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Evaluation of the Aesthetic Quality of an Industrial Building after Renovation

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Abstract Industrial buildings occupy large areas and are one of the main city-forming elements of the urban environment. In recent decades, the renovation of industrial buildings has become a special and widespread creative direction for designers. The aesthetic features of the industrial facilities renovation process are of great interest not only for designers but also for users of buildings and citizens. The results obtained by evaluating the aesthetic aspects of the renovation of a large industrial building in Kazakhstan are presented in this article: the Almaty Cotton Mill (ACM). Three large buildings of the former industrial site have been converted into a commercial facility. The study is based on an assessment of new use from the point of view of users and citizens. The study's methodology is based on conducting a sociological survey to analyze the aesthetic qualities of the interiors and exteriors of ACM buildings. Interior spaces were analyzed using the Post Occupancy Evaluation (POE) method. The exterior assessment will be based on the theory of visual perception of the city according to the method of K. Lynch. The result of the study is the final concept of a sociological survey and recommendations for improving the aesthetic characteristics of the interiors and exteriors in "Armada" and "Grand Park" buildings.

Keywords Industrial Building, Renovation, City, Aesthetics, Function

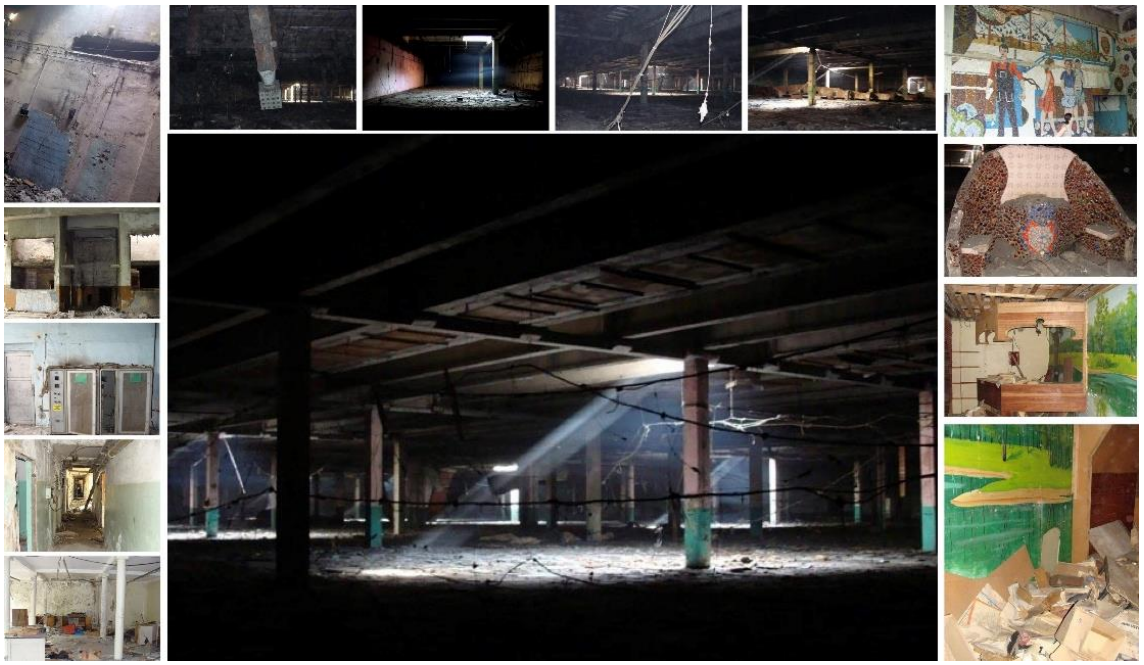
1. Introduction

In Kazakhstan and other post-Soviet period countries, the trend of reconstruction of public and industrial buildings is manifested. The relevance of this topic is due to the active development and reconstruction of existing buildings in large cities of Kazakhstan. Many buildings with the richest interior space are subject to demolition or renovation of non-relevant functions. The main reason for these actions is that private entrepreneurs make decisions on the renovation of the buildings. They bought out for personal reasons without considering the demand, participation and opinion of the residents of the area. Therefore, the relevance of this study exacerbates the detachment of city residents in deciding to renovate existing buildings and territories. Especially if the question concerns buildings that have an important socio-economic place in people's lives, it has long been established that any city that claims to be "human" must have strong ties to the historical past. Old buildings are also a source of information about the city's formation, citizens' way of life, and worldview. If old houses are maintained, they will have a lasting educational effect on people [1,2,3,4].

1.1. The History of the Almaty Cotton Mill (ACM)

The history of ACM began in the 60s of the last century. The plant was built in stages, and by 1970 all three

factories that were part of the enterprise were working acceleratedly. The annual production capacity was about 74 million linear meters, and in 1981 ACM produced the billionth meter of fabric. The enterprise is specialized in producing yarn, fabric (in total 13 types and several articles "marked" with the State Quality Mark), bed linen, and other textile products. Every year, the enterprise updates up to 70% of fabric designs at 50%. Products were produced exclusively made of 100% cotton. Most of the raw materials were supplied from South Kazakhstan, and some came from the neighboring republics - the Turkmen, Tajik and Uzbek SSR. It should be noted that ACM products were of extremely high quality. Therefore, they were popular both in the USSR and abroad - in Italy, Canada, Germany, Spain, and the USA. In the 1990s, a joint venture was created with the Canadian company Goodbye [5]. To date, the largest city-forming plant does not exist, in the 1990s, the plant stopped, and 10,000 people were left without work. Part of the production area (100,000 sq.m. workshop) since 2003 has been turned into the shopping center "Armada", while the other part of the buildings has been spontaneously dismantled (Figure 1).



a) Interior

b) Exterior

Figure 1. The building of the second workshop of ACM

Figure 2. Building of ACM after renovation

Before reconstruction, this site created a negative situation and was not a safe area of the city. In 2016, the Grand Park shopping center was arranged on the site of the second former workshop of ACM [6]. After the collapse of the Soviet Union, the plant could not join the structures that could help it rebuild. Relations between the republics and enterprises were destroyed, and establishing them was difficult because other countries in the post-Soviet space underwent the same changes. Also, the closure of the enterprise was brought closer by the free trade policy, when cheap synthetic and semi-synthetic things from China and Turkey poured into the country, which "stifle" the local market for quality textiles. Of course, the quality of these fabrics was incomparable with the products of ACM, but they won in the difference in styles, the brightness of colors, and, of course, in price. In addition, enterprises began to let down suppliers who could now sell raw materials to other countries at different prices. Before closing, the plant changed its owners several times, was bought up, and in 2003 was closed. Now only the premises remain from the plant, based on which the Shopping Centers (SC) "Armada" operate, in another part "Grand park" [7].

2. Methodology

In the first stage, by counting the number of people and observing the occupancy of the interior space of the shopping centers "Armada" and "Grand Park" on different days, their demand among the citizens will be analyzed. Further, the evaluation of the aesthetic qualities of the interiors of the shopping center "Armada" and "Grand Park" buildings after the renovation was carried out according to the Post Occupancy Evaluation (POE) criteria, and the following parameters were adopted: navigation systems and visual communications, lighting standards, acoustics, ventilation, temperature and humidity, air quality, user comfort [8,9].

Furthermore, the respondents were also asked to name the positive and negative qualities of the interiors of the shopping centers "Armada" and "Grand Park". In evaluating the aesthetic aspects of the exterior, the method of K. Lynch will be used based on the principles of human perception of the elements of the urban environment [10]. Aspects of the external perception of the shopping center "Armada" and "Grand Park" will be determined using a sociological survey of citizens living in the area, near the objects of study, residents from other areas of the city, and guests of Almaty city. According to Kevin Lynch's method, the study's results will be based on public images. Kevin Lynch was the first to draw attention to the visual elements and cognitive ideas of the urban environment, contributing to the theory of cognitive perception of the urban environment. "Each individual creates and carries his image, but there may be considerable agreement among members of the same group. It is group images, the manifested consensus among a significant number of people that are of interest to urban designers who seek to model an environment that many people will use.

During the sociological survey, the following questions were asked: 1. could you name a few architectural objects that play a dominant role in this area? 2. Next, the respondents were shown photographs of various architectural objects and asked to find the Armada and Grand Park buildings among them. 3. Find the location on the map "Armada" and "Grand Park". 4. Please name a few buildings, the aesthetic parameters of which, in your opinion, are on the same level as the buildings of the shopping centers "Armada" and "Grand Park". 2. Describe the image of "Armada" and "Grand Park". A sociological

survey will be conducted among passers-by, residents of the study area, and citizens from other areas. Visitors and tenants of the shopping center "Armada" and "Grand Park" also participated in the sociological survey. Certain requirements for the respondents' age, profession, and other aspects were not set.

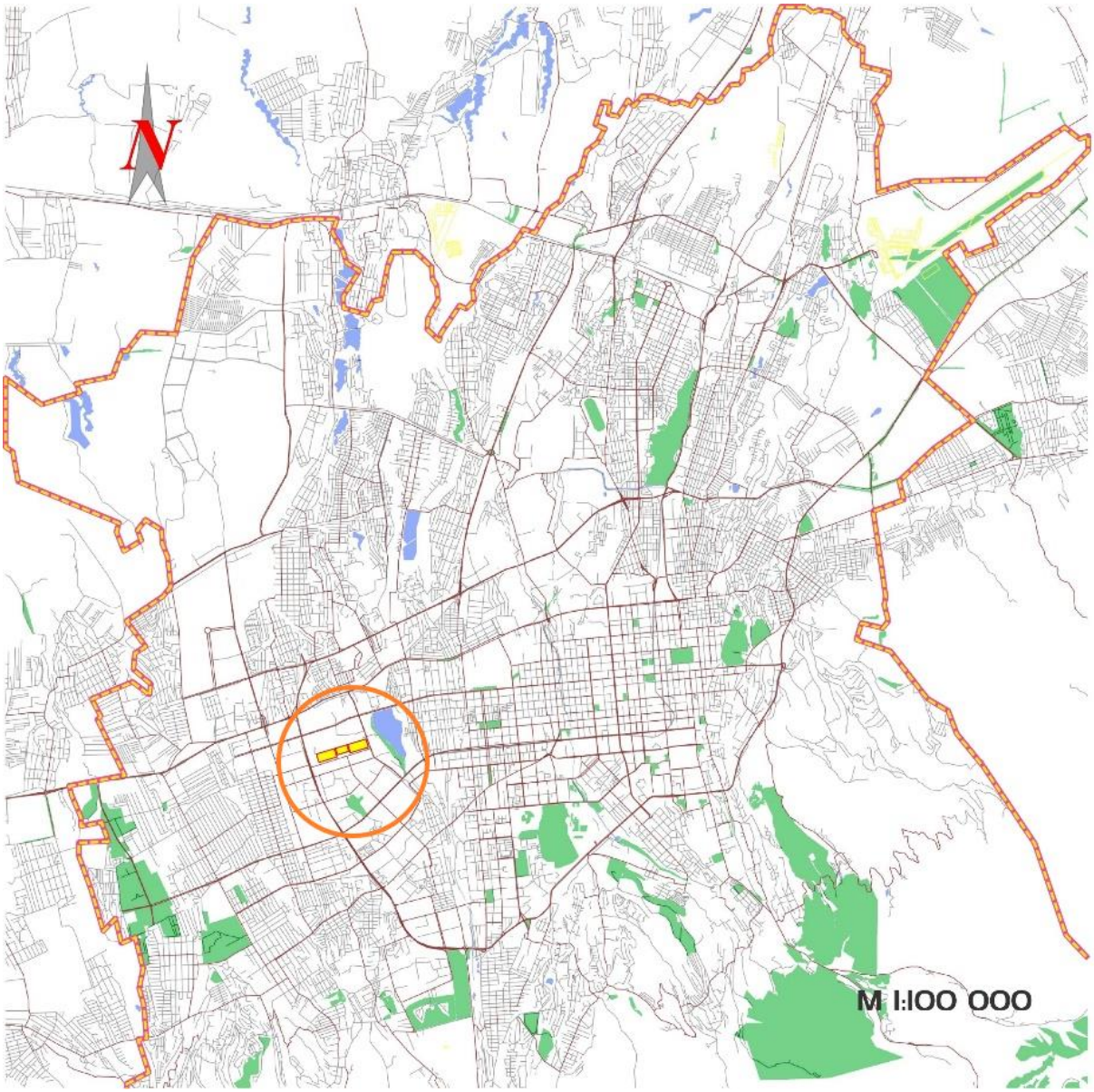


Figure 3. Buildings "Armada" and "Grand Park" on a city-scale

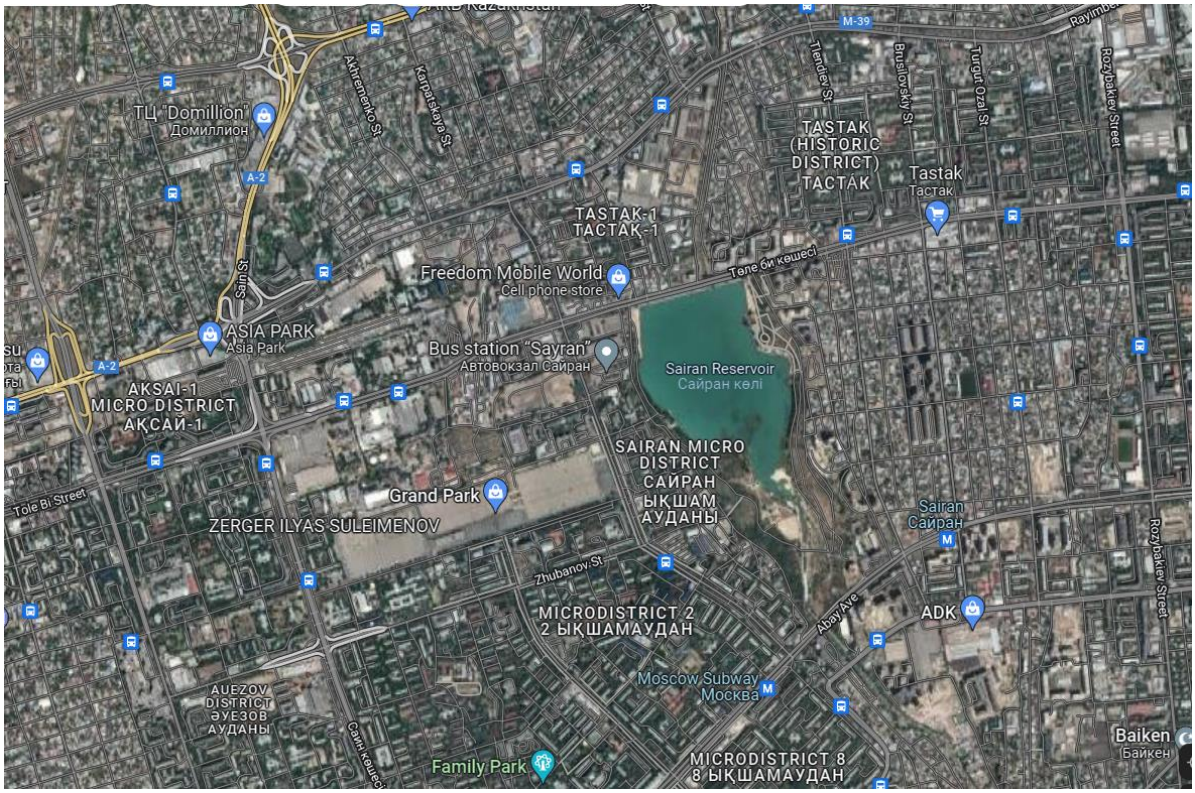


Figure 4. Buildings "Armada" and "Grand Park" on a regional scale

3. Results

The survey showed that the citizens visit the shopping center "Armada" mainly on weekends, in the time interval from 12-6 pm. The "Grand Park" situation is more stable, with uniform daily indicators, and visiting time is mainly after 6.00 pm.

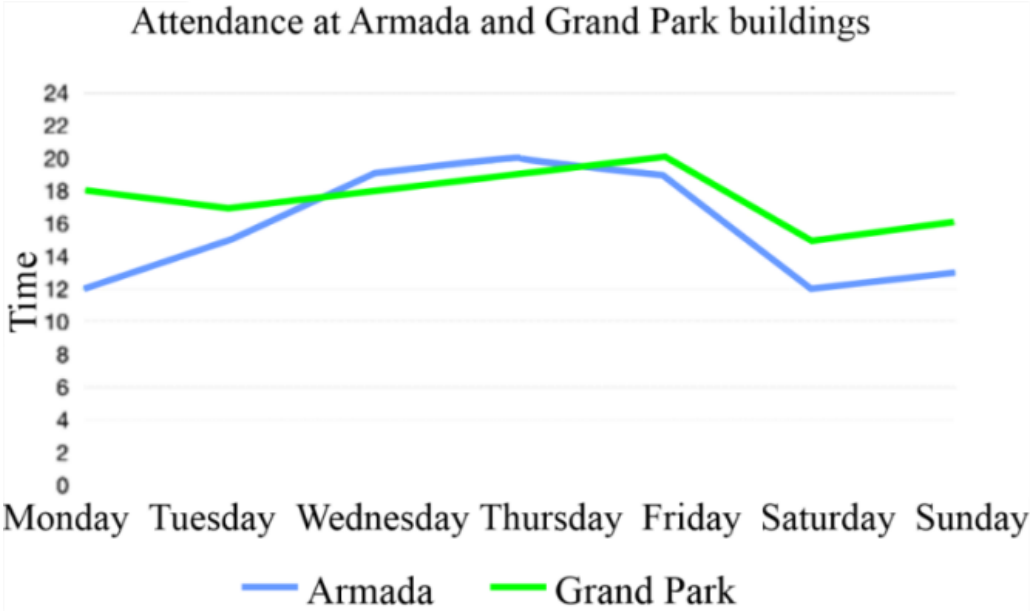


Figure 5. Analysis of the attendance of the shopping center "Armada" and "Grand Park"

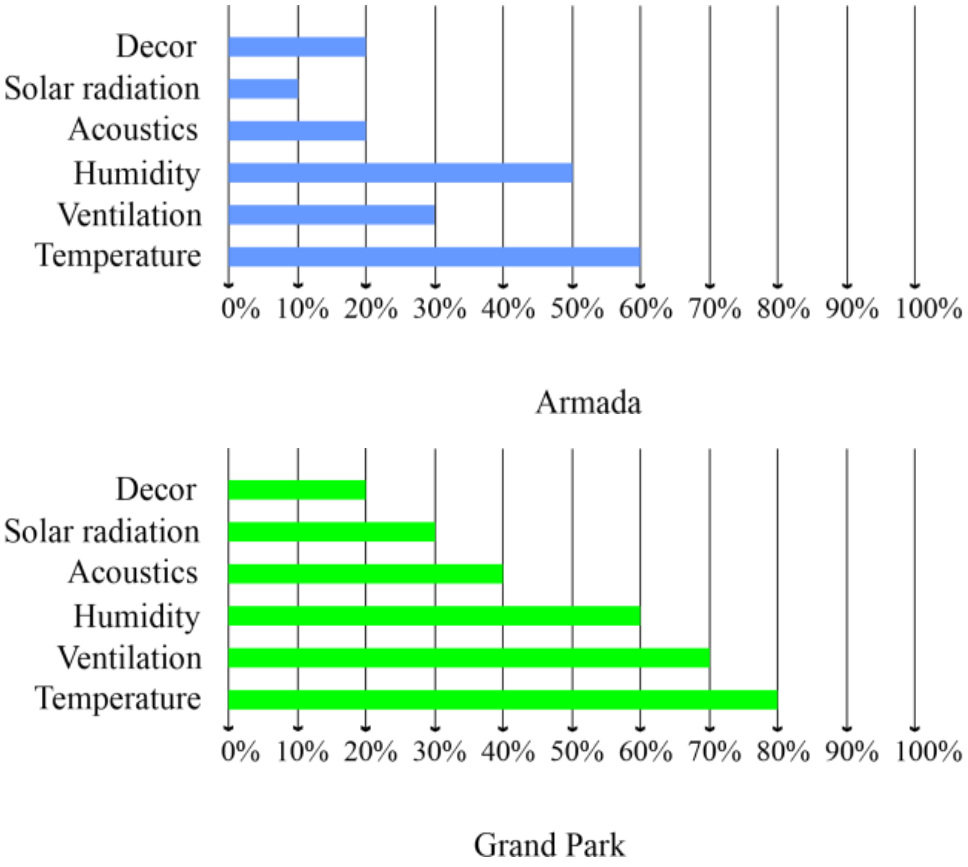
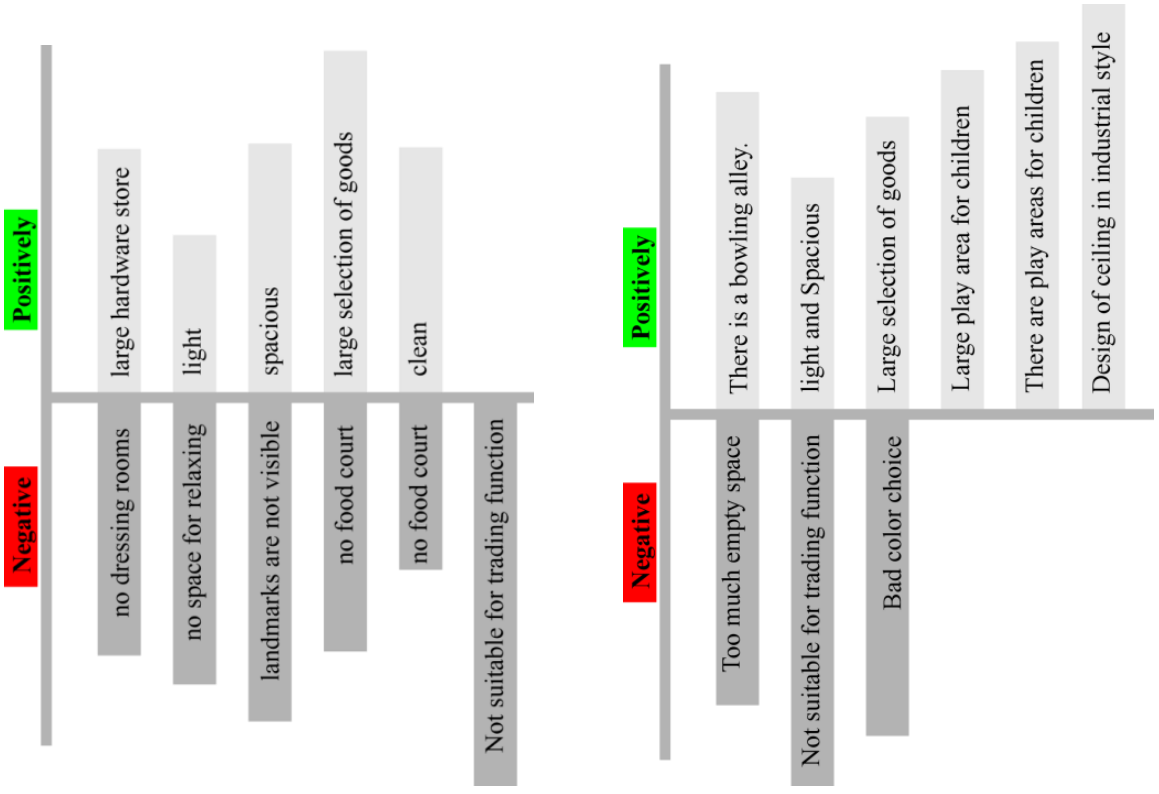


Figure 6. Assessment of internal comfort according to the criteria POE



a) Armada b) Grand Park

Figure 7. Functional comfort assessment

The results of the first question determining interior comfort based on the POE criteria showed that more positive opinions were expressed regarding the "Grand Park" building. Questions navigation systems and visual communications, lighting standards, acoustic environment, ventilation, temperature and humidity, air quality, and user comfort in shopping centers "Armada" and "Grand Park" were evaluated as 100%.

At the second stage of the assessment of internal comfort, the functional composition of the architectural and planning solution of the objects under study was determined. This aspect confirms the importance of considering additional functions that comfort visitors and developing a good environment design. In their opinion, the respondents pointed to the positive and negative functional qualities of the Armada and GrandPark buildings.

Regarding the Armada, comments were made: It has a large hardware store, light, spacious and clean, with a large selection of goods. Blocks 3 and 4 have poor lighting. There is no convenient food court. Pointers and landmarks are not visible briefly. There is a long distance between bathrooms. Lots of space and little space for relaxing, there are no dressing rooms. There is no clear division between the zones of outlets and trading floors. According to respondents, the Grand Park building: There is a bowling alley, large play area for children, light, spacious, large selection of goods and good advertisements. There are play areas for children; warmly; too much space for walking; design of ceiling in industrial style; not suitable for the trading function.

Further assessment of aesthetic qualities is based on the methods of K. Lynch. The external perception of the Armada and Grand Park buildings as elements of the urban environment were assessed. The assessment was conducted using a sociological survey of citizens living in the area, residents of other areas, and visitors to the city.

Ask for "Armada" and "Grand Park" publications among the submitted photos; the result is positive. Almost all participants of the sociological survey recognized the shopping center's "Armada" and "Grand Park" buildings.

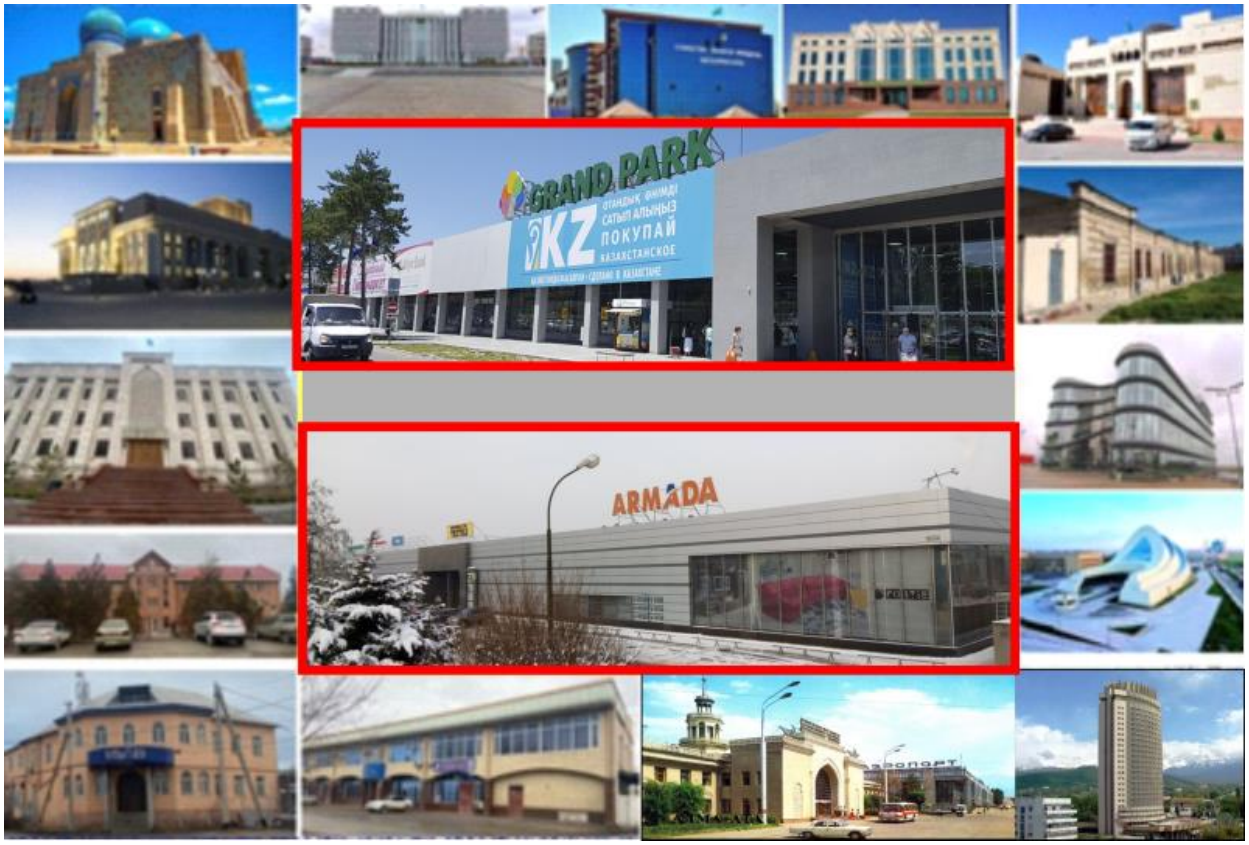


Figure 8. Set of photographs of various architectural objects

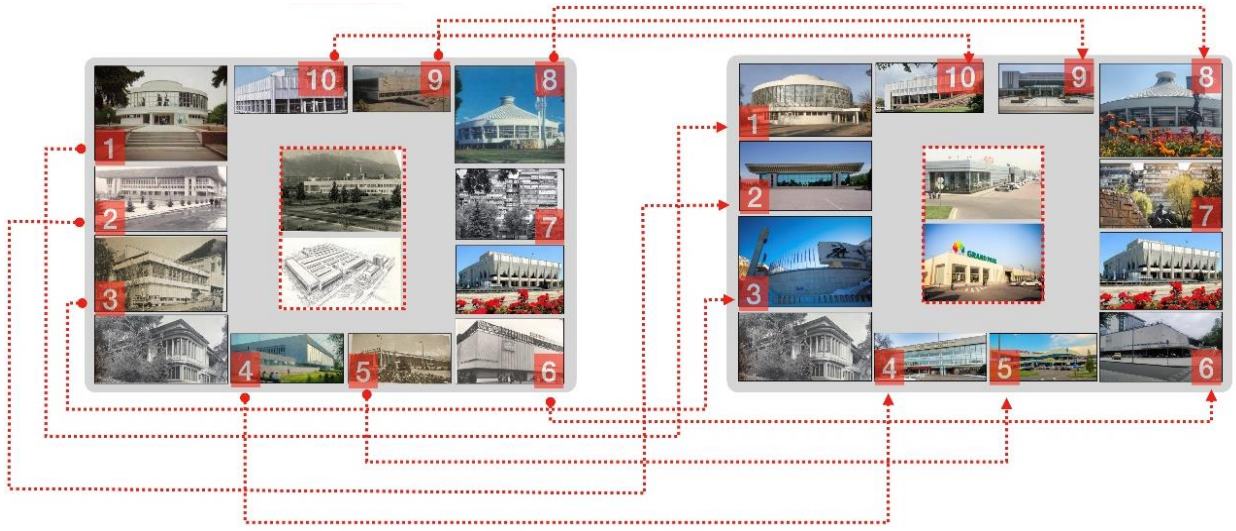


Figure 9. A set of photographs of various architectural objects indicating the buildings "Armada" and "Grand Park" before and after reconstruction

Moreover, the researchers proposed two options for collected photographs, including a photograph of the AMC building, i.e., before their reconstruction in the shopping center "Armada" and "Grand Park".

Eighteen people were interviewed, and more than 50% of them named the shopping center's buildings "Armada" and "Grand Park" among the dominant architectural objects in the area. Furthermore, they confirmed that they use the shopping center "Armada" and "Grand park" buildings for orientation in the district space and when showing the way to the person who asked the way.

Figure 10. Images of buildings for orientation in the area

Figure 11. Armada building recognition diagram" and "Grand Park

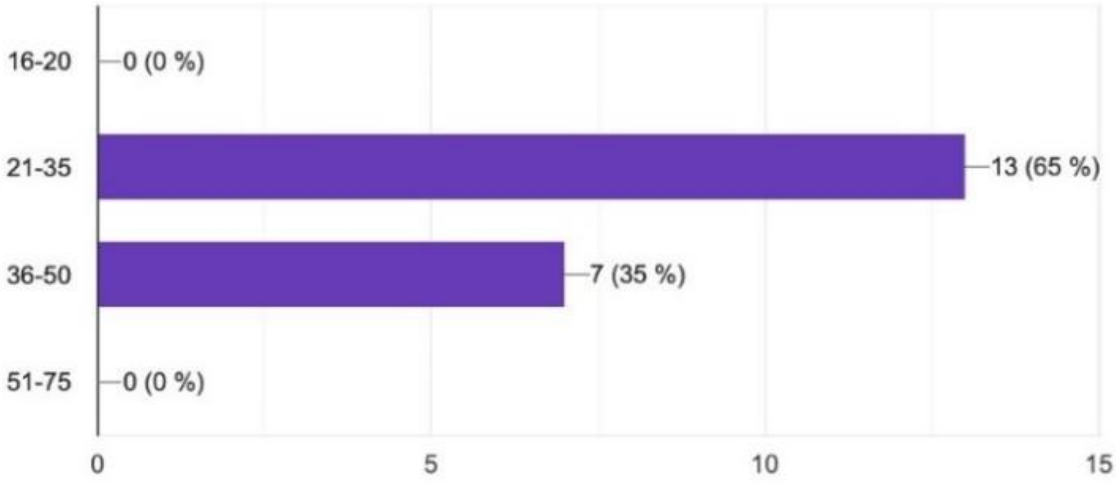


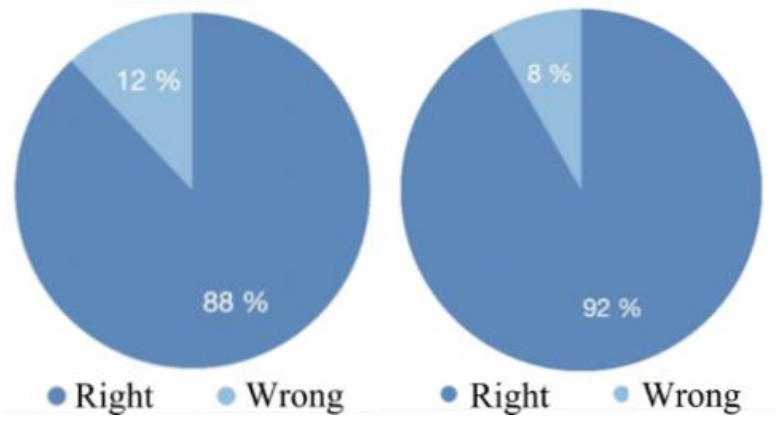
Figure 12. Assessment of the role of the architectural dominance of the buildings of the shopping center "Armada" and "Grand Park" in the located area

During the study and the course of the behavior of the results, it was also determined that people aged 21-50 years old more actively used the images and location of the buildings "Armada" and "Grand Park" for orientation in the space of the area and showing the way to another to a person.

The next interesting fact revealed during the research is the ability of all respondents to recognize architectural objects on the map. Despite the difference in age, education, and type of activity, most of the respondents correctly indicated the buildings under study on the building map.

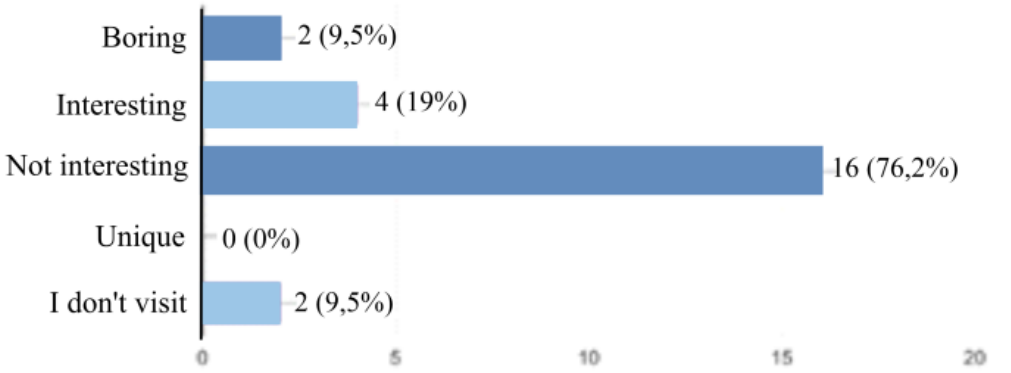
Figure 13. District map

The final stage of the sociological survey included collecting opinions on describing the image of the "Armada" and "Grand Park" buildings. The results showed that more positive opinions were expressed about the GrandPark building.

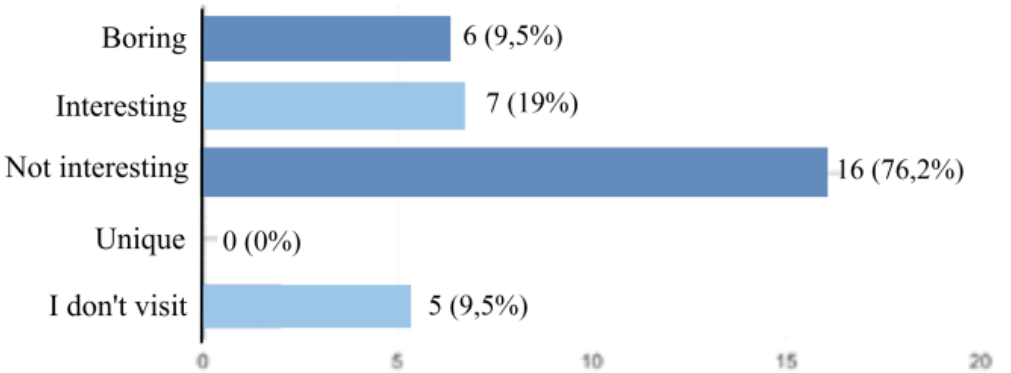


a)"Armada" b) "Grand Park

Figure 14. Recognition assessment diagram for buildings "Armada" and "Grand Park" on the map of the district"



a)"Armada"



b) "Grand Park

Figure 15. Characteristics of the image of the "Armada" and "Grand Park" buildings

4. Discussion

The aesthetic qualities of the renovation of the shopping center "Armada" and "Grand Park" and their role in shaping the image of the area are assessed positively by the residents and building users in general. However, there are opinions of respondents who have a negative attitude towards the change in the functions of industrial buildings in the Armada and Grand Park shopping centers to retail and entertainment activities. In their opinion, the renovation of buildings should have been focused on restoring the former industrial function. This suggests that the role of the ACM industrial building was important for the city's residents. Interestingly, many people remembered the same characteristics of the ACM building and its infrastructure. In the post-Soviet period, the

construction and operation of ACM stimulated the construction of a cultural center for ACM workers and a whole residential area, forming a separate city district.

In a sociological survey, many respondents remembered the green spaces and good landscaping of the plant's territory, which is more than 35 hectares of urban land. This confirms that urban area is not only three-dimensional. It is perceived at the level of abstraction and imagination. The urban area comprises landmarks, nodes, boundaries, districts, and places. These integral parts are divided among themselves, sometimes symbolically. The city acts as a collective experience - historical and social associations play a huge role in recognition of the urban area. Architectural objects function as a marker, filling one or another part of the city with a symbolic meaning.

Moreover, if the collective idea shares this value, it acquires the sacred status, carrying the norms and rules of behavior in a given place. In the collective view, the city is painted in various social feelings. Most city residents have a negative opinion of the renovation of the functional purpose of the ACM buildings.

According to residents, there are many shopping centers in the city. Therefore, they consider the transformation of the function of an industrial facility into a shopping center inappropriate [11,12,13,14]. Currently, the spatial potential of the building is not fully used. This is evidenced by the results of the study of the interior of the building from the point of view of users. Currently, most of the shopping center's interior is a single large space without partitions representing an exhibition of furniture. Furniture is brought from China, Belarus, and Russia, and some samples are produced in Kazakhstan. Kazakh manufacturers are usually representatives of medium-sized businesses that have their workshops outside the building of the shopping center "Armada". Plastic partitions separate some parts of the interior of the commercial building into separate retail premises for the sale of sanitary equipment, lighting fixtures, etc.

Figure 16. Interior of the AHBK building before and after reconstruction (Armada)

The same situation is in the other part of the former ACM building, which currently functions as the shopping center "Grand Park".

Figure 17. Interior of the building "Grand Park."

The obtained results from evaluating the aesthetic quality of the interiors and exteriors of buildings can provide important information for improving the operation of buildings and the satisfaction of staff and visitors. This section presents all aspects that require further improvement of the aesthetic quality and comfortable conditions in the functioning of the shopping centers "Armada" and "Grand Park" buildings.

Functional renovations, or adaptive reuse, can be challenging. Various planning methods and tools have been developed to support adaptive reuse [15,16,17,18]. The main objectives are to determine the service life of building components, including architectural and engineering components, to determine the replacement life cycle model of building components, and to study the relationship between building characteristics and facility operating costs [19,20,21,22]. Opinions are expressed about the dangers of reusing industrial buildings. For example, the reuse of industrial buildings generates a large amount of construction dust, which poses a significant risk to the health of builders. The Dynamic Health Risk Assessment (DHRA) system is proposed to comprehensively assess and reduce the hazards caused by dust generated during the renovation of contaminated industrial buildings [23,24,25,27].

5. Conclusions

The buildings of the shopping center "Armada" and "Grand Park" are known among the residents of the city. An imaginative solution, well-recognized locations, and active advertising of shopping centers do not call into question the operational life of the building's reuse. At present, the operation of commercial buildings has an income from the rental of commercial places in making a profit; it contributes to the mutual proximity of the two buildings to each other. However, the typological diversity of the functional organization of the internal space has a different impact on the citizens' demand for and perception of buildings. For example, the shopping and entertainment function of the Grand Park shopping center makes it more popular among the citizens and guests of Almaty city.

Consequently, this increases the recognition and readability of the building. Another important aspect is that each tenant, to increase their income, tries to create more comfortable conditions both in the interior and exterior of the building. This aspect also applies to visual communications and navigation, which are also of advertising nature.

The specific features of the functional organization of the shopping center "Armada" facilitate the periodic demand for the building among the urban residents. Nevertheless, the shopping center "Armada" is a popular facility among designers, builders, architects, and other professionals who design interior and exterior spaces and build various residential and public facilities. Shopping center "Armada" is known for the good quality of the goods and cooperates with large domestic and foreign companies.

Another main confirmation of the prevailing opinion among residents was that many citizens still associate these buildings with ACM and use the term "former ACM building". Moreover, when using the term "the building of the former ACM", both buildings are together without dividing them into the shopping centers "Armada" and "Grand Park". This is facilitated by people's memory of the role of ACM in the socio-economic life of the country and its city-forming characteristic, which occupies a significant part of the region. Until now, there are materials in Internet sources in printed publications that expressed negative opinions on the demolition of buildings and changes in the function of ACM. Like several other industrial buildings, ACM has named the brand of Almaty city.

To date, many citizens believe that the transformation of the function of an industrial building into a commercial one is not justified. Especially when the industry development and production question in various sectors are acute. Historical facts testify that the quality products produced at the plant were of a high level. Even though in aesthetic terms, the facades of the building have been changed and look more attractive, in functional terms, the current user is not efficient. In this aspect, it would like to be noted that the renovation of industrial facilities requires public participation and considering the opinions of both the residents of the area and the residents of the city. It is necessary to study the area's infrastructure and identify the types of buildings necessary to improve the comfortable conditions for the inhabitants of the area; such efforts will determine more effective functions in the renovation of industrial facilities. After all, the city has a historical destiny and a social structure. It has its past and memory storage institutions, urban traditions, myths, significant events, urban places of memory, etc. Therefore, to improve the aesthetic qualities of a changeable urban structure, it is necessary to understand its realities and consider aspects of people's perceptions.

In this regard, Kevin Lynch's anti-utilitarian building methods are invaluable and have greatly contributed to urban planning theory. This is the development of the theory of urban form, the perception of residents, and the consequences of urban design. Much effort has been put into creating spatial visual perception. This led to the creation of today's technologies for visualizing the urban environment and laid the foundation for a new science of human perception and behavior in the city - cognitive psychology.

Considering the features of the linear form of the three-dimensional composition of buildings, the city-forming role, and historical and economic significance, when developing interior design and landscaping of the objects under study, it is recommended: to conduct a semantic relationship with the life of the city as a whole or the area where the Armada and Grand Park" situated. The practical implementation of the recommendations is possible by combining transformed, stylized elements using such techniques as scale, rhythm, color, and silhouette. Apply a meaningful approach, increase readability and clarity of perception, and ease of recognition of the subject-spatial environment of various interior and exterior structures, which will achieve an aesthetically valuable result.

In general, about 30 people aged 18 to 50 were interviewed during the study of this area. When choosing respondents, there were no specific principles; a sociological survey was conducted among residents of the study and citizens from other districts of Almaty. This aspect allows us to state that the results obtained are effective and represent a collective idea of the aesthetic aspects of the interiors and exteriors of the Armada and Grand Park shopping malls.

Acknowledgments

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