Identifikace prostorových aspektů bydlení podporujících rozvoj udržitelných sousedských komunit

Identification of Spatial Aspects of Housing Fostering Sustainable and Resilient Communities

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Abstract:

This research examines the role of the residential environment in fostering socially sustainable and resilient communities in the Czech Republic, understood as the ability of housing environments to support social networks, sense of belonging, and inclusivity. While the concept of social sustainability has been widely addressed at the urban scale, its architectural and spatial dimensions at the scales of individual houses, housing blocks, localities, and neighbourhoods remain insufficiently explored. To address this gap, the study asks which architectural and urban elements across residential scales foster communities.

The research synthesizes insights from urban sociology, housing studies, and spatial design theory into a structured operationalization scheme that identifies socio-spatial conditions supportive of community. Building on this scheme, it proposes a qualitative checklist that combines plan and urban analysis, systematic observation, questionnaires, and interviews to make visible how housing environments embody community-supportive qualities.

The checklist is piloted through a comparative case study of two housing complexes in Prague, selected through paired comparison methodology. The cases share comparable contextual features but differ in their design intent: one explicitly aims to foster neighbourly living, while the other incorporates community spaces more conventionally. This contrast provided a testing ground for refining the descriptive procedure and for demonstrating its ability to capture socio-spatial conditions of community support.

By defining architectural and urban parameters and translating them into a systematic way of describing residential environments, the research contributes a method for scholars and practitioners to better recognize how housing design relates to socially sustainable and resilient communities.

Keywords:

communities; social sustainability; housing environment

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Identifikace prostorových aspektů bydlení podporujících rozvoj udržitelných sousedských komunit Markéta Káňová

1 Introduction

This research focuses on how the form and design of the residential environment influence neighbourly relations and, by extension, the development of socially sustainable and resilient communities. Social equality and the long-term viability of communities are central themes within the broader discourse on social sustainability (Bramley et al. 2009; Bramley and Power 2009, Roosta, Chizfahm Daneshmandian, Sadeghi, 2022), which are gaining increasing prominence in sustainability research. In recent years, the notion of socially sustainable and resilient communities has received growing attention (Roosta, Chizfahm Daneshmandian, Sadeghi, 2022). While academic discourse has mostly addressed this topic at larger urban or policy scales (Colantonio 2008; Shirazi a Keivani, 2017), it has also appeared in the rhetoric of private developers - e.g. as a marketing tool (Skanska, 2021) - and in policy documents aimed at fostering inclusive and supportive living environments.

Among the many factors shaping community sustainability, the physical environment plays an important role. It can either foster or hinder socially sustainable and resilient communities, depending on how it is designed and experienced. This highlights the need to formulate a comprehensive definition of such an environment and to develop a conceptual analytical tool for its evaluation.

1.1 Sustainable and Resilient Communities

Two main indicators of social sustainability are commonly recognised: social equality and community sustainability (ODPM, 2003; Bramley et al., 2009; Bramley & Power, 2009; Roosta, Chizfahm Daneshmandian, & Sadeghi, 2022). While social equality addresses access to services, infrastructure, employment, and public space, community sustainability encompasses aspects such as neighbourhood belonging, safety, perceived quality of the local environment, inclusivity, social interaction, residential stability, housing satisfaction, and participation in community activities (Bramley et al., 2009; Dempsey et al., 2011; Arundel & Ronald, 2017).

Winston (2021) characterises sustainable communities through multiple dimensions: mixed land use, sustainable transportation (walking, shared bikes, electric car sharing), resource management (energy, water, waste), social, cultural and environmental assets, and a high quality of life for both people and nature. Similarly, the 2006 "Bristol Accord," informed by Agenda 21 and signed by EU member states (Dempsey et al. 2011, ODPM, 2006), defines sustainable communities as "places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all" (ODPM, 2006).

In sociology, Matoušek (2003) defines a community as "a place where people can receive emotional support, appreciation, and practical help in everyday life," highlighting the importance of belonging, social capital, and mutual aid. Dempsey et al. (2011) similarly note that sustainable communities are those that support fairness, inclusion, and interaction.

Resilience is, in the urban context, commonly defined as the ability of a city to "mitigate the threats of shocks, absorb them (a sudden drop in performance), and recover quickly (restore normal performance)" (Bruneau et al., 2003). However, there is a criticism that current urban resilience policies tend to focus primarily on physical infrastructure while neglecting "the relationship between the built environment and the people and communities who inhabit it" (Larimian, Freeman, Palaiologou, Sadeghi, 2020). To understand how the built environment can support social resilience, it is essential to account for the spatial plurality of the social environment (Larimian et al., 2020).

Social resilience refers to a community's capacity to withstand external disruptions and shocks without suffering long-term harm (Beilin, 2015). This understanding of resilience is strongly influenced by the characteristics of the built environment, its scale, and spatial configuration (Larimian et al., 2020). Beilin (2015) highlights the critical role of local communities and neighbourhood associations, emphasizing that their active involvement in decision-making processes is key to fostering resilience. This underscores the distinct importance of place-based communities - those formed through shared space and resources – over the types of communities such as interest-based communities.

Research on social resilience has traditionally focused on either broad urban and regional scales (Meerow et al., 2016) or, conversely, on individuals and households (Boschma, 2014; Bristow & Healy, 2014). The neighbourhood scale - particularly in connection with spatial dimensions - has long been overlooked (Mehmood, 2015). Addressing this gap, Larimian et al. (2020) introduced the concept of Neighbourhood Social Resilience (NSR), defined through seven key dimensions: sense of belonging and place attachment; participation and influence; social networks; trust and reciprocity; residential stability; local community support; social equity; and safety and security.

These various definitions approach sustainable and resilient communities from different angles - some as places, others as networks of social relations, and others as sets of values or aspects. Building on these perspectives, this paper address sustainable and resilient communities as: fair, inclusive, and safe environments that offer opportunities for interaction, emotional support, and meeting the needs of the extended home.

This definition specifically concerns neighbourly communities, which are a subset of territorial communities. Territorial communities are one of three types of communities defined by Navrátil (2001). The other two types include communities of interest (e.g., based on ethnicity or hobbies) and communities sharing a common issue (e.g., support groups for addiction recovery). Territorial communities are distinct in that they form around shared spaces and resources. They can exist at various scales, from neighbourhoods and districts to cities and even nations (Navrátil, 2001). This research focuses on neighbourhood communities at the scales of individual houses, housing blocks, localities and neighbourhoods.

Neighbourly communities offer a number of benefits: they foster a sense of belonging, contribute to mental and physical well-being, and facilitate resource sharing—be it material, emotional, or informational. These communities can also enhance the place itself through bottom-up problem-solving, where local knowledge improves outcomes. Municipalities, in turn, benefit from active neighbourhoods by gaining effective communication partners in planning and governance (Tichý, 2013).

There are multiple ways to support the development of such communities. Some emerge from internal processes - such as resident participation in neighbourhood governance (Kohout et al., 2020). Others are externally introduced, such as in-house social workers ("housing partners") (Förster a Menking, 2018). Intangible factors like the length of residency also play a role (Talen, 1999). But physical (tangible) aspects of the environment are equally vital. These aspects could be the clustering of social functions (e.g., mixing commercial and non-commercial spaces) or design of an area where different streets play different roles (Pagh a Cook, 2023) and many others. This paper specifically addresses the definition and evaluation of these physical, spatial aspects.

1.2 Sustainable and Resilient Communities at the Scales of House, Block, and Locality

In recent years, social sustainability research has shifted from quantitative methods to more qualitative approaches and from city-scale analysis to more localised, community-scale investigations (Colantonio, 2008; Shirazi & Keivani, 2017). Social

sustainability is often defined by a set of principles or indicators. For instance, Shirazi and Keivani identify seven key principles: equiry; democracy, participation, and civic society; social inclusion and mix; social networking and interaction; livelihood and sense of place; safety and security; human well-being; and quality of life (Shirazi & Keivani, 2017).

There is also growing body of research examining the relationship between the built environment and social sustainability. Numerous studies demonstrate that the spatial form and configuration of urban environments significantly influence socially sustainable outcomes (Bramley et al., 2010; Roosta et al., 2022; Larimian et al., 2020). To fully understand these dynamics, the built environment must be analysed across multiple spatial scales. In the context of residential environments, the relevant spatial units (Fig. 1) included in this study are:

- neighbourhood
- locality
- housing block
- house
- apartment
- room
- place

These spatial levels mirror Hall's (1990) categories of human social interaction: public, collective, group, pair, and individual. According to Tichý (2013), there are three principles to follow when designing residential environments at different scales:

- Each unit of a chosen scale contains all units of lower scales and includes additional specific elements.
- These specific elements organise the layout of smaller-scale units (e.g., a building's circulation space organises the apartments).
- It is not possible to design in isolation at one scale—each scale is interrelated, with stronger spatial connections at closer ranges.

To support neighbourhoods that foster sustainable communities, we must therefore design environments that cultivate communities across multiple, interconnected spatial levels. This research focuses particularly on the scales of neighbourhood, locality, block, and house (Fig. 1), whose physical forms have a decisive influence on neighbourly life and interaction.

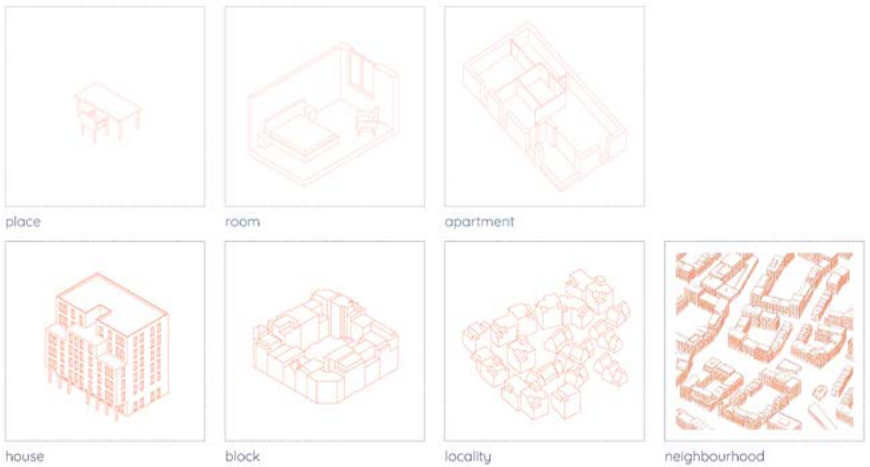


Fig. 1 – Spatial scales of housing environment (Source: author)

2 Czech context

2.1 Housing Production in the Czech Republic

To address the significance of this research, it is essential to contextualize it within the current state of housing production in the Czech Republic. Since the 1990s, private developers have dominated housing production in the country (Kohout et al., 2015). Understandably, private actors prioritize their own economic interests, and community-oriented design is often not a central concern. This can result in built environments that feel anonymous and lack social cohesion. In this context, the challenge emerges: how can we ensure that residential environments foster community development?

There are three primary mechanisms available: (1) Market-driven approaches, such as certification systems that reward community-enhancing design; (2) Regulatory measures, including laws, standards, and building codes; (3) Incentive-based models, which provide financial or procedural benefits when specific quality or social sustainability criteria are met.

In parallel, the Czech Republic has engaged in a longstanding debate regarding the role of the state and municipalities in supporting social or affordable housing. This presents a potential opportunity to set new quality benchmarks for housing production. Publicly funded housing, as Förster and Menking (2018) argue, can "create new qualities – architectural, technical, and social." Regulatory measures (2) or Incentive-based models (3) can again communicate such qualitative expectations.

Despite differing models of housing production - whether developer-led or publicly supported – they share a common challenge: the need to define and implement housing environments that foster sustainable and resilient communities.

2.2 Housing Policies in the Czech Republic

Housing policy in the Czech Republic is fragmented across several governmental departments. The principal authority is the Ministry of Regional Development (MMR), which primarily focuses on the economic dimension of housing, reflecting the neoliberal shift in the 1990s. The Ministry's stated aim is to "create a legal, institutional, and fiscal environment for all actors in the real estate market, without limiting its economic functioning, while supporting social groups unable to secure housing independently" (Koncepce bydlení České republiky 2021+, 2021).

Several housing policies and programs are currently in place:

2.2.1 Housing concept 2021+ [Koncepce bydlení 2021+]

This policy document defines housing quality criteria such as overcrowding and severe housing deprivation. It identifies opportunities in using modular prefabrication, which may significantly influence the physical housing environment. It also highlights threats such as rising construction costs and growing spatial and social segregation - issues that relate directly to the focus of this research. The vision it promotes is "available, stable, and sustainable housing," defined as quality housing that is accessible, aesthetically and functionally satisfactory, and systemically resilient. A key objective is increasing the availability and quality of rental housing (Koncepce bydlení České republiky 2021+, 2021).

2.2.2 Affordable Rental Housing Program [Program Dostupné nájemní bydlení]

This program supports larger-scale development projects that expand affordable rental housing in the Czech Republic (MMRa, 2024). Project proposals are evaluated by a set of criteria on project quality and economic sustainability including also some criteria defined as tangible aspects fostering communities by this research (Formulář hodnoticích kritérií, 2025).

2.2.3 Financial Support for Project Preparation [Finanční podpora přípravy projektů]

This program provides funding for project documentation, tender documentation, construction-technology studies, feasibility studies, BIM documentation, architectural competitions, and public-private partnership contracts. It is one of the few programs that include a structured evaluation of qualitative criteria across multiple dimensions: architectural and urban design quality, including typological diversity and coordination with adjacent public spaces; social criteria, such as the necessity of social and affordable housing; technical and environmental standards, which are assessed in detail (MMRb, 2024).

2.2.4 Housing for Life, 2024 [Bydlení pro život, 2024]

This is the first comprehensive housing policy since 1989. It includes several pillars: investment support for affordable rental housing involving both municipalities and the private sector; a Housing Support Act that provides predictable funding and tools like housing assistance centres, tenant support services, and landlord guarantees; a new Building Act aimed at reducing approval times and digitizing the permitting process.

While this policy aims to address the housing crisis and prevent housing loss, it does not explicitly address the role of built environment quality or community development (MMRa, 2024).

Other ministries also play crucial roles in shaping housing conditions. The Ministry of Labour and Social Affairs (MPSV) develops programs supporting vulnerable groups, such as Housing First and Rapid Rehousing. These programs directly affect housing stability and quality, key components of sustainable and resilient communities. The Ministry of the Environment administers ecological subsidies for housing, thereby contributing to improvements in the environmental performance of the housing stock. The Ministry of Finance oversees tax policies and credit instruments (e.g., property tax, mortgage interest deductions) that significantly shape housing affordability and production. Moreover, some municipalities - such as Prague, Brno, and Ostrava - have adopted their own housing policies, including strategic housing concepts, municipal housing programs, and affordability strategies.

This interdepartmental approach, while comprehensive, results in a fragmented housing policy landscape. The lack of coordination complicates efforts to develop a holistic and integrated housing policy that addresses all three pillars of sustainability—environmental, economic, and social (World Commission on Environment and Development, 1987.

3 Research Question, Research Aim

This research is following the initial stages of a doctoral dissertation - a comprehensive literature review which revealed a critical gap: the absence of a clear and systematic definition of the residential environment that fosters sustainable and resilient communities, specifically at the scale of individual houses, housing blocks, localities and neighbourhoods. To address this gap, the research seeks to answer the following two questions:

(1) What architectural and urban design elements and parameters of the residential environment, at the scale of individual houses, blocks and localities, support social sustainability and resilience?

(2) How can these elements and parameters be integrated into structured analysis of housing environment's potential to foster sustainable and resilient communities?

Based on these research questions, two principal aims were defined:

(1) To identify architectural and urban elements and parameters of residential environments that contribute to the development of sustainable and resilient communities.

To achieve this, an Operationalization Scheme was created to translate theoretical concepts from literature on urban sociology, housing studies, and architectural and urban design theory, into specific spatial conditions supporting community cohesion and thus forming a comprehensive definition of the residential environments with potential to support community development.

(2) To integrate these elements and parameters into structured analysis of the residential environments in terms of their potential to foster sustainable and resilient communities.

A methodology to systematically describe each element and parameter from the Operationalization Scheme was developed in a form of a Qualitative Checklist for two different stages of projects: planning/proposal and post-construction/existing developments.

4 Methodology

This research is part of the author's doctoral dissertation and builds directly on prior work, particularly the literature review that established the research questions. The methodology consists of three stages illustrated in Fig. 1:

1. Developing the Operationalization Scheme
2. Designing the Qualitative Checklist
3. Validating and refining the tool through a comparative case study

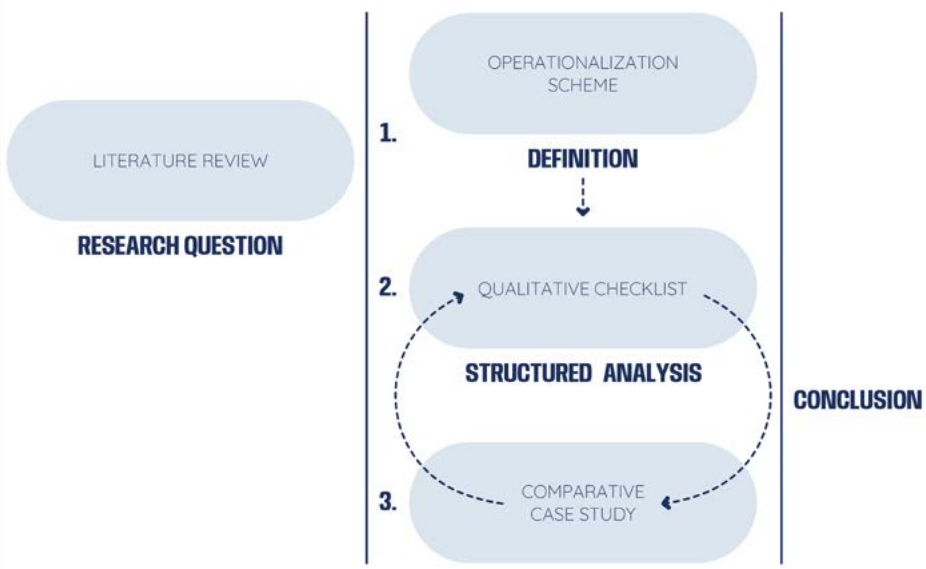


Fig. 2 – Methodology of the research (Source: author)

4.1 Operationalization Scheme

To construct the Operationalization Scheme, a comprehensive review was conducted of literature in urban sociology, housing studies, and spatial design theory. This included scholarly articles as well as key works by Jacobs, Norberg-Schulz, Gehl, Alexander, and others. Data on community-supportive environments were extracted and classified into three categories: processes, intangible aspects, and tangible aspects.

As this research focuses on the built environment, only the tangible aspects were selected for the Operationalization Scheme. These aspects were then categorized according to their spatial scale - individual buildings, housing blocks, localities and neighbourhoods (Kendall, Teicher, 2000; Kohout, Tichý, Tittl, 2015) - and grouped into fifteen key topics on urban social sustainability (Dempsey et al., 2011) and neighbourhood social resilience (Larimian et al., 2020) identified in the literature:

1. Urbanity
2. Attractive public realm
3. Decent housing
4. Quality of local environment and amenities
5. Accessibility
6. Sustainable urban design
7. Neighbourhood
8. Pedestrian-friendly environment
9. Sense of belonging and place attachment
10. Participation and influence
11. Social network
12. Trust and reciprocity
13. Stability of residence
14. Local community support
15. Social justice and security

For each aspect, the Architectural and Urban Elements (specific spatial features) were identified. This Operationalization Scheme defines the spatial conditions that support the emergence of sustainable and resilient communities in residential environments.

4.2 Qualitative Checklist

In the second stage, an analytical framework was derived in the form of a qualitative checklist that enables a systematic description of residential environments in terms of their capacity to foster socially sustainable and resilient communities.

The checklist links specific architectural and urban design features at four spatial levels – dwelling, block, locality, and neighbourhood into fifteen thematic areas defined by Operationalization Scheme. For each aspect, a three-point scale for recording findings (met / partially met / not met) is defined. The checklist serves as a framework for the description, identification, and interpretation of residential environments in relation to their community-supportive potential. It enables a structured way of capturing the relationship between physical space and social processes and provides a shared language for comparing different spatial strategies of community support.

4.3 Case study

To verify and refine the functionality of the Qualitative Checklist, a comparative case study was conducted, analysing two existing residential complexes. Cases were selected through a set of criteria ensuring both shared and contrasting features, in line with principles of paired comparison methodology (Vestbro, Hürol, Wilkinson, 2005).

The first case was Vackov – Alfa Residence (Fig. 2), a housing complex explicitly designed to support neighbourly interactions. Due to its conceptual aim of fostering intense social connections, it served as a strong candidate for testing the analytical tool's capacity to assess community-supportive environments.

For the second case, Emil Kolben Quarter – Phase 2 (Fig. 3) was selected. While the design considered community spaces and neighbourly interaction, it did not incorporate a spatial concept explicitly focused on supporting neighbourly living. The project includes three buildings (up to 13 floors), in contrast to Vackov's eleven low-rise buildings (4 floors each), thus ensuring a distinctly different spatial layout. However, both projects were matched by the number of residential units, ensuring comparable scale. Other matching criteria included apartment composition, location, and urban context, supporting a similar target demographic (see Fig. 4).



Fig. 3 – Vackov – Alfa Residence (Source: author)



Fig. 4 – Emil Kolben Quarter – Phase 2 (Source: author)

To validate the Qualitative Checklist, it was applied to both projects using observation, and plan analysis.

Project parameters	Vackov Alfa Rezidence	Emil Kolben neighbourhood, 2. phase
	the spatial design pursues the goal of ensuring the development of neighborly relations	interest in developing neighborly relations without implementing a spatial concept aimed at supporting the neighborhood character of housing
year	2012	2022
number of flats	124	132
number of buildings	11	2
number of floors	4	13
flat sizes	2kk, 3kk, 4kk	2kk, 4kk, 5kk
stakeholders (architect, developer, majitel...)	UNIT architekti Metrostav	Skanska Reality
locality	Olgy Havlové, Praha 3	Praha 9

contrasting features

shared features

Fig. 5 – Criteria for selecting projects for comparative case study (Source: author)

4.4 Iterative process

Based on first iterative step of comparative analysis Qualitative Checklist was adapted. Two descriptive methods were defined for each aspect, recognizing that analytical processes differ for planned vs. built environments. For proposals, methods such as spatial and urban analysis, author questionnaires/interviews, historical analysis, and process analysis were used. For existing projects, methods included observation, or resident questionnaires/interviews (Fig. 5).

proposals	existing projects
spatial analysis	observation
document analysis	photographic documentation
process analysis	historical analysis
urbánní analýza	on-site mapping
historical analysis	user quiestionaires
	user interviews

Fig. 6 – Analytical methods (Source: author)

Data collection instruments - such as forms, questionnaires, and interview guides - were tailored for different spatial scales.

5 Preliminary Results

5.1 Operationalization Scheme

The operationalization scheme was developed based on a synthesis of relevant academic literature. Tangible aspects identified in the literature were organized according to spatial scales - neighbourhood, locality, block, and house. Each aspect was thematically categorized under one of fifteen topics derived from literature.

5.1.1 1. Urbanity

This topic addresses the relationship between a housing project, its surrounding space, and its users. Key elements include the function and design of ground floors, which play a crucial role in activating adjacent public space. Ground floors with visually or physically open functions support spontaneous interactions and increase perceived safety through "eyes on the street" (Gehl, 2012; Jacobs, 2011; Sim, 2019). Sim (2019) emphasizes the importance of thresholds - such as windows and doors - which mediate between public and private domains and invite interaction.

Bernögger (2022) introduces the concept of "curated ground floor zones," which coordinate ground-floor functions across neighbouring buildings. The integration of clustered social functions and a mix of commercial and non-commercial uses (Pagh & Cook, 2023) supports vibrant urban life and accessibility. Alexander (1977) also stresses clustering, advocating for densely grouped facilities around small public squares that function as social nodes.

Design elements such as emphasized corners (Sim, 2019) and the distinction between fronts and backs of buildings contribute to the legibility of urban space and ease of orientation. Urban connection to the city - visually, functionally, and in scale - is also essential to integrate the project within the broader urban context (La Fond & Tsvetkova, 2017).

5.1.2 2. Attractive Public Realm

This topic concerns the design of exterior spaces to be engaging for both residents and other users. Built form plays a role in defining the public realm, with buildings helping to delineate the street profile (Jacobs, 2011) and articulate transitions between public, semi-public, and private spaces. Physical boundaries such as gates, fences, or walls can also strengthen territorial legibility (Gehl, 2012; Sim, 2019).

Sim (2019) advocates for multi-sensory urban experiences that appeal to sight, touch, and smell, fostering emotional comfort, shared memory, and identity. Visual appeal supports the appearance of positive emotions and desire to linger in visitors (Almusaed & Almssad, 2020). Pagh and Cook (2023) recommend creating spaces where people enjoy passing through or spending time.

The public realm should facilitate social interaction through increased green space and communal areas (Gehl, 2012; Pagh & Cook, 2023).

5.1.3 3. Decent Housing

This category addresses socially just housing and its quality. A socially and functionally mixed housing stock includes units of various sizes and typologies, accommodating diverse household types, including persons with disabilities (La Fond & Tsvetkova, 2017). A mixed-use programme may incorporate commercial units and (semi-)public community spaces. The wider locality should also offer a mix of building types and functions, including accessible public infrastructure (Förster a Menking, 2018).

5.1.4 4. Quality of Local Environment and Amenities

This topic includes climate mitigation strategies, functional diversity, public spaces, infrastructure, and material choices. Projects may employ blue-green infrastructure (e.g., rainwater retention) that simultaneously fosters biodiversity and supports community activities. Climate-responsive design should enhance comfort, sociability, and environmental quality (Pagh & Cook, 2023).

Integration with neighbouring development - both existing and planned - is essential, ensuring compatibility in scale and function (e.g., amenities, commercial and community spaces) (Bernögger, 2022).

5.1.5 5. Accessibility

Accessibility is a prerequisite for equality. The topic emphasizes access to diverse functions and spaces. Shared rooftop gardens (Förster & Menking, 2018) and well-designed recreational areas (Roosta et al., 2022) offer inclusive opportunities for leisure and socializing. Sim (2019) suggests providing varied outdoor spaces that support a wide range of needs and activities.

Mixed-use development and integration of social and transport infrastructure (e.g., transit stops, car-sharing hubs) improve inclusivity and enable access for surrounding communities (Pagh & Cook, 2023).

5.1.6 6. Sustainable Urban Design

Sustainable design encompasses adaptable buildings (Pagh & Cook, 2023), nature-based solutions, and blue-green infrastructure. Projects should allow for future changes in use and accommodate evolving household needs. Public and shared spaces should integrate climate mitigation measures - greenery, shade, rainwater management - thereby improving microclimate and environmental quality (Bernögger, 2022). Design should aim not only to preserve nature but actively build biodiversity into urban form (Pagh & Cook, 2023).

5.1.7 7. Neighbourhood

This topic emphasizes urban diversity at the neighbourhood scale. Diversity includes a mix of activities, building volumes and shapes, and the allocation of different functions to different streets (Sim, 2019; Pagh & Cook, 2023).

Scale also matters: enclosed, clearly defined public spaces support vibrant public life (Alexander, 1977). Smaller urban blocks (Roosta et al., 2022) and finer subdivisions of land (Sim, 2019) enable greater ownership diversity and urban adaptability.

5.1.8 8. Pedestrian-friendly Environment

This topic is concerned with walkability, safety, and inclusivity in public space. A pedestrian-friendly environment features connected streets (Roosta et al., 2022), compact urban form (Talen, 1999), and prioritization of walking and cycling over car use (Bernögger, 2022; Pagh & Cook, 2023). Reducing car dependency frees space for greenery and human activity.

5.1.9 9. Sense of Belonging and Place Attachment

This category explores the emotional and historical relationship between residents and place. Preservation of existing buildings and respect for local context contribute to identity and continuity (Pagh & Cook, 2023). Atmosphere and symbolism enhance place attachment (Almusaed & Almssad, 2020).

5.1.10 10. Participation and Influence

Projects that involve future residents or local stakeholders in design and implementation foster trust, ownership, and belonging (Almusaed & Almssad, 2020). Allocation of plots for community-led or self-build initiatives promotes appropriation, enabling users to adapt and personalize their environment (Pagh & Cook, 2023).

5.1.11 11. Social Network

This topic covers opportunities for social contact, particularly through passive interaction. Visual and physical connections between indoors and outdoors (Jacobs,

2011; Sim, 2019; Alexander, 1977) increase spontaneous contact. Built environments that provide closure and support proximity can reduce social distance (Talen, 1999). Social functions of space—such as streets, courtyards, and civic amenities—are key to fostering interaction and exchange (Gehl, 2012; Bernögger, 2022).

5.1.12 12. Trust and Reciprocity

This category addresses the development of trust through shared use and negotiated agreements. Shared facilities and architectural features that support communal use (Förster & Menking, 2018; Pagh & Cook, 2023) enable repeated, low-threshold interactions between residents.

5.1.13 13. Stability of Residence

Stability supports long-term place attachment and equality. Housing should be adaptable to changing life circumstances (Förster & Menking, 2018). This includes barrier-free access, flexible layouts, and a diverse housing mix that reflects the local context. Mixed housing typologies support demographic diversity and allow residents to remain in place as their needs evolve (Bernögger, 2022).

5.1.14 14. Local Community Support

This topic addresses infrastructure supporting social cohesion, such as community centres, youth facilities, and playgrounds (Bernögger, 2022; Kohout, Tittl & Tichý, 2020). Streets may serve as communal spaces, enhanced by traffic calming, furniture, and landscaping (Pagh & Cook, 2023; Jacobs, 2011). Appropriation of these spaces by residents increases activation and community interaction.

5.1.15 15. Social Justice and Security

Public spaces should be inclusive, safe, and responsive to diverse user needs. Jacobs (2011) and Gehl (2012) highlight the role of passive surveillance and diverse functions in enhancing safety. Pagh and Cook (2023) argue for reclaiming streets for citizen use and child-friendly planning. Social justice is also achieved through inclusive design for various social groups and activities (Almusaed & Almssad, 2020).

5.2 Qualitative Checklist

The qualitative checklist employed in this research translates the Operationalization Scheme – developed to identify aspects supporting socially sustainable and resilient communities - into a structured analytical framework. It systematically describes architectural and urban design features across 15 thematic categories and multiple spatial scales.

The checklist was initially applied to selected case studies in a preliminary form, based primarily on the operationalization scheme derived from the literature. At this early stage, the aspects were not yet linked to clearly defined spatial elements or associated with specific evaluation methods.

The first round of evaluation, conducted through plan analysis and on-site observations, revealed two major limitations:

- many aspects were too abstract, lacking concrete spatial anchors.
- the analytical process was inconsistent and subjective, relying solely on the evaluator's expertise without a clear methodological guide.

These insights led to a substantial revision of the checklist. Key improvements included:

- the specification of architectural and urban design elements to which each aspect applies.
- the development of tailored analytical methods for each aspect (e.g., on-site mapping, urban analysis, or user questionnaires).

This iterative development process reflects a practice-oriented approach, ensuring that the checklist is not only theoretically grounded but also practically applicable in real-world settings.

In its current form, the checklist takes the shape, where each aspect is linked to a specific architectural or urban design element and is evaluated through a defined method as either met, partially met, or not met.

A sample excerpt of analytical form, for which only aspects requiring plan analysis method were selected, is provided below (Fig. 6).

	7 neighbourhood
Tangible aspects (environment)	7.2 enclosure and spatial clarity
Architectural and Urban Design Elements	Spaces are clearly physically defined (material or physical distinction), and create enclosure of the environment reflecting the scale of human social ties in space - around 30 m for public ties, 15 m for semi-public ties, and 8 m for semi-private.
Relevance	- encourages appropriate social behavior, comfort, and orientation

☐ *the project meets the requirement*
☐ *the project partially meets the requirement*
☐ *the project does not meet the requirement*

Comments:

Fig. 7 – Excerpt of analytical form for proposals of housing blocks (Source: author)

5.3 Comparative Case Study

The analytical framework was initially applied to the two case study projects - Vackov – Alfa Residence and Emil Kolben Quarter – Phase 2 - to test its early version and to explore how each environment supports socially sustainable and resilient communities. This preliminary analysis relied primarily on plan analysis and on-site observation and was conducted before the qualitative checklist had been fully refined with detailed spatial elements and analytical methods.

At this stage, the operationalization scheme served as the primary framework. While it provided a useful starting point, it quickly became apparent that it lacked specific spatial criteria necessary to ensure objectivity in the analytical process. The preliminary analysis also highlighted the need to integrate additional methods, such as user questionnaires and document analysis, to capture the lived experiences of residents more effectively.

Several methodological insights emerged from this initial comparative evaluation:

- broad categories such as "community space" needed to be broken down into distinct spatial components to allow precise analysis.
- plan analysis and observation alone were insufficient to comprehensively understand community dynamics and resident experiences. As a result, further methods - including photographic documentation, document review, and semi-structured interviews - were proposed.
- the checklist needed to accommodate varying urban typologies (e.g., low-rise vs. high-rise buildings), prompting the development of flexible indicators that can be adapted to diverse physical and social contexts.

Building on these findings, a revised version of the analytical framework will be

applied in a second round of evaluation. This iteration will include:

- clearly defined spatial elements under each aspect of the operationalization scheme.
- a specific analytical method assigned to each element (e.g., plan analysis, observation, user questionnaires).
- an updated analytical forms that facilitates consistent and comparative analysis across cases.

Although preliminary, the initial results suggest that Vackov – Alfa Residence demonstrates significantly greater potential for fostering community then Emil Kolben Quarter – Phase 2. In particular, Vackov outperformed Kolben in the following thematic areas:

(4) Quality of Local Environment and Amenity,
(6) Sustainable Urban Design,
(7) Neighbourhood,
(9) Sense of Belonging and Attachment to a Place,
(12) Trust and Reciprocity.

These are categories where spatial layout, visuality, the use of sustainable materials, and intentional community-oriented design play a critical role.

Conversely, both projects underperformed in:

(1) Urbanity
(14) Support of Local Community

In both cases, the absence of active ground-floor edges (active parterre) and adaptable green spaces that encourage appropriation limited their performance in these areas.

The comparative case study thus served not only as a test of the qualitative checklist's functionality but also as a lens through which to reflect on which spatial configurations and design strategies may be most conducive in fostering socially sustainable and resilient communities.



Fig. 8 – Comparative assessment of the two housing projects according to the proposed framework (Source: author)

6 Discussion

The aim of this research was to identify spatial characteristics of the residential environment that have the potential to foster socially sustainable and resilient communities and to develop an descriptive method capable of analysing such potential. Supporting neighbourly relations and facilitating community development within the housing environment directly contributes to one of the core concerns of the broader social sustainability discourse: the long-term viability of communities (Bramley et al. 2009; Bramley and Power 2009, Roosta, Chizfahm Daneshmandian, Sadeghi, 2022).

In the Czech context, where housing production is largely driven by private developers (Kohout et al., 2015), there is a pressing need for a robust and comprehensive framework for defining and describing socially supportive housing environments. Such a methodological framework can serve as a basis for integrating qualitative criteria into development processes through one of the three recognised mechanisms: market-driven approaches, regulatory measures, or incentive-based models. Moreover, it could inform strategic documents and policy frameworks guiding public or subsidised housing initiatives by the state and municipalities.

The Operationalization Scheme developed in this research provides a comprehensive definition of such a housing environment. It structures tangible aspects across multiple spatial scales and is grounded in 15 key themes drawn from scholarly discourse on urban social sustainability and neighbourhood social resilience (Dempsey et al., 2011, Larimian et al., 2020).

However, during the course of the research, it became evident that the initial version of the analytical Qualitative Checklist – based mainly on the Operationalization Scheme – was insufficient for practical application. Its limitations were revealed through the comparative case study analysis, which highlighted the need for a clearer linkage between theoretical aspects and concrete spatial elements. Additionally, the analytical process lacked methodological consistency, relying heavily on subjective interpretation.

In response, the qualitative checklist was refined to include:

- defined architectural and urban design elements for each aspect.
- tailored analytical methods assigned to each aspect (e.g., plan analysis, site observation, interviews, or document analysis).

This iterative refinement ensures the checklist is not only theoretically grounded but also usable in practice.

Two comparative case study projects - Vackov – Alfa Residence and Emil Kolben Quarter – Phase 2 - were used for testing of the qualitative checklist in its initial form but at the same time also evaluated by this initial tool. These preliminary results revealed that Vackov – Alfa Residence demonstrates significantly greater potential for fostering community then Emil Kolben Quarter – Phase 2 since by outperforming in topics where spatial layout, visuality, the use of sustainable materials, and intentional community-oriented design play a critical role.

The qualitative checklist developed through this study has several potential practical applications:

- it can serve as a design guideline for architects and developers aiming to support community life through spatial strategies.
- it can function as an evaluation framework for assessing the community-supportive capacity of both proposed and existing housing projects.
- when applied to existing residential complexes, it can aid in identifying spatial deficiencies and proposing targeted improvements for strengthening community dynamics.

Despite these promising outcomes, the research currently remains at a preliminary stage. The most significant limitation is that the results are based on the checklist's initial application, prior to its full refinement. The next essential step is to conduct a second round of analysis using the updated version of the qualitative checklist. This future stage aims to address earlier shortcomings, such as the reliance on subjective assessments and the use of a limited range of analytical methods.

This research is embedded within the author's broader doctoral project, which includes additional methodological steps designed to further test and refine the final outcome. These include:

- reflective verification, involving workshops and interviews with academics and expert testing of the operationalization scheme and qualitative checklist to assess the their clarity, relevance, and usability.
- a case study of evaluation methodologies, examining existing frameworks used in housing projects under the three mechanisms - market-based, regulatory, and incentive-driven - in order to position the proposed tool within a broader descriptive and evaluative landscape.

In sum, the preliminary findings suggest that the proposed analytical qualitative checklist offers a promising path forward in analysing and promoting spatial conditions conducive to socially sustainable and resilient communities. However, further iterations and testing are necessary to ensure its robustness, adaptability, and real-world applicability.

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