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Art in Post-Industrial Facilities—Strategies of Adaptive Reuse for Art Exhibition Function in Poland

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Abstract: Along with the socio-economic changes in Poland after 1989 and the beginning of the industrial restructuring process, many industrial architecture objects lost their original purpose. At present, sustainable processes of reusing the building stock left over from the industrial period are proceeding. One of the possibilities includes adaptation to culture-related goals, where such activities have an established tradition in the world. The aim of the article is to analyze the adaptive reuse of post-industrial facilities in Poland for the functions of art exhibitions, such as museums, galleries, and art centers. The study was based on descriptive qualitative and quantitative research, in the following stages: identification and analysis of adapted objects; developing a typology of adaptive reuse strategies; questionnaire research aimed at institutions located in adapted facilities. The analyses show that the leading group of adapted facilities constitute former power plants, which ensure favorable exhibition conditions. The main result is the recognition of five types of adaptive reuse strategies implemented in Poland, resulting from a diversified approach to the historic substance, such as: the method of extension of an object; placing an exhibition; the character of the exhibition space, along with the type of intervention in the interior of a historic building.

Keywords: adaptive reuse; architecture; industrial heritage; adaptation; conversion; exhibition space; art museum; art gallery; art center; sustainable development

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1. Introduction

As a result of the political changes in Poland after 1989, there was a shift in the economic model and the transition to the free market economy. Along with the transformation, industrial restructuring accelerated, especially the limitation of the mining sector [1,2]. As a consequence of the changes, many buildings and industrial complexes were abandoned and lost their original purpose. One of the possibilities to give them new life are the processes of adaptation, including projects for cultural functions. This is favored by the fact that there has been a significant increase in investments in the cultural sector in Poland in the last two decades. Numerous concert halls, museums, and art exhibition spaces were built. This growth of new architectural implementations is described by researchers as a museum boom [3–5] or, as Rykwert called it, "a burst of creativity" [6] (p. 10). Not only were new architectural objects built, but also abandoned buildings gained new significance.

One of the possible and desired actions for such buildings is adaptive reuse, which is defined as reusing a building for a function other than that for which it was designed and constructed [7]. Let us add that the term "adaptive reuse" is sometimes used interchangeably with the terms "recycling" and "conversion" and will also be treated as such in this text. Let us also notice that the beginnings of adaptive reuse in the case of post-industrial facilities date back to the 1960s [8].

Adaptive reuse has an interdisciplinary character and focuses on aspects connected with conservation, art history, architecture, interior architecture, engineering, and spatial

planning [9–12]. In the process of changes, the importance of not only the external architectural form of a building is emphasized, but also its interior, with the transformation of the existing space [13,14]. The term "adaptive reuse" is an extremely capacious concept. It may describe minor modifications, but it is usually connected with significant changes resulting from conversion to a new function [15].

One of the reasons for adaptive reuse is the willingness to use the potential of already existing resources by fitting into the framework of sustainable development [16–18]. The result is the use of the so-called brownfields—land already invested. In this case, adaptation makes it possible to limit the embodied energy, which is lower here than for newly constructed buildings [19].

Another reason for adaptation may be the perception of historical values of industrial facilities and, consequently, a change in their status by recognizing them as an integral part of cultural heritage [20]. In this case, their original substance and its preservation are becoming an important issue. For this reason, this issue should be analyzed from the conservation point of view in terms of its authenticity and integrity [21]. The issue of aesthetic integrity [22] in industrial architecture conversion processes is also taken into consideration. Its beginnings go back to the understanding of a monument, as formulated in the Venice Charter [23]. On the other hand, The Nizhny Tagil Charter [20] and Dublin Principles [24], i.e., documents devoted to post-industrial buildings, explicitly indicate their adaptation as one of the acceptable methods, emphasizing that reuse makes it possible for these objects to survive. For that matter, the search and selection of functions enabling the preservation of their value was considered a key aspect [12,20]. The Burra Charter also signalizes the possibility of adaptations and emphasizes the role of cultural significance of a place that should be protected for present and future generations [25].

Adaptive reuse relates to the broadly understood group of post-industrial facilities. Some of these objects were given another chance in adaptation processes and avoided ruining or demolition. According to Jagodzińska [26], residential buildings and post-industrial buildings are among the most frequently adapted types of buildings for museums and contemporary art centers. Former residential buildings could include palaces, castles, and villas, such as the MS 1 Art Museum in Łódź in Poland. Redundant churches can also become museums. Generally, exhibition space is an accepted solution for defunct religious buildings [27]. On the other hand, Douglas [28] indicates art galleries as one of the six main directions of adaptation for industrial facilities, which makes its exhibition a potential catalyst for changes that help to solve the problem of abandoned buildings.

The influence on the perception of industrial-related buildings as an attractive space for the artistic environment should be sought in the activities of artists such as Andy Warhol, who, in the 1960s, created his studio in New York in a former hat factory [29]. At that time, similar enterprises were undertaken, which "exuded a raw industrial vitality" [30] (p. 173) both in the USA, especially in the New York district of SoHO, and also in Europe, such as in the case of the Museum of Modern Art Oxford. Such activities, consisting in the settlement of empty objects, should be considered pioneering.

When analyzing adaptations of post-industrial objects to the function of art exhibitions, it can be concluded that they differ in the scope of activities undertaken in the existing building. At one extreme, we have an example of the former Centrale Montemartini power plant in Rome, which was adapted in 1997 [31,32], in which old equipment and technologies were preserved and created an environment for the display of ancient sculptures. At the other extreme, the Tate Modern art museum in London, which is located in a former power plant, is perceived as a prototype of transformation [26]. The building was extended in 2000 and 2016, and the former technological equipment was removed from it, whereas architectural elements of a contemporary character were introduced into the interior of the former turbine hall [33].

In numerous works, attempts are made at making the typology of transformations of various architectural objects [13,34–36], but without distinguishing a group of post-industrial objects and changes to a specific function. Furthermore, there are works focusing

on environmental and energy quality of museums in repurposed buildings but without specifying a group of post-industrial facilities [37]. Moreover, they are based on analyses of selected case studies, which do not refer to a group coming from a specific geographical area or country.

Plevoets and Van Cleempoel were the only researched to undertake the task of systematizing activities based on adaptive reuse by positioning the research works and the attempts to organize the phenomenon contained therein. On the basis of the thematic scope and main criteria, they specified the approaches represented by the researchers, i.e., typological approach, architectural approach, technical approach, programmatic approach, and interior approach [9]. However, they do not take into account the specificity of post-industrial facilities or the specificity of a given region.

In connection with the above, the following objectives of this study were outlined, taking into consideration the following aspects related to adaptive reuse: socio-economic, heritage protection, legal, and assessment of the facility's functioning by administrators. First, the work contains a description and analysis of the post-industrial building stock in Poland, which is composed of adapted facilities in which the function of art exhibitions is the leading function. These are museums, galleries, art centers, and centers of creative work, in which the method of functioning is part of a permanent program of organizing exhibitions. This made it possible to identify the character of this phenomenon in Poland and its key features. On this basis, a typology was developed in order to classify design strategies aimed at obtaining exhibition space in post-industrial facilities and verified in the form of a questionnaire assessment of this space by their administrators-users.

2. Materials and Methods

The study was based on descriptive qualitative and quantitative research. It allowed us to characterize examples of adaptive reuse of post-industrial objects in Poland for the purposes of art exhibition. Our study was carried out in several stages in accordance with Figure 1, beginning with a literature review. At the same time, a list of institutions located in former post-industrial facilities and currently serving as art exhibitions was prepared. The research used data bases and the current List of Museums in Poland [38]. The identification of the remaining museums and art galleries was then started, inter alia, on the basis of publications containing an alphabetical catalog of museums [39] and on the functioning of private and public art galleries in Poland [40,41]. Art gallery databases were also analyzed, including the database of the Association of Polish Artists and Designers [42]. The search was expanded to include information from trade, architectural, and art magazines. Detailed recognition of the examples of adaptation was possible thanks to the acquisition of basic data on the identified objects. Their sources were architectural projects, monographic publications on the objects themselves or their adaptations, as well as interviews and studio visits. For each of the objects, it was ensured that the design documentation did not differ from the actual state. The collected data for each site was arranged in thematic groups and analyzed.

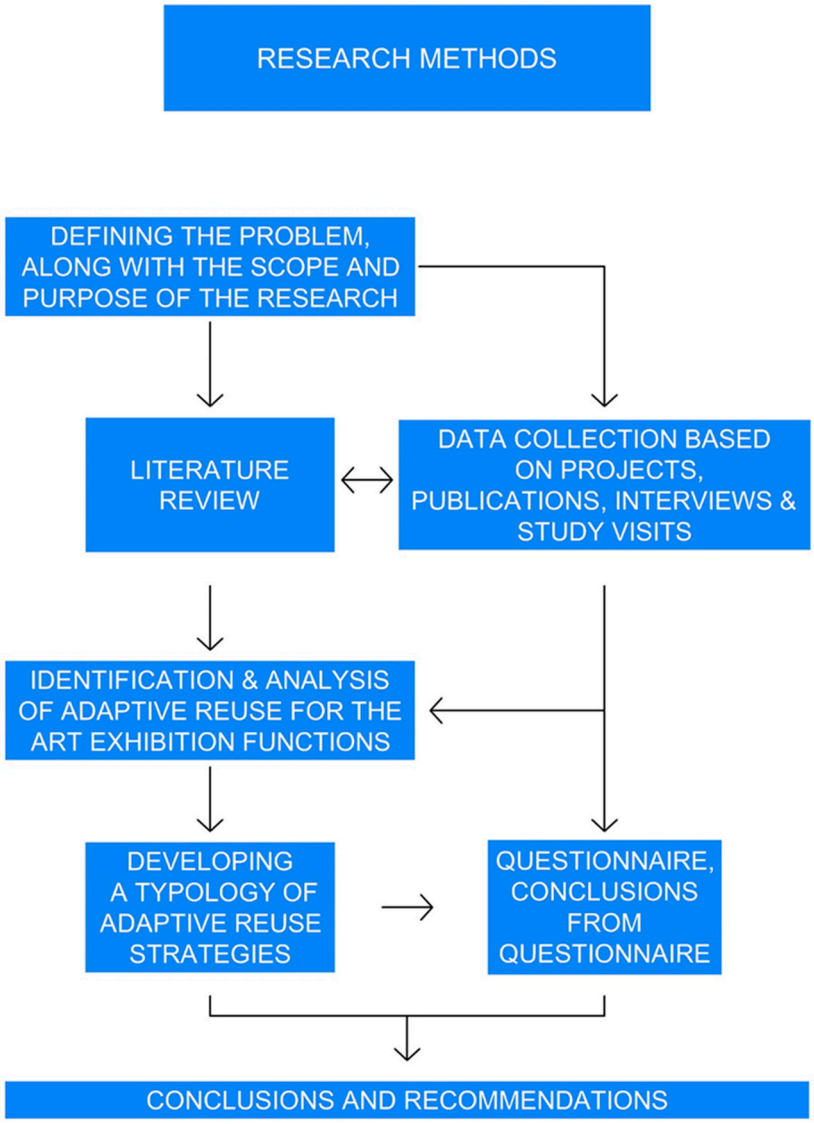


Figure 1. Research methods, authors' development.

The next step was the systematization of adaptive reuse strategies to the functions of the exhibition of post-industrial art in Poland, in line with the framework of typological analyses [43]. The typological division was developed on the basis of all the collected examples. For this purpose, three main criteria were adopted, namely the method of extension, the placement of the exhibition, and the character of the exhibition space, along with the type of intervention in the interior of the historic building. The objects were then subjected to questionnaire research. The questionnaires were directed to all identified institutions. Due to the nature of the questions, answers were provided by the departments responsible for facility administration, curatorial activities, and the organization of exhibitions. The answers were given by professionals who utilize a given space and struggle with its limitations. It was a group who had not previously commissioned or participated in a given adaptation process itself. They were aimed at supplementing the collected data on the functioning of institutions and their assessment of the exhibition conditions by indicating their main advantages and disadvantages. The questionnaires were public and contained open-ended and semi-open questions. Each institution received the questionnaire with the same questions, arranged in the same order. Moreover, the questionnaires were used to identify problems connected with the possession of historic post-industrial buildings and

thus provided a holistic view of the process of adaptation to the function of art exhibitions in Poland.

3. Results

3.1. Identification of Objects

The research process identified 15 institutions that worked for the exhibition of art and were located in post-industrial facilities. These were exclusively objects that function at present. Table 1 presents the final list of objects, whereas Appendix A (Table A1) presents the basic data on them and is divided into 4 thematic groups, i.e., characteristics of objects subject to adaptation, location, functional program of the institution, and adaptation activities. Objects were organized in it according to their usable area, i.e., from the largest to the smallest.

Table 1. List of post-industrial objects adapted to an art exhibition function in Poland.

Name	Name in Polish	City
The Silesian Museum	Muzeum Śląskie	Katowice
"Former Mine" Science and Art Centre	Stara Kopalnia Centrum Nauki i Sztuki	Wałbrzych
MOCAK Museum of Contemporary Art MS2 Art Museum	MOCAK Muzeum Sztuki Współczesnej Muzeum Sztuki MS2	Kraków Łódź
The BWA Gallery (a part of the Ostrowiec Brewery of Culture)	BWA Biuro Wystaw Artystycznych (część Ostrowieckiego Browaru Kultury)	Ostrowiec Świętokrzyski
Mazovia Centre for Contemporary Art "Elektrownia"	Mazowieckie Centrum Sztuki Współczesnej Elektrownia	Radom
CRICOTEKA Centre for the Documentation of the Art of Tadeusz Kantor	CRICOTEKA Ośrodek Dokumentacji Sztuki Tadeusza Kantora	Kraków
The Wilson Shaft Gallery	Galeria Szyb Wilson	Katowice
Modern Art Gallery (branch of the Leon Wyczółkowski District Museum in Bydgoszcz)	Galeria Sztuki Nowoczesnej (oddział Muzeum Leona Wyczółkowskiego w Bydgoszczy)	Bydgoszcz
NOMUS New Museum of Art	NOMUS Nowe Muzeum Sztuki	Gdańsk
Labyrinth Gallery	Galeria Labirynt	Lublin
TRAFO Center for Contemporary Art	Trafo Trafostacja Sztuki	Szczecin
Arsenal Gallery power station	Galeria Arsenał Elektrownia	Białystok
"Elektrownia" Contemporary Art Gallery	Galeria Sztuki Współczesnej Elektrownia	Czeladź
The Centre for Creative Activities (branch of Baltic Gallery of Contemporary Art)	Centrum Aktywności Twórczej (oddział Bałtyckiej Galerii Sztuki)	Ustka

3.2. Analysis of the Data Collected

The collected data indicate significant diversity in the research group. This is reflected in the results of the analyses: (1) characteristics of post-industrial facilities subject to adaptation; (2) their location; (3) the adopted program of functioning; (4) adaptation activities.

3.2.1. Characteristics of Objects Subject to Adaptation

Individual objects were mainly subject to adaptation processes; however, we also dealt with adaptation activities within building complexes that constitute part or all of the old industrial layouts. Most of the analyzed objects came from the first decade of the 20th century, although, of course, there were earlier ones as well. The oldest object was the grain mill in Bydgoszcz from 1861, which originally functioned as a steam mill and, from 1886, as an electric mill [44]. The youngest object to be adapted for the purposes of art exhibition is the former workshop hall of the mechanical school in Lublin from 1957. Six objects were covered by the statutory form of monument protection, which is an entry

in the register of monuments [45] and includes 40% of the analyzed objects. This form of protection requires all adaptation works to be agreed with the conservation services. It is worth pointing out that, in the case of three objects, the entry into the register was made only after adaptation. This shows that it was adaptation that became a factor, drawing attention to the value of an object and the need to preserve it. The remaining objects are listed in the Municipal Heritage Listings, which do not constitute a form of protection in itself, nevertheless, they may be subject to protection in local spatial development plans (zoning schemes) [45]. Entries in the Registers of Monuments or the Municipal Heritage Listings inform that the buildings should be considered monuments that are part of the heritage.

The diversity of the historical purpose of the adapted facilities is shown in Figure 2. The most frequently adapted facilities include power plants and typologically related facilities, such as converter plants, which together constitute 40% of the research group. It is determined by the spatial parameters of these buildings, for which one of their advantages is the presence of a high main room (or hall) without internal divisions. This feature is also characteristic of some other objects, such as the former post-mining pithead building and marking hall adapted to the Wilson Shaft Gallery. Such parameters in historic objects can be obtained, thanks to the construction pillars hidden in the external walls, which support cast iron or steel trusses carrying the covering of the object. A characteristic feature of these buildings is also relatively large glazing, which provides natural lighting. In the research group, there is also a factory hall with a saw-tooth roof, which was built in a system based on an internal modular grid of columns, which supported the trusses of the covering. In the particular case of MOCAK, the Museum of Contemporary Art in Kraków, the trusses were made of wood. It represents the type of development characteristic of the period of the Second Industrial Revolution, which was connected with the change of production processes and electrification [46].

Among the objects subject to adaptation, there are also multi-story buildings, inter alia, a former grain mill, a weaving mill, and a port warehouse, which are characterized by repeatable stories with a height of up to four meters. Their original structural layout consists of external load-bearing brick walls and an internal layout of wooden posts and ceilings in the case of buildings from Bydgoszcz and Ustka or cast-iron elements (posts and ceiling beams) in Łódź. These solutions, despite the late date, are typical of the First Industrial Revolution [28], and their later use results from the parallel occurrence of various types of buildings and the attachment to earlier models. However, in general, the dominating solution in the entire research group is a structure whose main part consists of roof trusses based on columns hidden in the external walls without additional internal supporters.

One of the features enabling the adaptation of post-industrial buildings is the ability to carry heavy utility loads. The trusses or overhead cranes present in the interiors of many facilities also make it possible to suspend various exhibition elements and thus a free and mobile arrangement of exhibitions. The general technical condition of the structure of the facilities before their adaptation can be considered good. This may indicate that the state of preservation is a factor conducive to the decision about the possibility of undertaking adaptation works.

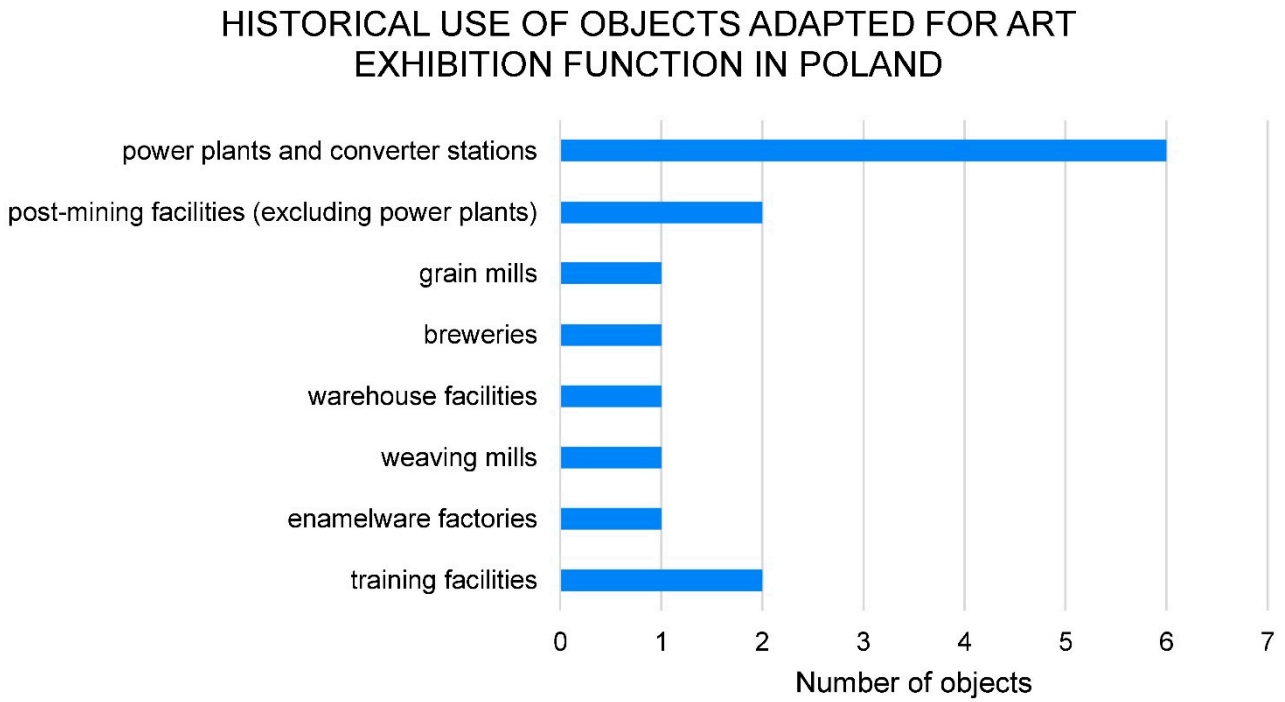


Figure 2. Historical use of objects adapted for art exhibition in Poland, authors' work.

3.2.2. Location of Facilities

The collected data show that objects that were adapted to the functions of art exhibitions in Poland were located in towns, mostly populated by over 100,000 poeple or which functioned within agglomerations. The only exception is Ostrowiec Świętokrzyski, with only just over 68,000 inhabitants. This indicates the estimated barrier of the number of inhabitants—Potential recipients of their offer. At the same time, it should be noticed that museums that function in smaller centers, such as Ostrowiec Świętokrzyski, Wałbrzych, and Radom, have the most diverse functional program and fill the gaps in the functioning of other cultural institutions in these towns.

The location in the city's urban structure is also important. The study adopted the division that is used to describe the location of industry in the city [47,48], distinguishing the following types, i.e., integrated (fully connected with the structure and other functional areas), adjacent (constituting a clearly separated area surrounded by areas with a different functional purpose), and autonomous (constituting a completely independent unit). The collected data show that the vast majority (93.3%) of objects whose location is integrated with the present urban tissue are subject to adaptation for the purposes of art exhibition. Among the analyzed examples, there is only one with an adjacent location, whereas there are no autonomous locations.

It should be emphasized that the present integrated character of the location is the result of a long-term process because a significant part of industrial facilities were originally located autonomously, constituting the main factor in the development of an urban unit in the following years. An important feature concerning 46.7% of the objects is the location in a multifunctional complex or a cultural complex. An example of location in a multifunctional complex is the NOMUS New Museum of Art in Gdańsk, which is located on the former shipyard grounds, where the European Solidarity Center currently functions and new residential and office buildings are being developed. A similar situation applies to the MS2 Muzeum Sztuki in Łódź, which is located in the complex of a former textile factory and now houses a shopping center, hotel, and entertainment facilities. Many revitalized facilities function as part of cultural complexes, where the leading example is Katowice, with the so-called Culture Zone, which includes the Silesian Museum, the philharmonic hall, the congress center, and the sports and entertainment halls. Another example of a

cultural complex is Zabłocie, which is located in the Krakow district and includes the MOCAK Museum of Contemporary Art, a historical museum, a glass and ceramics center, and a Cricoteka in the vicinity, all containing adapted buildings. This type of location is also characteristic of the Modern Art Gallery, which functions in the museum complex located on an island in the center of Bydgoszcz.

3.2.3. Institution Functioning Programs

They are predominantly publicly owned institutions and facilities. Only one of the analyzed examples is private property. The rest are financed from public funds and most of them by municipal or provincial governments. Additional proceeds come from fees for tickets. Only in the case of the Gallery of Contemporary Art "Elektrownia" in Czeladź and the private Galeria Szyb Wilson (Wilson Shaft Gallery), admission is free of charge. In the adapted facilities, there are institutions that adopt various ways of functioning (exhibition, cyclical, and ad hoc events). It is worth emphasizing that over 70% of them have their own collections of works of art, which makes them similar to museums that acquire exhibits and create collections.

The study group presents mainly modern and contemporary art, although in the case of the Silesian Museum, art from earlier periods is exhibited as well. The analyzed institutions present both works by Polish and foreign artists, but only the Museum of Art in Łódź and the Museum of Contemporary Art MOCAK in Krakow have a collection of international contemporary art, which is financed under government programs [49], whereas the remaining collections are of a regional character. The most characteristic form of presenting art is temporary exhibitions (73% of the researched institutions use this form of exhibition only), in spite of the fact that they have their own collections, which would make it possible to hold permanent exhibitions. This solution is dictated by the desire to create a variable offer, encouraging visitors to come back, which especially applies to institutions operating regionally, thus focusing on the local community. In the program of many museums in this group, apart from artistic events and festivals, there are also events connected with industrial heritage, which perfectly distinguishes them from traditional museums.

3.2.4. Adaptation Activities Taken

The research and analyses allowed us to identify the oldest adaptation of a former industrial facility to the function of an art exhibition in Poland, which is the Modern Art Gallery in Bydgoszcz. Since 1979, the facility was used as a seasonal exhibition place for contemporary art in the summer period, but the adaptation only worked with an extension from 2008, when a glass staircase and an elevator were added, which made it possible to permanently organize museum exhibitions for the whole year. The remaining few objects, which were adapted before the political changes in 1989, have recently undergone further transformations.

At the same time, it was found that most of the adaptation activities for the discussed group of objects took place in the last decade, which is the result of a significant increase in expenditure on culture and protection of cultural heritage from voivodship budgets [50]. On the other hand, the EU funds became a new source of financing after 2004, especially Regional Operational Programs and the Infrastructure and Environment Operational Program, which covered activities in the field of cultural heritage protection, including adaptations for cultural purposes [51]. In this way, the adaptation works were partially subsidized, e.g., in Katowice [52] and Wałbrzych [53].

The analyzed examples include both low-cost adaptations of the existing building substance and significant extensions, with new usable space significantly exceeding the space located in historic buildings. An extreme example of this is the Silesian Museum in Katowice, where the percentage share of the usable area of the new part exceeds 90% of the area of the entire complex of buildings. The phenomenon of extension occurrence, and in this way obtaining a larger area, refers to nearly half of the adaptation activities in the

research group. In some cases, this results from the need to provide new vertical transport, which would meet the safety conditions and legal regulations, or from the need to adapt the facility for use by disabled people.

The most frequently appearing supplementary functions include bookstores or museum shops, as well as gastronomy. The functional programs of many institutions also comprise cinema or audiovisual rooms, where meetings and film screenings are organized. Guest rooms for artists also constitute a characteristic element, which makes it possible to implement the so-called Artist-in-Residence Program.

In some cases, the extension resulted from the need to increase the space intended directly for the institution's activities, especially an exhibition space. The average usable floor space at the disposal of institutions in the research group amounts to nearly 6020 m^2, but there is a considerable diversity in parameters. The median usable area is 2575 m^2. The cubature parameter indicates a significant height of the interior of some of the objects in question. The maximum height of the exhibition interiors ranges from approximately 3.5 m for multi-story facilities to approximately 13.5 m for other adapted facilities. The total floor area of a building or a group of buildings dedicated to its main function, i.e., exhibitions, is on average 1817.54 m^2, while the median is 1020.32 m^2.

There is no data for the separated group of art exhibition spaces concerning the area intended directly for an exhibition, but these values can be applied to statistical materials concerning museums in Poland. For museums in Poland, the average total area of permanent exhibition halls is 1315 m^2 and the average area of temporary exhibition halls is 261 m^2 [54].

Comparing the obtained data, it can be concluded that, in the analyzed group, the average area devoted to exhibitions is significantly larger than in the case of a statistical museum in Poland, which gives potentially wider possibilities of organizing exhibitions and artistic events. It is worth pointing out that the external space can also be used to exhibit works of art. An example of this is the Stara Kopalnia (Former Mine) Complex in Wałbrzych, where, in the vicinity of buildings, apart from presenting sculptural forms of components of former mining equipment, sculptures and installations are also presented.

4. Typology of Adaptation Strategies

The identification of the types of adaptive transformations into exhibition functions occurring in Poland was carried out on the basis of the analysis of collected cases of objects adapted to the exhibition function on the criterion basis of the method of extension, placement of the exhibition, and the character of the exhibition space, along with the type of intervention in the interior of a historic building. These three categories were considered to be key properties, illustrating the attitude to the historic substance and the possibility of its reuse, allowing us to distinguish the types of adopted adaptation strategies. On the basis of the comparative analysis, all 15 collected cases were divided into five basic types of transformation strategies characteristic of adaptation to exhibition functions, according to Table 2 and the characteristics, as shown below.

Table 2. Adaptive reuse strategies of post-industrial objects for art exhibition function in Poland.

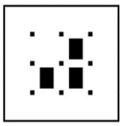
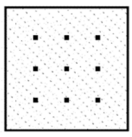
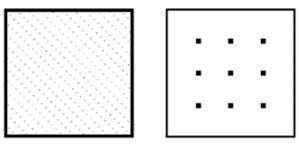
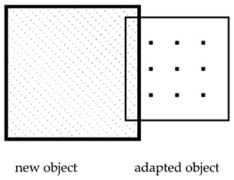
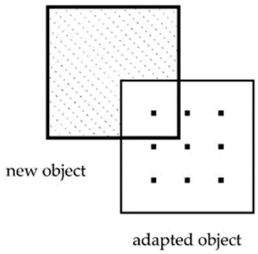
Adaptive Reuse Strategies of Post-Industrial Objects for the Functions of Art Exhibition in Poland		
Schematic Diagram of the Strategy Type	**Type of Strategy**	**Examples of Objects**
	Type 1 **Preservative strategy**	
 object adapted with technology	- Preservation of a historic post-industrial facility with limited intervention (preservation of the facility and interior). - No extension with a new exhibition space (there may be slight extensions connected with transport in the facility). - Exhibition function in an existing post-industrial facility—original industrial interiors left as the background of the exhibition.	- "Elektrownia"(Power plant) Contemporary Art Gallery in Czeladź
	Type 2 **Preservative strategy with intervention in the interiors**	
 adapted object	- Preservation of a historic post-industrial facility with intervention in the interiors. - No extension with a new exhibition space (there may be slight extensions connected with transport in the facility). - Exhibition function in an existing post-industrial facility—Historic interiors fully or partially adapted to the exhibition function in the form of a white cube.	- "Former Mine" Science and Art Centre in Wałbrzych - MS2 Art Museum in Łódź - NOMUS New Museum of Art in Gdańsk - Modern Art Gallery in Bydgoszcz - The BWA Gallery in Ostrowiec Świętokrzyski - TRAFO Center for Contemporary Art. in Szczecin - Arsenal Gallery power station in Białystok - The Centre for Creative Activities in Ustka - The Wilson Shaft Gallery in Katowice - Labyrinth Gallery in Lublin
	Type 3 **Strategy for the coexistence of the old and the new**	
 new object adapted object	- Coexistence—a new and historic object occurs independently (preservation of a historic object). - Extension with a new exhibition space. - Neutral exhibition space in the form of a white cube; other functions in post-industrial facilities.	- The Silesian Museum in Katowice

Table 2. *Cont.*

Adaptive Reuse Strategies of Post-Industrial Objects for the Functions of Art Exhibition in Poland		
Schematic Diagram of the Strategy Type	**Type of Strategy**	**Examples of Objects**
	Type 4 **The strategy of domination of the new facility**	
	- New building dominates a post-industrial facility. - Extension with a new exhibition space. - Exhibition space in the dominant part in the added part in the form a white cube or a black box.	- CRICOTEKA Centre for the Documentation of the Art of Tadeusz Kantor in Kraków - MOCAK Museum of Contemporary Art in Kraków
	Type 5 **The strategy of balance of a new and historic facility**	
	- Extension of the building is in a compositional balance with the historic building. - Extension with a new exhibition space. - Exhibition space in the form of a white cube in the new part and interiors with industrial elements in a historic building.	- Mazovia Centre for Contemporary Art "Elektrownia" in Radom
Legend:		
	**white cube**	
	**historic interior**	
	**interior converted to a white cube**	

4.1. Type 1—Preservative Strategy

This strategy consists of preserving an object and adapting the exhibition function to the existing layout. A fully developed example of this type of action is the former power plant in Czeladź, which was built in the years 1902–1908, according to the design by Józef Pius Dziekoński, in the Saturn coal mine complex [55]. It constituted an autonomous unit, which was located on the then outskirts of the city and was connected with residential and service buildings, as well as a hospital. The effect of revitalization actions is the adaptation of the historic power plant facility into an art gallery (Figure 3), as well as a place for events connected with the history of the city and industry. The development of the gallery's surroundings is a theme park, which presents the history of the Saturn mine. The adaptation of the building from 2013 (by Jan Pudło) included a comprehensive renovation of the facility, fully preserving the building of the former power plant (including interior elements, such as wall and floor cladding). However, the external form of the building was preserved with the adaptation of the building to legal regulations. The adaptation to the evacuation requirements forced the construction of a new staircase referring to the stylistic convention of the historic building in terms of the material. In the interiors, the original machines from the beginning of the 20th century were preserved, i.e., an electric generator, converters, a control panel, piping, technological elements, and a working overhead crane. These elements perform the role of a scenery in the gallery and at the same time they

constitute technical exhibits that underwent specialist maintenance. This space becomes a complex background for exhibiting works of art. Historic elements of the interior determine not only the visual perception of the room, but also influence, much more strongly than in other strategies, its (space) experiences, shaping the viewers' movements.

Figure 3. "Elektrownia" (Power Plant) Contemporary Art Gallery in Czeladź, photo by Michał Pieczka.

4.2. Type—Preservative Strategy with Intervention in the Interiors

This type of strategy is characterized by the preservation of the historic form of an object while interfering with its interior. The external parts (single-story or multi-story) are subject to conservation measures aimed at restoring its historic appearance. This type is the most numerous and is represented by a diverse group of objects. Exhibitions are located in the historic part, the interiors of which were transformed to various extents in order to transform them into a neutral exhibition space. The character of the interior follows the white cube model to a different extent, through white walls and new floors, but with visible elements of the structure or installation (trusses and posts, ventilation). In this type, lighting with artificial light performs a significant role, and for this purpose, systems that obscure lighting openings are introduced. There are also new elements in the interior, such as mezzanines and platforms (Trafo Trafostacja Sztuki in Szczecin, Figure 4). The industrial character of the interior is evidenced by rare relics of equipment, e.g., an overhead crane in the exhibition space (in Wałbrzych). Characteristic examples of this strategy are the Old Mine Science and Art Center in Wałbrzych and the MS2 Art Museum in Łódź (adaptation project by Bożena and Jacek Ferdzynowie). The MS2 building in Łódź (Figure 5) was built in 2008 as a result of the adaptation of the former four-story weaving mill, which was erected in 1895, according to the design by Hilary Majewski [56]. The adapted facility was introduced into the context of the revitalized post-industrial complex of the former Izrael Poznański's factory, which was transformed into a cultural and entertainment center ("Manufaktura"). The project of adapting the former cotton mill to a new function was to preserve the historic facades, while providing a neutral background ("white exhibition space") for the art exhibition (Figure 6). In this way, the interior is completely different from the preserved, and, with attention to detail, the external form of the object was obtained. Organization of exhibition halls was subordinated to the rhythm of the historic structure

of the multi-story building, which evokes ambivalent feelings, i.e., on the one hand, it organizes the exhibition space, while on the other, it limits it.

Figure 4. TRAFO Center for Contemporary Art in Szczecin, photo by Hoa binh, Wikimedia Commons, available online: https://commons.wikimedia.org/wiki/File:Szczecin,_transformatorownia_przy_ul._%C5%9Aw._Ducha_1.jpg (accessed on 24 September 2021).

Figure 5. MS2 Art Museum in Łódź, photo by Pelkian13, Wikimedia Commons, available online: https://upload.wikimedia.org/wikipedia/commons/d/d0/%C5%81%C3%B3d%C5%BA%2C_ul._Ogrodowa_17%2C_tkalnia_wysoka_%28ob._ms2%29%2C_1895_-2.JPG (accessed on 24 September 2021).

Figure 6. MS2 Art Museum in Łódź, documentation of the exhibition: Atlas of Modernity. The 20th and 21st Century Art Collection, MS2, 2014, photograph author: Piotr Tomczyk, source: the Resources of Art Museum in Łódź, available online: https://zasoby.msl.org.pl/files/objects/images/2751/18_2_p.__1_.jpg (accessed on 24 September 2021). Reproduced with permission from the Art Museum in Łódź [Muzeum Sztuki w Łodzi].

4.3. Type 3—Strategy of Coexistence of the Old and the New

This type of strategy consists ofdevelopment through the location of new accompanying facilities in a post-industrial area. We can observe here the parallel occurrence of historic and contemporary forms. New facilities are independent and stand alone in the surroundings of historic post-industrial buildings. This type is represented by the Silesian Museum in Katowice from 2013 (Figure 7), which is located on the site of the former Katowice Coal Mine and constitutes a relic of the former splendor of the Upper Silesian Industrial District. The museum is located in the city center and co-creates the Katowice Culture Zone. The Silesian Museum represents a type of transformations, consisting of the protection of the existing post-industrial landscape by putting up a new exhibition building with minimal intervention with the post-industrial landscape of the surrounding area. According to the authors of this layout, i.e., Roger Riewe and Florian Riegler, the location on the site of the former coal mine, surrounded by historic buildings, was an inspiration for the concept of museum areas hidden underground [57]. Outside, we can see glazed pavilions only. Entrances and administrative and technical functions, which also provide lighting and ventilation for the underground parts, are intended to be in the pavilions. They are arranged in such a way as to harmonize with the layout of the preserved objects. The architects designed a network of paths, squares, and green areas on the site of the former mine, which form a public city park. The existing post-mining buildings were adapted to the needs of restaurants and museum workshops, whereas the lift tower of the Warsaw II shaft, thanks to the addition of an elevator and a staircase, became available to visitors, offering a panoramic view of Katowice.

Figure 7. The Silesian Museum in Katowice, photo by Michał Pieczka.

4.4. Type 4—Strategy of Domination of a New Object

This type of strategy consists of developing an adapted historical facility and dominating it with a new cubature. In this type, the exhibition space is located mainly in the new part of the facility, and the building or historical spaces fulfill the basic functions. The exhibition rooms have neutral interiors in the form of a white cube or a black box. This type is represented by the MOCAK Museum of Contemporary Art in Kraków (by Claudio Nardi), where a new structure with a saw-tooth roof was obtained and in which it is difficult to distinguish between the old and the new tissues. Additionally, the CRICOTEKA Center for the Documentation of the Art of Tadeusz Kantor in Kraków (by Piotr Nawara, Agnieszka Szultk, and Stanisław Deńko) from 2014 also represents this type. It was located on the site of the former power plant at the very bank of the Vistula River (Figure 8). This object represents a type of transformation, consisting of a clear dominance of the historical part by a seemingly independent new form thrown over the old power plant. In this way, a new panorama of the Vistula riverbank was created. Functionally, the museum constitutes a whole, which is connected in the basement by means of transport, i.e., in the former power plant, which was subjected to conservation actions, theater spaces and an archive were placed. The Cricoteka exhibition space was raised a dozen or so meters above the historic complex and connected with the ground level by means of two towers with staircases only. The exhibition space blends in with the framework of the black box model, is used to present the permanent exhibition, and has an open plan that makes it possible to arrange anything freely.

Figure 8. CRICOTEKA Centre for the Documentation of the Art of Tadeusz Kantor in Kraków, photo by Michał Pieczka.

4.5. Type 5—Strategy of Balance of the New and of the Historic

The last type of strategy is based on a combination of interconnected equivalent forms—historic and modern. Its purpose is to bring out the contrast between new and old elements. Actions that consist of this type of combination of forms are illustrated by the building of the Mazowieckie Center for Contemporary Art Elektrownia in Radom (Figure 9), which was established in 2014 as a result of the adaptation of the former power plant, the oldest facility of this type in the former Russian partition, which was erected in 1901 under the supervision of Witold Idzikowski [58]. The adaptation of the buildings of the former power plant was based on the extension strategy combined with the creation of a place icon performing the role of an attractor. Architect Andrzej Kikowski contrasted the new part of the complex with both the massive cubature of the former power plant and the neighboring buildings by breaking the new cubature into a series of segmented sculptural shapes. The contrast of formal features is also visible in the interiors. The exhibition spaces are located in three halls of the historic power plant. Between the former halls there is a central passage with cascades—the backbone of the complex's internal composition. However, exhibitions are located in both historic and newly created spaces, which results in the creation of two different exhibition zones. These spaces follow the white cube model on the one hand and use interiors of a post-industrial character on the other. In the body of the former furnace, which is preserved as a technical monument and occupies part of one of the halls, galleries of small forms have been arranged on three levels.

Figure 9. Mazovia Centre for Contemporary Art "Elektrownia" in Radom, photo by Rafał Terkner, Wikimedia Commons, available online: https://upload.wikimedia.org/wikipedia/commons/f/f4/Centrum_Sztuki_Wspolczesnej_Elektrownia_1549766_Fotopolska-Eu.jpg (accessed on 24 September 2021).

5. Questionnaire Research

The questionnaire was sent to all 15 institutions included in the analyses. A total of 12 responses were obtained, which gives the consent rate for completing the questionnaire at the level of 80.00%.

Institutions provided attendance data from 2019 during the standard operating mode prior to the SARS-CoV-2 virus pandemic, which caused a periodic closure of cultural facilities in 2020 and 2021. The number of visitors in 2019 ranged from 246,069 to 6712, which is connected with the profile of the institution and the availability of art exhibition facilities in a given location. The largest annual attendance was achieved by the Silesian Museum, the largest in terms of area, which is also a historical museum, where the visit took place during one admission. The average number of visitors was 62,827 and the median was 15,150. In the same year, the average attendance for all art galleries in Poland was 13,900 [59]. The average attendance for museum facilities from the research group was 121,225 visitors. Due to the lack of data from 2019, this value can be compared to the average attendance in art museums in 2018, which was 33,406 visitors [54]. This means that the objects in the analyzed group have an above-average level of attendance.

The research attempted to define the institution's profile and related functional needs; therefore, the institutions were asked to indicate the main types of works of art presented and define the character of the exhibition. The most popular works turned out to be painting (10 answers), sculpture (8), graphics (6), artistic photography (6), and installation (6). The scale of popularity of the installation should be connected with the fact that most of the institutions present modern art, including site-specific art. The occurrence of such works, which are the artists' response to a specific exhibition space, is declared by nine of

the institutions, which shows that post-industrial space can influence artists. It is worth noticing that some of these works refer directly to the history of a given industrial facility, which was declared by four institutions representing mainly the second type of adaptation strategy connected with the preservation of a facility. All of the surveyed institutions stated that their exhibition space did not exclude the possibility of exhibiting any of the above types of works of art. This means that there were no architectural barriers which could prevent the exhibition.

All of the surveyed institutions claimed that their exhibition space was sufficient in relation to the needs. However, three of them indicated that if they had financial possibilities, they would be willing to extend their facilities and develop their activities. This answer was provided mainly by institutions, which were adapted according to the third and fifth strategies and have their seats in buildings that have already been extended in the adaptation process, such as the Mazovian Center for Contemporary Art in Radom and the Silesian Museum. The only institution of the second type was MS2 The Museum of Art in Łódź, located entirely in the original building of a former weaving mill. This kind of information demonstrates the possibility of a potential change in the adaptation strategy in the future.

In the questionnaire, respondents were also asked to identify the main advantages and disadvantages connected with the exhibition space held, which are summarized in Figure 10, with given features and the number of responses. The few disadvantages include issues related to the microclimate and the issue of old furnishings, as well as the neutrality of the interior. The most frequently indicated disadvantage was the construction elements, which made it difficult to exhibit works of art. This issue was raised mainly by objects that belong to the second type of adaptive reuse strategies. It occurred together with another disadvantage, which was the spatial arrangement of the interiors, indicated by some objects related to the presence of internal columns dividing the exhibition space. However, this feature was also indicated as an advantage, just as often in the examples of the second adaptation strategy and often by facilities that were former power plants.

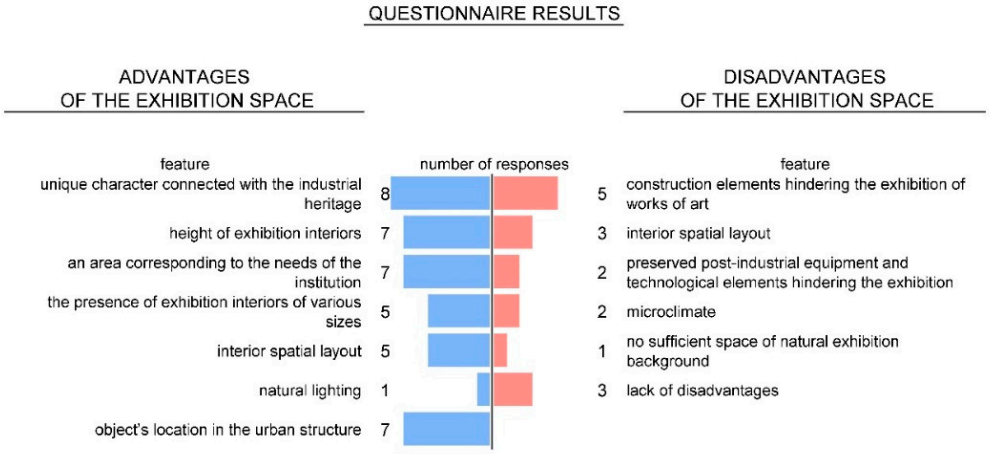


Figure 10. Questionnaire results; advantages and disadvantages of the exhibition space; authors' work.

The unique character connected with the industrial heritage was mentioned as the most frequently cited value of post-industrial objects adapted for art exhibition purposes (75% of respondents). Among the frequently recurring advantages, the height of the exhibition interior was mentioned, but it was not identified as an advantage in the case of multi-story buildings with repeatable stories. On the basis of the questionnaire, the presence of an interior with a height exceeding eight meters should be considered to be an advantage. The questionnaire also showed that the spatial layout of the interior can be perceived as a disadvantage or an advantage. The feature connected with the spatial layout, which is the presence of exhibition interiors of various sizes, was also indicated as

an advantage. This variability results from the existence of relatively large, open, and main post-industrial spaces, most often without internal supports, as well as smaller and more intimate auxiliary spaces, including cellars adapted to the functions of art exhibitions. One institution only indicated natural lighting as an advantage of the art exhibition environment. The natural light illumination conditions were found to be at least good in one third of the cases. This shows that lighting is not an important adaptation criterion for the analyzed function in terms of the dominance of artificial lighting in the modern way of exhibiting art.

In the first type of adaptive reuse strategy, named preservative strategy, the unique character of interiors was indicated as an advantage, while, at the same time, the features directly related to it, such as the lack of a neutral exhibition background and the preserved equipment that hinders the display, were defined as a defect. These two drawbacks were also signalized by objects belonging to the second type of adaptive reuse strategies. On the other hand, the most common advantage in this type was the presence of interiors of various sizes. Objects in the third and fourth type of strategies based on coexistence of the old and the new or domination of the new facility specified as an advantage the height of the exhibition interiors and the surfaces corresponding to the needs. This was the result of the presence of significant extensions and placing the exhibitions there. However, in the fifth type of adaptive reuse strategies, the presence of interiors of various dimensions was indicated as an advantage. This was the result of adopting a strategy based on the balance of the old and the new structure. This type shows the greatest number of advantages, which is related to the varied nature of the interiors.

Summing up, institutions assessed their own exhibition conditions as very good (comfortable) in 41.67%, good in 41.67%, correct in 16.66%; none of the institutions described them as bad or requiring any change.

Apart from the features that are directly connected with the parameters of objects, as many as 63.6% indicated the location of the object in the city's urban structure as an advantage. This confirms the importance of the localization factor and the role of the integrated location.

Another issue that was raised in the questionnaire included problems connected with the operation and maintenance of a historic facility. Among the more frequent answers, there were problems with moisture (5 respondents), the need for continuous remodeling works (4), and no or insufficient heating (3). Difficulties with insufficient ventilation and improper roof drainage (one response each) were marginally signaled. The main problem, concerning as many as 83.33% of institutions (10 responses), turned out to be high costs of maintaining a historic structure, understood as the costs of heating, electricity, cleaning, and repairs related to the use of the facility. Only 16.67% of institutions described the costs of living as average. The reason for this can be found in the low energy efficiency of historic buildings.

The questionnaire results also show a certain paradox. Namely, despite pointing out some disadvantages of the exhibition space used, at the same time in most cases, a unique character of these objects constituting an element of industrial heritage was given as the main advantage, even in the case of numerous interventions in the historic substance. In the opinion of the analyzed institutions, this is a distinguishing feature against the background of other museums, galleries, and art centers.

The survey also showed, in over 80% of cases, the activating impact of such an institution on local communities that permanently participate in their lives by participating in workshops and various events organized there.

6. Discussion

Attempts at adaptive reuse for the functions of art exhibitions in Poland began relatively early, i.e., in the late 1970s. They initially consisted of populating empty objects, as in the case of pioneering works from the USA and Western Europe. However, the increase in the number of adaptations did not take place until the 2nd decade of the 21st century.

The conducted research shows great popularity of former power plants, which account for 40% of the analyzed group of post-industrial facilities. Presumably, the adaptation of the former Bankside Power Station in London to the Tate Modern had a large influence on this phenomenon. Despite the perception of the object as a prototype [26], it represents one of the possible approaches and it can be described as an example of one of the described strategies, which is based on a new and historical balance. Other parallels can also be sought between other adaptations involving exhibiting works of art in the post-industrial environment with preserved equipment, such as Centrale Montemartini [31,32] and the Gallery of Contemporary Art in Czeladź, which represents the first identified strategy type. These former power plants are similar to the resulting character of the exhibition. However, the Italian building is used to present ancient art, whereas, in Poland institutions, adapted post-industrial facilities are situated in the mainstream, connected with modern art, and often have a profile of activity based on temporary exhibitions. In Poland, there are no examples of the use of old structures, such as the former grain silos in Cape Town, now housing The Zeitz Museum of Contemporary Art Africa. The reason for this is the need for significant transformations in order to adapt such facilities for use by visitors. In the Polish context, it is worth paying attention to the strategy of coexistence of the old and the new, which, in the case of the Silesian Museum, results in the adoption of an unprecedented solution, making it possible to limit the intervention in the post-industrial landscape with a significant extension of a facility.

The adaptive reuse strategies presented above show the fundamental issue, which is the search for a balance between preserving a building and an attempt at obtaining a neutral exhibition space. The mediation between the model of an alternative space and the model of a white cube was described by O'Doherty [60]. However, in reality, alternative spaces, along with their increase in popularity, have ceased to be something rare and, at the same time, alternative [30], and the ideal white cube layouts are never fully implemented [61,62].

Due to the use of post-industrial heritage, the exhibition space is perceived by the examined institutions as unique, which is also reflected by the presentation of site-specific art, referring to the post-industrial past. Jagodzińska [5] also indicates the phenomenon of searching for references to the history of a place in the case of adopted buildings, and the research results presented in the paper confirm this view.

The institutions analyzed in the study also declare the presence of groups of local communities that participate in their lives, but the adaptation process is ultimately undertaken mainly by local governments and is a public investment. On the other hand, in many European countries, an important role is played by civic initiatives, as well as by the activities of protection and voluntary organizations [63–65].

It is worth noting that adaptive reuse for heritage objects is an inevitable action [12] because, along with the aging of an object and the loss of its function, it is the only alternative to its destruction. As Bullen and Love [10] suggest, adapting a historic object may be costly due to conservation requirements. The questionnaire research also indicates that the subsequent maintenance of the facility may generate significant costs, which are one of the main problems of institutions. This shows that, in the analyzed processes, the issue of preserving heritage plays a greater role than the issue of subsequent maintenance costs. However, it is possible to undertake modernization measures to reduce these costs [66], also by limiting intervention in the original structure of post-industrial facilities [67] and gaining good energy quality [37]. This identified problem requires a deeper analysis and gives room for further research into adaptation processes in Poland.

The researched objects constitute a manifestation of a sustainable policy due to the extension of the life cycle of buildings and preservation of embodied energy, which would otherwise be wasted. Moreover, they limit the use of urban areas that have never been developed (the so-called greenfield sites) and prevent fragmentation of the urban structure [11] by filling gaps in the city structure and regenerating the surroundings. The importance of the object's location is an often-emphasized aspect [16], but in the case of the

analyzed group, it seems to be a factor that determines adaptation due to the significant similarity of location in the city's urban structure.

Adaptation works, which are performed in a given type of strategy, do not exclude its change in the future in the life cycle of a building. Additionally, institutions, which at present only occupy historic spaces, declare their will to develop them in the future. This will mean a shift from one type of adaptive strategy to another. This shows an uncertain border, which is dictated by the need to change and adapt a facility to modern needs, although it should be emphasized that some of these activities result in the loss of original values.

Typologies that have been developed so far generally refer to the group of adapted objects. Bollack [34] proposes a typology of transformation of existing objects, regardless of whether their original function is continued or changed. This author focuses on the formal expression of objects and distinguishes five types, i.e., insertions, wraps, parasites, juxtapositions, and weavings, which define the location of new extended elements in relation to the existing object. This typology is similar in its assumptions to the typology of conversion, as proposed by Robert [35]; it includes seven types, inter alia, building within, building around, and building over. In relation to abandoned buildings and ruins, a simplified typology of strategies is proposed by Guidetti and Robiglio [36], who list construction and de-construction depending on whether there is an increase or a loss of building substance. However, the typology proposed in the article also accepts a decision to develop as an important aspect the typology that aims at obtaining a new exhibition space. It combines this development with an equally important criterion, which is the obtained character of the interior—the environment for the exhibition of works of art. In terms of relationships between historical elements and modern remodeling in interiors, Brooker and Stone propose their own typology of strategies [13]. They distinguish three types of strategies depending on the scope and degree of intervention (reversibility of transformations performed), i.e., installation, intervention, and insertion. The examples analyzed in this study differ in the degree of intervention, which is also reflected in the obtained form of the object. However, in the case of the art exhibition function, a decision on the location of the exhibition space plays a significant role, which is the main determinant of the analyzed function, influencing the spatial arrangement and the appearance of the adapted, extended objects. The proposed typology of adaptation strategies concerns a set of objects adapted to a specific function, which positions it in the trend defined by Plevoets and Van Cleempoel [9] as a programmatic approach. On the other hand, the suggested division is part of the so-called architectural approach and interior approach [9], due to the focus on the adaptation process and the solutions adopted in its course, as well as the analysis of changes in historic interiors.

7. Conclusions

The paper presents a typology of adaptive reuse strategies, according to the main criteria, which determine the course of the process and makes it possible to obtain the space of art exhibition in former industrial facilities. The result of this process is a new use of the industrial heritage, including external appearance, interior character, and, above all, the quality of the exhibition space. The most popular type of transformation is preservation of the historic external form of an object, with advanced changes in the internal layout, the aim of which is to obtain a neutral exhibition space that corresponds to the second type of adaptive reuse strategy. However, there are also objects in which not only the form of the object has been preserved, but also machines and technological elements constituting a unique environment for the exhibition of works of art. Another method is to extend a facility with new exhibition spaces, which may result in adopting other adaptive reuse strategies. The typology described in this work can both be used to describe and organize adaptations already made and to help make decisions about the scope of future implementations. It can be applied in the research on objects intended to be adapted to the

function of art exhibitions, indicating possible solutions and effects of actions and at the same time promoting the sustainable use of the existing building resource.

On the basis of our research and analyses, characteristic features and factors, which may facilitate or limit adaptations of objects to the function of art exhibition, were identified. Among the features mentioned above, the key issue seems to be the issue of location, both in urban areas and in the city's urban structure. Close integration with the structure and transport accessibility constitutes a factor influencing adaptation. Another important feature refers to the parameters of a facility, which include the presence of the main open room and the layout of auxiliary rooms. These morphological and structural features predispose old power plants and typologically similar objects that dominate in the analyzed group to be adapted to the function of art exhibitions. The study shows that the location of the art exhibition function in a post-industrial object increases the attendance of visitors, since the object itself constitutes an additional value and a good destination. Moreover, project actions result in obtaining an exhibition space assessed as valuable by institutions, which are their users. New functions of art exhibition in Poland are located in objects recognized as an element of heritage, but sometimes it is the adaptation that draws attention to the value of an object and results in its legal protection. The reuse of facilities constitutes an example of sustainable and resilient actions in terms of environmental and social aspects. The new function of art makes it possible to preserve not only the material substance of objects, but also their history, thus strengthening the cultural identity.

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Appendix A

Table A1. Post-industrial objects adapted to the art exhibition function in Poland.

Post-Industrial Objects Adapted to the Art Exhibition Function in Poland																		
Institution		**Characteristics of the Object Subjected to Adaptation**					**Location**		**Functional Program of the Institution**					**Adaptive Actions**				
Name	City	Substance subjected to adaptation (building/complex of buildings)	Year of historic buildings' construction	Historical use of buildings	Method of protection of a historical object (year of entry in the Register of Monuments)	Number of inhabitants of a city (agglomeration) in thousands	Location in the urban structure (integrated/adjacen	Location in functional complexes (cultural, multifunctional)	Type ofinstitution	Presentedart	Types of exhibition organization	Year of the implementation adaptation	Percentage of extension in the usable area of the entire facility [%]	Location of the art exhibition	Main supplementary functions	Usable area (m^2)	Cubatur (m^3)	Area of exhibitions (m^2)	Maximum height of the exhibition space (m)]
The Silesian Museum	Katowice	complex of buildings	1881–1911	hard coal mine (bathhouse, carpentry shop, clothes warehouse, shaft engine room, shaft tower)	entry in the Municipal Register of Monuments	291.8	integrated	cultural complex	history and art museum	old art, modern art, contemporary art	permanent and temporary exhibitions	2013	91.00%	extension	education and conference rooms, museum shop, restaurant, maintenance department, library,	26,993.00	246,291	7531.00	11.94
"Former Mine" Science and Art Centre	Wałbrzych	complex of buildings	1867–1924	hard coal mine (art exhibitions in the former boiler house and power plant)	entry in the Register of Monuments (2004)	110.6	adjacent	multifunctional complex	multifunctional complex with a museum of technology and art center	modern art	temporary exhibitions	2014 (from 1999 Museum of Technology)	no extension	historic part	museum of technology, ceramics center, cultural center, accommodation, library, conference center,	17,759.00	no data	1100.00	9.00
MOCAK Museum of Contemporary Art	Kraków	complex of buildings	1937	enamelware factory	entry in the Municipal Register of Monuments	781.0	integrated	cultural complex	art museum	modern art	temporary exhibitions	2010	72.10%	extension	library, coffee shop, museum shop, education and audiovisual room	9581.00	36,157	3747.80	8.34
MS2 Art Museum	Łódź	building	1895	weaving mill	entry in the Register of Monuments (1971)	677.3	integrated	multifunctional complex	art museum	modern art, contemporary art	permanent and temporary exhibitions	2008	no extension	historic part	offices, warehouses, education and audiovisual room, coffee shop, museum shop	6104.30	37,303	3666.80	3.95
The BWA Gallery - a part of the Ostrowiec Brewery of Culture	Ostrowiec Świętokrzyski	complex of buildings	1908	brewery	entry in the Municipal Register of Monuments	68.3	integrated	-	art gallery	contemporary art	temporary exhibitions	1985/1995/2019	15.40%	historic part	library, cultural center, cinema room	5514.00	22,030	461.00	6.20
Mazovia Centre for Contemporary Art "Elektrownia"	Radom	building	1901	power plant	entry in the Municipal Register of Monuments	210.5	integrated	-	art center	contemporary art	temporary exhibitions	2014	53.50%	historic part and extension	cinema room, library, media library, conservation department, coffee shop, museum shop	4106.50	24,851	1021.00	11.70
CRICOTEKA Centre for the Documentation of the Art of Tadeusz Kantor	Kraków	building	1900	power plant	entry in the Register of Monuments (1987)	781.0	integrated	cultural complex	museum of one artist	contemporary art	temporary exhibitions	2014	66.40%	extension	theater hall, research center, archive, coffee shop	3567.00	26,719	800.00	5.20
The Wilson Shaft Gallery	Katowice	building	ok. 1918	building of pithead, the bathhouse, marking hall of a hard coal mine	entry in the Register of Monuments (2019)	291.8	integrated	-	art gallery	contemporary art	temporary exhibitions	2001	no extension	historic part	office areas	3172.50	no data	2240.00	ok. 12.0

Table A1. *Cont.*

Post-Industrial Objects Adapted to the Art Exhibition Function in Poland																			
Institution		**Characteristics of the Object Subjected to Adaptation**					**Location**		**Functional Program of the Institution**					**Adaptive Actions**					
Name	City	Substance subjected to adaptation (building/complex of buildings)	Year of historic buildings' construction	Historical use of buildings	Method of protection of a historical object (year of entry in the Register of Monuments)	Number of inhabitants of a city (agglomeration) in thousands	Location in the urban structure (integrated/adjacen	Location in functional complexes (cultural, multifunctional)	Type ofinstitution	Presentedart	Types of exhibition organization	Year of the implementation adaptation	Percentage of extension in the usable area of the entire facility [%]	Location of the art exhibition	Main supplementary functions	Usable area (m^2)	Cubatur (m^3)	Area of exhibitions (m^2)	Maximum height of the exhibition space (m)]
Modern Art Gallery—branch of the Leon Wyczółkowski District Museum in Bydgoszcz	Bydgoszcz	building	1861	a grain mill with a miller's house (art exhibitions at the mill)	entry in the Register of Monuments (1992)	348.2	integrated	cultural complex	art center	modern art, contemporary art	permanent and temporary exhibitions	1979/2008	6.30%	historic part	shop, works of art warehouse,	2575.55	9619	906.00	4.00
NOMUS New Museum of Art	Gdańsk	building	1940	basic school of shipbuilding	entry in the Municipal Register of Monuments	471.5	integrated	multifunctional complex	art museum	contemporary art	temporary exhibitions	2004–2016	no extension	historic part	educational room, artistic residencies (accommodation)	2428.00	11,221	1019.64	4.20
Labyrinth Gallery	Lublin	building	1957	school halls of mechanical workshops	entry in the Municipal Register of Monuments	339.5	integrated	-	art gallery	contemporary art	temporary exhibitions	2013	no extension	historic part	workshop room, museum shop, cinema and theater room	2230.39	13,387	713.40	7.60
TRAFO Center for Contemporary Art	Szczecin	building	1913	converter room	entry in the Register of Monuments (1984)	401.0	integrated	-	art center	contemporary art	temporary exhibitions	2013	no extension	historic part	coffee shop, bookstore, museum shop, artistic residencies (accommodation)	2092.42	10,156	942.00	18.50
Arsenal Gallery power station	Białystok	building	1909	power plant	entry in the Municipal Register of Monuments	297.6	integrated	-	art gallery	contemporary art	temporary exhibitions	2011	no extension	historic part	no supplementary functions	1843.80	12,600	680.00	13.50
"Elektrownia" Contemporary Art Gallery	Czeladź	building	1908	power plant	entry in the Municipal Register of Monuments	31.3 (2060)	integrated	-	art gallery	contemporary art	temporary exhibitions	2013	12.40%	historic part	conference room	1679.35	12,062	1077.00	11.30
The Centre for Creative Activities—Branch of Baltic Gallery of Contemporary Art	Ustka	building	in about 1900	harbor granary	entry in the Municipal Register of Monuments	15.4 (109)	integrated	-	art center	contemporary art	temporary exhibitions	1987/2013 (the entire facility)	no extension	historic part	studios, artistic residencies (accommodation)	1013.25	3965	269.20	3.70

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