

Article

Pro-Social Solutions in Residential Environments Created as a Result of Participatory Design

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Abstract: The pro-social dimension of contemporary housing is one of the main postulates of sustainability. The work aims to draw attention to the residential environment created as a result of participatory design and to examine how and to what extent it supports the creation of social contacts and the identification of inhabitants with their place of residence. The study included three housing projects prepared by the communities: B.R.O.T Aspern, Seestern Aspern, and LiSA. They are part of one urban block located in Aspern, part of the 22nd district of Vienna—Donaudstadt. The case studies were analysed using the same ten evaluation criteria. They were established based on previously developed theories of sociologists, psychologists and architects on the features of architecture and spaces supporting the formation of neighbourly contacts and the identification of users with their place of residence. The research showed that although the same evaluation criteria were used, each design group found an individual way to meet them in their project such as innovative design elements, unique community spaces, or user-driven features. This is proof that not only the place where architecture is created, has its conditions, and the planners and architects creating the project give it an individual, pro-social character, but also the users who create it. However, it is important to create an appropriate organizational, legal architectural and urban framework for the participation process to be successful.

Keywords: sustainable environment; residential architecture; social contacts; participatory design



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1. Introduction

A sustainable living environment should be shaped in an ecological, economic, and pro-social way. The demands mentioned above apply only to a narrow extent to ecological construction. The entire range of daily activities performed by residents should be in accordance with the principles of sustainable development including nutrition (waste segregation), energy consumption, child care, mobility, as well as building good neighbour contacts.

The work aims to draw attention to residential architecture created as a result of participatory design and to examine how and to what extent it supports the creation of social contacts and the identification of inhabitants with their place of residence, as well as an attempt to prove the following research hypothesis: The involvement of future users in the design process contributes to the creation of unique, pro-social architectural solutions.

Residential architecture created as a result of participatory design can support the creation of social contacts in two ways: in the “organizational form” and the “spatial form”. The first one involves the participation of future users in the design, building and management of residential space. The second of the mentioned forms means that an appropriately shaped living space can, to a greater or lesser extent, support the creation of social contact between neighbours.

For the purposes of this work, it was assumed that pro-social solutions are architectural and spatial factors that favour the formation of social contacts or help maintain bonds previously established, e.g., as a result of joint design or construction of a residential building.

The analysis of the review of existing, literature sources allowed for finding an innovative research approach. It was noticed that many studies focus on examining the identity of a place based on questionnaires completed by the users of the space. An example here is work whose main goal was to explore ways of measuring the contents of place identity to support the process of planning interventions in the context of a human-centred approach [1]. Several articles focus on problems related to the participation process itself and the skillful inclusion of users' requirements and needs in the project [2,3].

It was noticed that some works indirectly show that through the active participation of users in planning residential spaces, people identify with the place of residence and establish social contacts. These relationships are confirmed by the analysis of the construction of residential buildings conducted by Ring [4] and Hatch [5]. However, the mentioned works did not examine the extent to which the effect of this design, i.e., architecture, supports the creation of these dependencies. Residential spaces, due to their physical properties depending on both the conditions and the people who will shape them, have varying potential to become places supporting the formation of neighbourly bonds and, consequently, identification with the place.

This problem is noticed by Al-Kodmany [6], who in his research considers the impact of tall buildings on human behaviour. The researcher lists many threats that are associated with tall buildings not only in social but also in economic and ecological aspects. However, this article concerns only one of the characteristics of space that influence the formation of social contacts. An attempt to collect various concepts that show how architecture should be shaped to support the creation of social contacts was made by one of the authors of this article in her other work. Its purpose was to present the mechanisms that control the interaction of people, buildings, and the spaces between them. As a result of this research ten evaluation criteria were developed, which are practical recommendations for architects and urban planners on how they should shape the housing environment to make it pro-social which was used in the current work [7].

This article is a continuation of the research of one of the authors of the work on participatory design in residential architecture. Research conducted on three Polish housing complexes that were built in three different cities showed that creating well-functioning neighbourhoods and communities can take place not only through properly designed architecture, but also through mere participation in the design [8]. However, the comparison of three different projects created in different contexts that were developed following different spatial development plans did not allow for examining the impact of architectural design on the creation of individual, pro-social architectural solutions.

Therefore, it was decided to search for residential buildings created as a result of participatory design that will be set in the same context and designed in accordance with the same spatial development plan, because, by comparing them, it would be possible to obtain differences in the design approach.

2. Materials and Method

The study encompassed housing projects developed as a result of participatory design. They are part of one urban block located in Aspern, part of the 22nd district of Vienna—Donaudstadt. The town is located about 17 km east of the city centre, on the other side of the Danube River year after the first apartments were put into use, in 2013, two new metro stations on the U2 line were opened there: Aspern Nord—on the northern edge of the area, and Seestadt in the south. Additionally, several bus lines operated here before. Thanks to the timely development of public transport by the Vienna authorities, Aspern's residents could easily get to other parts of the city of their choice shortly after moving into their apartments. The urban concept of Aspen was prepared by Danish planners from the "Gehl Architekci" office. The main assumption when developing the town plans was to recognize public life as the highest value and, consequently, to create a public space in Aspern that would be attractive to the people living and working there.

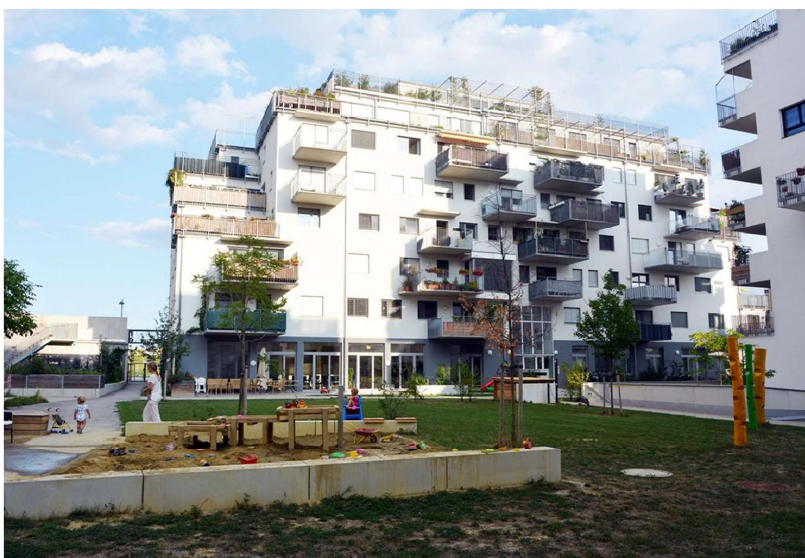
Particular attention was paid to today's standard of living, so a less dense urban plan was deliberately developed, unlike other urban development projects of the past [9].

Planners designed several important urban axes in the town: the Sonnenallee bypass, as the main traffic axis, an axis defining places for trade, services and cultural events, an axis designating green and recreational areas, and an axis along which the park and promenade were designed leading to the Seestadt metro station and the lake, which is the geographical centre of the town. As part of the Aspern urban development plan, in 2010, the city of Vienna designated for the first time such a large area in the town for five building groups which will form one urban block. Teams could apply for plots located in this area, proposing their concepts for residential buildings, which were then considered by city experts. Ultimately, five groups were selected: "B.R.O.T Aspern", "Seestern Aspern", "LiSA", "Pegasus", and "Jaspersn", who were asked to find a common solution for the layout of individual buildings in the urban block and develop a design for an open space located in the middle urban block.

Three out of five residential projects completed in the discussed urban block in Aspern were selected for research purposes. They were developed by the following communities: B.R.O.T Aspern (Table 1, Figure 1a,b), LiSA Aspern (Table 2, Figure 2a,b) and Seestern Aspern (Table 3, Figure 3a,b).

Table 1. Basic data of the B.R.O.T. Aspern project, source: own research.

Description	Data
Address	Hannah-Arendt-Platz 9, 1220 Vienna, Austria
Distance from the city centre	17 km, very good communication with the city centre
Building arrangement	The detached building is part of an urban block
Designer	Architect: Franz Kuzmich, cooperation: Stefan Kernstock
Project start	June 2010
Construction begins	May 2013
Completion of construction:	December 2014
Number of residential units	56
Number of floors	8 above-ground
Usable area	4812 m ²
Area of apartments	27–150 m ²



(a)



(b)

Figure 1. View of the B.R.O.T. Aspern building from the inner garden, © K. Kołacz, (a); Site plan of the B.R.O.T. Aspern building (own study based on <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023)) [10] (b).

Table 2. Basic data about the LISA Aspern project, source: own research.

Description	Data
Address	Maria-Tusch-Straße 8, 1220 Vienna, Austria
Distance from the city centre	17 km, very good communication with the city centre
Building arrangement	The detached building is part of an urban block
Designer	Architectural office: wup_wimmerundpartner, architect: Bernhard Weinberger, Project development office: raum&kommunikation, architect: Regina Gschwendtner
Project start	May 2011
Purchase and division of a plot of land	April 2012
Completion of construction:	November 2015
Number of residential units	49
Number of floors	7 above-ground
Usable area	3900 m ²
Area of apartments	35–125 m ²



Figure 2. View of the Lisa Aspern building from the inner garden, © K. Kołacz (a), Site plan of the Lisa Aspern building (own study based on <https://www.planering.org/plan-blog/2017/5/15/varfinns-alternativen> (accessed on 28 December 2023)) [10] (b).

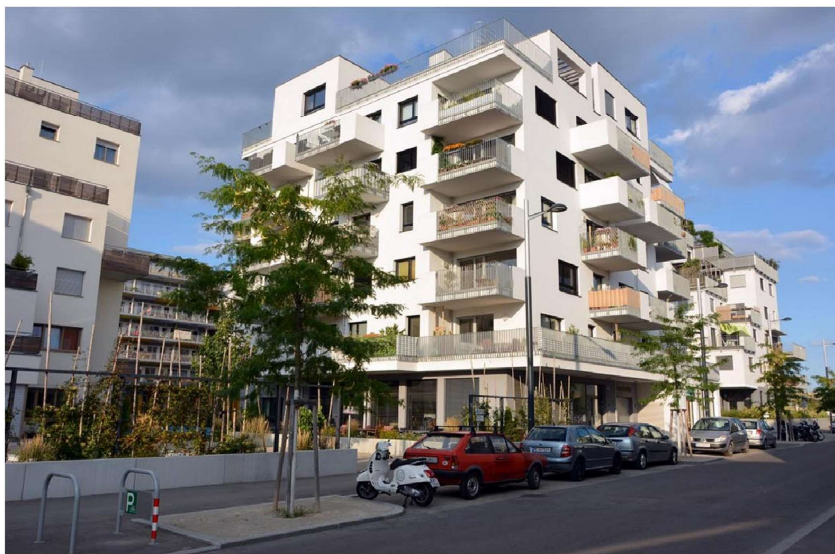
According to the authors of the work, these projects best illustrate the impact of participatory design on architecture (it was negligible in the remaining two others, omitted cases: Pegasus, and Jaspersn). Another selection criterion was also the possibility of obtaining information, and only the architects: Franz Kuzmich (B.R.O.T Aspern), Bernhard Weinberger (LiSA Aspern) and Markus Zilker (Seestern Aspern), agreed to give the author of the work interviews in which they presented the history of the development of the projects they co-created, thus providing much of the necessary data needed for the research conducted herein.

Developer, project initiator and manager of the Jaspersn building group, with whom the author of this work contacted, suggested that the influence of participatory design on architecture is overestimated. In his opinion, the quality of the urban and architectural

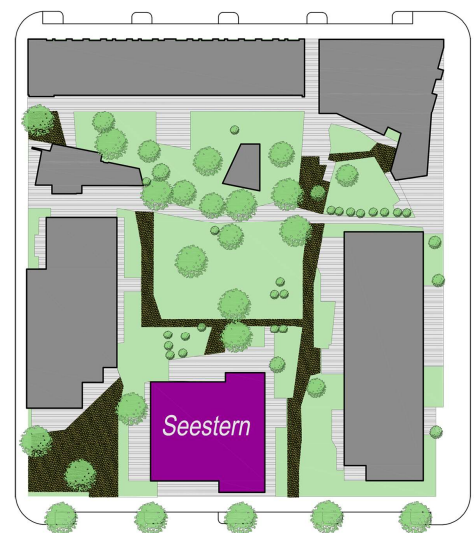
project development seems to be much more important. The case studies were analyzed using the same ten evaluation criteria (Table 4).

Table 3. Basic data about the Seestern Aspern project, source: own research.

Description	Data
Address	Gisela Legath Straße 5, 1220 Vienna, Austria
Distance from the city centre	17 km, very good communication with the city centre
Building arrangement	The detached building is part of an urban block
Designer	Architectural office: einzueins Architektur, architects: Katharina Bayer, Markus Zilker
Project start	January 2012
Construction begins	June 2013
Completion of construction:	July 2015
Number of residential units	28
Number of floors	7 above-ground
Usable area	2354 m ²
Area of apartments	280 m ²



(a)



(b)











Figure 3. View of the Seestern Aspern building from Gisela Legath Straße, © K. Kołacz (a), Site plan of the Seestern Aspern building (own study based on <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023)) [10] (b).

The criteria were established based on previously developed theories of sociologists, psychologists and architects on the features of architecture and spaces supporting the formation of neighbour bonds and the identification of users with the place of residence, such as: the optimal size of the housing estate and the residential building unit; residential buildings corresponding to human scale; smooth transition between private, social and public space; common outdoor space; available greenery; common indoor spaces, service infrastructure complementing residential spaces, diversity of households; territorial distinctiveness of the neighbourhood; architectural detail.

The work aims to draw attention to residential architecture created as a result of participatory design, but the evaluation criteria used here (Table 4) can also be applied to any other housing project. It should be considered that if the author of the work obtained the

necessary data to conduct the research, it would be possible to compare the evaluations of the Jaspersn and Pegasus projects with those presented here to obtain deeper research results regarding the pro-social solutions in residential environment of the entire urban block.

Table 4. Evaluation criteria: architectural and urban elements supporting the formation of social contacts., source: own research.

No.	Evaluation Criterion	Description	Pictogram	References
1	The optimal size of the housing estate and the residential building unit	Maximum number of apartments in one building: 30 Maximum number of apartments in the development quarter: 150		[8,11,12]
2	Residential buildings corresponding to human-scale	Maximum number of floors in a residential building: 4		[8,13,14]
3	Smooth transition between private, social and public space	The boundary between private and social space is designed in such a way that events happening at home can flow freely outside. The boundary between social and public space is separated by a system of buildings, a wall or a hedge. Social space is well connected to the city centre.		[8,15,16]
4	Common outdoor space	A common outdoor space designed in such a way that each resident has easy access to it, high-quality, well-sunlit.		[8,17]
5	Available greenery	Home gardens, green areas, parks, trees and shrubs make common spaces more attractive.		[8,18]
6	Common indoor spaces	Common internal spaces are located tangentially to the passages most frequently used by residents. Rooms for spending free time together or rooms where residents can perform everyday activities together, such as: kitchens, and laundry rooms.		[8,19]
7	Service infrastructure complementing residential spaces	Services located on the ground floor of a residential building or in the quarter to which the analysed building belongs.		[8,19]
8	Diversity of households	Age diversity of residents. A diverse layout of building plans adapted to the requirements of residents of different ages.		[8,20]
9	Territorial distinctiveness of the neighbourhood	Closed development layout with a courtyard in the middle, short, private street. Architectural elements that strengthen the territoriality of a given area, e.g., a gate.		[8,21]
10	Architectural detail	Small architecture that structures external spaces and becomes an element of residents' identification with this space, quality of space: properly selected lighting, properly designed surface.		[8,21]

Participatory design in the analyzed projects involved two-way communication. This means that decisions related to shaping the architecture came from both the architect and users and were agreed upon as a result of dialogue during design workshops. However, users did not always participate in all stages of architecture design.

The B.R.O.T. Aspern project was initiated by a group of well-known people who participated in all phases of the project, from the concept and overall shape of the house to its detailing. The work began with searching for a plot and finding a design office that would first develop a concept and then an executive design of the building based on the needs of future residents. The community decided to trust the architect Franz Kuzmich with whom, among others, the B.R.O.T. association cooperated in the implementation of previous investments.

The LiSA project was initiated based on many years of experience in projects for building communities by the “raum&komunikation” project development office and the “wup_wimmerundpartner” architectural studio. First, architects prepared a concept that was to constitute the basis for the development of the project. Then, the project development office, which was responsible for the participation process, individualized the project by adapting it to the specific desires of the residents. The first concept of the LiSA residential building was created without the participation of future users, but it was planned with the different needs of people in mind and to support social contacts between community members.

The initiators of the Seestern Aspern project were eight members of the community, which has grown over time and currently consists of 35 adults and six children. To cooperate on the project, the community decided to choose the architectural office “einszueins Architektur”, due to their extensive experience in the implementation of buildings intended for building communities. Decisions in the group related to the project were made in a sociocratic way. This meant equality in decision-making. Each community member had the right to object, provided they justified. However, the lack of objection was tantamount to consent to the decision being made. The participation process itself was divided into three stages. It concerned: the entire group, which was informed about the next stages of the investment implementation; a smaller design group, selected from among community members, who participated in the design of the entire building and individual households, with whom the architects, during individual meetings, designed their private apartments.

3. Results

The location of all three analyzed projects in a town, thanks to the well-executed policy of the Vienna authorities, facilitates excellent connectivity with the rest of the city. This town boasts an extensive service infrastructure, vast green areas, and a meticulously designed urban layout, which significantly eased the architects’ initial tasks when designing the residential buildings: B.R.O.T Aspern, Seestern Aspern, and LiSA Aspern. These advantages make each of the three projects meet at least five evaluation criteria, determining the extent to which the resulting architecture fosters social connections (Tables 5–7).

Table 5. Evaluation criteria used in the B.R.O.T Aspern project, source: own research.

1	2	3	4	5	6	7	8	9	10











The black colour of the pictogram: criterion is met: 8.5, grey colour of the pictogram: criterion is not met: 1.5

Table 6. Evaluation criteria used in the LiSA Aspern project, source: own research.

1	2	3	4	5	6	7	8	9	10

The black colour of the pictogram: criterion is met: 8, grey colour of the pictogram: criterion is not met: 2

Table 7. Evaluation criteria used in the Seestern Aspern project, source: own research.

1	2	3	4	5	6	7	8	9	10
									

The black colour of the pictogram: criterion is met: 9, grey colour of the pictogram: criterion is not met: 1

A semi-open development quarter, with subtly marked boundaries in the form of low walls and transparent gates (Figure 4a,b) between individual buildings, on the one hand, marks a clear neighbourhood boundary, and, on the other, allows for a smooth transition from the social space organized within the block to the public space. Excellent public transport connections further facilitate the link between the Seestadt township public space and downtown Vienna's public space. Architect Markus Zilker, co-designer of the Seestern Aspern project, emphasizes that the area's security is not guaranteed by the fence but by the residents, who know all their neighbours' faces and can quickly locate uninvited guests. This opinion is also confirmed by the author's private observations of the space around the buildings she photographed in August 2017: she had a different feeling when she entered the courtyard through the front door of the B.R.O.T Aspern community centre (Figure 4c), invited by one of the residents, and a completely different feeling when she returned an hour later to take more photos as she entered the courtyard through the corridor between the buildings (Figure 4d). On the second occasion, she felt that the people who were spending time in the courtyard at the time were watching her much more closely. The residents returned to their activities only after the researcher explained why she needed photographs of their space.

The numerous service outlets planned for the development area amid the residential buildings provide an opportunity for social contact not only between the neighbours of the buildings analyzed but also between the Seestadt township inhabitants. In addition, integrating local services into the development district, such as a shoe shop, an art supply store, an art studio in the LiSA building (Figure 5a), or a coworking office in the Seestern Aspern building (Figure 5b), promotes social cohesion. Employees of such services, who are also members of the neighbourhood community, are more vigilant about what is happening in the space surrounding the services than commuting workers from elsewhere in the city. As Czarnecki and Sieminski [21] point out, this type of service is a return to the traditional 'corner shop' approach. It also reduces commuting and strengthens the local community.

The township's spaces, filled with parks, communal gardens, vegetable gardens, and green promenades, where many benches and children's playground equipment have been designed, also encourage social contacts, not only the direct ones, related to conversations or common activities carried out by a group of people. Walking through these green areas provides opportunities for passive interactions—simply seeing or hearing others. However, even a simple chance encounter can lead to more complex forms of social behaviour.

Residents of all the residential buildings organized around the development quarter had the opportunity to participate in designing the quarter's internal common space with the "zwoPK" greenery design studio, further strengthening their neighbour relations. The courtyard design provided a solid structure that visually connected the visually disparate residential buildings, and clearly defined the distinction between open, shared spaces and spaces belonging to each community. Figure 6a,b shows that these boundaries were drawn very fluidly, with low walls or due to changing colour or paving type. The project's main aim was to create a balance between open functionality and structural incentives for personal interpretation and action [22]. Figure 6c,d shows that this objective has been successfully achieved. The space of the quarter is full of people actively spending time there. This has been achieved by introducing many details and elements of small-scale architecture. Designed here are a sandpit, various children's play equipment, but also bicycle racks, benches, platforms and lanterns to allow the courtyard to be used at night.

However, in addition to the elements belonging to the project, one can also see in this space the personal objects of the residents, brought from their private homes, scattered and disorganized. This shows that the residents consider the courtyard to be their own domestic space, where they feel very comfortable.



Figure 4. Gate separating the LiSA building from the JAspern building (a), B.R.O.T. Aspern community gate (b), Exit from the B.R.O.T. Aspern community building for the courtyard (c), Passage between buildings (d); © K. Kołacz (own study based on <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023)) [10].

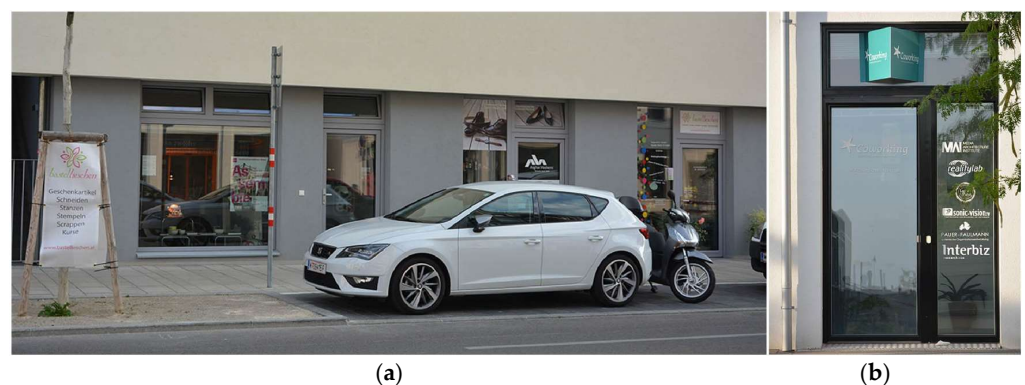


Figure 5. Services located in the LiSA building (a); Entrance to the coworking office (Seestern Aspern) (b); © K. Kołacz (own study based on <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023)) [10].



Figure 6. Increasing terrace development of the B.R.O.T. Aspern building (a,b), Children playing in the courtyard (c), Sandbox with residents' private items (d), Seestern Aspern building: view from the north (e), view from the south (f), © K. Kołacz (own study based on <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023)) [10].

The number of above-ground floors in the Seestern Aspern and LiSA buildings, initially set at seven each, adheres to the local zoning plan's terms, which limit building height to 21 m. These projects, therefore, do not meet the second assessment criterion, which concerns the 'four-storey limit'. Although the highest point of the B.R.O.T. Aspern building also rises to 21 m, its shape comprises a series of gradually rising sections (Figure 6e,f). As the co-designer of the project, architect Franz Kuzmich, pointed out, the B.R.O.T. Aspern cannot be considered seven storeys high, but is instead composed of different combinations of heights. This arrangement, reminiscent of a residential hilltop, may lead to more social interaction between neighbours than in a traditional seven-storey building. While looking out of a seventh-floor window makes it difficult to initiate a conversation with, for example, someone in the courtyard, the terraced layout of the B.R.O.T. Aspern building allows us to

establish relationships with a neighbour living on a terrace on a lower floor. For the above reasons, it was decided to award the B.R.O.T Aspern project half a point under the second evaluation criterion.

The fluidity of the boundaries between private and social space was expressed differently in each concept. Although all three buildings were built on a common plot, each contributing architect could make skillful use of their location within the block. The B.R.O.T Aspern community building, located right next to the park and Hannah-Arendt-Platz, connects the private spaces of the flats with the social space of the courtyard on the west side and the public park on the east side through the gradual sloping terrace structure described above. It should be noted that this structure descends gradually towards the social space of the courtyard and is more compact on the public side (Figure 6e,f).

The design of the B.R.O.T. Aspern community building began by determining the width of the building and arranging circulation within it, both horizontally and vertically. F. Kuzmich's design team proposed three architectural variants, presenting different proposals for the arrangement of communication. The future residents decided on one staircase with one elevator and a central corridor. The reason influencing the choice of this variant was the desire of community members to maintain frequent social contacts. They thought that if there was only one elevator and one staircase in the building, it would allow them to meet their neighbours more often, e.g., on their way to work. This behaviour proves the residents' high social awareness and their consistency in implementing their intentions. Community members wanted to live together, close to each other, and the decision to choose communication in the building was a manifestation of this.

The LiSA community building, located along the busiest Maria-Tusch-Straße (Figure 7a), separates the private space of the flats from it with a massive, long wall with small window openings. On the other side, the building opens onto the courtyard space thanks to large, glazed windows and balconies connected to the outdoor gallery (Figure 7b).



Figure 7. LiSA building: from the north side (a), from the south side (b); © K. Kołacz, 2017 (own study based on <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023)) [10].

From here, the residents have an excellent view of the social space of the courtyard. The individual private balconies are not radically separated from each other, which facilitates the creation of neighbourly conversations. The author witnessed one such conversation, in which a resident of the LiSA building, while doing her daily chores—hanging out the laundry—had a conversation with her neighbour who was just relaxing on the balcony. Another advantage of the project is that all the flats face both the public street and the social courtyard, so residents can observe from their windows what is happening in both the social and public spaces.

In the design of the Seestern Aspen, the fluidity of the boundaries between private and social spaces is reflected in the building's core structure. A centrally located, spacious staircase terminates in a skylight at the top, so that the corridors and lobby are well-lit. This solution seamlessly connects the interior and exterior spaces of the building. It encourages residents to make use of the social spaces of the roof and first-floor terraces, as well as the courtyard shared by all five communities.

The number of families and, therefore, the number of dwellings in the buildings analyzed was determined by the size of the area and the maximum building height allocated by the city council to each building group. The resulting number of dwellings in a given building was also influenced by each family's need for living space. It should be noted that the number of units determined may change in the future, especially in the concept proposed by the LiSA community, which offers the possibility to easily combine several units into one larger dwelling according to the family's changing needs. However, evaluating the current situation, only the Seestern Aspen project has realized less than 30 flats (Table 7). Therefore, only this project fulfils the first criterion for assessing the optimal size of a building. The buildings belonging to the B.R.O.T Aspen and LiSA Aspen communities have 40 and 49 dwellings respectively (Tables 5 and 6), so their projects exceed the threshold of the first assessment criterion. The number of dwelling units in the analyzed building block is also too high (the maximum number of dwelling units in the building block was 150).

It should be noted that the criterion of optimal building size was introduced because many architectural theorists believe that the size of a community that can maintain social connections and close neighbours should not exceed 30 families in a single residential building. However, Czarnecki and Sieminski [21], argue that the development of the situation depends not only on the density level itself, but also on the cultural background of the community members and the detailed conditions of lifestyle and spatial conditions.

Field observations made by the author of this paper show that the height of buildings above the four-storey limit or the number of residential blocks of flats above 150 in a residential block did not have a significant negative impact on the intensity of social contacts in the space analyzed. On the contrary, the author observed many cordial greetings between neighbours and spontaneous conversations initiated by residents both on balconies and in the common areas of the buildings. She also witnessed several joint activities between residents, especially the youngest ones, where they played happily together in the shared courtyard.

Nor did the height of the residential buildings, which exceeded four storeys above the ground, prevent the unrestricted use of the space, which, as mentioned above, was full of private objects brought in by the residents from their private homes. It was also not found that the scale of the buildings would have contributed to the unmistakable identification of strangers who were fully acquainted with all the occupants. The author's impressions of being in the courtyard space described above indicate that the residents of the development quarter analyzed in the Aspen township are well acquainted with each other and can react immediately when a stranger appears in their common space.

Another evaluation criterion that was met in all the buildings analyzed is the diversity of households. The communities in B.R.O.T Aspen, Seestern Aspen and LiSA are diverse in terms of age, occupation, social status, country of origin and life stage. They include: young single people, couples, married couples with younger and older children and the elderly. Intergenerational and intercultural housing promotes understanding of the needs of different social groups and offers the opportunity to develop new opportunities for cooperation between them. Although the creation of a diverse community in the city of Aspen was a top-down plan by the Vienna authorities, the various projects prepared by the B.R.O.T Aspen, Seestern Aspen and LiSA communities have provided a wide range of support and development opportunities for different social groups, depending on their economic situation, life stage and even their religion or individual interests and needs.

Each of these concepts contributes equally to the realization of quality of life and the promotion of social solidarity.

Within the B.R.O.T. community residential building, seven housing units were created in cooperation with the Vienna branch of Caritas, per the “Housing First” social policy” [23]. This organization aims to help homeless people find shelter. The B.R.O.T. Aspern community development concept was based on previous community projects: the B.R.O.T. Verband, B.R.O.T. Hernals and B.R.O.T. Kalksburg. The name of the association “B.R.O.T”, comes from the initials of the words “Beten—Reden—Offensein—Teilen”, which means “to pray—to speak—to be open—to share” [23]. The non-profit association B.R.O.T. sees co-housing as a response to the increasing loneliness of people and the isolation of families in times of social change [23].

The B.R.O.T Aspern community building has several common indoor spaces with a total area of 785 m², including a spacious entrance hall (Figure 8a) with photographs and pictures of community members on one wall, and framed intentions with community principles such as “help each other” and “be grateful” (Figure 8b). The first floor of the building also includes a living room with a kitchen (130.75 m²), a meditation room with a garden (88.5 m²), a children’s playroom with sanitary facilities and a terrace (27.39 m²). The basement was also designed with a wellness centre (90.60 m²), two workshop rooms (66.58 m²), two therapy rooms (41.69 m²), a laundry room (18.30 m²) with a drying room (28.70 m²), a bicycle room (133.80 m²) and a music rehearsal room (35.59 m²). Meanwhile, a large terrace of 300 m² was created on the roof with access to an indoor skybox space with a kitchen and sanitary facilities (44.84 m²).

Each flat in the B.R.O.T. Aspern building differs both in terms of surface area (27–150 m²) and the layout of the rooms, which are tailored to the individual needs of the residents. In Figure 8c,d, we can see that the doors of the flats are decorated with children’s drawings with brief information about the residents of a particular building. Around the entrances to the flats, we can also see the hosts’ individual belongings, which the residents leave in the hallway without fear of someone taking them away. This behaviour shows that neighbours trust each other, and the information on the door is a kind of incentive to visit. It also shows that the house’s residents want to know their fellow residents and are proud to live in this place.

The LiSA community project also includes common rooms, which have been adapted to the wishes and needs of the residents. These common spaces are found both within the main galleried building and two smaller buildings situated within the inner parts of the block (Figure 8c,d). They are accessed from ground level, directly from the courtyard. In addition, one of them is connected to the seven-storey gallery building by a footbridge at the second-floor level. They include a children’s playroom with sanitary facilities, a two-storey atelier with a leisure terrace, and a storage area for waste and bicycles. On the first floor of the main building are also designed: a large hall, a room for sports activities and 4 service units, while on the top floor: another common room with a terrace, and a wellness area in the basement.

The LiSA community project also includes common rooms, which have been adapted to the wishes and needs of the residents. These common spaces are found both within the main galleried building and two smaller buildings situated within the inner parts of the block (Figure 8e,f). They are accessed from ground level, directly from the courtyard. In addition, one of them is connected to the seven-storey gallery building by a footbridge at the second-floor level. They include a children’s playroom with sanitary facilities, a two-storey atelier with a leisure terrace, and a storage area for waste and bicycles. On the first floor of the main building are also designed: a large hall, a room for sports activities and 4 service units, while on the top floor: another common room with a terrace, and a wellness area in the basement.

The Seestern Aspern community project also offers various types of common spaces where residents can develop their passions and interests and spend time together. Although the Seestern building, like the one belonging to the B.R.O.T Aspern community, features a

spacious entrance hall (63.8 m²), a wellness area (78.5 m²), a meeting room with a kitchen and a separate children's corner (110.9 m²), a laundry room (9.0 m²) and a bicycle room (111.9 m²), these rooms have been located in other parts of the building and arranged differently. In addition, a large fireplace room (27.64 m²) and two sun terraces have been designed on the top floor, right next to the wellness area, one of which, the smaller one, is for the residents using the sauna. The other, the larger one, is located right next to the fireplace room and contains a large table, chairs, and a separate meditation area. In the basement, a flexible multipurpose space (79.7 m²) has been planned, which can be used for a variety of events, joint fitness classes, or movie screenings. Community residents, united by their concern for the environment, decided to set aside a special room in the building for sorting waste (28.7 m²).



Figure 8. (a) Entrance hall of the B.R.O.T. building. Aspern, (b) Creativity of the residents of the B.R.O.T. Aspern community, (c,d) Apartment doors decorated with children's works (B.R.O.T. Aspern), (e) Lisa Aspern community building with a playroom for children, (f) Buildings belonging to the LiSA community; © K. Kołacz (own study based on <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023)) [10].

As already mentioned, a coworking office space for twelve people was also created on the first floor, with a total area of 176.3 m². In the 1970s, sociologist A. Wallis wrote about two opposing and competing dependency systems: the ties of residence and the occupational ties of the population. He noted that the strength of the occupational ties was much stronger than the other ties at that time [8]. According to the author, it was impossible at that time to change the overall balance of power between these systems. The author wondered what the future might hold and felt that it was necessary to look for solutions that would allow the two systems to become more intertwined and perhaps even overlap [8]. It seems that the coworking space created by Seestern Aspern residents in their communal flat building could be the solution they were looking for. In addition to not having to waste time commuting to work, residents working in such an office can monitor what's going on in the building, and by spending time with other residents in the community, they can deepen their neighbourly relationships. Of course, the space is also open to outsiders. As we live in the internet age, the 21st century allows us to balance the eternally competing dependencies of work and home.

The advancement of technology and the Internet has also contributed to the emergence of new forms of social interaction in public spaces, as was observed during the fieldwork in Aspern, Vienna. Public benches are no longer solely used for face-to-face conversations between people sitting next to each other; they also facilitate virtual conversations through instant messaging or phone calls. In response to this new form of social interaction, the Polish company SEEDiA has created a bench that allows people to charge their phones and access the internet in public spaces. It works like a hot spot, with a solar panel, USB connection, and a rechargeable battery [24].

4. Discussion

The research carried out in this work has shown that residential architecture created as a result of participatory design supports the creation of social contacts and the identification of residents with their place of residence through an appropriately shaped living space. Research has also shown that the involvement of future users in the design process contributes to the creation of unique, pro-social architectural solutions such as innovative design elements, unique community spaces, or user-driven features.

However, can the quality resulting from the analyzed residential buildings and their immediate surroundings on a smaller scale also bring benefits to the residential environment on a large scale, or even on the scale of an entire city? We should consider to what extent architecture can improve urban space.

Analyses of case studies have shown that a properly conducted housing policy plays a significant role in achieving good quality architecture, which is manifested, among others, in attention to the proper execution and consistent implementation of spatial development plans and wise management of urban land. The evaluation criteria that were met in both the B.R.O.T. Aspern project and Seestern Aspern project, as well as the LiSA Aspern project, were largely the result of the fact that each of the mentioned projects was implemented in the same area, which was part of the town of Aspern. The authorities of Vienna, consistently implemented a precisely developed estate plan intending to create a friendly space for the people living and working there, establishing favourable conditions for the development of social contacts on a broader, urban level. Architects who continued this intention, making detailed designs of residential buildings and consulting them with the residents, had a much easier task.

It should be also noted that the authors of the analyzed projects decided to use the maximum allowable height and area of the building, which were specified in the local development plan. When there are no top-down guidelines, real estate and investments often become a game of interest. Developers may then try to build higher to obtain more usable space, which translates into greater profit, and not always into the quality of the proposed solutions.

A good solution to this issue is not only appropriate provisions in the spatial development plan but also architectural competitions organized by the city. Another method is to allocate urban plots only for building communities if they meet certain conditions, as was the case in the analyzed Viennese urban block. If, in a tender for a city plot, the main evaluation criterion is the design and not the price proposed for it, this encourages participants of the tender competition to take better care of the space being created.

The evaluation criteria developed for this work could prove helpful in awarding tenders of this type. They set the general conditions of social architecture without limiting the creativity of its creators. To achieve high-quality urban space, decisions regarding it should be made simultaneously at three levels: planning, urban and architectural [25].

Moreover, several studies examine novel opportunities for designers to generate objects by integrating a comprehensive understanding of architectural and structural principles. The principal findings underscore the impact of geometric variables on the performance of the form and emphasize the significance of effective topology optimization in the initial phases of the design process [26].

Architecture must cooperate with the existing urban fabric. All users of urban life should participate in its creation: development companies, city authorities responsible for spatial order, architects, and ordinary residents. As highlighted by Vietrova et al. [27], fostering the improvement of community-level public spaces necessitates consistent support from local authorities, resident initiative groups, and established public organizations at every stage of planning and execution, thereby serving as a fundamental avenue for active participation. Fekete et al. [28] also notice that the planning process needs multiple actors, one of them is the users. However, this cannot be done well without education promoting pro-social solutions. The design of a good quality residential building must be commissioned by someone who respects professionalism and design skills. Participatory design is also one of such forms of education. As the research presented here shows, residents who have greater knowledge of how people and buildings interact can consciously determine their social needs. During participatory design, they learn to think about space not only in individual terms but also in community terms. They can also, to a greater extent, appreciate the architect's workshop skills. They are eager to participate in creating their living space, but they often entrust the issue of designing the external appearance of a residential building to architects because they know that they are specialists in their field and can do their best. Of course, users represent great creative potential for architects. However, participatory design is much more efficient when working with people who are aware of their needs.

Despite the success of the research conducted here, it is necessary to bear in mind the possibility of unintended, potential limitations and complexities associated with participatory design in residential architecture, which may arise when applying the findings to diverse urban environments. It should be emphasized that the cultural and social milieu of Vienna played a significant role in shaping the efficacy of participatory design within these projects, which would be much more difficult to achieve in other conditions. The government of Vienna is open to new needs of the community, thanks to which the housing policy is constantly modified. An example of this is the initiative for construction and housing in the community, which was created in 2009 not only in Vienna, but also throughout Austria. Its task is to create a legal, organizational, and economic framework that will enable independent initiation and implementation of housing projects. In Vienna, there are professional consulting companies that assist construction groups in the development and management of projects, e.g., Raum & Kommunikation GmbH, which helped in the development of the project: "LiSA Aspern".

The success was also contributed to by the fact that the participation processes in all three projects were carried out by experienced architects who were able to professionally help building groups go through the complicated investment process. They also could design following the different needs of many people, which made it easier to find common

design solutions that were satisfactory for architects, community members, and the city that issued the building permit.

During conversations with the author of the work, architects mentioned that their first participatory projects took much more time before they learned how to design together with many people.

This work was not intended to explore participatory design methods that could be replicated and scaled in other urban environments characterized by diverse socio-economic contexts. It seems to be that it could be a potential avenue for further research in the domains of sustainable urban development and participatory design. It would also be worth conducting subsequent research or observation of analyzed areas of an urban block in Vienna to evaluate the enduring effects of participatory design on community development and social interactions. It would also be possible to compare a residential building that was created as a result of participatory design with one that did not involve future users in the design process using the same evaluation criteria mentioned in the work. This would allow us to obtain further interesting conclusions regarding planned architecture.

5. Conclusions

A comparative analysis of the assessment of architectural elements supporting social contacts, which concerned three projects belonging to one urban block, made it possible to assess the individual methods by which the considered assessment criteria were achieved. The evaluation criteria were based on the features of architecture and living spaces that make people identify more with their place of residence and are more willing to establish new social contacts. Even though these features were based on universal human needs, during the case study analyses, attempts were made to find individualities in their application.

The research showed that although the same evaluation criteria were used for the study, each design group found an individual way to meet them in their project in terms of: the external appearance of the buildings, the interior layout as well as the type of shared rooms and services offered. This is proof that not only the place where architecture is created has its own conditions, and the planners and architects creating the project give it an individual, pro-social character, but also the users who create it. However, it is important to create an appropriate organizational, legal architectural and urban framework for the participation process to be successful

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References

1. Bernardo, F.; Loupa-Ramos, I.; Coelho, R. How to Capture Place Identity Contents? A Tool for planning Interventions. *Sustainability* **2023**, *15*, 15535. [[CrossRef](#)]
2. Hamarat, Y.; Schelings, C.; Elsen, C. Participation: A Disciplinary Border for Architectural Research and Practice. *Architecture* **2022**, *2*, 711–723. [[CrossRef](#)]
3. Loiseau, B.; Safin, S.; Tufano, A. Promoting Social Interaction through Participatory Architecture. Experimentation, Experience, Evaluation in a Social Housing Complex (Grand'Goule, Poitiers, 1974–2021). *Architecture* **2022**, *2*, 383–405. [[CrossRef](#)]
4. Ring, K. *Self-Made City. Berlin: Self-Initiated Urban Living And Architectural Interventions*; Jovis: Berlin, Germany, 2013.

5. Hatch, C.R. *The Scope of Social Architecture*; Institute of Technology: Newark, NJ, USA, 1984.
6. Al-Kodmany, K. The Sustainability of Tall Building Developments: A Conceptual Framework. *Buildings* **2018**, *8*, 7. [CrossRef]
7. Kołacz, K. Sustainable living environment in the context of social needs. *Acta Sci. Pol. Archit.* **2023**, *22*, accepted.
8. Kosk, K. Social Participation in Residential Architecture as an Instrument for Transforming Both the Architecture and the People Who Participate in it. *Procedia Eng.* **2016**, *161*, 1468–1475. [CrossRef]
9. Seestern Aspern. Available online: <http://www.seestern-aspern.at/> (accessed on 31 October 2023). (In German).
10. Föreningen för Samhällsplanering. Available online: <https://www.planering.org/plan-blog/2017/5/15/var-finns-alternativen> (accessed on 28 December 2023).
11. McCamant, K.; Durrett, C.; Hertzman, E. *Co-Housing: A Contemporary Approach to Housing Ourselves*, 2nd ed.; Ten Speed Press: Berkeley, CA, USA, 2003; p. 158.
12. Chmielewski, J.M. *Teoria Urbanistyki w Projektowaniu i Planowaniu Miast*; Oficyna Wydawnicza Politechniki Warszawskiej: Warszawa, Poland, 2010; p. 92. (In Polish)
13. Lewicka, M. *Psychologia Miejsca*; Wydawnictwo Naukowe SCHOLAR: Warszawa, Poland, 2012; p. 214.
14. Wallis, A.; Siemiński, W. *Ankieta o Jednostkach Mieszkańcowych: Opinie 91 Architektów*; Instytut Urbanistyki i Architektury: Warszawa, Poland, 1974; p. 29. (In Polish)
15. Fromm, D. *Collaborative Communities Cohousing, Central Living, and Other New Forms of Housing with Shared Facilities*; Van Nostrand Reinhold: New York, NY, USA, 1991; pp. 12–14.
16. Hall, E.T. *Ukryty Wymiar*; PIW: Warszawa, Poland, 1976; p. 186. (In Polish)
17. Wallis, A. *Socjologia i Kształtowanie Przestrzeni*; PIW: Warszawa, Poland, 1971; pp. 74, 91–92. (In Polish)
18. Gzell, S. *Fenomen Małomiejskości*; Instytut Urbanistyki i Planowania Przestrzennego Politechniki Warszawskiej: Warszawa, Poland, 1987; pp. 189–191. (In Polish)
19. Gehl, J. *Life between Buildings, Using Public Space*; Island Press: Washington, DC, USA, 2013; pp. 115–117.
20. Alexander, C.; Ishikawa, S.; Silverstein, M. *A Pattern Language: Towns, Buildings, Construction*; Oxford University Press: New York, NY, USA, 1977; p. 193.
21. Czarnecki, B.; Siemiński, W. *Kształtowanie Bezpiecznej Przestrzeni Publicznej*; Difin: Warszawa, Poland, 2004; pp. 11, 19–21, 111, 112, 116. (In Polish)
22. Soziale Landschaft. Available online: <http://www.zwopk.at/sozial/> (accessed on 31 October 2023). (In German).
23. B.R.O.T. ASPERN. Available online: <http://www.brot-aspern.at/> (accessed on 31 October 2023). (In German).
24. Business Insider. Ta Ławka Działa Jak Hot Spot i Ładowarka w Jednym. W Przyszłości Ostrzeże Przed Burzą. Available online: <https://businessinsider.com.pl/technologie/polski-startup-seedia-stworzyl-lawke-ktora-jest-hotspotem-i-ladowarka/keffkql> (accessed on 31 October 2023). (In Polish).
25. Gzell, S.; Kurzątkowska, A.; Witskowska, A.; Zdunek-Wielgołaska, J. *Obszarowa Granica Miasta Zwartego*; Akapit-DTP: Warszawa, Poland, 2012; p. 12.
26. Kurcusz, M.; Stefanska, A.; Dixit, S.; Starzyk, A. The interdisciplinary designing in form, function, and structure coherency. *Acta Sci. Pol. Archit.* **2022**, *21*, 3–13.
27. Vietrova, P.; Vasyliiev, P.; Maksymiv, L. Participatory design method for improvement of urban public spaces-case study. *Acta Sci. Pol. Archit.* **2022**, *21*, 15–23. [CrossRef]
28. Fekete, A.; Hodor, K.; Dai, D. Urban Sustainability through Innovative Open Space Design. A Novel Approach to the Regeneration of Historic Open Spaces in Some Eastern European Countries and China. *Earth* **2021**, *2*, 420. [CrossRef]

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