cesty k sobě' (Visual arts and architecture: Paths to each other), PhD thesis, Faculty of Architecture CTU, Prague, Czech Republic. [online] Available at: https://dspace.cvut.cz/bitstream/handle/10467/100917/F5-D-2022-Vicherkova-Veronika-priloha-disertace_teze_cd.pdf?sequence=-1 [Accessed: 10 Sep 2023] (in Czech)

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Rise of container structures along the Danube River in Bratislava: Transformation of the embankment after the river regulation

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Abstract: The paper traces the particular moments of historical development of the Bratislava (now the capital of Slovakia) embankment along the Danube River during the 20th century until present. The observed territory is understood as a relatively newly formed terrain that resulted as a by-product of river regulation at the end of the 19th century. The emerged space offered attractive and spacious building plots for various new typologies and rather than a compact city block, these were mostly hosted in the container-like structures. Referencing the theoretical work of De Solà-Morales, the containers are understood as self-standing, large-volume envelopes creating a controlled platform for order and consumption. Research was focused on the study of visual archival materials and contributions in architectural journals of the period. The selected aspects were subsequently displayed in the form of author's schemes, which combine map data with an axonometric representation of the described objects. The paper distinguishes three different periods of embankment development that correspond to the political and economic historical framework and highlights the specific characteristics of each of them. While the interwar era brought the concept of free-standing palaces on the waterfront, the period of socialism was generally characterised by failed ambitious plans. Finally, the period of the neoliberal transformation of the city set the new condition for real estate market and resulted in the construction boom on the waterfront. The long-awaited construction on the waterfront is now in the hands of the private sector, while containers-like residence complexes and shopping malls are ultimately raising the questions about their generic nature.

Keywords: Bratislava, Danube, embankment, urban history, post-socialist city

INTRODUCTION

Main part of the Bratislava (now the capital of Slovakia) embankment between the Lanfranconi and Apollo bridges, largely consists of private facilities built during the last two decades. Voluminous complexes that combine luxury residences and commerce are complementing the fragments of historical waterfront and currently vacant plots along the river. On a small scale, this territory illustrates the changes that the city underwent after the fall of the socialist regime under the pressure of private capital. The increasing privatisation of the riverbank puts in danger the attributes of the public space. This paper traces the particular moments of historical development that contributed to the current state of the waterfront.

The urban development of the Bratislava embankment itself was recently analysed as a result of several partially completed spatial plans and urban studies. (Moravčíková, Szalay, Haberlandová, Krišteková, Bočková, 2020) This contribution aims to describe in more detail the form and function of selected objects that were constructed on the embankment following the regulation of the river and to point out their social background. The paper distinguishes three different periods of embankment development that correspond to the political and economic historical framework and highlights the specific characteristics of each of them.

The research was focused on the study of visual archival materials and contributions in architectural journals of the period. The selected aspects were subsequently displayed in the form of author's schemes, which combine map data with an axonometric representation of the described objects. The theoretical framework of the research is represented by a phenomenological approach. For the investigation of these objects the definition of urban categories by Ignasi De Solà-Morales was applied. The development that arose on the waterfront during the 20th century and then sharply culminated in the 21st century was examined through the urban category of a *container.*

De Solà-Morales defines containers as *"the envelopes in which the ritual of consumption takes place, places where the distribution of desired goods finds its consumers ready to spend part of their accumulated wealth."* (De Solà-Morales, 1996) Containers cover large interior and exterior spaces, drawing people from the city streets into an artificial environment that creates a controlled platform for order and consumption. In addition to

the clearly commercial spaces of shopping centres, containers for De Solà-Morales are also museums, stadiums, opera houses, amusement parks, or historical monuments transformed into tourist attractions. They act as bubbles of concentrated clusters that, depending on their scale, can grow into mega projects with a multifunctional content and ambitiously assume the function of the urban core. At the end of the 19th century, the frontal line of the left bank of the Danube in Bratislava was mainly composed of residential houses built in continuous compact blocks. However, the beginning of the new century brought new typologies that the concentrated urban structure could not adopt. Available building plots for larger urban palaces emerged next to the river, in an area that resulted as a by-product of the Danube regulation.

The regulation of the Danube River in the territory of Bratislava took place from the middle of the 18th century to the beginning of the 20th century in three main phases. (Pišút, 2018) The reshaping of the river was motivated by economic, practical, or political-cultural reasons. In order to narrow the river into the desired shape, transverse stone spurs were built during the second phase of the regulation, between the years 1832 and 1834. This effort was followed up by the third phase of a systematic river channelizing between the years 1886 and 1896. The narrowing of the river and the filling up of the land on its banks subsequently continued in the first decades of the 20th century. (Pišút, 2017) The interventions carried out during the regulation of the river are considered the key moment for the subsequent construction on the embankment. The newly created sites turned out to be an ideal space for the construction of objects and areas of larger scales that could not be squeezed into the historical city.

ORIGIN OF THE CONTAINER ON THE WATERFRONT DURING THE INTERWAR ERA

Although the real consumer society and its influence on construction was fully manifested only in the period of post-socialist transformation of Bratislava, the germs of the urban container can be traced back to the first Czechoslovak Republic. After the First World War, in Czechoslovakia freed from the monarchy, following the example of other developed countries, there was a need to organise a certain kind of business fair, which would both support domestic and international trade relations and at the same time demonstrate the economic maturity of the young state. The necessary space for holding the fair was found at the then south-eastern border of the city on the new embankment terrain near the winter port, which was only drained when the river had been regulated. (Bočková, 2021a) At that time, the territory fulfilled the necessary attributes for the fair, as it was close to the river and the railway, and easily accessible from the city centre. In 1921, the main pavilion in the eastern part (later referred to as Pavilion V) and two smaller pavilions were built on a plot of land 150 meters long and 120 meters wide. A year later, a two-storey pavilion was added to the area in the western part (Pavilion Z). Over time, the market was renamed the International Danube Fair and more accurately communicated the idea of Bratislava as the business centre of Europe on the Danube.

The fair was more spectacular than a traditional marketplace. Over 1500 exhibitors participated in the first year and it was visited by almost 145,000 people, while the entire population of Bratislava at the time was around 93,000. (Komora, 2021) At the fair, sellers presented exhibition samples of goods to traders, which they subsequently ordered in bulk. The fair thus illustrated the general phenomenon of the transformation of small craft production into mass production of goods, which was gradually gaining economic dominance. These shopping festivities, which lasted on average from 8 to 13 days, were a kind of *spectacle*, as the situationist Guy Debord later elaborated on these events. (Debord, 1970) The fair included various exhibitions, entertainment attractions, fashion shows and musical productions, which the organisers used to attract mass participation. It was a show that already artfully used advertising to express what modern man needs and cannot do without. From today's point of view, we can say that the form and the content of the fair made its pavilions real containers, as described by De Solà-Morales. (Fig. 1)

At the background of the fair happenings around the port, in the interwar period, several other large free-standing buildings were built on the embankment. The neoclassical building of the Agricultural Museum (Milan Michal Harminc, 1928) was built the area of the newly formed Fajnorovo nábrežie, fulfilling its container-like character as the envelope for a cultural collection. Two other interwar realisations were manifestations of the container in its scale, as solitary units protruding from block buildings. In the eastern part of the embankment, on the Danube floodplain near the harbour close to the railway line leading over the bridge, a massive building comprising financial offices was built (Krupka, 1933) and in the western part, an extensive functionalist student dormitory complex (Šilinger, 1931) was built as the first of its kind.

The economically more promising era of the 1920s and 1930s brought arguments for the enlargement and especially the relocation of the Danube Fair. The long, relatively narrow space proved to be insufficient, and moreover, was required for the announced expansion of the port. Besides, the wooden pavilions in which the fair was located were designed with a limited lifespan and after two decades were no longer presentable or safe. (Gross, 1940) After 1939, during the period of the Slovak State, the appeal for building a representative embankment and finally the whole city intensified even more. The new form of the left bank was supposed to reflect the economic conditions of Bratislava, as the new seat of the head of state, and fulfil the role of an *"entrance gate"* to Slovakia.

The territory chosen as the new location for the exhibition centre was the western part of the embankment, the place where the river widened before the regulation. (Bočková, 2021b) A total of approximately 700,000 m^3 of gravel was poured into the section (Fig. 2, 3, 4) and in 1940 a public, anonymous competition was launched to develop conceptual designs for the exhibition centre. (Gross, 1939) There was a total of 7 competition proposals, but the jury decided not to award the first prize. The second place was awarded to the design of architects Ján Štefanec and Pavel Andrík. The architects composed the complex as a line of longitudinal halls parallel to the river. The entrance pavilion was accentuated by the shape of a 13-storey tower for administrative spaces and the rounded volume of a restaurant extended above the surface of the Danube. (Šľachta, 1991)

While the pre-war 1930s were characterised by economic growth and high construction output, thanks to German investments, the twist of the military situation at the turn of 1942 and 1943 caused supply problems and a construction slowdown. (Hrdina, 2010) However, the International Danube Fair did not have time to move to the new premises. The last annual of the fair was held in 1942, and in 1944 the exhibition complex was destroyed during the bombing of the city. The area under construction on the waterfront was no longer relevant given the change of political regime after the Second World War. The idea of a trade fair was contrary to socialist principles: suppressed private property, nationalization of enterprises and a planned economy. (Moravčíková, Szalay, Haberlandová, Krišteková,

Bočková, 2020) In the years 1951–1954, the construction and conversion of the built industrial-exhibition pavilions into cultural-social pavilions took place. The complex originally meant to host the trade fair was completed in 1955 as a Park of Culture and Recreation abbreviated in Slovak to PKO). With its programme and scale, it also represented a certain form of urban container, albeit of a non-commercial nature. In the following decades, countless balls, congresses, exhibitions, concerts, dance and singing competitions and sports events took place there.

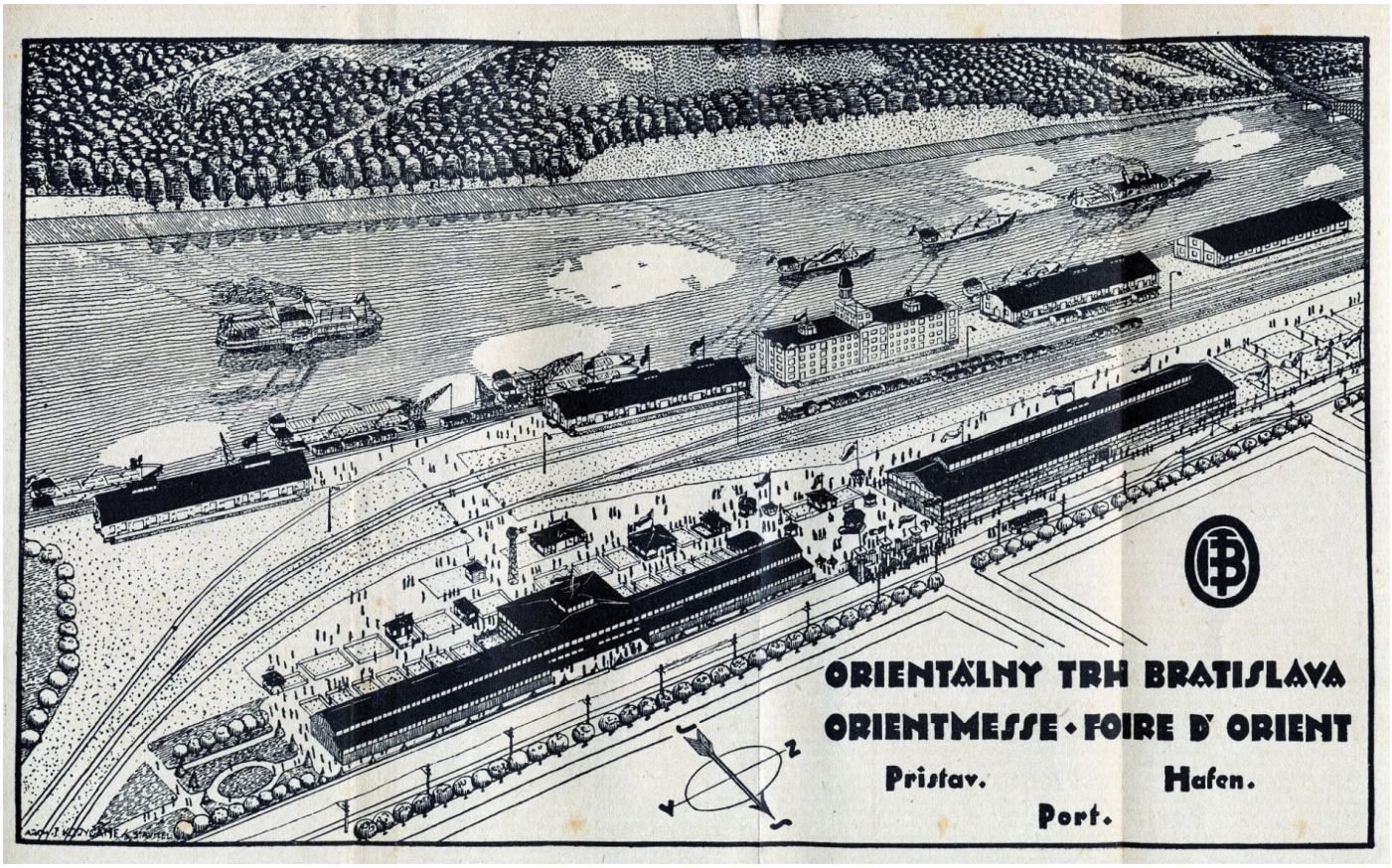

Fig. 1. Plan of the 2nd Annual Danube Fair near the winter port, 1922. Graphics: Jozef Koryčánek. (Source: Komora, 2021)

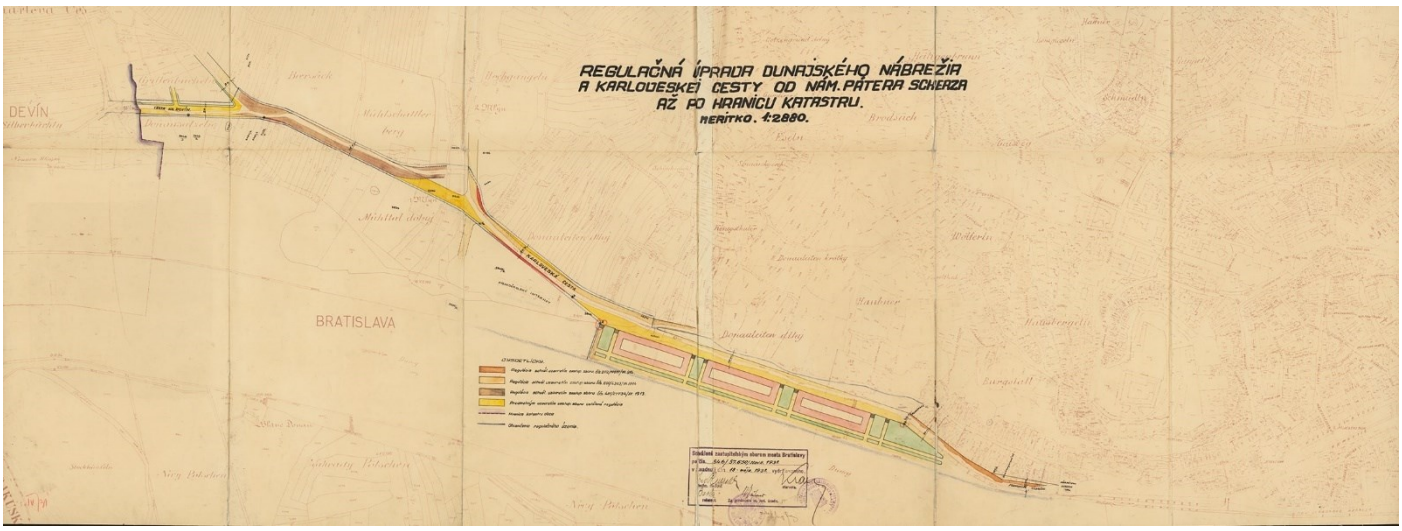

Fig. 2. Regulation of the Danube embankment approved by the Bratislava City Council in 1931. (Source: Bratislava City Archives, Fund of the Office of the Chief Architect, 1931)

Fig. 3. Construction of the embankment. Photo: Pavol Poljak. (Source: Slovak National Gallery, after 1945)

Fig. 4. Construction of the embankment. Photo: Pavol Poljak. (Source: Slovak National Gallery, after 1945)

GRADING OF VOLUMES DURING SOCIALISM

The restoration of the trade fair tradition began to be considered as early as 1963. Since Bratislava did not have any other large-capacity exhibition space, the fair eventually took place temporarily in the halls of the Park of Culture and Recreation, but at that time it had already been decided that a completely new multipurpose complex would be built. The area on the right bank of the Danube was chosen as the most suitable place for such a complex. (Bodický, 1972) The location had direct access to the river (which allowed for the establishment of a passenger port in front of the exhibition centre), it was in a convenient position in relation to the centre, and at the same time was consistent with the development tendencies of the city focused on the right bank at that time. The urban-architectural competition for the multipurpose area took place in 1972 without awarding the first prize.

At the end of 1973, the ministry assigned the task to design an exhibition centre to the studio of architect Vladimír Dedeček, who did not participate in the original competition. Several determinants were key to Dedeček's proposal: the territory was divided both by an expressway and by a protective barrier, into which engineering networks were to be inserted. The presence of both was definitively stabilised, and they fundamentally influenced the subsequent architectural-urbanistic solution. The design was limited by the investment funds and their several reductions over time, to which the architects responded by dividing the construction into three stages. The design of the new multipurpose centre (later named Incheba) was a megalomaniac project, a true container in its cubic capacity but also in its multifunctional content. The project was meant to create an autonomous "cultural and sports city" for 40,000 visitors on the right bank of the river. The construction took place between 1977 and 1989, and due to financial demands and a change in the political regime, it was implemented only to a very limited extent. (Fig. 5, 6)

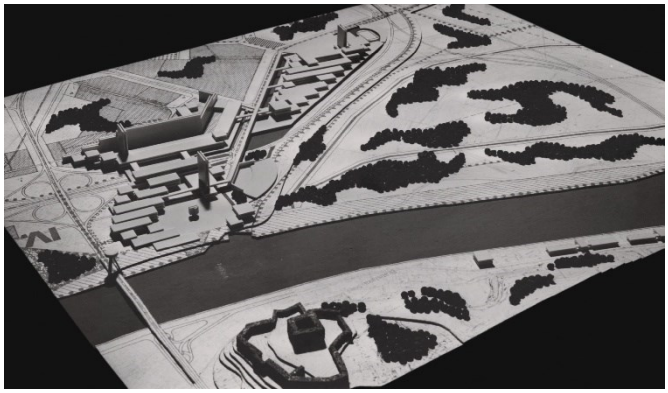

Fig. 5. Model of the originally projected Multipurpose exhibition complex on the right bank (later known as Incheba). Architect: Vladimír Dedeček. (Source: Slovak National Gallery, 1974-79)

Fig. 6. Plan of the originally projected Multipurpose exhibition complex on the right bank (later known as Incheba). Architect: Vladimír Dedeček. (Source: Slovak National Gallery, 1974-79)

Ambitious plans and at the same time the inability to implement them were characteristic of the socialist period. On the left bank, only a small fragment of the project of the Podhradie housing estate (Alois Daříček, Ferdinand Konček and Ilja Skoček, 1955) was built, even though the design included the placement of such representative solitaires, containers, as the Philharmonic, the Parliament and the College of Fine Arts. (Moravčíková, Szalay, Haberlandová, Krišteková, Bočková, 2020) Another topic discussed was the extension of the embankment to include the territory of the former factory district, where a new city centre was to be built. The form of the centre was sought in an urban planning competition, which was won by the collective of architects Jozef Lacko, Ladislav Kušnír and Ivan Slameň in 1967. Their proposal included the buildings of the central Slovak authorities in the form of a double pyramid as the main structures, and the focal point of the public space was a pair of pedestrian routes that led to the central square open towards the river. (Zárišš, 1968) However, only a few buildings were built based on the proposal and the territory of the former factory quarter was not a topic until the 1980s when it was raised again in the urban-architectural competition for the solution of the

new building of the Slovak National Theatre (1979) and subsequently in the creation of the Territorial Plan of the Martanovičova Zone (Peter Bauer, Martin Kusý, Pavel Paňák, 1982).

The spatial plan of the zone from the 1980s used "postmodern principles of the rehabilitation of a compact city" (Moravčíková, Szalay, Haberlandová, Krišteková, Bočková, 2020) based on layering and complementing the existing mass. The authors proposed to transform the former industrial area in terms of block development. The goal was also to correct the "hostile" relationship between the city and the river in the newly created 900-meter embankment. (Bauer, Kusý, Paňák, 1982) From this complex proposal for the transformation of the factory district, the construction of the Slovak National Theatre building and its forecourt (Peter Bauer, Martin Kusý, Pavel Paňák, Eduard Šutek, 1980–2007), the building of the Slovak Insurance Headquarters (Eduard Šutek, 1990–1995), and the basic street structure of the neighbourhood were realised. The rest of the district was already built in a different political-economic context with other key actors. Finally, the zone has become a new city centre, but instead of the cultural and social functions it saturates different needs of the market.

WATERFRONT SPACE PRIVATISATION DURING THE NEOLIBERAL TRANSFORMATION OF BRATISLAVA

The construction of real private container-like structures in the sense of their commercial programme and isolated form occurred on the linear space of the embankment only after the fall of socialism. The city was undergoing a post-socialist transformation, a lengthy process that led from the rejection of communism and central planning to the building of democracy with a market economy. For some time, Bratislava became a typical post-socialist city, i.e., *"a city temporarily characterised by the adaptation of the inherited socialist environment to the new political, economic and cultural conditions of capitalism."* (Sýkora, 2009) After decades of centrally managed development, the transformation resulted in an unplanned distribution of growth. (Korec, Ondoš, 2009) It took several years for this process to manifest also in the physical form of the city.

The transition to a market economy had several common features in central and eastern European capitals. In general, the crisis of expert planning and the adoption of deregulatory neoliberal policies quickly became apparent. (Cook, 2010) After 1989, Bratislava's territorial strategies also changed. A former *"caring"* socialist city has gradually become an entrepreneurial capital that did not hesitate to privatise the housing stock and sell off large areas for new, private developments. While the metropolises of neighbouring post-socialist states were changing under the influence of foreign capital, strong domestic financial elites were forming in Slovakia, which later focused their activities on the real estate market. (Šuška, 2014) The key players in urban development thus became primarily domestic businessmen and various financial groups (Penta, HB Reavis, or J&T), while the influx of foreign investors arrived only on the threshold of the millennium. A turnaround also occurred in the understanding of spatial planning documentation. The city's spatial plan represented *"on the one hand, a less flexible tool that could not grasp and influence dynamic changes in construction, on the other hand, via various changes and additions, it created space for non-transparent transactions and trading of investors, city councillors and representatives of the city administration related to specific plots of land as well as to the overall image of the city."* (Moravčíková, 2010)

The construction boom starting in the second half of the nineties and lasting practically until the economic crisis in 2007 was characterised by some new typologies, often concentrated in central locations of the city. The commercialization and expansion of the city centre, the dynamic revitalization of long-standing stagnant places inside the city, and commercial and residential suburbanization on its outskirts have become characteristic of the period. (Sýkora, 2009) The arrival of foreign companies caused a great demand for office space. From this point of view, Bratislava was underequipped, and the existing buildings could not be adapted for the purposes of open *Bürolandschaften*. A significant part of the investments was therefore directed to the construction of new office and administrative buildings (the emerging business centre phenomenon), another focused on the construction of exclusive (unavailable to the general population) residences intended in part for foreign clientele. The space for the realisation of these investments was to a large extent also the river embankment, as the one with large vacant areas available. These activities contributed to the typical post-socialist generic image of the city.

A project par excellence of this kind, which was later to occupy more than 2.5 hectares of the waterfront area to accommodate a multifunctional complex comprising administrative, residential, and commercial spaces, was River Park. The complex is the result of the real estate activities of the financial group J&T from the beginning of the millennium. At that time, the financial group already owned a fifth of the land on the embankment and in 2001 it announced an architectural and urban planning competition for the future appearance of the embankment near the Park of Culture and Recreation. The resolution adopted by the city council obliged the private investor to organise a public tender. The demanding location program assigned by the investor revealed the effort to maximise the use of the land, which several proposals solved with high-rise dominants. The jury evaluated 10 competition proposals but did not award the first prize. Already during the competition, critical voices stressed that *"the waterfront promenade is unique and should not have the character of a one-sided urban class with permanent housing and commercial polyfunction"*. (Gašparec, 2002) As a follow-up to the competition, J&T commissioned an urban study of Bratislava embankment. Functionally, the planned construction was stable, but the placement of high-rise accents remained "perplexing and unconvincing". (Svetko, 2002)

In this case, the private investor was ahead in the preparation of urban plans, which should be provided by the city by default. A rather unfortunate situation arose when the city sold land without prior formulation of the future use of the territory. The owner de facto determined the size and function of the completed construction, and the city's professional departments only subsequently set the height regulations for the future construction, to gain at least some control over its future form. Finally, in 2003, the city council changed the established regulations in favour of the investor that subsequently organised a second, this time a private invited competition, in which it chose the design of the Dutch architect Erick van Egeraat. The River Park project started a line of large developments in the central locations of the city designed by a foreign office with a famous name. The invitation of the foreign architect was undoubtedly intended to underline the stamp of lucrativeness. The project conceived according to van Egeraat as a "vibrant neighbourhood that reflects a modern cosmopolitan lifestyle" no longer considered a high-rise dominant, but several tall blocks compacted into a continuous volume.

The masterplan was then taken over by local architects (Juraj Almássy, Peter Bouda, Richard Čečetka, Ivan Masár, 2010–2011) and the project was implemented with changes. Although the accentuating element of the protruding mass above the river has been preserved, the overall result rather evokes thoughts of a generic city, as Dutch architect Rem Koolhaas described it in the early 1990s. By generic, Koolhaas means such construction

production that negates urban space by standardising it. Without the inclusion of local specifics and historical context, developments are created by the continuous recycling of what has been seen and tried already. (Koolhaas, 1998) The symbolic moment of ownership and physical transformation of the embankment was the demolition of the Park of Culture and Recreation. In 2005, the city sold the Park plots to Henbury development (a consortium of investors including J&T and Cresco Group) for 281 million Slovak korunas (about 9.3 million euros). The unfavourable sale was argued by the management at the time due to the lack of funds for the reconstruction of the derelict area. After a wave of criticism from the public, there was a 10-year period of litigation and civil activism, which, however, did not prevent the demolition of the PKO complex. The large-capacity cultural complex was definitively demolished in 2015 without any future replacement. (Fig. 7)

The left-bank development also focused on transformation of the former factory district and the regeneration of the area under the castle. After a series of numerous private competitions as well as zoning plans, the construction of mainly residential projects started only recently. The names of the new developments Zuckermandel (Juraj Almássy, Peter Bouda, Richard Čečetka, Ivan Masár, 2017) and Vydrica (Compass Architekti, planned completion in 2025), taken from the original historical settlements in the castle grounds, today name residential and administrative mega complexes with retail and with several floors of underground garages excavated in the castle hill. These projects are a perfect example of "containerisation" of the form of residential buildings. (Fig. 8)

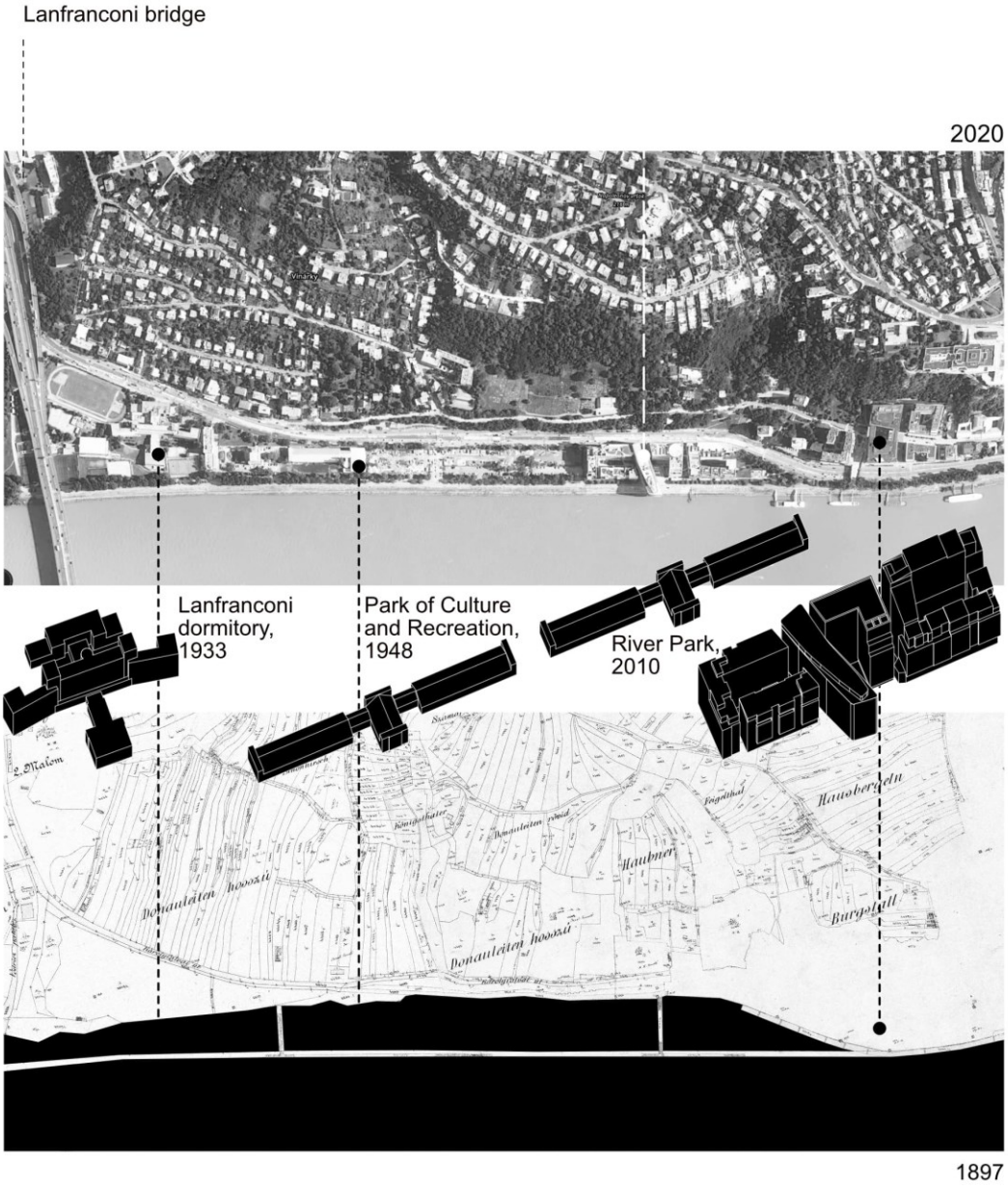

Fig. 7. The western left bank and its container structures (Source: Monika Bočková, 2022) featured on top of a cadastral map dated 1934. (Source: Archive of Geodetic and Cartographic Institute Bratislava, 1934)

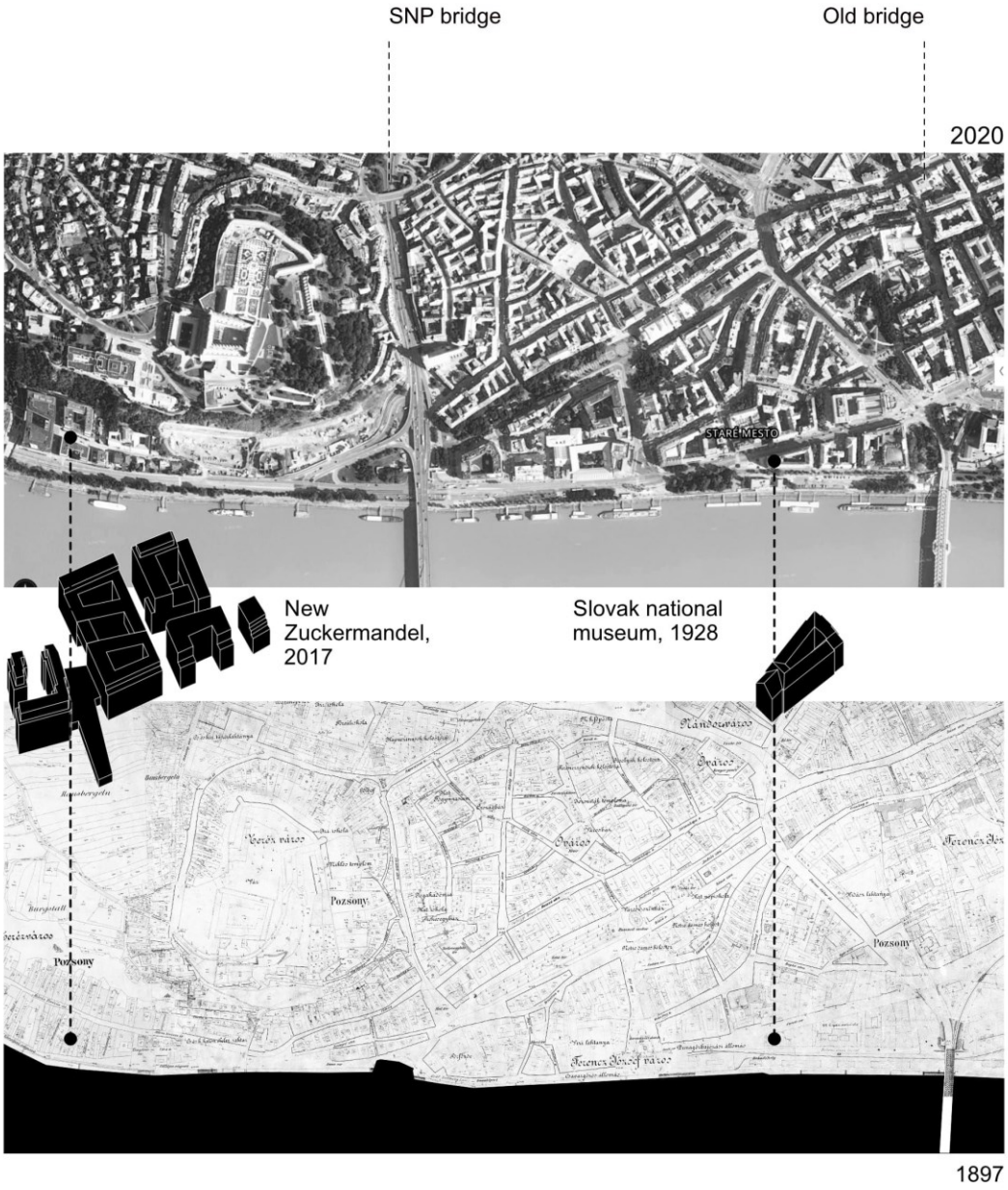

Fig. 8. The central left bank and its container structures. (Source: Monika Bočková, 2022) featured on top of a cadastral map dated 1934. (Source: Archive of Geodetic and Cartographic Institute Bratislava, 1934)

However, the containerisation of space on the banks of the Danube in Bratislava is primarily linked to the evolution of consumer behaviour and shopping culture. In the post-socialist city, retail development has skipped about 50 years of continuous evolution, and the shops selling utilitarian goods have been replaced by temples of consumption and entertainment. (Crawford, 1992) While in the past leisure activities were completely separated from shopping activities, the new arrangements of shopping malls have brought space for the fusion of entertainment and shopping. Newly, the typology of commercial premises began to be divided into "purpose-built shopping" and "recreational shopping". (Spilková, 2012) The demand for recreational shopping was saturated on the right bank by the construction of the shopping and entertainment centre Aupark (Juraj Jančina, Ivan Kubík, 2001) by developer HB Reavis. The shopping and entertainment centre with a leasable area of 44,000 m^2 (more than 58,000 m^2 after its extension in 2006) bears the name of the first public park in the Habsburg Monarchy established in the vicinity, which ironically illustrates the evolution of the leisure time activities. The Sunday walks have moved from the waterfront park to the artificial interior of the shopping mall while the mall itself creates the illusion of a city, including a pseudo-promenade and a pseudo-square with a fountain, all safely separated from undesirable low-income groups of the population. The layout resembles a public space with a video surveillance system and security guards, and the house operation policies are defined by the mall's owner.

The programme that Koolhaas describes as the most typical for a generic city (Koolhaas, 1998), i.e., offices (the need for which is still lower, but production does not decrease in any way), shopping (as the only activity we have left) and hotels (as a generic way of accommodation in a generic city and, like offices, absolutely redundant) was also applied on the left bank, in the Eu-

rovea complex. In the space between the Old Bridge and the New National Theatre, its first stage was built (Branislav Kaliský et al., 2010) by the Irish developer Ballymore properties. The second stage between the theatre and the Apollo Bridge, including the Eurovea Tower, is already being built by the domestic group J&T Real Estate. The Eurovea colossus is part of the new downtown, built in a renovated factory district.

Despite numerous studies of the new city centre, this district was only built in a neoliberal environment, according to the specific ideas of individual developer groups. Despite this, the Eurovea shopping and entertainment centre has architectural qualities and responds appropriately to its waterfront location, which gives it a place-specific character. The two stages are divided in the space of an axially composed square with an exit to the waterfront steps. Part of the development was the construction of a waterfront park with a hydraulic flood protection system. The area of the shopping and entertainment centre is thus the only articulated section of the left bank that today provides direct contact with the Danube, although the emerged public space does not carry the qualities of a public promenade. On the waterfront, which is covered with terraces of private businesses, the visitor is still a customer, and the public space is more of an attraction, a tool for the multiple consumption of our highly ritualised societies. (Fig. 9)

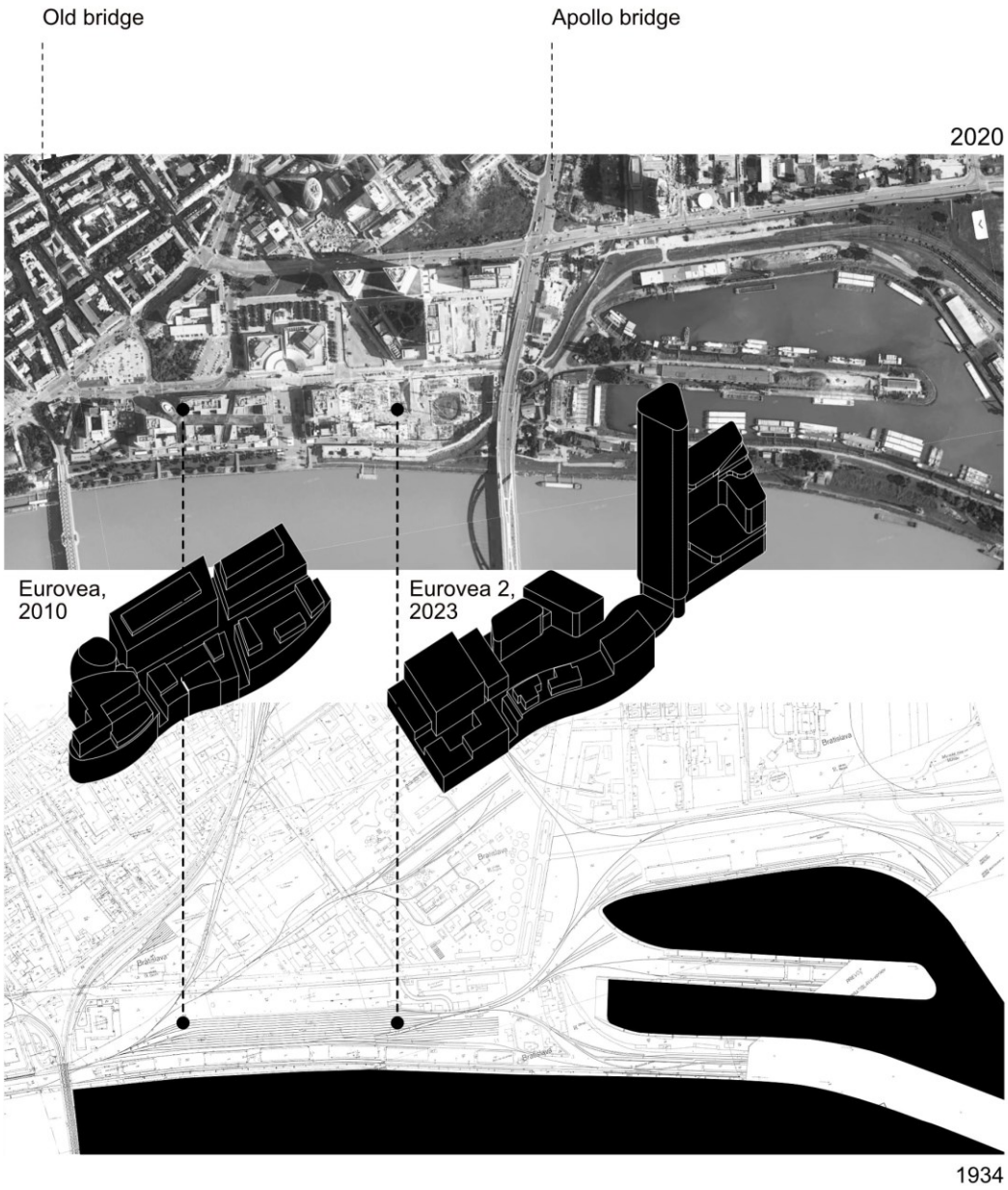

Fig. 9. The eastern left bank and its container structures (Source: Monika Bočková, 2022) featured on top of a cadastral map dated 1934. (Source: Archive of Geodetic and Cartographic Institute Bratislava, 1934)

DISCUSSION AND CONCLUSION

The current urban form of the embankment can be analysed from different points of view. This paper presents one of them, namely an insight into the historical context and conditions that defined the development of the embankment during the 20th century and until today. As it transpired, the regulation of the Danube was an important factor discussed when comparing

Bratislava to Budapest (now the capital of Hungary) and Vienna (now the capital of Austria). The city of Budapest, just like Bratislava, historically developed on the main course of the river, but on both its banks at the same time. The oldest parts of the embankment, Belvárosz on the left bank and Vizováros on the right, were arranged in the form of compact blocks with squares in the voids. The narrowing of the Danube in the 18th century supported the formation of the banks with the focus on transport along the river. It also created space for the enlargement of the Lipótváros district. A perfect example of a container-like structure from that period is the parliament building (Imre Steindl, 1902). Other free-standing representative buildings from the twentieth century are adjacent to the city parks that respect the street network.

Vienna is, on the other hand, a very specific example in its relation to the Danube. Before the regulation of the Danube, the river created wide wetlands in the city, as a patchwork of numerous streams meandering through the area. The northern flow of the river was dominant, but the city developed on a channel diverted to the south. Although plans to break through the main course of the Danube between the canal and the original course existed already in the 19th century, this idea was realised only in the years 1972–88, when the so-called New Danube and *Donauinsel* was formed. Since the embankment was created on the banks of a calm canal, it was possible to build it in two height levels in the central part and with a continuous promenade leading past the city parks as a buffer between the river and the compact urban structure.

Unlike in these two cities, Bratislava embankments were built relatively late. The development was created mainly in the second half of the 20th century and in the 21st century. It was therefore determined by other socio-economic conditions, especially the transition from socialism to capitalism. City waterfronts generally have a unique capacity to provide an open and neutral space for all kinds of social life. By their nature, they tend to be specific and unmistakable. They are often the most attractive thing that cities have to offer. While in many European cities recreational facilities are still part of the area along the river, Bratislava has not offered this option for four decades. Instead, complexes of often questionable value and generic nature are being built on its shores. Building a comprehensive and continuous embankment in Bratislava was a vision that always beyond the possibilities of the city. Today's efforts to close gap on urban development also bring valuable waterfront space, but only under the conditions of associated commerce.

Acknowledgements

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References

Bauer, P., Kusý, M., Paňák, P (1982) 'Dvesto metrov nového nábrežia. Dunaj v územnom pláne zóny Martanovičovej ulice' (Two hundred meters of new embankment. The Danube in the territorial plan of the Martanovičová street zone), Projekt, 24(10), p. 30. (in Slovak)

Bočková, M. (2021a) 'Bratislava and the planned river: Mapping the impact of the Danube regulations between 1772 and 1896 on urban development', Architektúra & urbanizmus, 55(1–2), pp. 105–111. https://doi.org/10.31577/archandurb.2021.55.1-2.9

Bočková, M. (2021b) 'River as a flow of commodities: The reasoning behind the third Danube regulation in Bratislava by Enea Grazioso Lanfranconi'. Architecture Papers of the Faculty of Architecture and Design STU, 26(4), pp. 46–54. https://doi.org/10.2478/alfa-2021-0024

Bodický, V. (1972) 'Syntéza alebo kompromis?' (Synthesis or compromise?), Projekt, 14(3), pp. 38–39. (in Slovak)

Cook, A. (2010) 'The Expatriate Real Estate Complex: Creative Destruction and the Production of Luxury in Post-Socialist Prague', International Journal of Urban and Regional Research, 34(3), pp. 611–628. https://doi.org/10.1111/j.1468-2427.2010.00912.x

Crawford, M. (1992) 'The world in a shopping mall', In: Sorkin, M. (ed.) Variations on a Theme Park: The New American City and the End of Public Space, Hill and Wang, New York, USA. ISBN 9780374523145.

De Solà-Morales, I. (1996) 'Present and Futures. Architecture in Cities', In: De Solà-Morales, I., Costa, X. (eds). Present and Futures. Architecture in Cities. Exhibition catalogue. Actar, Barcelona, Spain, pp. 10–23. ISBN 9788489698109.

Debord, G. (1970) 'Society of the Spectacle', Black & Red, Detroit, USA.

Gašparec, M. (2002) 'Bratislavské nábrežie z iného pohľadu' (Bratislava embankment from a different point of view), Projekt, 44(1), p. 33. (in Slovak)

Gross, K. (1939) 'Regulačná úprava nového dunajského nábrežia v Bratislave' (Regulatory adjustment of the new Danube embankment in Bratislava), Slovenský staviteľ, 9(11–12), p. 187. (in Slovak)

Gross, K. (1940) 'Regulačná úprava nového dunajského nábrežia v Bratislave' (Regulatory adjustment of the new Danube embankment in Bratislava), Slovenský staviteľ, 10(1–2), p. 5. (in Slovak)

Hrdina, M. (2010) 'Niekoľko poznámok o postavení architektúry v rámci prvej Slovenskej republiky (1939–1945)' (A few notes on the position of architecture within the first Slovak Republic (1939–1945)), Architektúra & urbanizmus, 44(1–2), pp. 81–97. (in Slovak)

Komora, P. (2021) 'Medzinárodný dunajský veľtrh v Bratislave 1921–1942' (International Danube Fair in Bratislava 1921–1942), Slovak National Museum, Bratislava, Slovakia. ISBN 9788080605148. (in Slovak)

Koolhaas, R., Mau, B. (1998) 'The Generic City. In S, M, L, XL', Monacelli Press, New York, USA, pp. 1239–1264. ISBN 9781885254863.

Korec, P., Ondoš, S. (2009) 'The development of urban structure of Bratislava in the time of post-socialist transformation', Quaestiones Geographicae, 28(2), pp. 31–43.

Krupka, F. (1933) 'Finančné úrady v Bratislave' (Financial offices in Bratislava), Slovenský staviteľ, 3(1–2), p. 2. (in Slovak)

Moravčíková, H. (2010) 'Bratislava: mesto bez vlastností?' (Bratislava: a city without characteristics?), Architektúra & urbanizmus, 44(1–2), pp. 34–51. (in Slovak)

Moravčíková, H., Szalay, P., Haberlandová, K., Krišteková, L., Bočková, M. (2020) 'Bratislava (Un)planned City', Slovart. Bratislava, Slovakia, ISBN 9788055646961.

Pišút, P. (2017) 'Bratislavské podhradie (Zuckermandel) a Dunaj v 17. až 20. storočí' (Bratislava suburbs (Zuckermandel) and the Danube in the 17th to 20th centuries). In: Woch (2017) Vol. 5, Bratislava Beautification Association, Bratislava, Slovakia, pp. 42–69. ISBN 9788097157739. (in Slovak)

Pišút, P. (2018) 'Využitie historických krajinomalieb na rekonštrukciu regulačných prác v koryte rieky – príklad Dunaja v Bratislave' (Use of historical landscape paintings for the reconstruction of regulatory works in the river bed - the example of the Danube in Bratislava), Geographia Cassoviensis, 12(2), pp. 173–194. (in Slovak)

Šilinger, K. (1931) 'Univerzitná kolej na Lafranconi v Bratislave' (University dormitory at Lafranconi in Bratislava), Slovenský staviteľ, 1(7), pp. 170–172. (in Slovak)

Šľachta, Š. (1991) 'Nerealizovaná architektúra v Bratislave', Projekt, 33(7–8), pp. 18–29.

Spilková, J. (2012) 'The Birth of the Czech Mall Enthusiast: The Transition of Shopping Habits from Utilitarian to Leisure Shopping', Geografie, 117(1), pp. 21–32. https://doi.org/10.37040/geografie2012117010021

Šuška, P. (2014) 'Aktívne občianstvo a politika premien mestského prostredia v postsocialistickej Bratislave', Veda, Bratislava, Slovakia. ISBN 9788089580095.

Svetko, Š. (2002) 'Sklamania z projektov dunajských nábreží' (Disappointments from the Danube embankment projects), Projekt, 44(2), p. 50. (in Slovak)

Sýkora, L. (2009) 'Post-Socialist Cities'. In: Kitchin, R., Thrift, N. (eds.) International Encyclopedia of Human Geography, Elsevier, Oxford, UK, pp. 387–395. ISBN 9780080449111.

Zárišš, F. (1968) 'Súťaž na ideové architektonické riešenie kultúrno-spoločenského centra v Bratislave' (Competition for an idea architectural solution of a cultural and social centre in Bratislava), Architektura ČSR, 27(6), pp. 346–352. (in Slovak)

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Presentation of older layers and findings on historical architecture using the method of analytical presentation: Example of the Old Town Hall in Bratislava, Slovakia

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Abstract: Analytical presentation is one of the methods used in the process of monument restoration. The method displays certain valuable older layers in the form of a cutout in the dominant layer of the facade´s surface. This article seeks to illustrate the method on the example of the facades of the Old Town Hall in Bratislava, Slovakia, and its restorations that were performed in several phases. The floor is presented in the Renaissance style – a part of the wall in medieval style over the arch of the underpass is exposed. The largest areas of analytical presentations are realized on the northern facade in the courtyard. The areas of arcades are restored in light beige colour, respecting the Renaissance colour palette. On the wall, research uncovered important medieval style findings and fragments of the chopped pillars of continuous balconies. A large-scale analytical probe encompassing two floors was realized. A system of various medieval windows, richly decorated and formed by a curved arch or triangular gable, is preserved here with some more recent openings in the Renaissance style. The main facade facing the town square could also be classified as a system of analytical presentations. The tower shows plaster in an Early Baroque style with various windows (Gothic, Renaissance, Baroque) on both facades (Main Square and Kostolná Street). Interesting are Late Gothic double windows with wimpergs. The rest of the facade facing the Main Square is prevailingly designed in the Renaissance style. But in the middle, there is a part reconstructed in the Gothic style with a rich curved decoration. Next to the tower, there is a Gothic portal with an arc and oriel above it. In the part of the Kostolná Street, there is a Gothic plaster reconstructed by applying two methods. One contains a grained plaster in sandy colour, the second has a surface with networking. Various windows and niches (medieval, Renaissance, Baroque) are present here. The complicated analytical presentations contained in the facades of the Old Town Hall raise many questions in the expert discussion.

Keywords: analytical presentation, Old Town Hall, Bratislava, façade restoration

INTRODUCTION

Caring for cultural–architectonical heritage is now anchored in the national legislation. The development of monument care – both in the practical and theoretical field – has not been easy and was manifested more expressively mainly from the 19th century. Various aspects that have emphasized different actual understandings have gradually prevailed in its concept. Two competitive tendencies began to develop approximately from the end of the 18th and especially in the 19th century: acceptance of the primary substance with smallest interventions on the one side, and the tendency (mainly resulting from practice) to replace damaged matter on the other side. Not only relating to the static need, but also concerning the aesthetic integrity of the work (Kroupa, 2021, p. 115). At the beginning of the 20th century, the experience with purism and historicism led Alois Riegel, Austrian art historian, to a radical change of view on monument care. He preferred conservation to restoration (in the sense of the word at that time). In his opinion, not only the value of the past time, but also the value of the present time enters the discourse, meaning that it is necessary to be aware of the conditionality of the means of aesthetics during development and not to make visible one period over another (summarised by Štulc, 2021, p. 23). In the conceptual apparatus, he also established the value of "aging" (Alterswert) and a "will to art" (Kunstwillen). His ideas were further developed by his scholar Max Dvořák, Czech-born Austrian art historian (Scarrocchia, 2011). As a matter of principle, the theory of the "Vienna School" laid the foundation of the analytical method. In the most extreme cases, it caused (following the monument research and findings) a petrification of the resulting status (Štulc, 2001, p. 24). In reaction to this practice, a synthetical method was created by Václav Wagner, Czech art historian (Gregor, 2008, p. 29).

Nowadays, analytical presentation represents one of the renewal methods for monuments. After its origin in the first decades of the 20th century, it was often used mainly in the 1960s –1980s. Frequently, it has been used (sometimes stereotypically) to renew facades of the monument buildings containing findings of various style adjustments. The method consists of partly applying the methodology of monument renewal, when the older layers are not only preserved and overlaid, but selected parts are directly optically presented and interact in the visual perception of the work together with the dominant work phase. During the development of a work (its rebuilding, expansion, and surface treatments), in addition to removing older layers

and artefacts, these remained largely walled of and covered by new surface adjustments. So, research of monuments often reveals older substances with important stylistic or artistic values. The value of a building increases with the level of its authenticity and grows in direct proportion to the research quality (Paulusová, 2000, p. 30). A specification of individual monument values subsequently conditions not only the need for its preservation and monument renewal (Kvasnicová, 2006, p. 268), but also their possible presentation in a new situation. The result of each research is not only a stylistic analysis of development, but the project of renewal and presentation represents another important part. It relates the definition of all types of values forming a monument content and their interpretation – that means determination and justification of the hierarchy of importance of the types of values with a need for their objectivization (Gregor, 2000a, p. 50). This is reflected in the choice of a suitable renovation method. Scientific interpretation of research findings redefines monument values of works and delivers arguments for suitability and ability of their preservation (Kvasnicová, 2011, p. 14).

In the past, certain variability of opinions prevailed with respect to the solution of surface adjustments. The proposals ranged from a full respect for historical colouring of individual works through compromises accepting the surroundings, to proposals for new colouring (Urlandová, 2000, p. 49). For monument buildings, a new colour scheme is excluded. Specific analytical materials dealt with the questions of colouring in monument surrounding and took into account research results, global context of the line of street houses, prevailing stylistic composition and also psychological influences (Grígerová, Bauer, 1982). Such general approach, however, could not be devoted to the specification of analytical presentations, which is why its underlying documents consisted of partial probes into colour conditions of individual elements and failed to uncover preserved older artefacts. The decision lies in the question, which of the discovered historical colourings is dominant for the visuality of the work. Where the findings are absent, an analogical method taking into account known situations is applied. Even today, disagreements between monument owners and methodical experts occur occasionally, mainly where the owner assigns the facade solution to a designer, who only views the building from the artistic point of view. A similar situation can be observed in the material field, as many of the colours that are of synthetical character are not suitable for historical facades. Not only for their chemical properties, but also in terms of the natural patina (detailed: Kušnierová, 2000).

Critics legitimately criticize the analytical method for destroying younger layers and disturbing the visual unity of the architectonical concept and characteristics of elements. Already Václav Wágner categorically rejected it as "analytical vivisection" of his time (Štulc, 2001, p. 25). It has rarely been used recently. Despite genuine reservations, it is not right to generalize such criticism. When choosing the method, first of all it is necessary to start from the hierarchy of values of each historical layer. The removed adjustments must be documented in detail. In specific cases, this option is supported by a standard level of younger adjustments, or rather their artistic blandness (colour, absence of morphological articles and decorations, etc., Botek, 2021, p. 127). The resulting expression of the realized analytical method is always a question of the scope of the chosen analytics, its acting within the whole and the relationship to other valuable layers. Consequently, there are cases when its use is adequate, but also when it is a questionable solution. It is not possible to decide unequivocally for all cases. The degree and specific context are the decisive factors. In an attempt to evaluate their specific methods, I wish to demonstrate some realisations by presenting the following examples from Bratislava, Slovakia.

OLD TOWN HALL

As an example, we can mention the Old Town Hall in Bratislava. As the first town hall in the region of Slovakia, the work was created by a gradual unification of several medieval buildings during the 14th and 15th century (Šášky, 1981, p. 78). The oldest part is the tower with a two–floor house in the yard, mentioned as early as 1330 (Kresánek, 2009, p. 40), but the oldest parts date back to the 13th century. Originally a house of magistrate Jacob's sons, the house was later bought by municipal council (Jankovič, Bauerová, Machová, 1984). Gradually, other houses were acquired, rebuilt, and modified several times (Fig. 1). The last unification of the facade was performed in the 19th century in the classicist style (Fig. 2).

Fig. 1. Floor plan of the Old Town Hall with development stages marked. Author: Peter Kresánek. (Source: Municipal Institute for the Protection of Monuments in Bratislava, Slovakia, Department of Documentation, Inv. Number 1719, Fig. 2.)

The Old Town Hall was an object of various researches (historical, archeologic, architectural, artistic, restorative, etc.) from the 19th century until the present (researches summarized by Musilová, Horanský, 2020, p. 114). The first great renovation was realized in the 1960s when new knowledge about its development was gathered and many important fragments of older layers and artefacts were uncovered (results of these researches were summarized by Fiala, 1987). During this renovation, the method of large analytical presentation of several older adjustments was adopted, partially by using reconstructions. The renovation performed in the 1990s was devoted mainly to the facades. Some interventions from previous actions were altered and new analytical presentations were realized. The last renovation was performed 2008–2011 and concentrated on the renovation and modernisation of the entire interior, but some parts of the facades were also covered.

The east facade in the area where the underpass opens into the courtyard is relatively narrow (Fig. 3). The floor is presented in the Renaissance style – over the arch of the underpass a part of the wall is showcased in the medieval style. Its area is receded from the younger facade above. It has a medieval-style plaster in grey shade and white networking. The underpass arch has a

white smooth passepartout. In the wall a stone label with chronology 1558 is displayed (Fig. 4). The junction of the medieval part over the arch and the Renaissance one is created by a cut-out. The largest areas of analytical presentations are realized on the northern facade in the courtyard. In the front of the wall, there is a storey arcade built with gradation of matter typical for Renaissance, built in 1581 (Kresánek, 2009, p. 41). The columns of the ground floor are wider and their spacings are larger – they form eight axes including two in the corners.

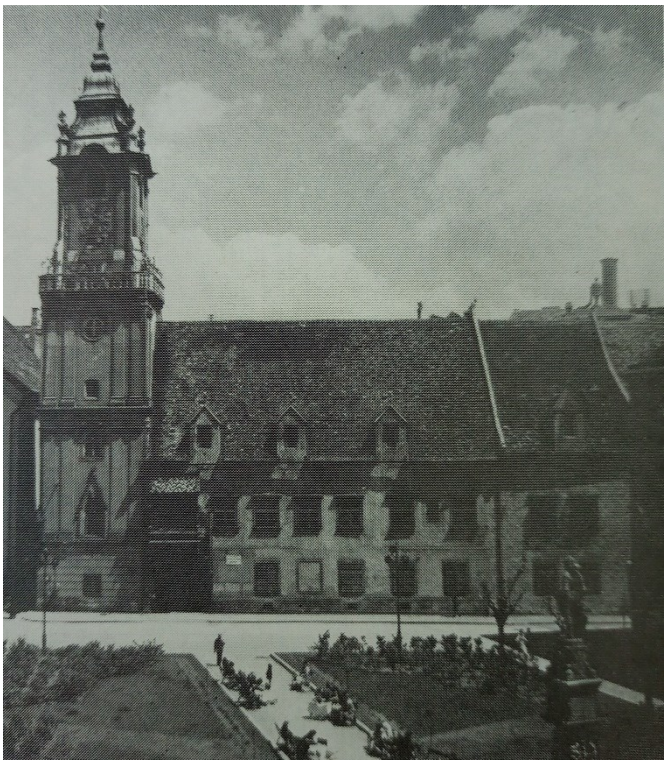

Fig. 2. The Old Town Hall in Bratislava before the restoration in the 1960s. Photo: Archives of City Museum. (Source: Šášky, Guldan, 1987)

The columns on the floor above are subtler and their rhythm is relating to the ground floor more rapidly. They form ten axes. The areas of arcades are restored in light beige colour, which respects the Renaissance colouring. The research on the wall uncovered significant medieval-style findings and fragments of the chopped pillars of the continuous balconies. A large-scale analytical probe comprising two floors was realized here. But it is not only restoration of the original layer and elements – from the wide perspective, it is a copy and reconstruction (Fig. 5, 6). Medieval plaster is imitated in the entire area – grey with white networking. In the 2nd and 3rd axe, latter portals – rectangular and round – can be found, both with black coating (Fig. 7). A more recent portal with a skylight is erected in the 5th axe. The 6th axe contains a niche with a segmentally terminated portal. Its original height is levelled below the yard. A similar subsided saddle – portal is situated in the 7th axe. The flat of the 4th axe is shown in a Renaissance form with two windows. Above them, a segment forms the wall in medieval style.

The whole wall is reconstructed in medieval style with network on the floor above. A system of various medieval windows, richly decorated and formed by a curved arch or triangular gable can be found here. Double windows, presented as walled-up niche, are formed by black stonework, richly profiled and with a triangular wimperg – gable – and situated in the 6th and 7th axe. They are formed by nun's stonework and tracery above. The windows are framed by white smooth plaster – passepartout. The window niche in the 8th axe has no stonework, but the niche in the 9th axe has a black one. The trio of niches (originally windows) with curvy form is situated in the 4th and 5th axe (Fig. 8). The middle niche is taller than the lateral ones. The system is framed by a plastic plaster decoration with cutout circles. The lower niche with segment form and pointed stonework of black colour is situated on the interface of the 5th and 6th axe. A niche in segment form with a white passepartout stands in the 3th axe. A younger rectangular portal can be found in the 2nd axe. The pillars from the Middle Ages were destroyed by the Renaissance rebuilding. Found during the research in 1966–67 (Fiala, Plachá, Leixner, 1970, pp. 337–340), the pillars are now exposed as fragments in the flat of the wall and in the pavement in a form of an octagonal trace.

Fig. 3. The eastern facade in the courtyard. (Photo: Author, 2020)

Fig. 4. The stone label with chronology 1558. (Photo: Author, 2020)

The main facade in the town square could also be classified as a system of analytical presentations (Fig. 9). Unifying adjustments from the 19th century were removed during the renovation in the 1960s–1970s and aimed at visual presentation of the original houses. Next to the Gothic tower a portal with an oriel above

can be found. This does not fall within the new analytical presentation – this composition within the Renaissance facade is original (Fig. 10). Between the two Renaissance facades, a work with large-scale analytical medieval-style reconstruction comprising the complete house can be found – so called Pawer's house (Fig. 11). Research has found fragments of facade decorations in the "Venetian Palace" style dating back to the 1420s (Kresánek, 2009, p. 40). The facade was formerly rebuilt in the Renaissance style and the windows in the same form as in the neighbouring facades are preserved (Fig. 12). The grey plaster of the contemporary Gothic reconstruction has a white network on the ground floor wall. In the middle of the wall, a niche of an entrance can be seen. During the renovation in the '90s, a former glass entrance with interesting architectonical form (from the '60s) was removed in this situation. Two little windows with curvilinear form are positioned on its both sides, also as niches.

Fig. 5. The southern facade in the courtyard – western part. (Photo: Author, 2020)

Fig. 6. The southern facade in the courtyard – eastern part. (Photo: Author, 2020)

The facade of the floor above shows composition of four curvilinear Gothic windows with a rich plastic decoration – panellation, tracery, canopies, etc. From an exact point of view, it is not a correct analytical presentation. Research has uncovered only fragments of the mentioned system. The major part was supplemented and reconstructed. This whole part of the Town Hall is a large-scale analytical reconstruction by use of original elements. It is well seen by comparing the documentation from the restoration research and from the project of reconstruction (Fig. 13, 14).

Fig. 7. The southern facade in the courtyard – middle part of the ground floor. (Photo: Author, 2020)

Fig. 8. The southern facade in the courtyard – middle part of the first floor with medieval decorations. (Photo: Author, 2020)

Fig. 9. The whole view of the Old Town Hall from the square, western façade. (Photo: Author, 2019)

Fig. 10. Detail of the northern part – next to the tower is a part with the late Gothic portal and oriel above it. (Photo: Author, 2023)

Fig. 11. The middle part with the reconstruction of medieval surface. (Photo: Author, 2023)

Another analytical presentation can be observed on the tower (Fig. 15). The extent is concentrated in a smaller part. According to research, the Renaissance window (with a stone frame with lattice) of the ground floor is reworked from a Gothic one. Over it was a pointed arch from a Gothic window. It is presented together with a medieval plaster with networking by a cutout (Fig. 16). Rich plastic bifora with a wimperg on the first floor constitutes an analytical presentation in a Baroque plaster without cutout. This window is of the same art as similar windows in the yard described above. Their coating is black, but it is sandy on the tower – a natural expression of the stone material. As a result, we can see the analytical presentation of a window on the 3rd floor above the cordon ledge. A more recent window was built into an older medieval one. The Gothic pointed frame with a nun is shown as a niche. The situation with the northern facade is similar (Fig. 17). The 1st floor has a Gothic double window same as on the main facade (Fig. 18). As opposed to it, it has a common wimperg but only two triangular gables. An older Gothic window with a pointed frame has been unwalled on the floor above. A similar window with a pointed arch can be seen on the 4th floor below the Renaissance balcony walkway. Its stone frame has not been preserved, only the original form of the opening.

Fig. 12. Detail of the southern part, reconstructed in the prevailingly Renaissance style. (Photo: Author, 2023)

In the overall evaluation of the Old Town Hall facades facing the Main Square, we can perceive a set of smaller and larger analytic presentations – reconstructions. From the right-hand side, the Renaissance part of facade is followed by a Gothic one (mainly reconstructed) and then by another Renaissance part that ends at a late Gothic portal and an oriel above it. It has tripartite

windows with canopies on corners. Above it is a roof with glazed tile in the Art Nouveau style. On the roof of these three parts, there are four Gothic dormer windows with profiled frames. At the top they have purple stone and – with the exception of the right-hand window – their surfaces are decorated with checkerboard. The tower shows plasters with Renaissance and Baroque decorations on the corner and, in addition to Renaissance and Baroque windows, also local Gothic windows on the surface.

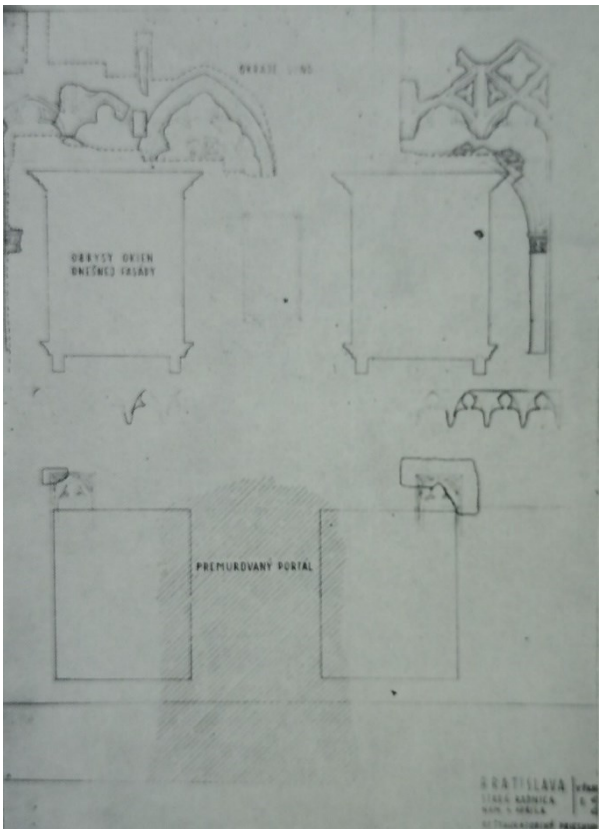

Fig. 13. The findings on the middle part during restoration research (Albert Leixner, Andrej Fiala). Reprophoto: Klement Šilinger. (Source: Šášky, Guldan, 1987)

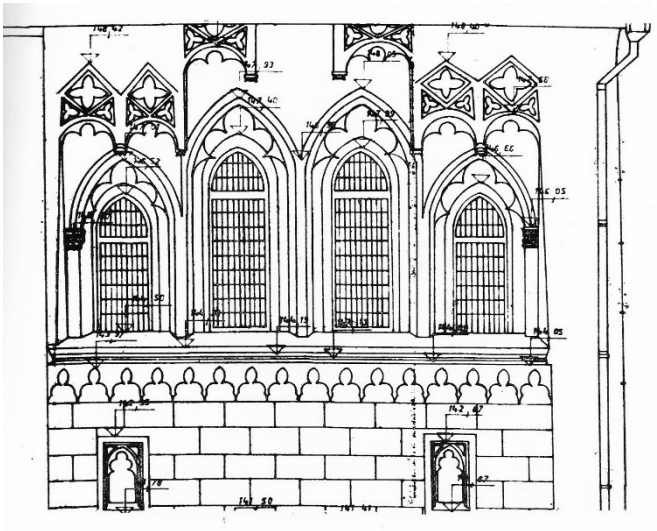

Fig. 14. The project of the reconstruction of medieval decoration of the middle façade's part. Reprophoto: Klement Šilinger. (Source: Šášky, Guldan, 1987)

An earlier analytical presentation was also realized on the lateral facade in the Kostolná Street. The tract wraps and right next to the tower the wall is increased. Within the framework of this increased section, a coarse – a sandy-coloured grained plaster is presented on the whole surface (Fig. 19). The plaster imitates a Gothic one. The wall ends at an ascending battlement over a retreated surface of the other less recent wall – surface. The ascending of the battlements proves that a counter roof was situated here formerly (Musilová, Horanský, 2019, p. 126). Various blocked-up medieval windows can be observed on the Gothic wall. Two little pointed windows with a nun decoration can be seen on the 1st floor. An opening with segmental arch and semicircular recess in the windowsill is situated below them (Fig. 20). Another medieval window with rectangular stone frame is presented approximately in the middle of the wall.

Fig. 15. The western facade of the tower with various presentations. The first floor – a late medieval double window, then a richly-decorated Baroque window, above the ledge a curvilinear medieval window and a Baroque elliptical window. (Photo: Author, 2023)

Following this part, a lower and broken one continues. The whole surface is reconstructed in the form of medieval plaster with networking and several windows from various times of origin as well. Two slanted niches – originally ventilation holes of the underground floor – are presented in the western part of this section. A similar slanted niche is situated above them on the upper floor. There is another little pointed window above it and a larger window in rectangular profiled frame with white plaster passepartout near the latter (Fig. 21), creating a system of three different windows – niches. Three Early-Baroque windows in rectangular stone frame with perimeter belt and grid are situated on the 1st floor of the next part of the wall with medieval networking. Next to the second one, an earlier Gothic window is presented (Fig. 22). Its rectangular stone frame is profiled and the niche is surrounded by a white plaster passepartout.

Evaluation

From the point of view of renovation of the facades of the Old Town Hall in Bratislava, Slovakia, we can observe different analytical presentations from different ages and in different scopes. They are not all purely analytical presentations – direct presentations of older artefacts. In many cases, there are reconstructions based on partial knowledge, analogies, or possibly known characteristics and logic of composition. It is necessary to recognise that reconstruction is eligible if it respects the authenticity of the monument. The original preserved substance of the work with the layers and other artefacts must be saved consistently (Pauliny, 2017, p. 9, Polomová, 2020, p. 27). This is how the part of the lateral street – facade and the northern yard facade can be judged. Regarding the square – façade – the result is a fragmentation of a house – row. Basically, this is a return to the medieval composition of volumes. But only the middle sector is renovated in a medieval expression. It is adjacent to Renaissance facades on both sides.

A greater degree of visual cooperation is represented by the facade of the tower, where the recent presentations are only local, not allocated significantly and they do not disturb the whole visual expression of the tower. Regarding the yard façade, two historical fronts are presented one after another. The Renaissance arcades stand in the front of the presented Gothic wall and their visual expression is independent. Thus, it does not interfere with the surface of the wall behind that is renovated in a Gothic expression. But this is a presentation of medieval findings from different medieval periods. As a result of the changed layout, naturally, functional more recent openings of this background had to remain. Due to a narrow space, the facade in the Kostolná Street has the least visual effect. It is a composition of two completely medieval reconstructing analytics of the surfaces. The medieval openings from various time periods are presented as niches. There are three functional Early-Baroque windows preserved in the eastern part. But they are situated on a surface that is modified with a Gothic network.

Fig. 16. Detail of the window on the ground floor – a curvilinear medieval form is presented analytically above a more recent window. (Photo: Author, 2023)

Fig. 17. The northern facade of the tower with various presentations. A Renaissance window on the ground floor, a late medieval double window on the first floor, then a curvilinear medieval window with stone framework, above the ledge a Baroque elliptical window and curvilinear medieval one. (Photo: Author, 2023)

Fig. 18. Detail of rich plastic bifora with wimperg on the first floor. (Photo: Author, 2020)

CONCLUSION

Architectural heritage is the continuity of conscious and subconscious integration of material and nonmaterial substance (Fifik, 2000, p. 193). Monument researches are an important part not only of knowledge about the development of specific monuments over centuries but also of the next analysis of values that appear in the methodical project of renovation. Researches involve something more than just phasing the building development and getting to know individual modifications. It is also about realizing the historical essence preserved in different layers and from different periods (Botek, 2000, p. 23). The primary condition for an architect's work in a monument area is a thorough knowledge of the resulting research materials. It should lead to the preservation of architectural and historical values with a purposeful approach to difficult development (Ševčíková, 2001, p. 52). The multi-layer structure of the determined values leads not only to the necessity of their documentation but also to efforts to make available at least part of these older artifacts, which otherwise remain under younger layers. This constitutes the essence of the analytical method in the field of the renovation of architectural monuments. Its application is time-dependent, alternately the principle of presenting only one dominant phase of adjustments is preferred. This is due to the exposure of originals to adverse climatic conditions (as long as the original and not its copy is presented), but also due to the violation of the integrity of the visual concept of the whole. Today, therefore, such interventions are approached rather rarely and only in the case of exceptional findings.

Fig. 19. The facade in the Kostolná Street – part with medieval windows, (niche), shooting range (embrasure) and battlements. Reconstructed medieval plaster. (Photo: Author, 2023)

In some situations, the results of archival–historical research can also help to know the unpreserved form (in general on the contribution of archival research in renovation Obuchová, 2000a, Obuchová, 2000b), possibly a logical shape addition or analogy. In case of analogical addition, however, it cannot be a whole, but only a detailed part. Otherwise, such usage would be spurious and highly hypothetical in many respects. For a responsible solution to the issue of presentation, especially in the case of several valuable layers, it is extremely important to know them. Therefore, the question of the current state of knowledge of the cultural–historical values of the monument should be the basis of any methodological reasoning (Neubert, 2021, p. 75). When realizing a specific form of an analytically presented element, it does not always have to be a fully preserved form. Therefore, the analytical method is often combined with reconstruction or indication.

Fig. 20. Detail of two nun windows (niches) and a former shooting range (embrasure). (Source: Author, 2023)

Fig. 21. Detail of the middle part in Kostolná Street with older medieval pointed window, younger medieval rectangular window and ventilation hole. Presented as niches. The surface is decorated with medieval network. (Photo: Author, 2023)

A presentation of older layers and adjustments is not necessary. The older layers found were recorded in the research reports, possibly in published articles. However, as time progresses, knowledge about them is lost. Even experts may not have

knowledge about all findings after several decades, unless these have been sufficiently published. Thus, only the external visual state remains, and it does not say anything about the older values preserved beneath it. It is also a question of aesthetics whether it is necessary to preserve all that is valuable. What is more important? Knowledge of older forms at the cost of visual fragmentation, or a complete image of the whole, covering up older values? In the end, every analytical presentation is only partial. It is not possible to present all older findings in their whole extent. It is always a selective choice based on hierarchy of values (about values Gregor, 2000b). These questions are under constant discussion of experts. Many have a decidedly negative opinion, mainly due to the breaking of a coherent visualisation and presentation of a form that never actually existed in such context (Solař, 2019, Vácha, 2019). Questions of conservation, presentation, surface modification, painted and decorative layers are the most common issues in the restoration of historic facades, but in practice, there are also issues of modifying sculptural elements connected with architecture (balustrades, reliefs, amphoras, statues, ...). These introduce another range of methodological and practical questions into the issue (Botek, Pilný, 2022).

Fig. 22. Detail of the eastern part with two early Baroque windows and a medieval window (as niche). The surface is decorated with medieval network. (Photo: Author, 2023)

The historical point of view in the assessment of monuments, important especially in the 19th century, lost its meaning at the end of the 20th century. Therefore, we need new arguments to ensure the right of existence in our globalising culture to the material works of the past (Maldoner, 2021, p. 17). The protection of cultural heritage is not only a protection of artistic or historical value, but also a preservation of the identification function of a cultural symbol (Schlaus, 1993, p. 23). When considering the restoration of historical buildings, we must take into account the whole range of values, incentives and contexts. An important criterion for the outcome of this activity is also professional and craft readiness, as during monument restoration there is often a need of revive traditional construction and technological procedures, mainly in choosing materials or procedures (Schneider, 2021, p. 17). Of course, the supporting principle must be the preservation of all valuable layers. This does not mean, however, an automatic presentation of older layers at the expense of the more recent ones. The resulting form must also be considered in the local context and with final point of view of the protection of all preserved artefacts. Again, this does not mean all older artefacts must be visualised. In today's conditions new technologies are also available, such as virtual realities, that – even better than selective chosen presentation – can convey older forms of development of individual works. Perhaps we are on the threshold of a period when the analytical presentation will not be necessary at all, and the relevant development forms will appear to interested parties in a digitized form.

References

Botek, A. (2000) „Niektoré aspekty interdisciplinárnych problémov výskumu architektonických pamiatok" [Some aspects of interdisciplinary problems by the research of architectonical monuments], In: Patschová, M. (ed.) Teória a prax výskumu architektonických pamiatok (Theory and practice of architectural monument research), Fakulta architektúry STU, Bratislava, Slovakia, pp. 23–25. (in Slovak)

Botek, A. (2021) „Problematika metodiky prezentácie starších vrstiev na príklade obnovy fasád historickej architektúry/Die methodische Problematik der Präsentation der älteren Schichten am Beispiel erneuerten Fassaden historischer Bauten" [Problem of the methodology of the presentation of older layers illustrated by examples from restored facades of historical buildings], In: Zíka V. et. al. (eds.) Plánování a přípravné práce/Planung und Vorbereitung (Planning and preparatory work), Col - Conference 3, Sborník z konference/Sammelheft von der Konferenz. Universität für Weiterbildung Krems, Zentrum für Baukulturelles Erbe, Krems, Austria, pp. 120–143. (in German)

Botek, A., Pilný, I. (2022) „Metodické aspekty v procese edukácie reštaurátora na príklade sôch spojených s architektúrou" [Methodical aspects in process of restorer's education by example of sculptures associated with architecture]. In: Disputationes scientificae Universitatis catholicae in Ružomberok, 22(2), pp. 23–37. (in Slovak)

Fiala, A. (1987) „Stará radnica v Bratislave" [Old town hall in Bratislava], Tatran, Bratislava, Slovakia. (in Slovak)

Fiala, A., Plachá, V., Leixner, A (1970) „Archeologický a architektonicko – reštaurátorský výskum v objekte Stará radnica" [Archaeological and architectonic – restorative research in the work Old town hall], In: Spisy mestského múzea v Bratislave (Files of the city museum in Bratislava), Vol. 6, pp. 337–362. (in Slovak)

Fifik, V. (2000) „Architektonické dedičstvo" [Architectonical legacy], In: Patschová, M. (ed.) Metodológia obnovy architektonického dedičstva (Methodology of restoration of architectural heritage), Fakulta architektúry STU, Bratislava, Slovakia, pp. 192–194. (in Slovak)

Gregor, P. (2000a) „Požiadavky na výstupy stavebno-historických výskumov z pohľadu projekčnej praxe" [Requirement of the outputs of the construction-historical research from the point of view design practice], In: Patschová, M. (ed.) Teória a prax výskumu architektonických pamiatok (Theory and practice of architectural monument research), Fakulta architektúry STU, Bratislava, Slovakia, pp. 50–51. (in Slovak)

Gregor, P. (2000b) „Kultúrno-historické hodnoty architektonických objektov, ich charakter a interpretácia významu" [Cultural-historical values of architectural works, their character and interpretation of meaning], In: Patschová, M. (ed.) Metodológia obnovy architektonického dedičstva (Methodology of restoration of architectural heritage), Fakulta architektúry STU, Bratislava, Slovakia, pp. 17–22. (in Slovak)

Gregor, P. (2008) „Vývoj teórie a praxe architektonického dedičstva" [Development of theory and practise of architectural legacy], In: Gregor, P. et al.(eds.) Obnova pamiatok (Restoration of monuments), Perfekt, Bratislava, Slovakia. (in Slovak)

Grígerová, M., Bauer, P. (1982) „Farebnosť uličných fasád objektov v ŠMPR" [Color of street facades of the works in SMMR]. In: Moncoľ, M. (ed.) Pamiatky a príroda Bratislavy 7: Zborník Mestskej správy pamiatkovej starostlivosti a ochrany prírody v Bratislave (Monuments and Nature of Bratislava 7. Proceedings of the Municipal Administration of Monument Care and Nature Protection in Bratislava). MSPSOP, Bratislava, Slovakia, pp. 211–220. (in Slovak)

Jankovič, S., Bauerová, G., Machová, A. (1984) „Gotické architektonické pamiatky Bratislavy" [Gothic architectonical monuments of Bratislava], Príroda, Bratislava, Slovakia. (in Slovak)

Kresánek, P. (2009) „Slovensko. Ilustrovaná encyklopédia pamiatok" [Slovakia. Illustrated encyklopedy of monuments], Simplicissimus, Bratislava, Slovakia. (in Slovak)

Kroupa, P. (2021) „Význam kulturního dědictví pro společnost – náčrt sociálnych dějin ochrany architektonických památek/Die Bedeutung des kulturellen Erbes für die Gesellschaft – ein Einblick in die Sozialgeschichte

des Schutzer architektonischen Denkmäler [Importance of cultural heritage for the society – sketch of the social history of the protection of architectural monuments]. In: Zíka V. et. al. (eds.) Význam kulturního dědictví/Bedeutung des kulturellen Erbes (The importance of cultural heritage), Col – Conference 1, Sborník z konference/Sammelheft von der Konferenz. Universität für Weiterbildung Krems, Zentrum für Baukulturelles Erbe, Krems, Austria, pp. 108–135. (in German)

Kušnierová, E. (2000) „Farba v metodike pamiatkovej obnovy" [Colour in the methodology of monuments reneval], In: Patschová, M. (ed.) Metodológia obnovy architektonického dedičstva (Methodology of restoration of architectural heritage). Fakulta architektúry STU, Bratislava, Slovakia, pp. 145–151. (in Slovak)

Kvasnicová, M. (2006) „Výskum architektúry pre potreby pamiatkovej obnovy" [Architectural research for need of monuments reneval], In: Monumentorum tutela/Obnova pamiatok, Vol. 17, PUSR, Bratislava, Slovakia, pp. 267–280. (in Slovak)

Kvasnicová, M. (2011) „Výskum a prezentácia architektonických pamiatok" [Research and presentation of architectural monuments], In: Architektonické listy Fakulty architektúry STU (Architecture papers of the Faculty of Architecture STU), 16(2), pp. 14–23. (in Slovak)

Maldoner, B. (2021) „Obecné zásady památkové péče/Allgemeine Grundsätze des Denkmalschutzes" [General principles of monument care]. In:
Zíka V. et. al. (eds.) Plánování a přípravné práce/Planung und Vorbereitung (Planning and preparatory work), Col - Conference 3, Sborník z konference/Sammelheft von der Konferenz. Universität für Weiterbildung Krems, Zentrum für Baukulturelles Erbe, Krems, Austria, pp. 14–25. (in German)

Musilová, M., Horanský, P. (2020) „Archeologický výskum Starej radnice v rokoch 2008-2010. Severné krídlo" [Archaeological research of Old town hall in the years 2008-2010. Northern tract]. In: Francová, Z. (ed.) Mesto a pamäť. Zborník z vedeckej konferencie (City and memory. Proceedings of the scientific conference), Bratislava City Museum, Bratislava, Slovakia, pp. 112–128. (in Slovak)

Neubert, J. (2021) „Památkář jako účastník procesu obnovy památek/Der Denkmalpfleger als Teilnehmer am Prozess der Erneuerung von Denkmälern" [Curator of monuments as a participant in the process of monument restoration], In: Zíka V. et. al. (eds.) Plánování a přípravné práce/Planung und Vorbereitung (Planning and preparatory work), Col - Conference 3, Sborník z konference/Sammelheft von der Konferenz. Universität für Weiterbildung Krems, Zentrum für Baukulturelles Erbe, Krems, Austria, pp. 72–90. (in German)

Obuchová, V. (2000a) „Význam práce historika pri výskume architektonických pamiatok" [Importance of the historian's work for research of the architectonical monuments], In: Patschová, M. (ed.) Teória a prax výskumu architektonických pamiatok (Theory and practice of architectural monument research). Fakulta architektúry STU, Bratislava, Slovakia, pp. 19–22. (in Slovak)

Obuchová, V. (2000b) „Archívno – historické výskumy – súčasť obnovy architektonického dedičstva" [Archival–historical researches – part of renewal of architectonical heritage]. In: Patschová, M. (ed.) Metodológia obnovy architektonického dedičstva (Methodology of restoration of architectural heritage). Fakulta architektúry STU, Bratislava, Slovakia, pp. 103–109. (in Slovak)

Pauliny, P. (2017) „Koncepcia pamiatkovej obnovy architektonického diela" [The Concept of Monument Renewal in Architectural Artwork], In: Architektonické listy Fakulty architektúry STU (Architectural Papers of the Faculty of Architecture STU), 22(1–2), pp. 4–13.

Paulusová, S. (2000) „Teória a prax výskumu v pamiatkovej starostlivosti" [Theory and Practice of Research in Monument Care] In: Patschová, M. (ed.) Teória a prax výskumu architektonických pamiatok (Theory and practice of architectural monument research). Fakulta architektúry STU, Bratislava, Slovakia, pp. 26–30. (in Slovak)

Polomová, B. (2020) „Prezentovanie kultúrnych vrstiev na pamiatke I" [Presentation of the cultural layers on a monument I], In: Eurostav, 26(3), pp. 26–28. (in Slovak)

Šášky, L. (1981) „Kamenná krása našich miest" [Stone beauty of our cities], Osveta, Bratislava, Slovakia. (in Slovak)

Šášky, L., Guldan, F. (1987) „Mestská pamiatková rezervácia Bratislava v minulosti a dnes" [City monument reservation yesterday and today], Mestská správa pamiatkovej starostlivosti a ochrany prírody (Municipal administration of monument care and nature protection), Bratislava, Slovakia. (in Slovak)

Scarrocchia, S. (2011) „Dvořák and the Trend in Monument Care", In: Ars, 44(1), pp. 45–67.

Schlaus, R. (1993) „Kulturgüterschutz als Teil der Identitätsfindung" (Protection of cultural assets as part of finding identity), In: Sladek, G. (ed.): Das kulturelle Erbe in Risiko der Modernität (Cultural heritage at risk of modernity). Salzburger Symposium. Österreichische Gesselschaft für Kulturgüterschutz, Wien, Austria, pp. 23–34. (in German)

Schneider, B. (2021) „Řemesla a památková péče/Handwerk und Denkmalschutz" [Crafts and monuments care], In: Zíka V. et. al. (eds.) Restaurování a řemesla/Restaurierung und Handwerk (Restoration and crafts), Col - Conference 4, Sborník z konference/Sammelheft von der Konferenz. Universität für Weiterbildung Krems, Zentrum für Baukulturelles Erbe, Krems, Austria, pp. 14–21. (in German)

Ševčíková, Z. (2001) „Problém uplatnenia výsledkov umelecko-historického výskumu v tvorivej práci architekta" [Problem of applying the results of artistic-historical research in the creative work of an architect], In: Patschová, M. (ed.) Architektonická tvorba v historickom prostredí (Architectural creation in a historical environment), Fakulta architektúry STU, Bratislava, Slovakia, pp. 52–54. (in Slovak)

Solař, M. (2019) „Existují výnimky, ale analytický přístup k restaurování památek je zločin" [There are exceptions but the analytical approach to the restoration of monuments is a crime], In: Zborník prednášok 17. medzinárodného seminára o reštaurovaní (Proceedings of the 17th International Seminar on Restoration), Záhorie, Restau art, Senica, Slovakia, pp. 128–147. (in Czech)

Štulc, J. (2001) „Vývoj teorie památkové péče a její vztah k architektonické tvorbě" [Development of the Theory of monuments care and its relation to architectural work], In: Patschová, M. (ed.) Architektonická tvorba v historickom prostredí (Architectural creation in a historical environment), Fakulta architektúry STU, Bratislava, Slovakia, pp. 21–31. (in Slovak)

Urlandová, A. (2000) „Metodické prístupy k riešeniu farebnosti v historických štruktúrach" [Methodical approaches to the solution of color in historical structures], In: Metodológia obnovy architektonického dedičstva (Methodology of restoration of architectural heritage). Fakulta architektúry STU, Bratislava, Slovakia, pp. 47–50. (in Slovak)

Vácha, Z. (2019) „Polychromie a prezentace kamene" [Polychromy and the presentation of stone], In: Zborník prednášok 17. medzinárodného seminára o reštaurovaní (Proceedings of the 17th International Seminar on Restoration), Záhorie, Restau art, 2019, Senica, Slovakia, pp. 56–67. (in Czech)

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Summaries

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ARCHITECTURAL ALCHEMY: LEVERAGING ARTIFICIAL INTELLIGENCE FOR INSPIRED DESIGN – A COMPREHENSIVE STUDY OF CREATIVITY, CONTROL, AND COLLABORATION

Lenka Petráková, Vladimír Šimkovič

Keywords: design, architecture, artificial intelligence, AI, creativity

Traditional architectural design provides a human-centric and intuitive way of creating spaces based on personal creativity, experience and cultural history. The final design usually unfolds linearly with predetermined approaches set in early stages, and sometimes, the experience can overshadow objective evaluation. In contrast, the design approach enhanced by Artificial Intelligence (AI) leverages technology to expand the boundaries of inspiration and creativity, offering new ways for exploration and innovation. AI enhances creativity by allowing architects to experiment with novel forms, structures, and ideas at an unprecedented pace. This fosters an environment where architects can explore and innovate more freely and faster without the typical constraints of manual design.

This research paper explores the complex role that Artificial Intelligence can occupy in architectural design. Contrary to the view of AI as a mere utility tool, the paper posits that AI can function as a collaborative partner, advancing human creativity by offering innovative design possibilities. Originating from 1950s computer science explorations, AI has come a long way to permeate various industries, including architecture, where it is notably propelled by recent advances in machine learning algorithms like Generative Adversarial Networks (GANs).

This paper delves into the effectiveness of AI-driven design approaches, exploring new ways of inspiration and innovation in the architectural sector while researching how we can control AI in the design process and use it as a tool instead of an autonomous designer. When working with the two platforms (Midjourney AI and Stable Diffusion), the questions are multifaceted and require careful consideration: How do text-to-image and image-to-image generation algorithms contribute to a more vivid visualisation of designs? How can we enable greater control and flexibility in the design process? What are their comparative strengths and limitations in the context of architectural design? How can AI's role be moderated within the design process to ensure it functions as a collaboratively interactive tool rather than an autonomous designer? By focusing on these questions, the paper aims to investigate the mechanics of these platforms, evaluating their relative capabilities and providing insights into how they can be effectively harnessed in modern design practices.

To empirically validate these concepts, our paper conducts a comprehensive three-phase investigation featuring nine tests that meticulously assess the strengths and shortcomings of two leading AI platforms: Midjourney AI and Stable Diffusion. These

platforms harmonise human creativity with AI-generated solutions by utilising features such as text prompts and image references, and they open up unprecedented avenues for innovation in architectural design.

Our comparative analysis shows that Midjourney AI excels in creating initial design concepts based on text prompts, mainly due to its extensive data libraries. However, it is deficient in refining these designs and providing designers with adequate control. Conversely, Stable Diffusion offers greater control to designers through features like ControlNet, enabling the selection of various control mechanisms. Nevertheless, Stable Diffusion's generated visuals may lack definition compared to Midjourney AI, mainly because its generative models are smaller. In both systems, a standard limitation is an emphasis on shape and aesthetics at the expense of understanding the functionality of the given geometry.

Building on our empirical findings, the paper illustrates how designers can exert nuanced control over this emerging AI-driven design methodology to optimise workflow. The tests we conducted provide invaluable insights into these AI platforms' capabilities and limitations. They also offer practical guidelines for overcoming these challenges through a balanced, hybrid approach that amalgamates the best elements of Midjourney AI and Stable Diffusion. Instead of positioning AI as a rival to human ingenuity, our methodology envisages it as a valuable adjunct, enhancing the collaborative potential between humans and machines in architectural design.

The research validates two key hypotheses regarding the harmony of creativity, control, and collaboration, stressing that human architects and AI platforms benefit from iterative feedback and ongoing adaptation. In conclusion, the study asserts that AI is not just a technological supplement but a transformative catalyst that has the potential to redefine the architectural design process fundamentally. It further emphasises that while AI can amplify and extend human creative instincts, the essence of creativity remains a uniquely human attribute. As such, the paper foresees a future for architectural practice that is both technologically advanced and artistically profound, thereby heralding a new paradigm in which human expertise and machine capabilities coalesce to create enriched design outcomes.

In summary, this paper contributes significantly to the ongoing conversation about integrating AI and machine learning in architectural design. The paper advocates for a balanced, dynamic partnership between human creativity and technological innovation, explaining the transformative potential inherent in such collaborations.

COLOUR IN THE ENVIRONMENT FOR OLDER ADULTS

Monika Hencová, Veronika Kotradyová

Keywords: social inclusion, older adults, health, interior, furniture, colours

A large part of public and residential interiors is not designed for or adapted to the needs of older people. The trend of aging population is a demographic phenomenon, but its consequences affect the entire society. One of the priorities of the modern society is to address the issue of social integration of people with disabilities. Many professional articles and publications have been published, which have led to the development of guides and documents related to barrier-free accessibility. It should be a new standard to level the visiting opportunities for all types of people. Accessibility is an essential part of new buildings, but also of the renovation of older architecture. It is not only people with health, hearing, visual, or other disabilities who encounter problems in the public environment, but social inclusion also concerns other vulnerable groups of the population – children, mothers with strollers, neglected people, and older adults. The vision is to improve the quality of life without discrimination. In designing, the diversity of people, their needs, and constraints must be considered so that all users feel equal and have the same opportunities to be an active part of the community. Approaches to designing environments that address the diversity of people's needs and requirements are called human-centred design, which encompasses universal design, design for all, inclusive design, user-friendly design, design for all ages, and accessible design. Living in your own home for as long as possible is one of

the most important requirements of aging people. Their desire is to be as self-sufficient as possible. The living space for older adults with mobility impairments needs to be adapted to allow sufficient room to manoeuvre and change directions. Their greatest need is for safety, functionality, and comfort.

As we age, our visual perception changes, but so does our sensitivity to certain colours. Age-related changes in vision occur in all layers of the eye and can have different effects. First of all, the change in vision is caused by the tissues of the eyelids and the muscles around the eyes becoming flaccid. The biggest changes affect the lens of the eye, which hardens, thickens, and becomes less flexible. Changes to the lens allow less light to enter the eye and make it harder to recognize the environment a person is in. The most common problems associated with vision loss are loss of central vision, which allows us to see fine details and colours, blurring of the eye, reduced sensitivity to contrast, reduced ability to see in low light or at night, difficulty seeing objects up close, loss of normal vision, and also increased sensitivity to glare.

Whether it is adapting existing rooms in the home or designing a public service space, colour plays an important role in the space. When used purposefully, colour is a powerful tool that can not only enhance design aesthetics but also greatly help older adults feel independent and safe. Elements that can compromise our safety should be designed in contrasting colours. Moving through space is a multisensory experience. People use most of their senses such as sight, hearing, smell, and touch in addition to moving their bodies. Disorientation and unfamiliarity with the environment can increase fear in people and have a negative impact on their overall well-being. Flooring in areas designed for older adults should be designed in contrast to the walls and should be complemented with relief features such as artificial guidelines of different textures and colours. Older adults may be disoriented or feel unsafe if the space blends before their eyes and they cannot determine where they are walking. Alternating the colours of floor coverings, marking the purpose of rooms with embossed signs, or other wayfinding signs are helpful in supporting older adults‘ orientation. In circulation areas, there should be no obstacles on the ground that restrict the movement and safety of older adults. Safe floors should be solid, uniform, and protected against abrasion and slipping. The choice of solid floor coverings or tiles that do not shimmer is appropriate so as not to impair spatial orientation. If a carpet is used, it is advisable that it is low pile and passable by wheels. Carpeted floors have several major advantages. Carpets transmit fewer pathogens to the hands than vinyl or rubber floors, and some serious pathogens survive for a shorter time. They reduce noise and glare, make walking easier, reduce the likelihood of falls and subsequent injuries, and prolong visits with family and friends (increasing social support).

The colour scheme of the individual zones in the apartment can be a good aid to spatial orientation. Furniture elements or doors, for example, should have a contrasting colour to the wall on which they are mounted. Contrasting or different colours should also be used for elements or objects that may pose a safety risk to users. Warm and pleasant to the touch colours are preferred for furnishings. The monotony and lack of sensory stimuli in interiors can hinder users' orientation as they lack the visual cues needed to identify architectural elements. Colour contrasts in interiors need not be limited to walls and floors; the contrast between stair arms and walls, and colour highlighting of important points and zones is also appropriate. Aging eyes lose the ability to distinguish bright colours, making yellows and other pastel colours appear white. Shades of blue, green, and purple are classed as cool colours and can be seen as grey. People with colour deficiency are best able to perceive bright colours at the warm end of the spectrum, such as red and orange.

Colour can significantly help with orientation in space, but it is the architect who addresses the core principles. Spaces for the elderly should be organized, clear, and allow natural movement. Orientation in space is also closely related to the navigation system integrated in it. A wayfinding system in spaces for older adults helps with spatial orientation and navigation. A good navigation system is clear, understandable, intuitive, and non-verbal. Many studies can now be found that examine the impact of physical elements on well-being in health care settings for older adults, but few are concerned with colour. These homes often have neutral to hospital-style facilities. Instead of institutional aesthetics, one should begin to think about adding more of a sense of home, and colour may be one of the most useful elements for this purpose. In

addition, colour can be used to emphasize the difference between rooms designed for relaxation and those designed for activities.

FINE ART AS AN INTEGRAL PART OF ARCHITECTURE: POLITICAL AND SOCIAL ASPECTS OF THE FORMATION OF THIS SYNTHESIS IN THE 20TH CENTURY

Peter Mazalán, Katarína Morávková

Keywords: fine arts, politics, synthesis, architecture, history

The theme of the connection of visual arts with architecture, or the cooperation of visual artists with architects in post-war Europe, basically follows two lines: a theoretical line and a political-institutional line. Especially in Eastern European architecture and socialist construction, art had specific conditions for its emergence between 1950 and 1989. Two terms arose in the German environment that are also used in principle in translations in other parts of Europe: the term "architekturbezogene Kunst" (architecture-related art), used by the Bauakademie as an official technical term in the German Democratic Republic, and the phrase "Kunst am Bau" (art in architecture) referring to the same concept in the democratic Federal Republic of Germany, however, the term was intended to have a primarily educational function.

Aesthetic education thus had the function of conveying socio-political messages. Just as knowledge of the history of art and the history of architecture is necessary for analysing this period, knowledge of the political-economic circumstances is necessary in the field of realisations in architecture, because by definition this public art is a political affair and not independent creation. Art in architecture was promoted not only in communist countries (for ideological reasons), but also in Western Europe as an aesthetic cultivation of contemporary architecture. From the mid-1950s onwards, visual art in architectural space appeared more and more frequently, which led to the adoption of legislative measures that regulated and supported this practice. A gradual transformation in the understanding of the task can be observed over the period under review, or the position of "public art", presented as part of architecture or public space. This is naturally attributed to social development. If at the beginning of the 1950s the mission was to convey ideology and indoctrinate it, in the next period the focus shifts more towards design with the task of cultivating the "environment" and creating a certain atmosphere.

The study also peripherally explores forms of arts support in the context of other European countries. The idea of integration between art and architecture dates back to the very origins of both disciplines. During the avant-garde movement at the beginning of the twentieth century, it acquired a new meaning and social purpose and became one of the most defining characteristics of modernism. Modernism arose from the expectation of moral and material reconstruction of the world devastated by war, which served as a tool to strengthen collective identity and, consequently, to forge the bond between the city and its inhabitants.

Our study traces the development of the relationship and funding of visual arts in architecture in the Slovak and European context in the 20th century. In 1965, Government Resolution No. 355/1965 was adopted in Czechoslovakia. Art in architecture was considered to be a work that constitutes an integral part of architecture and its design was already part of the project documentation. In practice, these works were placed in public spaces, in the interiors of buildings or in the immediate vicinity of buildings' exterior, or were part of the design of a housing estate. The works are often fixed into the architectural framework, which means that they cannot be manipulated in any other way, they can only be destroyed. Furthermore, our paper deals with the ongoing research of works of art created in the context of architecture in Slovakia.

RISE OF CONTAINER STRUCTURES ALONG THE DANUBE RIVER IN BRATISLAVA: TRANSFORMATION OF THE EMBANKMENT AFTER THE RIVER REGULATION

Monika Bočková

Keywords: Bratislava, Danube, embankment, urban history, post-socialist city

The paper observes the space along the Danube River in Bratislava as a relatively newly formed terrain, which was created as a by-product of the river regulation at the end of the 19th century. The emerged space offered attractive and spacious building plots for various new typologies and rather than a compact city block, these were mostly hosted in the container-like structures. Referencing the theoretical work of De Solà-Morales, the containers are understood as self-standing, large-volume envelopes containing large interior and exterior spaces, drawing people from the city streets into an artificial environment that creates a controlled platform for order and consumption. The paper distinguishes three different periods of embankment development that correspond to the political and economic historical framework and highlights the specific characteristics of each of them. The first, interwar era brought the concept of freestanding palaces on the waterfront, be it a student dormitory, a national museum, or an art association building. However, the most prominent topic was the International Danube Fair and the pavilions that would host such an event. The fair was more spectacular than a traditional marketplace. These shopping festivities, which lasted on average from 8 to 13 days, were a kind of spectacle, as the situationist Guy Debord later elaborated on these events. The fair was originally held in the premises near the winter port, but later it was considered it should move to the western part of the embankment, on the former Danube alluvium. In the second period, after World War II, the socialist regime took over the under-construction exhibition complex on the waterfront to complete it as a Park of Culture and Recreation. The period of socialism was generally characterized by ambitious plans on both sides of the river, but at the same time, the inability to implement these plans in full. This phenomenon is well illustrated by the construction of the Podhradie housing estate and the construction of the multi-purpose exhibition complex (later named Incheba), which were implemented only to a limited extent, in a fragmentary manner. Finally, the construction of real private container-like structures in the sense of their commercial program and isolated form occurred on the linear space of the embankment only after the fall of socialism. The city was undergoing a post-socialist transformation, a lengthy process that led from the rejection of communism and central planning to the building of democracy with a market economy. After 1989, Bratislava's territorial strategies also changed. A former “caring” socialist city has gradually become an entrepreneurial capital that did not hesitate to privatize the housing stock and sell off large areas for new, private developments. Together with the formation of strong domestic financial elites, these factors set the new condition for the real estate market and resulted in the construction boom on the waterfront. The long-awaited construction on the waterfront is now in the hands of the private sector, while containers-like residence complexes and shopping malls are ultimately raising the questions about the public space and Rem Koolhaas's idea of the "generic". The current construction on Bratislava’s embankment can be analysed from different points of view. The paper presents one of them, namely an insight into the historical context and the conditions that defined the nature of waterfront development in the 20th century. For construction in the 21st century, other actors and other policies and the economic situation were critical. Nevertheless, the article tries to compare the volume and content of these new developments. It transpires that each era produces its characteristic layer in the urban fabric, and the one we experience today is no different. The paper concludes that the city waterfronts generally have a unique capacity to provide an open and neutral space for all kinds of social life. They are often the most attractive thing that cities have to offer. While in many European cities recreational facilities are still part of the area along the river, Bratislava has not offered this option for four decades. Instead, complexes of often questionable value and generic nature are being built on its shores. As the history shows, to build a public and continuous embankment in Bratislava is a vision that has always been beyond the possibilities of the city. Today's efforts to close the gap on urban development also bring valuable waterfront space, but only under the conditions of associated commerce.

PRESENTATION OF OLDER LAYERS AND FINDINGS ON HISTORICAL ARCHITECTURE USING THE METHOD OF ANALYTICAL PRESENTATION: EXAMPLE OF THE OLD TOWN HALL IN BRATISLAVA, SLOVAKIA

Andrej Botek

Keywords: analytical presentation, Old Town Hall, Bratislava, façade restoration

Analytical presentation is one of the methods used in the process of monument restoration. After its origin in the first decades of the 20th century, it was often used mainly in the 1960s–1980s. Frequently, it has been used (sometimes stereotypically) to renew facades of the monument buildings containing findings of various style adjustments. A specification of individual monument values subsequently conditions not only the need for its preservation and monument renewal, but also their possible presentation in a new situation. Critics legitimately criticize the analytic method for destroying younger layers and disturbing the visual unity of the architectonical concept and characteristics of elements. The resulting expression of the realized analytical method is always a question of the scope of the chosen analytics, its acting within the whole and the relationship to other valuable layers. Consequently, there are cases when its use is adequate, but also when it is a questionable solution.

As an example, we can mention the Old Town Hall in Bratislava, Slovakia. The work was created by gradual unification of several medieval buildings during the 14th and 15th century. The oldest part is the tower with a two–floor house in the yard, mentioned as early as 1330, but the oldest parts date back to the 13th century. Gradually, other houses were acquired, rebuilt, and modified several times. The last unification of the facade was performed in the 19th century in the classicist style. The first great renovation was realized in the 1960s when new knowledge about its development was gathered and many important fragments of older layers and artefacts were uncovered. During this renovation, the method of large analytic presentation of several older adjustments was adopted, partially by using reconstructions. The renovation performed in the 1990s was devoted mainly to the facades. The last renovation was performed in 2008–2011. Today, we can observe various historical restorations of the facades with various analytical presentations.

The largest areas of analytical presentations are realized on the northern facade in the courtyard. In the front of the wall, there is storey arcade (dated 1581) built with gradation of matter typical for Renaissance. The back wall is reconstructed in the medieval style with medieval windows and openings (some as niches); younger perforations are shown in various parts. The facades facing the Main Square are divided into four segments. The former style dating back to the 19th century showed it in a single visual style. The southern part is designed with the Renaissance style prevailing, another part is designed in a late medieval style with reconstruction of a rich plastic decoration. The northern part is characterized by a Renaissance expression with a late Gothic arch and portal with an oriel above it. The tower in the corner of the square and the street is shown in the visual form of the Baroque style with a Renaissance balustrade. On the facades, various medieval windows are presented in the form of openings or niches. The major visual effect is created by rich plastic bifora with wimpergs on the first floor. The facade in the narrow Kostolná Street shows a reconstructed medieval plaster with curvilinear windows (niches) and a presentation of battlements in the western part. The rest of the wall shows another Gothic style (with a network) and larger windows, some of them from the Baroque period.

Monument researches are an important part not only of knowledge about the development of specific monuments over centuries but also of the next analysis of values that appear in the methodical project of renovation. The primary condition for an architect's work in a monument area is a thorough knowledge of the resulting research materials. Questions of conservation, presentation, surface modification, and painted and decorative layers are the most common issues in the restoration of historic facades, but in practice there are also issues of modifying sculptural elements connected with architecture (balustrades, reliefs, amphoras, statues, ...). The multi-layer structure of the determined values leads not only to the necessity of their documentation but also to efforts to make available at least part of these older artifacts, which otherwise remain under younger layers. This constitutes the essence of the analytical method in the field of the renovation of architectural monuments. A presentation of older layers and adjustments is not necessary. What is more important? Knowledge of older forms at the cost of visual fragmentation, or a complete image of the whole, covering up older values? In the end, every analytical presentation is only partial. It is not possible to present all older findings in their full extent. The use of the analytical method remains an object of discussions among experts.

The restoration of the Old Town Hall is a good example not only for various analytical presentations, but also concerning the questions about the rate of using this method in specific conditions and their influence on the visual perception. The protection of cultural heritage is not only protection of artistic or historical values, but also a preservation of the identification function of a cultural symbol. And the Old Town Hall in Bratislava fulfils this requirement significantly.

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Summary of approved PhD theses

Natália Bošková Filová
Petra Huraiová

MUSEUMS FOR CHILDREN?

Ing. arch. Natália Bošková Filová, PhD.

It is important for the society to offer possibilities to participate in cultural events in museums to all groups of people. Likewise, museums are hugely important in the life of children, playing a role in their education, artistic sensitivity, and socialisation. This dissertation aims at finding out whether it is significant and beneficial to have a museum for children as a separate object or facility. Such a museum would come in addition to exhibitions created for children as part of regular museums and galleries, which are more widespread in our region. The thesis focuses on a children's museum concept in the context of Central Europe, where the stand-alone children's museums are scarce. Thus, also the architecture of museums that target child visitors only in the form of specific exhibits or parts of exhibitions dedicated to them is analysed and examined through case studies. Playful solutions, multisensory and interactive design are applied to ensure that children are able to absorb the necessary information. Four main functions of traditional museums and museums for children have been identified, namely the collection, educational, exhibition, and inclusion functions. These functions are explored using different methods in order to derive recommendations for designing a quality museum for children that would address each of these functions. On the theoretical level, the research visions are developed through the study of scientific publications and project documentation. Field research in the context of BIBIANA – International House of Art for Children in Bratislava, Slovakia, and other museums was also employed and so were model projects in cooperation with students of the Faculty of Architecture and Design of the Slovak University of Technology under the Universal Design course. Another research tool are surveys and interviews conducted to investigate the interaction of children and young people in the museum spaces and their preferences. Furthermore, research by design of creative solutions in the museum for children was applied. The architecture of the museum should have an easy-to-understand layout that promotes clear navigation in the building. Good quality spatial solutions can create the atmosphere of concentration, relaxation, experiences, and stories, and thus contribute to the education, learning and developing taste in children. The way in which spaces are composed in a museum, the degree to which they are free or articulated, and tour routes are all of high importance. It is essential that the architecture of the museum for children is consistent with the principles of Universal Design enabling as many diverse people as possible to make full use of the environment, so that the museum can be enjoyed equally by children and adults with different needs and of different age.

PhD thesis approved at the Faculty of Architecture and Design STU in Bratislava, Slovakia, in the study programme Architecture

PRINCIPLES OF TIME MEASUREMENT AND THEIR DEVELOPMENT USING INTELLIGENT TECHNOLOGIES

Mgr. art. Petra Huraiová, ArtD.

The submitted dissertation thesis describes the complex concept of time from the perspective of society and design development. Based on previous research, the concept of time can be subdivided into objective and subjective. Objective time is defined as one of the components of the resulting outcome in the design process ("designing time"). The measurement of time is determined by a mathematical construct that is socially recognized and commonly accepted. Subjective time—the main study objective of the thesis—can be described using sensory perceptions. The perception of time is a phenomenon that is subjectively felt by a human and can be accurately defined thanks to research in the fields of biology, cognitive psychology, neuroscience, etc. The dissertation therefore considers the subjectivity of time as one of the features of design that should be involved in the design process ("designing with time"). The main result of the dissertation research is a scheme describing the relational connections of subjective time and sensory perceptions. The scheme is subsequently developed into an inspirational tool for designers and creators.

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