# Psychological Acceptance of Sustainable Architecture in Lithuania: a Qualitative Study

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## Abstract

The concept of sustainable development has been applied to the field of architecture since the end of the 20th century and has become an official paradigm for planning, design, and construction policies. However, a lot of researchers notice the lack of attention to cultural, place-based, and aesthetic aspects in the field of sustainable architecture. Moreover, the efforts to implement sustainability ideas sometimes lead to very unusual designs that can even be provocative experiments, and may sometimes lead to conflicting assessments in the general public. This study investigates the architectural language of sustainable design and how the aesthetics of sustainable architecture are distinguished and psychologically accepted by people. An online sociological survey was prepared and conducted, the results of which were analysed by general statistical calculations. The study analysed respondents' preferences towards sustainability in architecture, opinion towards sustainable architecture trends, and their features. The results of the study are illustrated by comparing opinion between professionals in the field of architecture and general public.

**Keywords:** sustainable architecture, aesthetics, architectural trends, architecture quality, psychological sustainability.

## Introduction

The incorporation of the psychology of sustainability and sustainable development into Sustainability Science has fostered a transdisciplinary approach towards the complex and interconnected realm of sustainable architecture. By studying the psychological aspects of human environments, these disciplines are playing a critical role in advancing the seventeen UN Sustainable Development Goals (United Nations, 2018). This inter-disciplinary approach helps to promote the development of sustainable urban environments that benefit both the present and future generations (Sustainability, 2013). Furthermore, these studies are essential in promoting sustainable living practices, which can improve the overall health and wellbeing of individuals and communities, while also reducing the negative impact of human activities on the environment. As such, the incorporation of psychology of sustainability and sustainable development into Sustainability Science is a necessary step in achieving a sustainable future for all.

Therefore, the need to explore the psychological aspects of sustainable architecture is becoming an increasingly important topic. Fox (2000) working in the field of environmental ethics, emphasises that sustainable development is primarily a value category. Considering sustainable development as a value category, its grounding idea 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs' illustrates the focus on traditional three-dimensional model aspects (ecological, economic and social) but omitts the cultural aspect. Moldovanova (2014) approves that this model does not fully reflect complex modern societies, so it is necessary to supplement it with the di-

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mension of cultural sustainability (Culture, 2010; Moldavanova, 2014; Meireis and Rippl, 2019). The cultural dimension of sustainability emphasizes the significance of aesthetics, which is a crucial aspect of sustainable architecture in the broader context of holistic development.

The constructed environment has a strong impact on psychologival states and well-being (Coburn, 2019). The biophilic theory highlights extensive research on the advantages of incorporating natural elements into constructed environments, where both aesthetic and sensory factors are significant (Browning, 2014). Emerging ideas on 'psychological sustainability' in architecture adds to the growing understanding of the importance of aesthetics in architecture (Kok, 2018). Aesthetics is officially one of the architectural quality criteria in Lithuanian law (LR Seimas, 2017), which illustrates its growing practical significance.

However, formal compliance with the principles of sustainability does not ensure the aesthetic quality of architectural works, and their aesthetic expression does not necessarily reflect the ideas of sustainability and environmental friendliness (Heymann, 2020). It is an extremely difficult task to define sustainability aesthetics. It is even more difficult to measure it. Additionally, there is a lack of studies investigating contemporary expression in architecture or trends of sustainable architecture expression. This study aims to explore how sustainable architecture trends are psychologically perceived by professionals and general public, and their association with architectural quality as defined by Lithuanian law.

The psychology of sustainability and sustainable development may be categorized as Guruprasath (n.d.) suggests: Spatial relationship (Relationship between spaces), Interpersonal relationship (Relationship between persons), and Person-space relationship (Relation between persons and spaces). Consequently, this study analyses the relation between person and space. This study systemized and distinguished the directions of sustainable architecture and the features that describe it. These results were used for designing a questionnaire that tested respondents' opinion in order to distinguish the main features of sustainable architecture that ensures psychological comfort and the basic needs of its users.

The present study contributes to the field of sustainable architecture by providing a systematic analysis of the relationship between person and space, and by identifying the main features of sustainable architecture that ensure psychological comfort and meet the basic needs of users. The study also considers psychological acceptance of sustainable architecture, which is described as design ensuring comfort, security, and avoidance of uniformity and inexpressiveness as by Pulyaevskaya (2019). The novelty of this study lies in its specific interest in exploring the aesthetics of sustainable architecture and its relation to attitudes in Lithuania, potentially reflecting Northern European trends.

## Methods

For the implementation of the study, an online sociological survey was prepared and conducted by the author. The survey was conducted through an online survey website (https://apklausa.lt/f/darnios-architekturos-tendenciju-patrauklumo-visuomenei-tyrimas-9wl7ybq/answers/new.fullpage) during April – May 2022. The target group was adult residents of Lithuania (age 18 and older). The survey focused on collecting random samples and was shared with the target public groups on social media for architecture professionals and communities. It was shared by email to Lithuanian architectural companies. The questionnaire was completed by 240 respondents (of whom 86 professionals and 157 non-professionals). The survey consisted of 27 open and closed questions that were divided into four groups:

1. Social-demographic questions: age, gender, education, professional experience in architecture, place of residence;

2. Questions illustrating general attitudes towards sustainable architecture and assessment of 10 trends of sustainable architecture (respondents were asked to indicate if the trend is acceptable to them, if the trend seems environmentally friendly, and to leave a short comment about the trend);
3. Questions determining respondents' attitudes towards the distinctive aesthetic features of sustainable buildings;
4. The final question was dedicated to the respondents to describe the features of sustainable architecture by themselves.

## Results

### Characteristics of the Respondents

The dominant group of respondents may be described as highly educated, early middle-aged urban residents who try to choose environmentally friendly solutions in their everyday life and of whom 1/3rd were related to the field of architecture. The majority (70.0%) of the respondents were 25 – 45 years old. The other largest group (19.8%) of respondents were 45 – 65 years old. Others were 18 – 24 years of age (8.6%) and 65 years old or older (1.6%). Most of them (67.1%) were women. Most of the respondents had higher education: 80.2% of the respondents had higher (university) education, 4.9% had unfinished higher (university) education and 7.4% higher (college) education. The ratio of specialists (35.4%) in the field architecture with non-specialist (64.6%) was similar to 1/3. The majority of the respondents lived in the residential areas (40.3%) of the city or its central part (34.2%), which together is 74.5% of city residents. The other smaller group lived in the suburbs of the city (13.6%) and the rural area in settlement (9.9%). The residents of the rural home was just 2.1%. The greatest number of respondents choose environmentally friendly solutions in their daily life, 58.0% choose *yes* and 18.5% choose *definitely yes* to this statement.

Most of the residents agreed that the expression of modern architecture should reflect ecological ideas – 48.1% chose yes and 26.3% definitely yes to this statement as well as 46.9% chose yes and 49.0% definitely yes to the statement 'Environmentally friendly solutions should be applied in the field of architecture'. This opinion illustrates that this group of Lithuanian residents highly supports sustainability in the field of architecture. To find out whether it was not just a declarative opinion, three questions were presented with the intention of eliciting personal responses. The majority of the respondents stated that they would choose more expensive but environmentally friendly solutions based on latest technologies (46.9% chose yes and 14.4% - definitely yes to this statement, 30.0% did not have an opinion). It can be assumed that the price of how much more expensive it would be would help them decide.

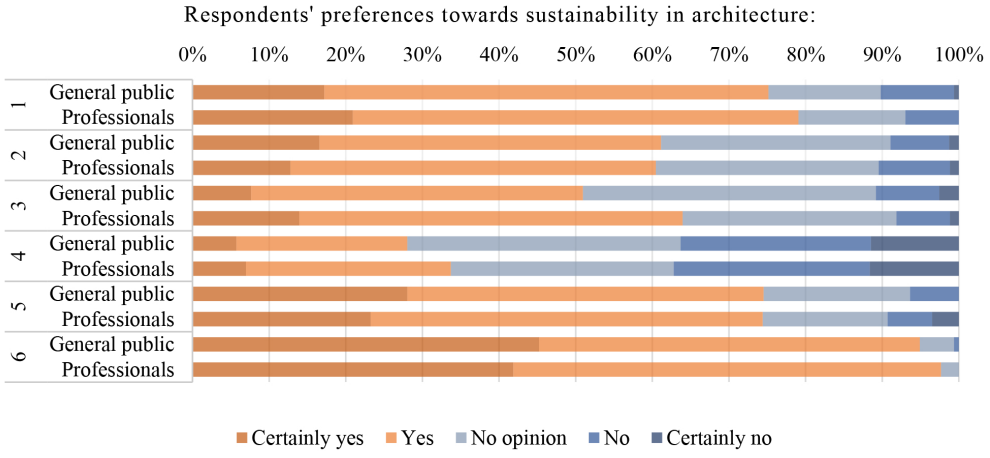
Almost all respondents (95.9%) including professionals and general public consider that expression of contemporary architecture should include environmentally friendly solutions should be applied in the field of architecture.

Both the professionals and non-professionals preferred environmentally friendly solutions based on the newest technologies and supported the idea that contemporary architecture should reflect ecological ideas and apply environmentally friendly solutions. Professionals slightly more often chose environmentally friendly solutions in their daily life. Non-professionals were more interested in trying non-conventional building materials (Fig. 1).

### Assessment of Sustainable Architecture Trends

The respondents evaluated 10 building groups that represent the most outstanding sustainable architecture. Pictures were given as digital illustrative collages representing each trend (Fig.2).

Fig. 1
Respondents' preferences towards sustainability in architecture




1 - I choose environmentally friendly solutions in my daily life.

2 - When building a house for myself, I would choose more expensive but environmentally friendly solutions based on the latest technologies.

3 - When building a house(s) for myself, I would choose conventional materials such as bricks, blocks, wood, stone wool, polystyrene foam, etc.

4 - When building a house for myself, I would choose alternative cheap, eco-friendly materials such as straw, clay, or recycled, "reclaimed" materials and products.

5 - The expression of contemporary architecture should reflect ecological ideas.

6 - Environmentally friendly solutions should be applied in the field of architecture.

1. Low-tech re-used buildings represent the trend promoting the use of recycled or re-used materials to create a modern architectural expression;
2. Dictated by re-used aesthetics, the trend, where aesthetics of buildings is dictated by what materials have been obtained for re-use;
3. Trashy anti-consumerist architecture - the trend in which a building can be created from anything that is discarded using secondary raw materials. In this way, the opposition to modern consumerism is demonstrated;
4. Low-tech expressive organic forms - the tendency to create a particularly mannerly architectural expression using natural, recycled, or reused materials;
5. Low-tech ecological buildings, the trend dominated by local, natural materials (straw-clay mixture, hemp concrete, etc.), although a modern expression is being developed;
6. Eco-technological buildings - the trend dominated by glass and metal, integrating the latest eco-technological advances, often using innovative materials;
7. Vegetated buildings - the trend dominated by greenery (planted facades, roofs, or otherwise integrated plants);
8. Building-landscape integration - the trend in which the building blends in with the landscape;
9. Expressive iconic organic forms, the trend in which the aesthetics of a building is expressed in distinctive organic, plastic forms;
10. Biophilic architecture, the tendency to deliberately reproduce certain features of natural environments in buildings.

Fig. 2
Trends of sustainable architecture (sources numbered left to right and provided in the list of pictures at the end of the article)

1. Low-tech re-used (Source: 1 & 3 – Weburbanist.com, 2 - Archdaily.com)

2. Dictated by re-used (Source: 1 - Modlar.com; 2 & 3 - Weburbanist.com)

3. Trashy anti-consumerist (Source: Inhabitat.com)

4. Low-tech expressive organic forms (Source: 1 & 3 - Dailymail.co.uk; 2 - Vice.com)

5. Low-tech (Source: 1 - Archdaily.com; 2- Dezeen.com; 3 - Dezeen.com)

6. Eco-technological buildings (Source: Archdaily.com)

7. Vegetated buildings (Source: 1 & 3 - Arquitecturaviva.com; 2 - Archdaily.com)

8. Building-landscape (Source: 1 - Archdaily.com; 2 - dortemandrup.dk; 3 – Ignant.com)

9. Expressive iconic organic forms (Source: 1 - Cgarchitect.com; 2 – Archdaily.com; 3 – Aureus-studio.com)

10. Biophilic architecture (Source: 1 - Lrt.lt; 2 - Designwanted.com; 3 - Archdaily.com)

Respondents were asked to indicate whether the trend was acceptable to them (**Fig. 3**) and if the trend seemed to be environmentally friendly (**Fig. 4**). All trends of sustainable architecture were accepted generally well. It was interesting to test tolerance towards architectural experiments and its scope. To find out respondents' opinion, examples of recycling projects were divided into three groups which showed different levels of recycling intensity (group 1-3).

The first group was the most reasonable recycling trend which aimed to use recycled or re-used materials for a contemporary architectural expression; architecture of the second group was more focused on expression, which was dictated by received materials and showed more intense level of recycling. The last group were extreme examples as a declarative form against consumerism, a form of protest rather than a real building.

The first group of recycling projects (Low-tech reused) was highly positively accepted by most respondents, with 78.6% finding it acceptable and 60.9% considering it environmentally friendly. The acceptance of the second group (Dictated by reused) was more evenly divided by possitive and negative answers, with 46.1% finding it acceptable and 46.9% considering it environmentally friendly. The third group (trashy anti-consumerist) was hardly acceptable, with 27.2% finding it acceptable and 44.8% considering it environmentally friendly.

Fig. 3

Respondents' opinion about acceptability of architectural trends

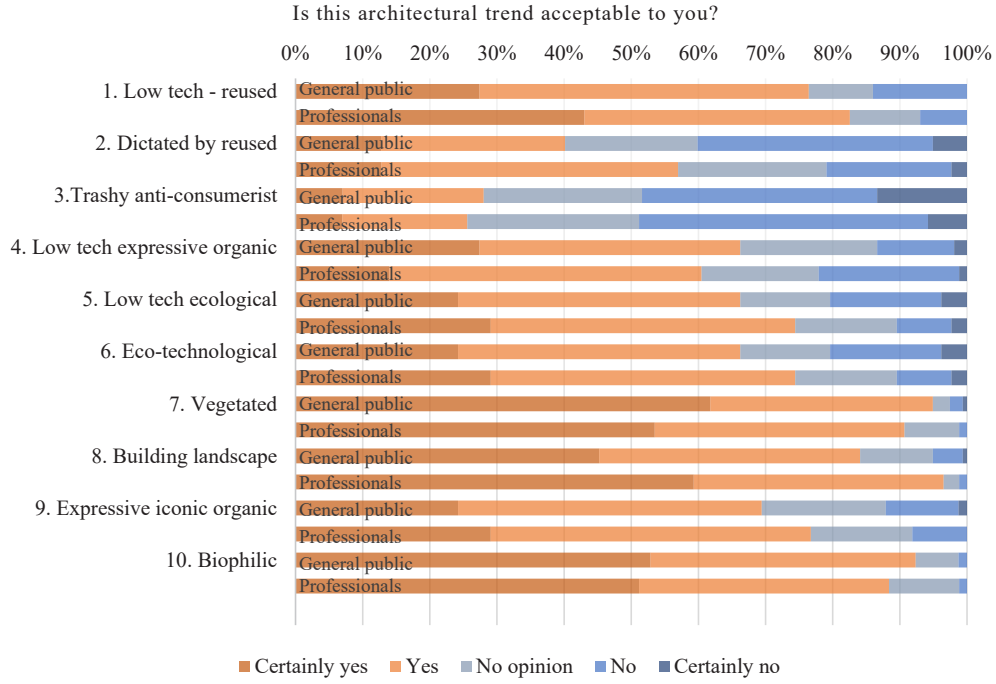
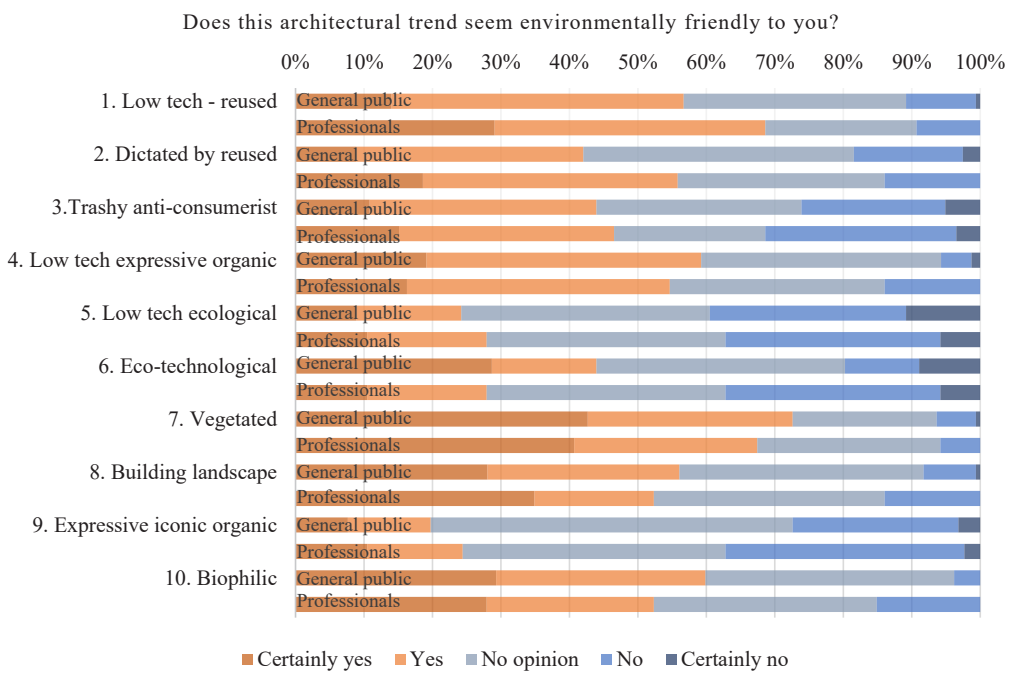



Fig. 4

Association of architectural trends with environmental friendliness




To summarise, the initiative of using recycled materials was generally welcomed by the respondents, however supported more often by professionals.

The best accepted trends in sustainable architecture were Vegetated (93.4% positive responses), Low-tech ecological (92.5% positive responses), and Biophilic (91.0% positive responses). Vegetated architecture, characterized by greenery integrated into buildings was the most accepted

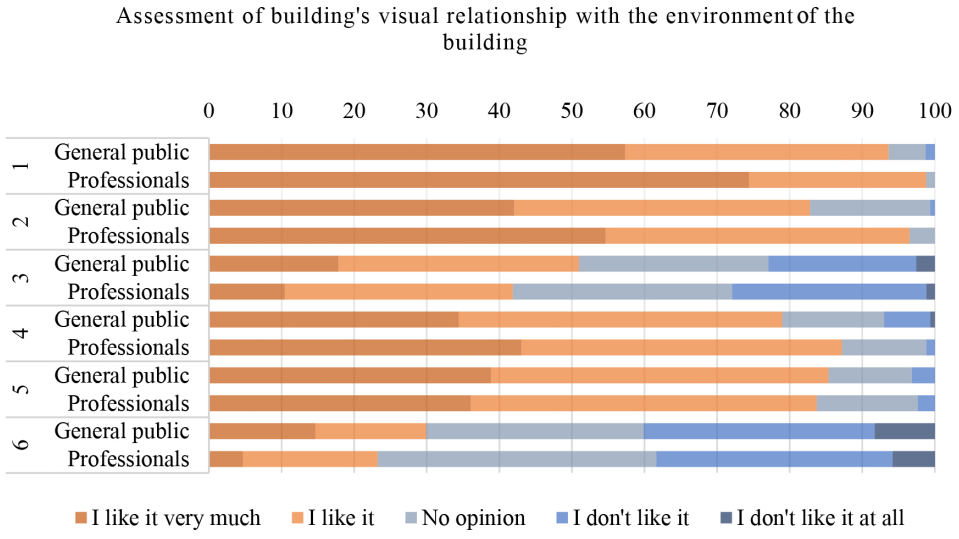
trend, with 93.4% of respondents giving positive answers. Low-tech ecological buildings that employ contemporary architecture with low-tech solutions were also accepted very well, with 92.5% of respondents giving positive answers. Biophilic architecture, which aims to replicate natural environments in buildings, was the third most accepted trend, with 91.0% of respondents giving positive answers. The most environmentally-friendly looking trends were Vegetated (70.8% positive responses) and Low-tech reused (60.9% positive responses) and Low-tech expressive organic (57.6% positive responses) architectural trends.

Low-tech expressive organic buildings and building-landscape integration were also well-received. Buildings integrated into the landscape were considered as environmentally-friendly by the majority of the respondents. The trend of expressive iconic organic forms (group 9) had a positive acceptance rate, but was perceived as the least environmentally friendly. As later noticed in the comments – due to often extensive use of materials and large consumption in the construction site. The trend of eco-technological buildings was also accepted well, but was the second least perceived as environmentally friendly.

The most significant differences, albeit minor, between professionals and the public were that the reuse and building-landscape projects were more favorably received by the former. On the other hand, the eco-technological trend was perceived as environmentally friendly more frequently by the public.

## The Attitudes towards the Distinctive Aesthetic Features of Sustainable Buildings

Building's visual relationship with the environment was assessed (Fig. 5). Majority of respondents (95.5%) agreed that an attractive quality of the building is when a building opens views to distant perspectives. Buildings that adapt to their environment through materials and colours were preferred to buildings contrasting by materials and colours. Local and natural materials were appreciated by the majority of respondents (97.7% of positive answers).




1 - Opens views with distant perspectives.

2 - It is made of local and natural materials.

3 - Contrasts with the environment in colour and materiality.

4 - Adapts the landscape by its form (e.g., earth-shelter buildings, buildings replicating landscape forms, etc.).

5 - It is similar in colour and material to the environment.

6 - It dominates the landscape with its volume.

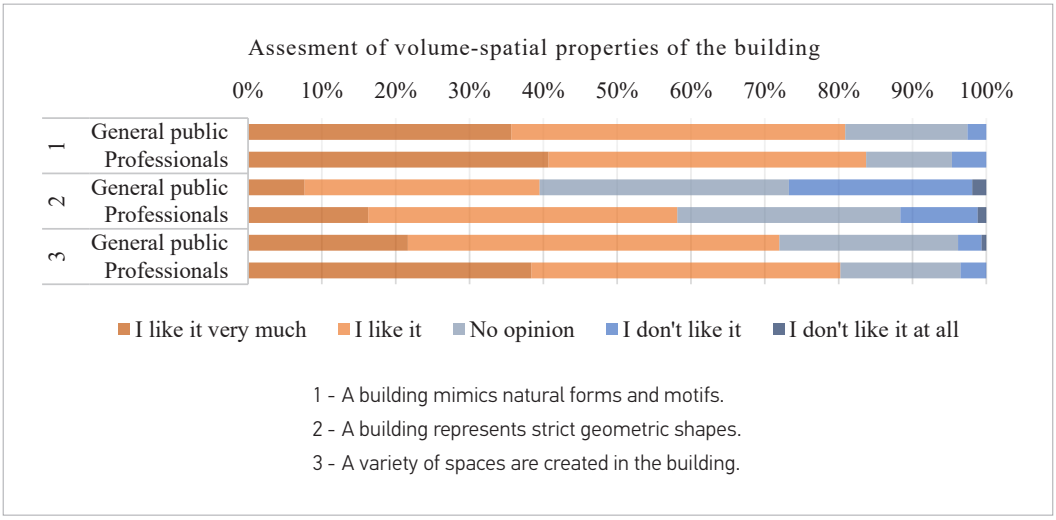
Fig. 5

Assessment of the visual relationship with the environment of the building

The similarity in colour and material to the environment was preferred by the majority (84.8% of positive answers). On the contrary, buildings contrasting by colour and materiality were evaluated as disliked by 22.6% of respondents and as totally disliked by 52.1% of respondents. Buildings, adapting to the landscape by their form, were also valued (81.8% of positive answers), but the buildings dominating the landscape by their volume were perceived more negatively than positively (27.6% of positive answers versus 39.51% of negative answers). The general public accepted more positively buildings that dominate the landscape and contrast by colour and materiality in the environment compared with professionals.

Furthermore, respondents were asked to evaluate the volume-spatial properties of the buildings (**Fig. 6**). The buildings which mimic natural forms and motifs were more preferred than buildings consisting of strict geometric shapes. To illustrate this, buildings that mimic natural forms and motifs were almost completely liked, while strictly geometric buildings were disliked by 19.8% and evaluated as totally unacceptable by 1.6% of the respondents. Strict geometric shapes were more appreciated by professionals than by the general public. A variety of spaces created in the building was evaluated as an attractive feature of the building.

Fig. 6
Assessment of the visual relationship with the environment of the building




Furthermore, respondents evaluated materials used in building construction (**Fig. 7**). Respondents were more likely to choose conventional materials such as bricks, blocks, wood, stone wool, polystyrene foam, etc. that may not always be sustainable (45.7% answered *yes* and 9.9% - *definitely yes*) rather than alternative cheap, eco-friendly materials such as straw, clay or recycled, "reclaimed" materials and products (11.5% answered *yes* and 25.1% - *definitely yes*). However, it is worth to notice that respondents indicated in the comments that they value durability and aesthetics. Based on that, it could be predicted that respondents who doubted (33.3%) could possibly choose unusual eco-friendly materials if they were durable and aesthetic.

The most appreciated materials that were selected as *'really liked'* were plants (49.8%), wood (41.6%) and clay (19.3%), also selected as *'liked'* were brick (60.1%), timber (51.4%) and stucco (44.4%). Meanwhile, the least appreciated were synthetic materials (disliked by 37.0% and totally disliked by 14.0% of respondents) and metal (disliked by 34.2% and totally disliked by 5.8% of respondents). The most liked material of all (sum of responses *'I really like'* and *"like"*) were wood and plants. Metal and concrete were liked more by professionals than by general public.

The natural and local materials were liked by a larger percentage of the professionals than general public, with minor differences between both groups.

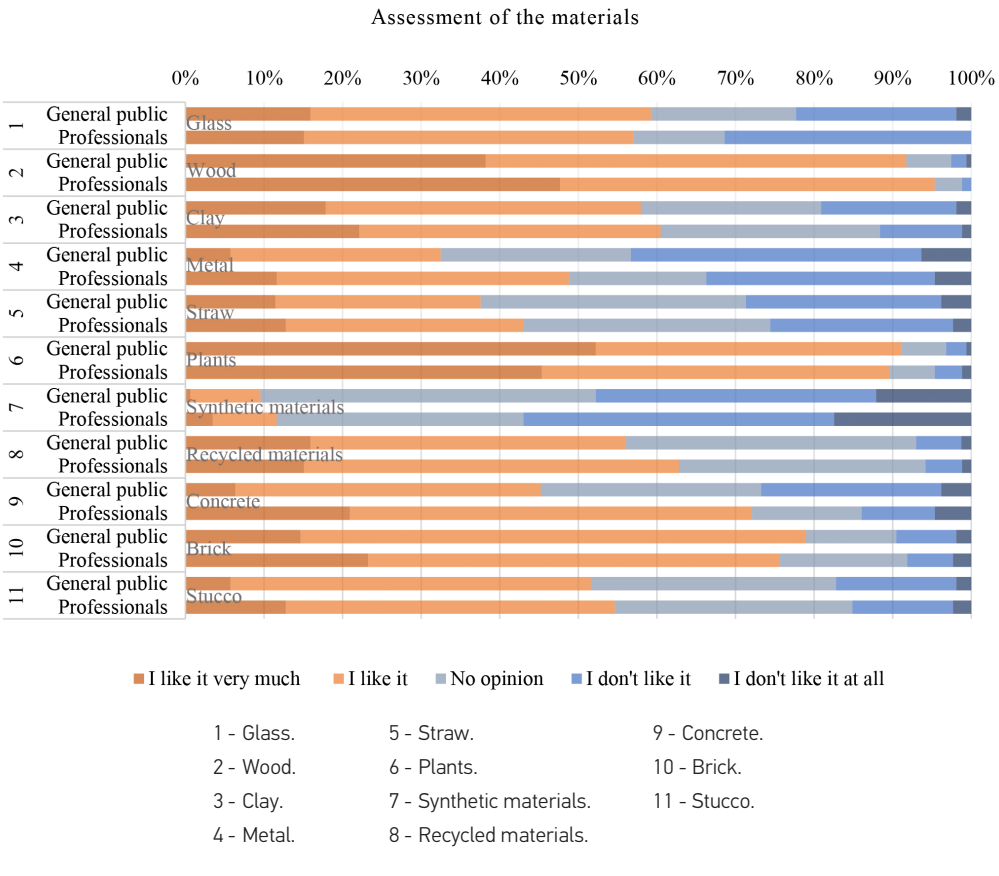



Fig. 7
Assessment of the materials of the building, if the aesthetics is dominated by

## Describing the features of sustainable architecture

Further, respondents were asked to evaluate the lighting of constructed environment (Fig. 8).

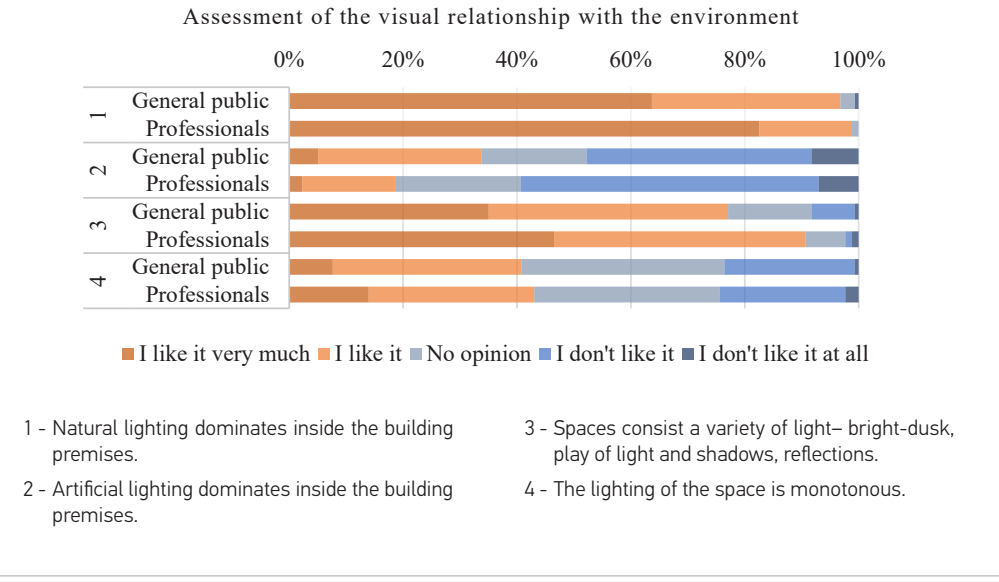
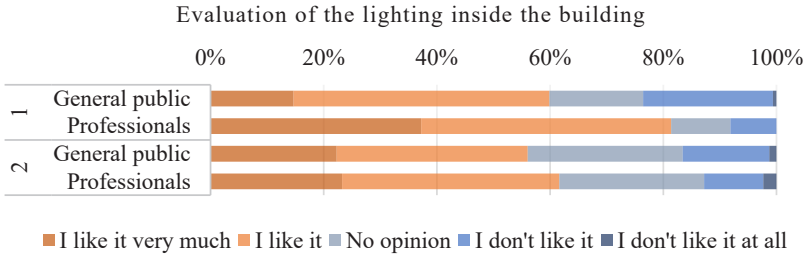



Fig. 8
Assessment of the visual relationship with the environment of the building

The study showed that natural lighting was considered as a very important feature of a building. Almost all the respondents (97.6%) answered *'I really like"* (70.4%) and *"I like"* (27.2%) the natural lighting dominant inside the premises. Meanwhile, the dominating artificial lighting in the building was disliked by 44.0% of the respondents and 7.8% considered it totally unacceptable. More respondents liked spaces consisting a variety of light such as bright-dusk, play of light and shadows, reflections, etc. (*"I really like"* - 39.1% and *"I like"* - 42.8%) rather than monotonous light inside (*"I really like"* - 9.9% and *"I like"* - 31.7%). In addition, the monotonous lighting was disliked more often (22.6%) than the variety of lighting (5.3%). Lighting qualities such as a variety of light and natural light was more preferred by professionals.

Other aesthetic properties such as changes of the building during time and presence of renewable energy production systems were evaluated during the study (Fig. 9). The aesthetic changes of the building over time were accepted positively - 22.6% of respondents really liked it and 44.9% liked it. However, it was more preferred by professionals. Visibility of renewable energy production and/or rainwater harvesting systems was not considered as an aesthetic drawback of the building - 22.6% of respondents really liked it and 35.4% liked it.

Fig. 9
Evaluation of lighting inside the building



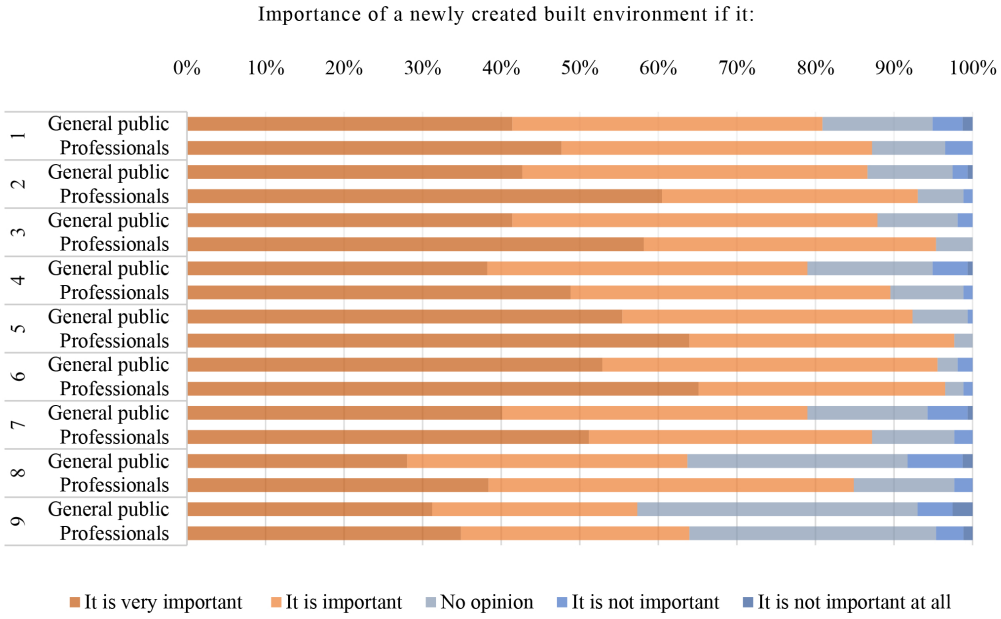

1 - The aesthetics of the building change significantly over time (e.g., rusted metal, seasonal change of green facades, modernisation of historical buildings, etc.).

2 - Renewable energy production and/or rainwater harvesting systems are visible in the architecture of the building and create the aesthetics of the building.

It was important for the study to evaluate not only visible characteristics of the built environment but also the sensual experience within it (Fig. 10). The most important features were creating a sense of security, being aesthetically pleasing, and contributing to the creation of the local spirit in an ecological, cultural, and historical aspect. The least important thing was expressing the co-creation of nature and man. Experiencing the environment through various senses, promoting spiritual attachment and encouraging exploration were considered important more frequently by professionals than by general public.

## Describing Sustainable Architecture

The last question of the survey asked to associate features of the building with sustainable architecture (Fig. 10 and Fig. 11). From a total of 196 comments, meaningful responses were selected and assigned to 25 groups as 437 short responses - qualities of the built environment. Subsequently, the number of responses was compared to the architectural quality criteria established by the Lithuanian architecture law and the characteristics of sustainable buildings and environments (LR Seimas, 2017). The results show the attention given by the respondents illustrated by the significance of each response group in comparison between answers of professionals and general public.




1 - Would integrate local ecosystems (e.g. habitats for plants, birds, insects, etc.);

2 - Would contribute to the creation of the local spirit in an ecological, cultural, historical aspect;

3 - Would restore an existing damaged environment;

4 - Would encourage exploration and discovery;

5 - Would create a sense of security;

6 - Would be aesthetically pleasing to users and viewers;

7 - Would promote emotional and spiritual attachment;

8 - Would be experienced through various senses;

9 - Would express the co-creation of nature and man (e.g. construction using mycelium, technologies with algae for energy production and air quality improvement, "biological concrete" made of moss and mycelium that absorbs rainwater and provides the opportunity to grow plants on the facades, salt slabs grown from salt, sunflowers and algae, bioplastics from algae, etc.)

Fig. 10
Evaluation of the important features of a newly created built environment

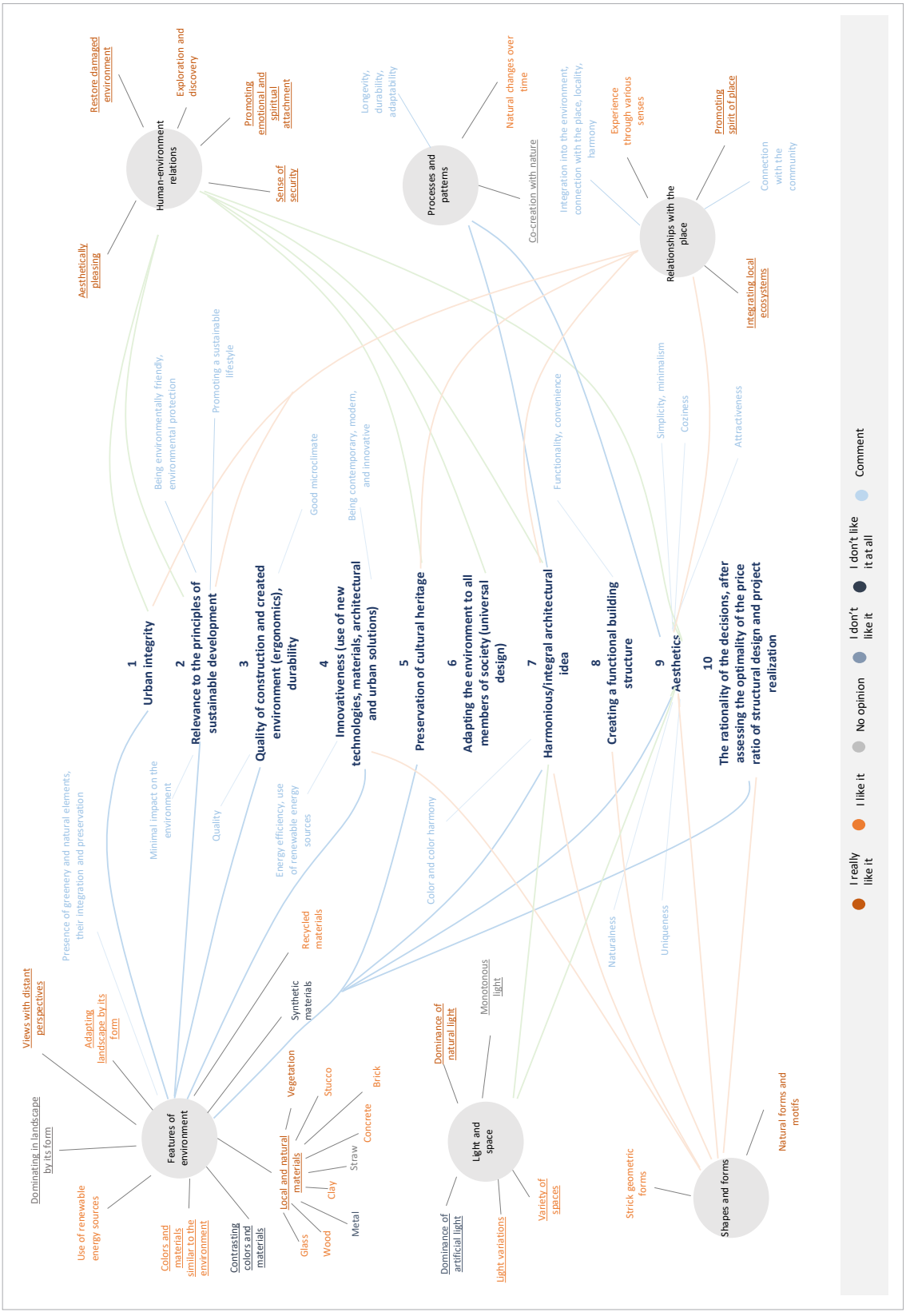
Respondents defined sustainable architecture in their own words, where the greatest attention was given to the use of natural, ecological, and local materials, integration into the environment, connection with the place, locality and harmony, energy efficiency and use of renewable energy sources. Quality criteria No. 5 – *'Preservation of cultural heritage'* was not associated as a feature of sustainable architecture at all.

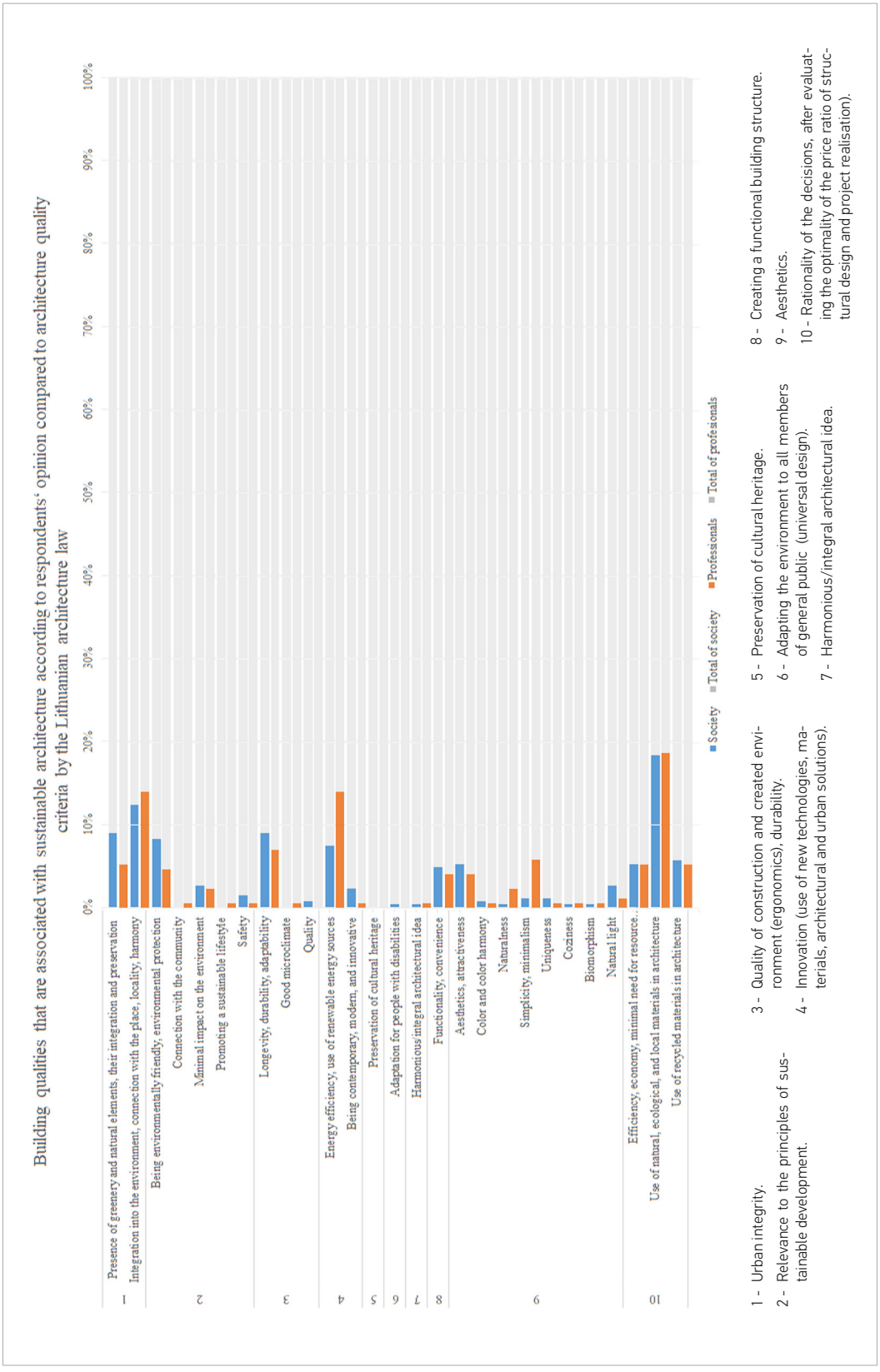
Respondents hardly associated sustainable architecture to the quality criteria No. 6 – *'Accessibility of the environment (universal design)'* and No. 7 – *'Integral architectural idea"*, although ~85% (245 of 439) of the answers were related to the aesthetic characteristics of the architecture.

General public paid more attention to the presence of greenery, environment protection, safety, and durability, innovativeness of the building, functionality, aesthetics and natural lighting. Professionals were more concentrated on connection to the place and integration into the environment, use of renewable energy sources, naturalness, simplicity and minimalism while defining sustainable architecture.

Fig. 11

Preferences of sustainable architecture features and their relation to the 10 architecture quality criteria outlined in Lithuanian Law of Architecture (LR Seimas (2017)






## Fig. 12

Visual representation of the building features that survey respondents identified as being associated with sustainable architecture and its comparison to the 10 architecture quality criteria outlined in Lithuanian Law of Architecture (LR Seimas (2017)

## Conclusions

The majority of the respondents supported the concepts of sustainability in architecture, demonstrated by their agreement that environmentally friendly solutions should be applied and that modern architecture should reflect ecological ideas. Almost all respondents believed that contemporary architecture should include environmentally friendly solutions, indicating that this issue is of great importance to the general public as well as professionals in the field of architecture. Both professionals and non-professionals showed a preference for environmentally friendly solutions based on the newest technologies. In contrast, even though the respondents highly supported sustainability in architecture, they were more likely to choose conventional materials such as bricks, blocks, wood, stone wool, polystyrene foam, etc., over alternative cheap but eco-friendly options such as straw, clay or re-used materials. The non-professionals displayed greater interest in trying non-conventional building materials. The comments indicated that if the alternative materials were durable and aesthetic, they could become more favorable. The general acceptance of recycling projects was related to aesthetics, material durability, and possible comfort of living. These findings provide valuable insights into urban residents' opinion about sustainability in architecture.

In this study the three most well-received trends in sustainable architecture were vegetated, low-tech ecological, and biophilic designs, with over 90% of respondents giving positive responses. The low-tech ecological trend was considered to be the most environmentally friendly, with almost 85% of respondents finding it acceptable. These trends were appreciated for their use of environmentally friendly solutions such as protecting trees and landscapes, saving resources, reducing carbon footprint, using sustainable engineering solutions, and using patterns.

Relation to the environment plays an important role in creating an aesthetically pleasing building. According to the survey results, almost all respondents agreed that the aesthetic quality of a building is enhanced when it is harmonized with surrounding environment and provides views of distant perspectives. In fact, buildings that adapt to their environment through the use of materials and colors were preferred over contrasting ones. The use of local and natural materials was also highly preferred. This suggests that appearance of building materials can help a building blend into the surrounding environment and improve its overall aesthetic appeal.Wood and plants were the most popular building materials, followed by clay, brick, and stucco. Synthetic materials and metal were the least favored, though professionals had a slightly higher appreciation for metal and concrete. Wood has always been a traditional building material in Lithuania, but it's novel attractiveness may be attributed to image of a renewable eco-friendly material that brings people closer to nature. Trees have always held a significant and even sacred role in the lives of Lithuanians, which may explain why wood remains a preferred building material. The fact that plants were the second most favored material suggests a desire to incorporate nature into building design.

Additionally, buildings that adapt to the landscape by their form were more commonly liked, while buildings dominating the landscape by their volume were more commonly disliked, suggesting that a thoughtful use of proportion impact a building's attractiveness. Creating a variety of spaces within a building was preferred over monotonous spaces. Psychological research (Ramzy, 2015) has shown that people prefer shapes based on the Golden Ratio, which is found in nature and reflects order and sequence. This ratio is also prevalent in growth patterns of many organisms, including nautilus shells, fern fronds, and vine tendrils As a result, buildings that incorporate natural forms and motifs are often favored over those with strict geometric shapes.

The results show that natural lighting was essential to respondents, while artificial lighting dominating the building was disliked. Spaces with a variety of light, such as bright-dusk, play of light and shadows, and reflections, were preferred over monotonous ones. Maximizing daylight not only saves electricity but also contributes to the psychological well-being of building users. Natural light enables people to experience the natural progression of time throughout the day. Additionally, research by Smolders (2013) suggests that increased light exposure is linked to higher

levels of vitality. In January 2023, the sun shone for less than five hours per month in Vilnius (lrt.lt, 2023), which may help explain why Lithuanians place a high value on natural daylight as a crucial aspect of building design.

This study revealed the importance of aesthetics in architectural design, as the majority of the respondents (85%) who defined sustainable architecture themselves related sustainability with aesthetic features. This supports the notion that aesthetics is a key factor in creating sustainable and psychologically acceptable architecture. Moreover, the study suggests that psychological sustainability of architecture may be related to several factors, including the use of natural and local materials, building's integration into the environment, connection with the place, locality, and harmony. Therefore, architects and designers should consider these factors when creating sustainable buildings to achieve psychological comfort of building's users and preventing inexpressiveness in architecture.

Overall, the study's findings suggest that environmental sustainability and eco-friendly architectural solutions are becoming increasingly important to urban residents, particularly those who are highly educated and early middle-aged. The study suggests that further research on architectural aesthetics and social-psychological acceptability could lead to a more precise definition of aesthetic quality criteria. Additionally, educating the general public about the relationship between sustainability and heritage preservation is crucial, as respondents did not associate these two concepts. The general public did not associate the accessibility to sustainable architecture, emphasizing the need for further education about social challenges in sustainable building. Moreover, the sustainability aesthetics ideas should be integrated into the initial stages of architectural design and considered as features of quality and originality. Additionally, this study can inform the development of national policies and local initiatives aimed at promoting sustainable building practices.

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## List of pictures in Fig. 2

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