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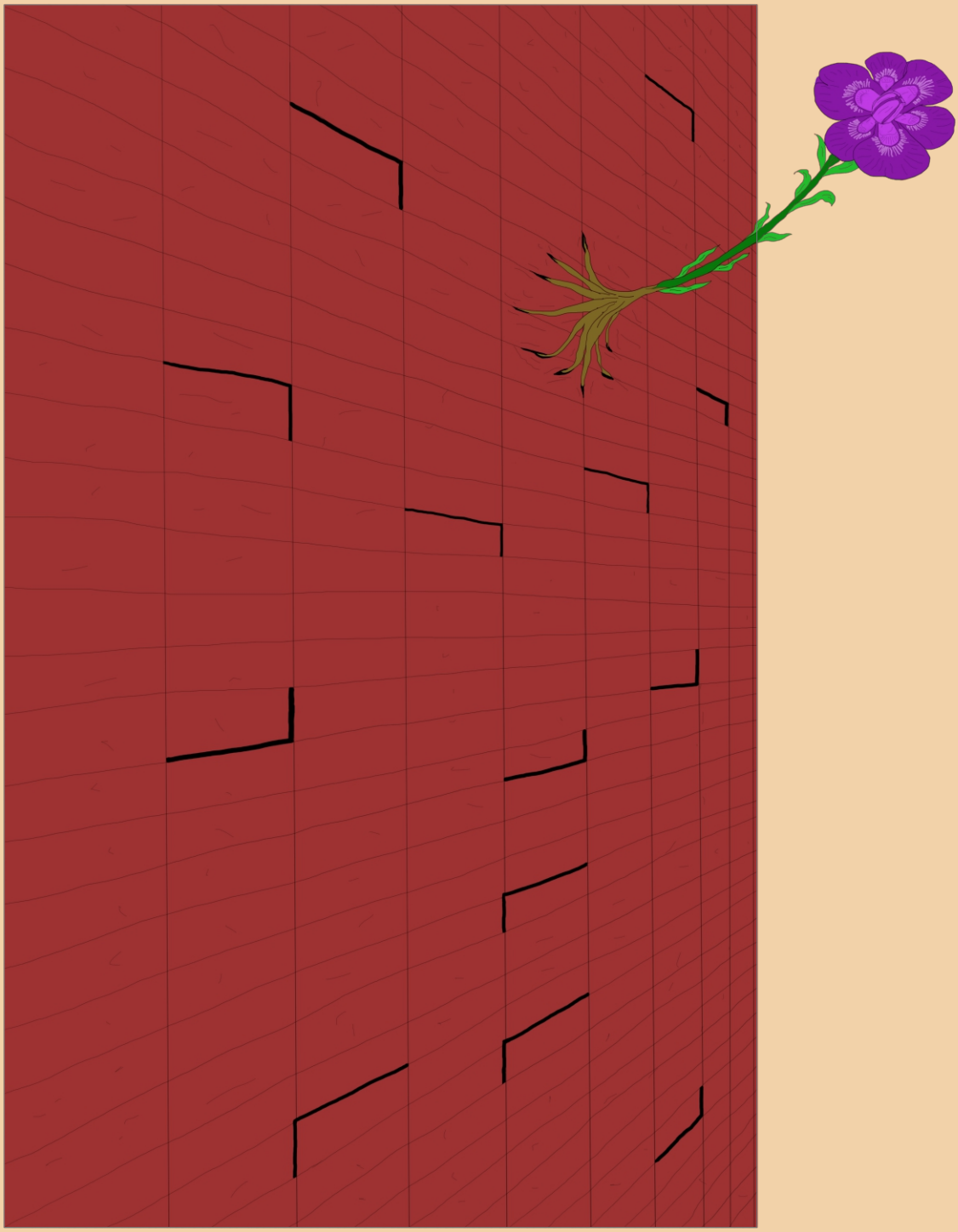

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SCOPE AND AIMS

The review is concerned with a multi-disciplinary approach to spatial, regional and urban planning and architecture, as well as with various aspects of land use, including housing, environment and related themes and topics. It attempts to contribute to better theoretical understanding of a new spatial development processes and to improve the practice in the field.

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EDITORIAL

Dear readers,

The latest issue of *Spatium* (No. 53) reflects on both resistance and adaptation as the two sides of a coin, or the unity of opposite narratives. This may have captured a highly sensitive moment, especially considering the present social, political and environmental concerns, both locally and globally. The cross-national studies in this edition include examples of Iranian, Nigerian, Serbian and Western European regional and urban planning, housing, and architectural pedagogy, which encapsulate diverse contextual knowledge. The contents include: discourse arising from analysing policies and planning frameworks; the motives and types of citizen/local community engagement in environmental protection in mining areas; the elements of territorial capital and their correlation with competitive regional growth; the specific issue of public spaces and urban land use as predictors of potential radical terrorist strikes; and to conclude, an analysis of the integrity of the urban planning process and development of more adaptable, ecologically and socially inclusive advancements in family house design, with a review of community-based architectural pedagogy. Going back to the resistance and adaptation narratives (from the beginning of this Editorial), let me quote one of the articles in this issue of *Spatium*: "Looking beyond, transformative steps are essential." N'est pas?

Jasna Petrić
Editor-in-Chief

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EFFICIENT, YET INSUFFICIENT: INVESTIGATING TRANSIT-ORIENTED POLICIES AT THE NATIONAL LEVEL

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The initial design concept of Transit-Oriented Development (TOD) has emerged as a key urban policy to address urbanization challenges worldwide, drawing on an integrated transportation and land use planning approach. Although TOD policies are typically formulated at the local level, addressing related subjects such as parking and zoning codes, some governance systems elevate them to the national level to guide lower-tier policies. For instance, in Iran – a newcomer to TOD – a national TOD policy has recently been introduced as part of a TOD policy package. However, there remains uncertainty about the extent to which a national guideline can contribute to successful TOD implementation, support local tiers, and ensure the achievement of TOD goals. The present research aims to address this gap by shedding light on the Iranian experience through a qualitative approach. The findings indicate that a National Transit-Oriented Development Guideline (NTODG) is among the 'efficient' instruments available to governments for advancing TOD culture – particularly in developing-country cities as newcomers to TOD, where the integration of transport and land use faces numerous challenges. However, NTODGs tend to be "insufficient" on their own, as they must be coordinated with other related policies under a "stable" political system and planning framework to turn TOD aspirations into reality.

***Key words*: Transit Oriented Development (TOD), policymaking, transport, land use, Iran.**

INTRODUCTION

The concept of Transit-Oriented Development (TOD) has long been recognized globally as a successful strategy for integrating transportation and land use planning, with the aim of promoting active and sustainable mobility, pedestrian accessibility, and social interaction – all under the umbrella of community livability. Initially rooted in urban design ideas such as *Pedestrian Pocket* and *Traditional Neighborhood Design* concepts (Calthorpe, 1997), TOD has since evolved into a key urban policy. Consequently, numerous TOD-centered research studies and practices have been conducted worldwide.

Although a successful TOD policy should integrate various sectors, actors, and levels into a cohesive policy package (Swenson and Dock, 2004), it can also take the form of sectoral categorization. In this approach, transportation policies (e.g., Transportation Demand Management or TDM) and land use planning or built environment policies (e.g., parking regulations) are developed separately, but remain strongly interconnected (Abdi, 2021). These policies can also be designed based on end-user demand-side measures, such as subsidies, or top-down supply-side measures, such as planning policy reforms (Abdi, 2021), as well as within the framework of "pull" and "push" policy dichotomies (Lund *et al.,* 2006). Additionally, TOD policies can be tailored to different levels of governance. While municipal (micro) levels often focus on design-oriented strategies for city-region corridors, station areas, and specific sites (ITDP, 2017; Ollivier *et al.,* 2021), TOD can also be integrated into higher (macro) level strategies. At this level, the adaptation

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of complex policies and coordination among various entities become critical and often challenging, particularly within complex governance structures (Hrelja *et al.,* 2020; Salat and Ollivier, 2017). Accordingly, Jamme *et al.* (2019) found that 35% of the reviewed TOD literature classified it under the policy, planning, and implementation category, compared to 29% for land use and transportation. This underscores the significance of TOD as a policy and planning tool at the governance level.

Although TOD policies are primarily established at the local (micro) level, governance systems are increasingly elevating such policies to higher tiers, such as the national level, to guide lower-tier policies and provide a robust framework for implementation. This may take the form of subject-based policies (e.g., public transportation, fuel) and/or specific TOD guideline packages, such as Iran's National TOD Guideline. However, significant uncertainty remains regarding the effectiveness of such national-level policies. Specifically, it is still unclear to what extent they can contribute to successful TOD implementation, support local tiers, and ensure the achievement of TOD goals. This study therefore aims to (1) assess the efficacy of TOD "macro-level" (national) policies and (2) explore the success factors and barriers to their adaptation, based on the perspectives and experiences of TOD experts in Iran. The recent experience of Iran's National TOD Guideline (NTODG) was examined as a case study in this research. Data were collected through a series of semi-structured interviews with 15 urban planning and transportation experts, including academics, policymakers, and practitioners. Although the present investigation sheds new light on the specific case of Iran, the findings contribute more broadly by offering fresh insights into upper-level TOD policymaking, particularly for countries considering the adoption of such policies. This contribution is achieved by providing a new perspective on the successes and challenges of the NTODG, the content of national TOD guidelines, and the relationships with other influencing factors.

TOD POLICY IN NATIONAL DRESS: A LITERATURE REVIEW

Urban planning policy is closely tied to a country's political system. In centralized, top-down approaches, the central government holds the authority to formulate, approve, and enforce regulations, whereas in bottom-up systems, municipal entities or local governments operate independently and have the authority to adopt local regulations. Walloth (2012) argued that an effective planning system should position itself within the interplay of fast (bottom-up) and slow (top-down) dynamics, acting quickly enough to initiate change while being deliberate enough to guide the actions of other actors. Top-down and bottom-up models are not confined to political systems; they can also be applied based on different planning scales. According to Pissourios (2014), top-down approaches are typically used at regional and strategic urban planning scales, while bottom-up approaches are employed at the local level. Linking these approaches is essential to formulating a robust planning framework. Even in bottom-up planning systems, such as Sweden's, collaboration between local, municipal, and regional planning is crucial (Björling and Capitao Patrao, 2024).

Regarding TOD policies, some countries have begun developing them at higher scales, such as the national level, while others have primarily focused on local-level design initiatives, including street-level design (e.g., Abdi and Soltani, 2022). As previously noted, it can be concluded that general planning systems define priorities. For instance, in countries with independent municipalities, such as those in North America and Western Europe, local governments are responsible for planning policies. In contrast, in countries with centralized systems, the authority lies primarily with central governments, and municipalities have significantly less control over general planning approaches. In the former system, the development of design tools at the urban design scale may be more critical, while in the latter, the creation of policy documents may constitute the initial step.

Nonetheless, it should be emphasized that, regardless of the planning system, successful TOD requires the integration of upper- and lower-level policies, encompassing both micro- and macro-level tools. In other words, national and/or regional plans, as well as local-level plans, should be developed in harmony, with strong coordination among various stakeholders, as highlighted in the work of other TOD researchers, such as Björling and Capitao Patrao (2024). When addressing larger scales, such as countries or regions, TOD documents should align with upper-level frameworks, necessitating a top-down approach. While this approach can be applied in any planning system, it may be more practical in centralized systems, where the entire planning framework is guided and controlled by the central government.

Some governments have directly established TOD policies at the national level, accompanied by subsequent executive guidelines. For instance, the Union Urban Development Ministry of India formulated the National Transit-Oriented Development (TOD) Policy to address urbanization challenges and improve the quality of life around urban transit corridors (Indian Ministry of Housing and Urban Affairs, 2015). The document explicitly highlights the need for a national TOD policy as a guiding framework with a catalytic role in responding to rapid urban growth (particularly in travel demand), given that state governments are responsible for managing urban spaces (Indian Ministry of Housing and Urban Affairs, 2015). Furthermore, the policy document outlines the vision, objectives, principles, implementation approach, Value Capture Financing mechanisms for TOD, legal frameworks, and recommendations for communication and outreach.

Most recently, Iran established a national TOD policy to promote the concept across the country in response to increasing urbanization and traffic-related challenges. Although planning for the integration of transportation and land use – such as locating high-density urban centers along mass transit lines – dates back several decades (Jafari and Hein, 2021; Sharifi *et al*., 2018), recent planning activities referencing Calthorpe's concept have gained renewed attention in recent years, culminating in the preparation and approval of the Iranian National TOD Guideline (NTODG) in 2020. According to a critical review by Mirmoghtadaee and Abdi (2021), which details the process, content, prospects, and challenges, the guideline

underwent a complex preparation and approval process. It is organized into four sections: (1) definitions (e.g., TOD definitions, scales, key principles, place types), (2) general principles (e.g., vision statement, goals, strategies, policies), (3) TOD reconceptualization within the Iranian planning system (e.g., adaptation of TOD levels to Iranian planning levels, station area typologies, expected outputs at each planning level), and (4) roles and responsibilities of various organizations in facilitating TOD implementation (e.g., the roles of key governmental stakeholders in supervision, revision, dissemination, capacity building, documentation, and funding of the guideline). When compared with the Indian version – the only national-level TOD guide developed in another country – it is evident that two main aspects neglected in the Iranian version are finance and communication. In other words, although the 'roles and responsibilities' of primarily governmental organizations are mentioned in the Iranian model, financial tools are not discussed. Additionally, the Iranian version does not consider awareness programs, or multi-stakeholder participation, both of which are given separate attention in the Indian national guide. This highlights the potential influence of a country's general planning approach on the development of planning policies.

However, it was expected that the national guideline would bring about a fundamental shift from car-oriented to transit-oriented development, at least to some extent. In reality, the opposite has occurred, particularly since changes in the upper-level governance structure in 2021 led to newly assigned authorities abandoning their predecessors' priorities. What remains unclear is the efficacy (and role) of such macro-level policies, among others, in implementing TOD projects, as well as the key factors contributing to this outcome. In response, this article reflects on these issues, drawing on a research project conducted in 2023, with the aim of identifying the weaknesses and potential challenges of the TOD guideline in Iran.

RESEARCH METHOD

Data collection

The present study aims to determine the extent to which national TOD policies can facilitate or hinder TOD projects, and to explore the potential success factors and barriers involved. To this end, a qualitative approach is well-suited for such an exploratory investigation into TOD practices. The authors found semi-structured interviews to be a valuable research tool for understanding the subject under study (Merriam, 2009). On this basis, a total of 15 semi-structured telephone interviews were successfully conducted – following 36 interview invitations sent with follow-up calls and emails – with three groups of TOD experts in Iran: academics (AC), policymakers and government officials (PO) at state and municipal levels, and TOD practitioners (PR), including planning consultants in the private sector (see Table 1). This reflects our efforts to include representatives from different stakeholder groups, ensuring that the results capture multi-perspective viewpoints and diverse ideas. The interviewees were selected purposively to ensure the trustworthiness of the qualitative research, targeting professionals with publications on land use and transportation integration, involvement in local TOD planning and implementation programs (i.e., practitioners), or experience as policymakers. To achieve this, a list of potential qualified interviewees was compiled, and invitations were sent after an initial screening process. We were deliberate in selecting participants based on their academic and professional expertise, although this approach resulted in a limited number of participants for the present study.

The discussion topics, which formed the core of the interview content, were designed based on the key research questions derived from the study's aim: (1) What role did the NTODG play, and how effective was it in turning TOD plans into reality? and (2) What are the driving factors behind this process?

Table 1. Interview participant profiles

Participant code	Group category	Affiliated organization/institute	TOD related experiences
PO1	Policymaking/ Government official	*Iran Ministry of Cultural Heritage, Tourism and Handicrafts*	• Representative in technical committees of the *Ministry of Road and Urban Development* • Member of the NTODG review team
PO2	Policymaking/ Government official	*Iran's Railway Company*	• Member of the supervision team for national inter-city rail TOD projects
PO3	Policymaker/ Government official	Transportation vice-presidency of the *Ministry of Road and Urban Development*	• Member of the NTODG review team • Member of the *Urban Street Design Guide* review team
PO4	Policymaker/ Government official	*Iran's Railway Company*	• Member of the supervision team for national inter-city rail TOD projects
PO5	Policymaker/ Government official	*Tehran Urban Renewal Organization*	• Experienced in applying the TOD concept to urban areas under regeneration
PO6	Policymaker/ Government official	*Iran's Railway Company*	• Member of the supervision team for national inter-city rail TOD projects
PO7	Policymaker/ Government official	Transportation vice-presidency of the *Ministry of Road and Urban Development*	• Member of the NTODG review team • Member of the *Urban Street Design Guide* review team
PO8	Policymaker/ Government official	Transportation vice-presidency of the *Ministry of Road and Urban Development*	• Member of the NTODG review team • Member of the *Urban Street Design Guide* review team

AC1	Academic (Architecture and urban planning)	*Road, Housing and Urban Development Research Center*	• Representative in technical committees of the *Ministry of Road and Urban Development*
AC2	Academic (Transportation researcher)	Public university	• Published works on TOD-centered topics, such as public transportation and walkability
PR1	TOD practitioner (transportation planning)	Consulting engineers (private sector)	• Member of the planning team for several TOD projects (e.g., *Urban Street Design Guide and TOD Strategic Plan for the City of Tehran*)
PR2	TOD practitioner (Urban planning)	*Tehran Urban Research & Planning Center, Tehran Municipality*	• Supervisor of TOD research projects in Tehran Municipality
PR3	TOD practitioner (Urban and transportation planning)	Planning consulting engineers (private sector)	• Member of the NTODG committee • Advocate for TOD and sustainable transportation
PR4	TOD practitioner (Transportation planning)	*Iranian Society of Consulting Engineers*	• Member of the NTODG committee • Conducted planning projects on TOD implementation for Qazvin City
PR5	TOD practitioner (Architecture and urban planning)	Planning consulting engineers (private sector)	• Member of the NTODG committee • Advocate for transportation and land use integration • Expert consultant for the Center for Station Area Complexes (Tehran Municipality)

Data analysis

A conventional qualitative approach was adopted for analyzing the interview content. The authors extracted codes, categories, and study themes (i.e., NTODG roles, success factors, and barriers) from the textual data without relying on a pre-existing conceptual framework or theory. To achieve this, all interviews were recorded after obtaining prior permission. These recordings were listened to repeatedly, transcribed, and organized based on content similarity. The major analytical categories were derived from the two primary discussion topics, with the unit of analysis being the textual content, including the leading factors of the NTODG. Initial codes were generated, followed by a second round of coding through re-coding. Finally, the concepts were synthesized in the third stage, resulting in analytical categories (i.e., study themes and subthemes) (Table 2). The authors served as the primary coders and analysts throughout the entire process. The interview results are presented in the next section, with references to the participants' codes (as assigned in Table 1).

FINDINGS

The qualitative analysis of the interviews identified seven themes, categorized into two main topics. First, the efficacy of the NTODG was critically examined, focusing on its role in either hindering or facilitating TOD implementation and its potential to foster a shared understanding of the TOD concept. Another theme that emerged was the NTODG's potential to integrate urban and transportation planning. Second, leading factors were categorized as a separate topic, encompassing the NTODG's content and structure, associated planning policies, and stakeholder awareness. The political context, particularly at higher levels, was also identified as a theme that can influence the success of any planning policy. Subthemes were categorized into two groups: challenges and limitations on one hand, and success factors and recommendations on the other (Table 2). These topics, themes, and subthemes are analyzed in detail in the following sections.

NTODG EFFICACY

NTODG: facilitator, yet obstacle

First, it is important to understand the participants' perspectives on the extent to which the NTODG has been effective in facilitating TOD project implementation for several years since its introduction. Unsurprisingly, five respondents directly stated that it was "not at all" effective [PO2, PO4, PO6, AC2, and PO8], arguing that the national guideline failed to achieve the expected TOD goals and outcomes. Others were more optimistic, noting that it is still in its early stages and, like other planning regulations, requires more time to yield results [AC1, PO5, and PO7]. On this point, PO7 emphasized that TOD should not be viewed as a short-term, one-off project, as "it is much more of a long-term process." A third group of interviewees [PO1, PR1, PR2, PR3, and PR4] highlighted that the NTODG has positively influenced urban plans in some cities, where interest in TOD principles under the NTODG framework is growing – despite limited evidence of tangible TOD outcomes. For instance, the NTODG has been officially adopted as a guideline in cities like Tehran [PR2, PR3]. However, many other cities remain largely unaware of its existence. Conversely, PO5 and PR1 raised concerns about the NTODG potentially acting as an obstacle, particularly when it risks overlooking the importance of local contexts.

How urban plans can benefit from NTODG

The participants concluded that the NTODG alone is insufficient, as many other prerequisites must also be addressed. More than half of the participants emphasized that the NTODG needs to be integrated with other planning mechanisms and agendas [PO1, AC1, PO4, PO5, PR4, PO6, PO7, and PR5], such as strategic regional and urban TOD plans based on the NTODG framework [PR4]. Additionally, they highlighted the need for complementary guides at both national and local levels to support the NTODG [PO1, PR2, PR4, and PO7]. Four participants suggested establishing a dedicated entity to coordinate and oversee TOD initiatives across upper and lower levels of governance [AC1, AC2, PO8, PR5]. PO6 further noted that adherence to TOD principles

Table 2. The efficacy of NTODG and its success factors and barriers: themes and subthemes

Discussion topic	Theme	Subtheme	
		Challenges and Limitations	**Success Factors and Recommendations**
NTODG efficacy (role)	Hindering and facilitating TOD projects implementation	• Limited acceptance and high levels of unawareness among cities • At an early stage, requiring more time for adoption • Unsuccessful in achieving TOD goals • Generalized policies that overlook local contexts • Confusing TOD typology for local experts	• Increasing interest in TOD principles
	Driving urban and transportation plans	• Many other influencing factors at play	• Establishment of a coordinating entity for TOD policies (e.g., NTODG) • Coordination with other planning mechanisms and agendas • Development of subsequent strategic regional and urban TOD plans • Consistency with TOD principles as a success indicator • Creation of subsequent guides attached to the NTODG
	Providing a common definition	• Insufficient to establish a common definition • Poorly introduced and inadequately advertised • TOD as a "public transportation policy" versus "place-making approach"	• Reconceptualization of TOD beyond merely increasing density
Leading factors	NTODG guideline's content and structure	• Lack of a clear implementation mechanism • No guarantees for implementation • No reflection of diverse local contexts	• A specified entity to track TOD policies e.g. NTODG • Restructuring with precise details and clear recommendations • Involvement of civil society, NGOs, and voluntary entities • Development of specific financial mechanisms • Implementation of specific appraisal methods
	Other associated planning policies	• Conflicts between stakeholders, policies, and decisions • Alignment of budget plans with mass housing policies	• Recognition of the significance of supportive (national) policies • Updating governance structures and related policies • Introduction of new agendas and checklists • Employment of qualified experts
	Political (policy) stability	• Misunderstanding risks for incoming authorities • Unstable management bodies, policies, and authorities • Politically driven (party-led) and subjective decision-making • Appointment of unqualified individuals based on political connections	• Interrelation between political stability and TOD success
	Understanding TOD concept	• No common definition of TOD • Risk of deviation from the original TOD concept • Lack of full awareness among consultants and urban authorities	• Implementation of educational and awareness programs

could serve as a success indicator for urban plans and as an appraisal metric for urban authorities during the post-implementation phase.

A national policy, a national definition

Most participants highlighted that the guideline was not adequately introduced to key stakeholders, including authorities [PO2], and criticized the NTODG's content, arguing that it is insufficient to establish a common definition accepted by its users. PR1, however, believed that the NTODG could reconceptualize TOD in Iran to some extent, moving beyond the simplistic idea of increasing density in station areas. When asked to define TOD in their own terms, most interviewees prioritized "TOD as a public transportation policy" over a "place-making approach" [PO1, PR2, AC1, PO3, PO4, PR3, PR4, and PR5]. Consequently, most participants argued that developing public transportation systems and restricting private car use are key to achieving TOD goals.

Leading factors

What a national guideline should (not) include

- The content of the NTODG document was a major topic of discussion during the interviews. Most interviewees criticized the NTODG's content and structure for providing overly general guidelines without a clear implementation mechanism for future urban plans (Table 3). They noted the absence of guarantees for implementation, such as incentives, requirements, mandatory tasks, and other supportive measures. More importantly, participants expressed concern about the failure to account for local characteristics across the country, particularly due to the proposal of a uniform TOD typology for cities with diverse features, such as varying sizes. On this issue, there was agreement among participants on the need to reflect various urban contexts based on: (a) climate, geography, socio-economic features, structure, form, and density patterns; (b) access to public transportation (PT); (c) the national function of the city within its regional network; and (d) city size, with a focus on metropolitan areas and large cities. Their recommendations extended further, proposing a restructuring of the NTODG content through the following strategies:
- Adding precise details, clear recommendations, and explicit explanations of the subject;
- Defining the roles of civil society, NGOs, voluntary entities, and advocates;
- Establishing a dedicated entity to oversee and track TOD policies, such as the NTODG; and
- Outlining financial mechanisms, appraisal methods, and socio-cultural requirements.

Policy coordination: a powerful tool for TOD policy success

The discussions revealed that coordination with other planning policies is one of the most critical factors behind the success of TOD policies. While the majority of interviewees acknowledged that supportive national policies, such as the NTODG, are essential for implementing TOD projects [PO1, PR2, PO2, AC1, PO5, PR4, AC2, PO7, PO8, and PR5], they also called for aligning other national policies and regulations. These include land value capture mechanisms [PO3], car toll systems, practical budgeting, and revised transportation master plans [AC1], alongside structural changes in upper-level governance, such as within ministries [PR1, PO3]. To facilitate the realization of the NTODG, interviewees emphasized the need for a new set of revised agendas and checklists for urban plans, aligned with TOD principles [PO1, PR1, PR2, PO2, AC1, PO3, PO4, PO5, PR3, PR4, PO6, and PR5]. Additionally, they highlighted the importance of employing qualified transportation and planning consulting engineers – experts – to ensure effective implementation [PO2, PO6].

On the other hand, participants highlighted the existence of conflicting policies that reflect a fragmented transportation and urban planning system, which undermines the efficacy of the NTODG. For example, the mass housing construction policy was heavily criticized. PO1, PO5, and PR3 expressed disappointment with mass housing projects in peripheral areas, noting that they contradict TOD principles. Such policies contribute to budget shortages and create pressure to sell additional floor area ratio (FAR), leading to the neglect of TOD policies [PO2]. Additionally, participants pointed to conflicts between stakeholders, policies, and decisions [AC2], including investments in urban projects that lack a TOD focus [PO2, PR5], subsidized fuel policies [PO2], and decisions that undermine public transportation [AC1].

*Table 3. Analysis of participants' responses about the content of the guideline**

	Participants														
	PO 1	***PO 2***	***PO 3***	***PO 4***	***PO 5***	***PO 6***	***PO 7***	***PO 8***	***AC 1***	***AC 1***	***PR 1***	***PR 2***	***PR 3***	***PR 4***	***PR 5***
Criticism			■	■	■	■	■	■	■			■	■		
Absence of guarantees for implementation			■	■	■	■	■	■	■						
Failure to account for local characteristics					■	■	■								
Uniform TOD typology									■			■			
Recommendation-contextualization		■			■				■			■	■	■	
Natural, socio-economic, physical features					■				■						
PT accessibility														■	
City function within regional network		■											■		
City size												■			
Recommendation-other		■	■		■	■	■		■				■	■	■
Precise details and recommendations									■				■	■	
Non-governmental roles						■									
TOD policies tracks-entity									■						
Financial and appraisal mechanisms		■	■		■	■	■		■						■

* Grey fields indicate that participants mentioned that Criticism/ Recommendation-contextualization/ Recommendation-other.

A stable policy system matters

In line with the results discussed above, nearly all interviewees emphasized that the realization and success of TOD policies are strongly tied to national-level policies and political stability. This means that any changes in higher-level leadership – such as the president, ministers, or local mayors – could lead to shifts in broader policies, including TOD policies. PR2 stated:

> *"When a national document is approved, its implementation is mandatory. However, this process is not always straightforward. Changes in political leaders and municipal-level authorities can hinder or delay implementation. They may prioritize other issues and simply neglect the document if it does not align with their ideals or priorities."*

Similarly, PR5 added:

> *"Consistency is key to successful planning. In cases where there are rapid changes in the management system and a strong link between the personal preferences of authorities and their decisions—especially in the absence of a robust, independent system of regulations and obligations—changes in leadership often result in changes in policies."*

New policies may even directly contradict TOD principles. This is evident in affordable mass housing projects in peripheral urban areas, as discussed earlier, where lower land prices make these locations attractive despite poor access to public transportation. While the initial investment may result in lower housing costs, long-term living expenses and environmental impacts are significantly higher. Additionally, the short tenure of urban management and the personal preferences of elected authorities can influence decisions and priorities, as they may interpret TOD based on individual perspectives.

Respondents criticized this situation in Iran. AC2 noted a lack of stability due to frequent changes in the policymaking system, with many positions being temporary or short-term. Under such conditions, TOD decisions are influenced by shifting management bodies, urban policies, and authorities [PO2, PO5, PR3, and AC2]. New appointments are often based on political connections rather than qualifications [PO1], leading to unqualified individuals in key roles. As a result, many decisions are driven by personal preferences and political agendas (party-led) [PR1, PR2, PO3, PO4, and PO5], compounded by a poor understanding of TOD's importance [PR3].

Full awareness drives TOD success

The interviewees criticized the lack of a common definition and the deviation from the original concept during the process of translating general policies into practice [PO4, PR3, and PO6]. They noted that local authorities often interpret the concept based on their own understanding and act accordingly. This issue becomes more pronounced in metropolitan areas, where urban management systems hold significant power and independence, potentially acting in ways that do not fully align with NTODG principles. This can create a chain reaction, as medium and small cities often look to metropolitan areas as role models for development.

Additionally, there is limited awareness among transportation and planning consultants, as well as urban authorities, regarding the NTODG recommendations and how to apply them [AC1, PO4, PR3, PR4, PO6, and AC2]. In response, interviewees emphasized the need for educational and awareness programs for planning experts and authorities to better understand and implement NTODG recommendations [PR3, AC2, and PO7].

DISCUSSION

An initial objective of the study was to assess the extent to which the national TOD guidelines have been effective in achieving TOD goals. The study found that, despite some limited advantages, the NTODG may increase risks and even act as a barrier. Specifically, the prescriptive nature of the NTODG's content – such as its TOD typology – raises the risk of imposing uniform obligations without considering local contexts. This approach can confuse local experts, particularly in a country with diverse urban landscapes, despite the well-documented importance of context sensitivity in TOD implementation (Aston *et al.,* 2016; De Vos *et al.,* 2014; Higgins and Kanaroglou, 2016; Lyu *et al.,* 2016; Ortuño-Padilla *et al.,* 2017; Qviström and Bengtsson, 2015; Thomas *et al.,* 2018).

In addition, despite the significant progress made in establishing a common definition among TOD stakeholders (Abdi, 2021; Abdi and Lamíquiz-Daudén, 2022; Thomas *et al.,* 2018; Thomas and Bertolini, 2015), the findings revealed that the NTODG failed to foster a shared understanding of the TOD concept among various stakeholders at the national level. For instance, it did not achieve a balance between the two core pillars of TOD: "sustainable urban planning" – which emphasizes compact, mixed-use, walkable neighborhoods with open green spaces and balanced density distribution – and "sustainable transportation planning" – which focuses on integrated land use and transportation, reduced car dependency, access to public transit, parking management, and efficient origin-destination planning (Allan *et al.,* 2022). TOD experts viewed it as a multifaceted strategy, whose success in shaping urban plans and subsequent urban design projects depends on numerous influential factors.

The second objective of this study was to identify the leading factors behind the successes and failures of the NTODG, as discussed above. The study distinguished between internal and external factors influencing the success of the NTODG. Internally, the content of the guideline should go beyond basic definitions by providing detailed implementation mechanisms and addressing the diverse contexts of urban settlements across the country. Externally, the guideline can contribute by identifying opportunities for policy coordination, defining roles and responsibilities, and establishing educational programs to enhance stakeholder engagement and awareness. It should also advocate for political continuity by involving upper-level laws and legislation.

Regarding political continuity, it is widely agreed that TOD is a long-term process, requiring strong and consistent leadership vision for success. Conversely, frequent changes in leadership and a lack of consistent vision hinder

the achievement of TOD goals (Ollivier *et al.,* 2021). In many developing countries, it is common for the entire administration system or adopted policies to be replaced with the arrival of a new mayor or governor, as seen in the case of Bangkok (Wu and Pojani, 2016). In contrast, project continuity has been a key factor in achieving transport-land-use integration and the success of TOD-based initiatives in cities like Curitiba and Bogotá (Cervero, 2013; Willoughby, 2013). Thus, the lack of political and technical continuity remains one of the most significant barriers to implementing TOD in developing countries, including Iran.

In some cases, the NTODG may even act as a hindrance when local initiatives are blocked by outdated upper-level guidelines. Additionally, establishing a common definition of TOD heavily depends on the full awareness of all stakeholders involved in TOD policy, planning, and project implementation, though political will and comprehensive guidelines also play critical roles.

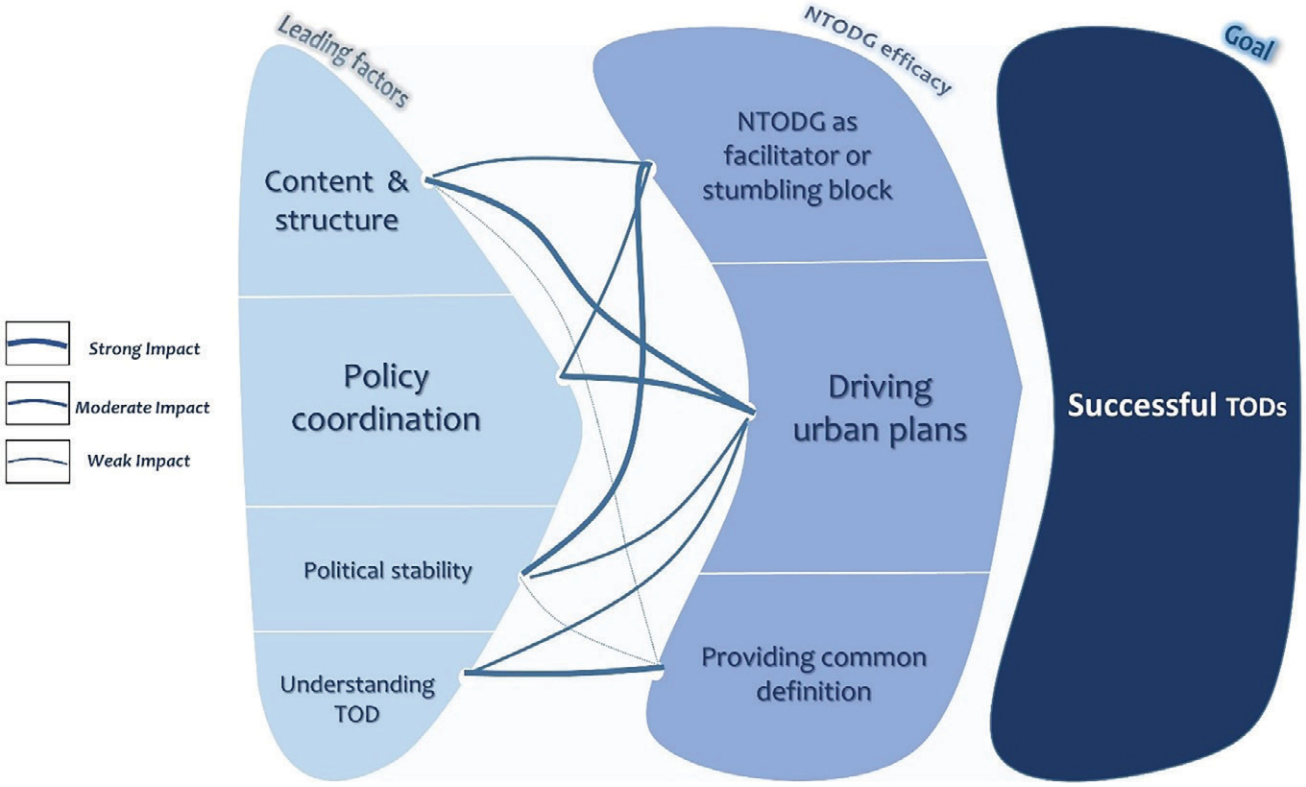

Figure 1. Relationship between the NTODG impacts and leading factors

The analysis above also revealed the interrelationships between the impacts and leading factors behind the success of the NTODG. Figure 1 illustrates this through: (1) sizing the factors proportionally to their significance, based on the total number of times each factor was mentioned by interviewees, and (2) depicting a three-level internal connection – strong, moderate, and weak impacts.

The results indicate that the NTODG can effectively guide urban plans only if it aligns externally with other planning policies and upper-level decisions and, internally, provides a well-structured guideline with sufficient implementation tools and guarantees. Second, a national TOD policy like the NTODG can act as a facilitator for other plans when supported by a stable system – even if regularly updated – that builds on previous knowledge and experiences. Without such support, these policies, like their predecessors, risk being archived and unimplemented. On this point, PR5 highlighted the frequency with which planning policies and regulations remain unimplemented, often due to a lack of political will.

CONCLUDING REMARKS

The present study was designed to examine the impact of national TOD policies on achieving TOD goals, based on the recent experience of Iran's National TOD Guideline. Interviews with local TOD experts revealed that an NTODG can influence the success of TOD projects in three ways: by acting as a facilitator or a barrier, by being a driver for urban plans, and by providing a common definition. However, its effectiveness is influenced by four key factors: the structure and content of the NTODG, policy coordination, political stability, and comprehensive awareness.

To summarize, barriers to successful TOD implementation often stem from the lack of interconnected and integrated tools designed to address both upper- and lower-level policies and strategies. Additionally, there is a mismatch and disagreement between policymakers and local governments regarding the definition and implementation process of TOD. In this context, top-down planning originates from the central government (e.g., the Ministry of Road and Urban

Development), while bottom-up initiatives are driven by municipalities, which often prioritize profit-making through land use changes and the allocation of higher densities. This creates a contradiction in goals: the central government focuses on public benefits, whereas local authorities seek financial gains. As a result, there is a misalignment between the objectives of national policies and the projects or plans pursued at the local level. An effective TOD framework should seek solutions at both macro and micro levels. The development of national guidelines is a crucial first step, but it must be complemented by local-level instructions and tools.

The concept of TOD is inherently complex and tends to resist being confined to a strict framework. As a result, it is often defined based on the goals, intentions, and even interests of individual organizations. Policymakers working at the macro level strive to formulate it as a national policy that governs urban and transportation planning. At the same time, local-level authorities primarily focus on its application as a micro-level design tool. In complex and unstable planning environments, profit-driven motives – such as land speculation and the allocation of higher densities – can lead to the misuse of this utopian concept, transforming it into a dystopia. This risk applies to any planning concept initially developed to promote equity and social justice but later co-opted by real estate developers.

Changing priorities and inconsistencies within the upper-level management system are significant factors affecting the achievement of TOD goals. When the overarching vision is unstable and influenced by the personal preferences of managers, it becomes difficult to establish a mutual understanding and develop shared goals. The creation of national guidelines is an essential first step, but it is not the final solution. Macro- and micro-level institutions and authorities must collaborate to build a mutual understanding and reach a win-win solution that also serves the public good. TOD is not merely a concept for reorganizing the built environment; it also introduces a new perspective on cities and communities. As such, it seeks to transform the urban environment and the normative values of authorities.

In summary, the findings of this study support the idea that NTODGs are among the "efficient" instruments available to governments for advancing TOD culture – particularly in the context of developing countries as newcomers to TOD, where the integration of transport and land use faces numerous challenges. However, NTODGs tend to be "insufficient" on their own, as they must be coordinated with other related policies under a "stable" political system and planning framework to effectively contribute to turning TOD goals into reality.

The present study was limited to a mono-method approach (i.e., a qualitative method), a single case study, and a small number of participants. Therefore, to enhance the generalizability of the study's findings, what is now needed is a cross-national study (i.e., involving those experienced in national TOD policies) to capture diverse contextual experiences. Additionally, the study could be replicated by engaging diverse municipal stakeholders at lower levels, supported by focus groups, to uncover the challenges and successes of TOD implementation in relation to national TOD policies.

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REFERENCES

Abdi, M. H., Lamíquiz-Daudén, P. J. (2022). Transit-oriented development in developing countries: A qualitative meta-synthesis of its policy, planning and implementation challenges, *International Journal of Sustainable Transportation*, Vol. 16, No. 3, pp. 195–221. https://doi.org/10.1080/15568318.2020.1858375

Abdi, M. H., Soltani, A. (2022). Which Fabric/Scale Is Better for Transit-Oriented Urban Design: Case Studies in a Developing Country, *Sustainability*, Vol. 14, No. 12, 7338. https://doi.org/10.3390/su14127338

Abdi, M. H. (2021). What the newcomers to transit-oriented development are confronted with? Evidence from Iranian policy and planning, *Journal of Transport Geography*, Vol. 92, 103005. https://doi.org/10.1016/j.jtrangeo.2021.103005

Allan, A., Soltani, A., Abdi, M. H., Zarei, M. (2022). Driving Forces behind Land Use and Land Cover Change: A Systematic and Bibliometric Review, *Land*, Vol. 11, No. 8, 1222. https://doi.org/10.3390/land11081222

Aston, L., Currie, G., Pavkova, K. (2016). Does transit mode influence the transit-orientation of urban development? – An empirical study, *Journal of Transport Geography*, Vol. 55, pp. 83–91. https://doi.org/10.1016/j.jtrangeo.2016.07.006

Björling, N., Capitao Patrao, C. (2024). Strategic planning for a sustainable local-regional transit-oriented development, *Urban, Planning and Transport Research*, Vol. 12, No. 1, 2345770. https://doi.org/10.1080/21650020.2024.2345770

Calthorpe, P. (1997). *The next American metropolis: Ecology, community, and the American dream*. New York: Princeton Architectural Press.

Cervero, R. B. (2013). Linking urban transport and land use in developing countries, *Journal of Transport and Land Use*, Vol. 6, No. 1, pp. 7–24. https://doi.org/10.5198/jtlu.v6i1.425

De Vos, J., Van Acker, V., Witlox, F. (2014). The influence of attitudes on Transit-Oriented Development: An explorative analysis, *Transport Policy*, Vol. 35, pp. 326–329. https://doi.org/10.1016/j.tranpol.2014.04.004

Higgins, C. D., Kanaroglou, P. S. (2016). A latent class method for classifying and evaluating the performance of station area transit-oriented development in the Toronto region, *Journal of Transport Geography*, Vol. 52, pp. 61–72. https://doi.org/10.1016/j.jtrangeo.2016.02.012

Hrelja, R., Olsson, L., Pettersson-Lofstedt, F., Rye, T. (2020). *Transit oriented development (TOD): A literature review*, Lund: The Swedish Knowledge Centre for Public Transport [online]. https://www.k2centrum.se/sites/default/files/fields/field_uppladdad_rapport/k2_research_2020_2_0.pdf [Accessed: 08 Nov 2024].

Indian Ministry of Housing and Urban Affairs (2015). *National*

Transit Oriented Development (TOD) Policy, New Delhi: Indian Ministry of Housing and Urban Affairs [online]. http://mohua.gov.in/upload/whatsnew/59a4070e85256Transit_Oriented_Developoment_Policy.pdf [Accessed: 08 Nov 2024].

Institute for Transportation and Development Policy (ITDP) (2017). *TOD Standard*, New York: Institute for Transportation and Development Policy - Promoting Sustainable and Equitable Transportation Worldwide [online]. https://itdp.org/publication/tod-standard/ [Accessed: 08 Nov 2024].

Jafari, E., Hein, C. (2021). Revisiting the transnational building of a modern planning regime in Iran: The first Tehran master plan and the interplay between local and foreign planners, *Planning Perspectives*, Vol. 36, No. 3, pp. 451–474. https://doi.org/10.1080/02665433.2020.1789500

Jamme, H.-T., Rodriguez, J., Bahl, D., Banerjee, T. (2019). A Twenty-Five-Year Biography of the TOD Concept: From Design to Policy, Planning, and Implementation, *Journal of Planning Education and Research,* Vol. 39, No. 4, pp. 409–428. https://doi.org/10.1177/0739456X19882073

Lund, H., Willson, R. W., Cervero, R. (2006). A re-evaluation of travel behavior in California TODs, *Journal of Architectural and Planning Research (J Archit Plann Res)*, Vol. 23, No. 3, pp. 247–263.

Lyu, G., Bertolini, L., Pfeffer, K. (2016). Developing a TOD typology for Beijing metro station areas, *Journal of Transport Geography*, Vol. 55, pp. 40–50. https://doi.org/10.1016/j.jtrangeo.2016.07.002

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Mirmoghtadaee, M., Abdi, M. H. (2021). A National Guideline for Transit-Oriented Development: Challenges and Prospects for the Iranian Edition, *Space Ontology International Journal*, Vol. 10, No. 1, pp. 1-15. https://sanad.iau.ir/Journal/soij/Article/938477

Ollivier, G., Ghate, A., Bankim, K., Mehta, P. (2021). *Transit-Oriented Development Implementation Resources and Tools* (2nd ed.). Washington, DC: World Bank. https://hdl.handle.net/10986/34870

Ortuño-Padilla, A., Espinosa-Flor, A., Cerdán-Aznar, L. (2017). Development strategies at station areas in southwestern China: The case of Mianyang city, *Land Use Policy*, Vol. 68, pp. 660–670. https://doi.org/10.1016/j.landusepol.2017.08.034

Pissourios, I. A. (2014). Top-down and Bottom-up Urban and Regional Planning: Towards a Framework for the Use of Planning Standards, *European Spatial Research and Policy*, Vol. 21, No. 1, pp. 83–99. https://doi.org/10.2478/esrp-2014-0007

Qviström, M., Bengtsson, J. (2015). What Kind of Transit-Oriented Development? Using Planning History to Differentiate a Model for Sustainable Development, *European Planning Studies*, Vol. 23, No. 12, pp. 2516–2534. https://doi.org/10.1080/09654313.2015.1016900

Salat, S., Ollivier, G. (2017). *Transforming the Urban Space through Transit-Oriented Development: The 3V Approach*, Washington: International Bank for Reconstruction and Development/ The World Bank [online]. https://hdl.handle.net/10986/26405 [Accessed: 08 Nov 2024].

Sharifi, M., Taymourtash, S., Hanachi, P. (2018). Trans-Iranian Railway Heritage and Its Outstanding Universal Values, *Industrial Heritage: Understanding the Past, Making the Future Sustainable*, International congress of TICCIH, Santiago, Chile: Central University of Chile. [online]. https://www.academia.edu/38155588/Trans_Iranian_Railway_Heritage_and_Its_Outstanding_Universal_Values_pdf [Accessed: 08 Nov 2024].

Swenson, C. J., Dock, F. C. (2004). Implementing a Suburban Network of Transit-Oriented Development Centers: Policy Implications, *Transportation Research Record: Journal of the Transportation Research Board*, Vol. 1885, No. 1, pp. 71–78. https://doi.org/10.3141/1885-11

Thomas, R., Bertolini, L. (2015). Defining critical success factors in TOD implementation using rough set analysis, *Journal of Transport and Land Use*, Vol. 10. No.1, pp. 139-154. https://doi.org/10.5198/jtlu.2015.513

Thomas, R., Pojani, D., Lenferink, S., Bertolini, L., Stead, D., Van Der Krabben, E. (2018). Is transit-oriented development (TOD) an internationally transferable policy concept?, *Regional Studies*, Vol. 52, No. 9, pp. 1201–1213. https://doi.org/10.1080/00343404.2018.1428740

Walloth, C. (2012). Integrated bottom up and top down governance of cities – A systems approach, *Fast forward – Planning in a (hyper) dynamic urban context*, 48th ISOCARP Congress, Perm: RUPA – Russian Urban Planners Association [online]. https://www.isocarp.net/Data/case_studies/2232.pdf [Accessed: 08 Nov 2024].

Willoughby, C. (2013). How much can public private partnership really do for urban transport in developing countries?, *Research in Transportation Economics,* Vol. 40, pp. 34–55.

Wu, I., Pojani, D. (2016). Obstacles to the creation of successful bus rapid transit systems: the case of Bangkok, *Research in Transportation Economics*, Vol. 60, pp. 44–53. https://doi.org/10.1016/j.retrec.2016.05.001

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RESISTANCE AND ENGAGEMENT IN MINING COMMUNITIES: EXPERIENCES FROM BOR AND MAJDANPEK (SERBIA)

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Extracting resources without considering the needs of the local community and adequate environmental protection can deepen existing inequalities between social groups, creating opportunities for ecological conflicts. This, in turn, gives rise to various forms of activism opposing the exclusion of individuals and social groups from decision-making processes related to the management of natural resources. The first part of the paper explores the concepts of participatory, professional, and transactional activism. Additionally, the theoretical framework includes the concepts of environmental distribution conflicts and mining conflicts. These concepts will be illustrated through an analysis of mining areas in Eastern Serbia, firstly by providing a contextual overview of broader local community engagement in Bor and Majdanpek based on the analysis of secondary sources, and secondly by analyzing the results of a survey conducted with the residents of Bor and Majdanpek between July and September 2024 (N=300). In the concluding section, based on the contextual analysis and empirical findings, the sources of motivation and types of citizen engagement in Bor and Majdanpek are interpreted in relation to different conceptualizations of activism that may lead to social conflict expressed through collective action resisting mining activities.

***Key words*: activism, mining, conflict, local community, Serbia.**

INTRODUCTION

The development of countries on the (semi)periphery of the global capitalist system (Wallerstein, 1976) largely depends on the inflow of foreign direct investments (FDI) in the mineral extraction sector. This trend is driven by low production costs (primarily lower labor costs), the deregulation of land ownership, and the misalignment of environmental standards in peripheral countries with the regulations characteristic of core countries in the global economic system. The growing demand for energy, natural resources, minerals, metals, and agricultural products makes it increasingly difficult to reconcile various societal needs regarding land, one of the most crucial environmental factors alongside air and water.

Recently, the concept of neo-extractivism has emerged, referring to processes that restrict the rights of local landowners in order to facilitate profit accumulation by national governments and private (often transnational) corporations. The term describes the methods of dispossessing these landowners to extract value from natural resources in peripheral countries or regions during the postcolonial phase of capitalist development (Borras and Franco, 2013; Veltmeyer and Petras, 2014; Petrović, 2023; Petrović and Pešić, 2023). Some of the key features of neo-extractivism include: (1) monopolization of resource extraction, where profits are privatized and costs externalized; (2) close ties between the state and private capital (national or international); (3) generated value that is not directed toward the local population negatively affected by extractive activities, nor to those (individuals or institutions) who may have a legal right to a share of the profits (Petrović, 2023, Ye *et al*., 2019).

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Mineral resource exploitation without considering local development needs, environmental protection, and improvements in the quality of life of local communities, can exacerbate existing inequalities between different social groups (Manojlović and Kabanga, 2023). This, in turn, creates opportunities for the emergence of environmental conflicts at various levels of intensity and, consequently, different forms of activism that oppose the exclusion of individuals and social groups from decision-making processes related to the management of natural resources.

In academic literature, the aforementioned social issue is approached from different perspectives, with two particularly influential interpretations – the developmental and critical perspectives. The developmental perspective emphasizes the economic benefits for less developed countries, highlighting the role of FDI and increased employment opportunities for local communities. In contrast, the critical perspective focuses on the negative consequences of transnational capital involvement in these countries. Transnational companies often overlook local interests when exploiting mineral resources, leading to significant environmental problems (deforestation, air pollution, disruption of aquatic ecosystems, ecological imbalance, etc.) and adverse social consequences (forced displacement, inadequate compensation for expropriated land, weak institutional engagement, restrictions on landowners' rights, etc.) (Petovar, 1983; Terminski, 2013; Petovar, 2015; Oliveira *et al*., 2021; Petrović, 2023; Petrović *et al*., 2024).

Serbia exemplifies a semi-peripheral country within the global economic system, where economic growth heavily depends on FDI, including controversial mining projects that threaten to transform landscapes into so-called sacrifice zones (Scott and Smith, 2017). These processes, particularly prominent in recent years, have contributed to the emergence of new pro-environmental social movements. Given Serbia's intensified mineral exploitation, anti-mining movements have begun to take shape, resisting the extraction of certain metals. Conflicts among stakeholders over land use further fuel grassroots activism and community engagement.

The first part of this paper explores the concepts of participatory, professional (Della Porta and Dianni, 2006), and transactional activism (Petrova and Tarrow, 2007). Another key theoretical framework is the concept of ecological distribution conflicts, closely linked to environmental equity and environmental justice, which gained prominence in the U.S. during the 1980s (Pulido, 1996). Examining those conflicts through these lenses provides a deeper understanding of civil disobedience, protests, and activism aimed at achieving a fairer distribution of benefits and harms associated with land use (Pellow and Guo, 2018). Finally, this framework includes a specific category of environmental conflicts – mining conflicts.

These concepts are illustrated through the analysis of mining areas in Eastern Serbia, firstly by providing a contextual overview of broader community engagement in Bor and Majdanpek, based on secondary sources, and secondly by analyzing the results of a survey conducted with residents of Bor and Majdanpek between July and September 2024. In the concluding section, based on both contextual analysis and empirical findings, the study interprets the sources of motivation and types of citizen engagement in Bor and Majdanpek, linking them to different forms of activism that may lead to social conflict and collective resistance to mining operations.

THEORETICAL BACKGROUND

Professional, transactional, and participatory activism

Professional activism refers to the work of specialized non-governmental organizations (NGOs) focused on specific issues, such as environmental protection. This form of activism dominates post-socialist Eastern European countries, including Serbia, where the civil sector in environmental protection has developed within the context of European integration and Europeanization (Vukelić *et al*., 2021). Professional environmental organizations primarily rely on project-based funding, which ties their activities to donor policies and project cycles. Because of this, their work is often referred to as "project-based activism".

The core activities of professional NGOs revolve around expert analyses of environmental issues and public policy advocacy. As a result, their work is highly bureaucratic, governed by special regulations, and more oriented toward international institutions than local communities (Vukelić *et al.,* 2021). This phenomenon, often called the "NGO-ization of resistance", describes how grassroots opposition is co-opted and neutralized through institutionalized civil society organizations (Roy, 2014). Since NGOs act as intermediaries between the state and citizens through institutional channels, their role frequently leads to the depoliticization of environmental activism, diminishing the impact of legitimate political resistance. Many citizens perceive professional activism as part of "big government" – distant, bureaucratic, and non-transparent (Bosso, 1999 p. 70). Consequently, this approach has slowed the development of participatory environmental activism in post-socialist countries (Vukelić *et al*., 2021).

Transactional activism refers to the collaboration between non-governmental actors and their connections with political parties, state institutions, and officials. These relationships are built on the exchange of information, resources, and joint projects (Petrova and Tarrow, 2007, as cited in Vukelić *et al*., 2021). Such "lateral" connections emerge for two main reasons: (1) Civil society organizations often struggle to establish meaningful relationships with citizens and local communities, prompting them to form partnerships with other organizations instead; (2) International donor programs promoting civil society capacity-building require NGOs to collaborate with public, private, and civil sector institutions (Petrović, 2020). Petrova and Tarrow (2007), who coined the term "transactional activism", use it to describe environmental movements across Eastern Europe.

Participatory activism is typically associated with bottom-up citizen mobilization and numerous grassroots initiatives, a defining characteristic of environmental movements in Western Europe. However, over the past decade, various forms of self-organization and everyday activism have also emerged in Eastern European countries. Unlike professional

activism, these movements seek independence from public, private, and civil sector institutions. Instead, they engage at the local level through direct collective action and confrontation. While "participation" is often used to describe public involvement in institutionalized decision-making structures, in this context, it refers to mass citizen mobilization within a social movement, including extra-institutional forms of engagement in the public sphere.

Participatory activism reflects the growing popularity of alternative political participation, driven by a "crisis of representation". As traditional political institutions become more professionalized and centralized, the connection between citizens and political parties weakens, reducing the latter's ability to represent public interests (Vukelić and Stanojević, 2012). As with many concepts borrowed from the West, it is worth questioning whether the term "participatory activism" accurately describes environmental engagement in Serbia. Only in recent years have environmental movements in Serbia begun to exhibit characteristics of large-scale social movements through mass mobilization (Petrović, 2020). Recently, grassroots resistance has intensified against the construction of small hydropower plants, waste landfills, and both existing and planned mining projects, in both rural and urban areas. These localized resistance efforts resemble participatory activism in form, yet they often involve small social groups and sporadic actions with limited impact. This raises the question of whether the term is appropriate, as it typically refers to large-scale citizen mobilization and widespread grassroots movements.

The challenges of cooperation between professional and grassroots organizations are best understood through the continuum of professional and participatory social movement types. Rather than viewing them as opposing approaches, they can be seen as complementary poles along a spectrum of activism models.

Recent research on environmental activism in Serbia suggests that the relationship between grassroots environmental initiatives and professional organizations is weakening. This is due, partly, to the structural constraints of professional organizations and, in part, to activists' growing distrust of their agendas (Vukelić *et al*., 2021).

Ecological distributional conflicts

While the concepts of professional and participatory activism are commonly used in sociological literature to discuss the emergence and development of the environmental movement in Serbia and Eastern European countries, the concept of ecological distribution conflict (EDC) originates from economic theory, in an attempt to explain the forms of local community resistance to mining projects worldwide (Martinez-Alier and O'Connor, 1996). The term is often used interchangeably with similar notions of environmental or socio-environmental conflicts. Ecological distributional conflict refers to social conflicts that arise as a result of "*unequal distribution of environmental benefits*, such as access to natural resources, fertile land, or ecosystem services, as well as *unequal distribution of environmental burdens*, such as pollution or exposure to waste" (Scheidel *et al*., 2018). Not only are distributional aspects (who gets what environmental benefits and burdens) present in EDC, but also other problems are considered, such as procedural issues or recognition of different values and worldviews (Schlosberg, 2004; Scheidel *et al*., 2018).

Like any social conflict, EDC involves a gap between the interests, values, and norms advocated by individuals or social groups, which leads to antagonism and a struggle for power. Unlike economic conflicts, which usually revolve around material concerns such as wages, prices, and profits, EDC are more complex because they involve deep differences in values and beliefs, making it harder to reach a solution that satisfies everyone. For example, in the decision-making process regarding the fate of a project related to the use of a natural resource, several values need to be considered: market and monetary values, the territorial rights of indigenous local communities, environmental values, traditional ways of life, etc.

Mining conflicts

The literature also uses the broader term "mining conflicts" (Urkidi and Walter, 2011), referring to various social conflicts caused by mining activities (Martínez-Alier, 2001; Conde and Le Billon, 2017; Scheidel *et al*., 2018). The causes of conflicts over environmental distribution are seen within capitalism, particularly neoliberalism, which, driven by the imperative of economic growth, leads to the expansion of natural resource exploitation. Through the extractive industry, this results in social and environmental injustices and weakens civil society, making it harder to resist unwanted projects. Several specific causes of mining conflicts have been identified, including: the socio-environmental impacts on land, water, and local livelihoods; the exclusion of local communities from decision-making processes; distrust in mining companies; and inadequate compensation for environmental damage and for the economic losses suffered by households engaged in activities that conflict with mining, such as agriculture. However, it should be noted that not all local communities resist mining companies and authorities (Conde and Le Billon, 2017). The emergence of conflicts against mining depends on various factors: the perceived threat to traditional ways of life, the timing of that perceived threat, local contextual factors, the location of the potential mine, the reputation of the company, the type of ore (uranium, lithium, copper, etc.), access to reliable information, and so on (Eerola, 2024). It is believed that the involvement of environmental NGOs and government institutions as regulators is crucial in preventing mining conflicts (Lodhia and Hess, 2014). Mining companies, through the mediation of NGOs and authorities, should act in accordance with the principles of corporate responsibility and take into account the social and environmental consequences of their activities. Finally, a mining conflict does not necessarily lead to confrontational behavior among the involved actors; it can even foster cooperation. Of course, achieving this is not easy, but more importantly, it is essential to "maintain the form of cooperation achieved" (Vuković, 2008, p. 243).

Activism and conflicts in mining regions are closely influenced by the shifting governance dynamics tied to the EU integration process, and Serbia's potential EU accession could significantly reshape this landscape. As early as 2012, when Serbia was granted EU candidate status, it

had already committed to the liberalization of land sales by allowing foreigners to freely purchase agricultural land, which provoked resistance among farmers and the broader public (Petrović, 2023).

Drawing from the experiences of post-socialist EU member states like Bulgaria, Croatia, and Romania (Kenarov, 2012; Sotirov *et al.*, 2015; Chiodi and Epis, 2022; Proctor, 2022; Szabo *et al.*, 2022), several key shifts may influence activism and Social Licence to Operate (SLO) dynamics in Serbia: (1) stricter environmental and participation standards could provide activists with stronger legal tools and procedural rights; (2) greater transparency and accountability of institutions could enable communities to more effectively challenge mining projects; (3) increased funding and institutional support for civil society could enhance the capacity of NGOs to mobilize, advocate, and participate in governance; (4) changing legitimacy frameworks, since SLO is dynamic and culturally embedded, EU norms may conflict with Serbia's centralized governance structures, triggering both resistance and adaptation. Proctor (2022) contends that SLO may avert various problems tied to ''protests, boycotts, social media storms and attacks on the reputation of key stakeholders, which can stop mining operations.'' Although SLO was academically defined for the first time a quarter century ago (Joyce and Thomson, 2000), this concept is still vague, with no clear criteria or measurability (Bice and Moffat, 2014).

On the other hand, the EU green transition policies could drive new conflicts and enhance existing ones, as pressure to secure critical raw materials may intensify mining activity in candidate countries like Serbia. In Europe, as Proctor (2022, p. 19) states, ''we are facing a paradoxical situation where demand is high and exploration resources are available, but societal and political reluctance hinders entrepreneurship and investment in the exploration/extractive sector''. Some authors suggest that new conflicts may arise due to the changing power relations between the state, investors and civil society organizations. If Serbia progresses on its path towards EU membership, NGOs are expected to strengthen their lobbying capacity, which could result in growth of conflict (Proctor and MacCallum, 2020). This adds complexity to the activist landscape, potentially placing local communities at odds with both national and EU-level priorities. The EU simultaneously promotes extractivist projects in its periphery, strengthens civil society, and enables transnational networking among local movements that oppose corporate power and unresponsive political regimes (Petrović, 2023).

LOCAL ENGAGEMENT AND RESISTANCE TO MINING IN THE CITY OF BOR AND THE MAJDANPEK MUNICIPALITY

The region that includes today's city of Bor and the municipality of Majdanpek has a long history of mining activities, with traces dating back to ancient times, whereas exploitation was industrialized at the beginning of the 20th century (Janković, 1990; Özdemir *et al.*, 2024). Due to their rich deposits of copper and precious metals, these areas have attracted significant interest in recent decades from the scientific community, as well as from government authorities and foreign investors (Petrović *et al.*, 2024). The expansion of the Bor-Majdanpek mining basin has led to a major transformation of the area, affecting both the natural environment and the socio-economic sphere of life. While the opening of mines in the region has created jobs and spurred economic growth, this activity has also reshaped the socio-cultural landscape of the area (Stojmenović, 2024a).

The population in villages near the mines (e.g., Krivelj, Oštrelj, Slatina) has faced numerous negative consequences induced by mining activities, including landscape changes and degradation, air, water, and soil pollution, altered river courses, damage to roads, private property, and buildings, reduced agricultural yields, noise, dust, land contamination from tailings, forced displacement, and increased health risks for both people and animals (Urošević *et al.*, 2018; Jovanović, 2019; Maričić *et al.,* 2022; Nikoletić, 2023; Petrović *et al*., 2024; Stojmenović, 2024b). It is therefore no surprise that many authors refer to Bor and Majdanpek as an "environmental black spot" (Krstić, 2022).

Local strategies for resisting mining activities are varied and depend on the specific context of each country, but generally include protests, blockades, occasional violence, complaints, public campaigns, street demonstrations, and the building of support networks through scientific research and legal actions (Leonard, 2020). Here, we provide a brief overview of some forms of local engagement in Bor and Majdanpek aimed at addressing the negative impacts of mining. We focus on the period after 2018 because it marks the convergence of several key factors: (1) following a period of relatively low production, the residents of Bor began reporting serious air pollution issues, which they associated with the takeover of the mine by a new owner in late 2018; (2) this change triggered a rapid expansion of mining activities in both Bor and Majdanpek, prompting complaints from local farmers and landowners that their properties were taken without fair compensation or transparent relocation plans; and (3) although not directly related to Bor or Majdanpek, the national debate surrounding lithium mining and broader mining practices in 2021 has significantly shaped local public sentiment against mining in general.

Due to insufficient public information, lack of transparency regarding mining expansion plans, and the exclusion of citizens from the decision-making process, the local population has organized itself in opposition to the expansion of mining activities and their consequences. In 2022, residents from several villages around Bor protested for days by blocking roads in the city to draw attention to the uncontrolled spread of mining activities (Radio Slobodna Evropa, 2022). The local movement "Borani se pitaju" ("Borani have a say") has been actively involved in efforts to combat air pollution caused by heavy metals and has organized protests in Bor since 2019 (Jovanović, 2019; Popović, 2024).

The residents of Slatina and Krivelj villages have also been protesting for years against the expansion of mining activities and plans for collective resettlement, blocking access roads to their villages (Bor 030, 2021; Za Media, 2024). Reactions to resettlement vary, ranging from formal and informal participation methods to round-the-clock road blockades aimed at drawing attention to issues such

as coercion during land expropriation, low compensation rates, and so on (Petrović *et al*., 2024; Stojmenović, 2024b).

On several occasions, there have been more direct confrontations between the local population and representatives of the mining company, including physical clashes with private security personnel. One notable example of such resistance in Majdanpek was the activism of the citizens' association "Ne Damo/NU DAU", which organized an activist camp on Starica Mountain in 2022. This association has three representatives in the city council, where they previously unsuccessfully tried to prevent the blasting of the mountain with the support of the "Ekološki ustanak" ("Ecological Uprising"), a part of the political party "Zajedno" (Krstić, 2022).

Starica Mountain, aside from being an important symbol for Majdanpek, serves as a hydrogeological water collector for the entire region and a barrier separating the town from the copper mine (Krstić, 2022). In June 2022, without any prior notice, a mining company detonated rocks on one of the mountain peaks. The company later claimed it was an emergency measure to prevent the collapse of rocks onto the city. However, the locals feared this was an excuse to expand the mine toward the city, and they felt threatened by the explosions, especially when rocks fell above unprotected residential buildings. This prompted some residents and supporters of the "Ne Damo" association to organize an activist camp on a ridge of Starica Mountain, where they stayed for three and a half months, attempting to prevent further mining of the mountain.

The protest ended when the mining company's private security violently destroyed the activist camp and physically removed the activists from the land. Some activists were arrested, and there were cases of police brutality during their detention (Krstić, 2022). Several mountain peaks were subsequently destroyed. Although the company attempted to legally sanction the activists through lawsuits, the court ruled in their favor, as the land where the camp was organized was public property (Krstić, 2023). While the activists won the legal battle, the damage had already been done. Some experts believe that the destruction of the peaks of Starica Mountain caused the draining of the nearby Zaton Lake and resulted in a shortage of drinking water in Majdanpek (Opačić, 2024).

SURVEY RESULTS

The aim of this analysis is to identify the key concerns of the local population in Bor and Majdanpek, as well as the expectations from key stakeholders in addressing issues caused by mining activities. Additionally, it seeks to assess the extent to which residents are engaged and participate in various community activities.

The survey was conducted between August and September 2024 using a random sampling method and focusing on urban and rural communities directly affected by mining. The sample was designed to ensure the representativeness of the population in the City of Bor and the Municipality of Majdanpek based on key sociodemographic characteristics such as gender, age, and education level (Table 1).

Table 1. Survey sample by gender, place of residence, and education (Source: Authors)

GENDER (%)	
Male	47.3
Female	52.7
PLACE OF RESIDENCE (%)	
Bor, urban local communities	53.4
Bor, rural local communities	23.2
Majdanpek, urban local communities	13.4
Majdanpek, rural local communities	10.1
EDUCATION (%)	
No formal education or incomplete primary school	6.4
Primary school	15.2
Secondary school	57.6
Higher school	7.4
University degree	8.4
Master, Magisterium, Doctorate	5.0

The survey revealed that the local population of Bor and Majdanpek identifies the most pressing issues in their communities as environmental problems (39.1%), followed by issues related to displacement due to the spread of mining activities (19.4%), population decline (16.7%), and municipal issues (15.3%). There is no statistically significant correlation between the recognition of these problems and the respondents' gender, age, or education level. However, a statistically significant correlation ($\chi^2(1) = 72.184$, $p < 0.001$) was found in relation to the place of residence. Both the urban and rural populations of Bor recognize environmental problems as the primary community issues. As expected, communal problems were more often identified in rural areas than in urban ones within the municipality of Majdanpek.

Respondents were asked to rate the contributions of the major actors in addressing problems caused by mining activities (Table 2). The local population rates the contributions of almost all stakeholders (except local activism) in addressing problems caused by mining activities as very poor. Respondents believe that the European Union (84.8%), experts and the scientific community (81.5%), and private companies (80.5%) contribute the least (a small or no contribution). The contribution of the state (73.5%), local government (75.5%), and non-governmental organizations (NGOs) (77.4%) is also rated poorly. Local activism was rated somewhat better compared to other stakeholders, but even here, 62.0% of respondents felt there was little or no contribution.

Although greater contributions from citizens were expected compared to other actors in addressing these issues, more than half of the respondents (51.7%) were unaware of any activities undertaken by citizens to improve life quality in the city over the past five years. Among those who were aware of such efforts, the most commonly mentioned activities were protests (17.8%), including demonstrations against Rio Tinto, air pollution, displacement, lack of parking, road blockages in Krivelj, and

Table 2. Evaluation matrix of the contributions of the major actors in addressing problems caused by mining activities (Source: Authors)

	No contribution (%)	Small contribution (%)	Neither small nor large contribution (%)	Large contribution (%)	Very large contribution (%)
1. State	52.0	21.5	15.1	7.7	3.7
2. Local government	56.0	19.5	16.8	6.0	1.7
3. Private companies	59.6	20.5	15.5	3.4	1.0
4. NGOs	64.0	13.4	16.2	3.7	2.7
5. Experts and scientific community	67.0	14.5	14.8	3.0	0.7
6. European Union	66.9	17.9	11.8	3.4	0.0
7. Citizens – local activism	34.9	27.8	22.0	12.6	2.7

illegal construction in Bor. A smaller percentage mentioned resolving local issues such as improving parks and green spaces, fountains, playgrounds, sports fields, streets, renovating schools, addressing heating problems, cleaning waste, cleaning rivers, lakes, the city pool, organizing humanitarian action, supporting residents during the COVID-19 pandemic, activities by the non-governmental sector, and raising awareness about corruption in the city. Involvement in participatory processes was hardly mentioned; only 1.7% of respondents referred to public hearings, neighborhood meetings, addressing the local community, municipal authorities or the mayor, or petition signing. Of all respondents, only 24.3% took part in any participatory activity.

To better understand who participates in local community activities, we analyzed the relationships between respondents' demographic characteristics and their involvement using correlation methods. The analysis revealed a statistically significant association between gender and participation ($\chi^2(1) = 5.862$, $p = 0.015$), indicating that men are more likely to be involved than women. Although the Chi-square test did not reveal a statistically significant relationship between age and education, we present the profile of active participants based on a descriptive analysis. Men made up a greater share of the active group (59.7%) compared to women (40.3%). The most active participants were aged 45–65 (36.6%), followed by those aged 27–44 (29.6%). The least active groups were individuals over 65 (15.5%) and the youngest respondents aged 18–26 (18.3%). Regarding education, those with secondary school education were the most engaged (64.8%), followed by respondents with higher or vocational education (15.5%). The least engaged were individuals with only primary education (11.3%) and those with a master's, magisterium, or doctoral degree (8.4%).

The local population shows a low level of formal membership in various organizations (Table 3). Over 90% of the local population is not a member of any of the organizations listed here: youth organizations, religious organizations, animal protection organizations, environmental, and humanitarian organizations. The results are somewhat different when it comes to political parties, but even in this domain, 83.3% of respondents are not members of any party. Among the few active members of all the listed organizations, there are more men (58.7%) than women (41.3%). The highest number of active members are in the 45-65 age group (50%), followed by the 27-44 age group (23.9%), while the youngest (18-26) and the oldest (over 65) are equally represented (13%). The largest percentage of active members in organizations comprises those employed on a permanent contract (40%), which can be interpreted as either having a lower fear of job loss or as a condition for employment. In terms of education, 21.7% of respondents with incomplete or completed primary education are active, 58.7% with secondary education, 10.9% with higher and vocational education, and 10.7% with a master's degree, magisterium, or a doctorate.

Table 3. Membership of the local population in organizations (Source: Authors)

	Active member (%)	Inactive member (%)	Not a member (%)
Youth organizations/student councils	1.9	0.8	97.3
Animal protection organizations	2.3	3.7	94.0
Environmental organizations	4.0	2.0	94.0
Church or other religious organizations	2.7	5.0	92.3
Humanitarian organizations	5.4	3.7	90.9
Political parties	6.6	9.8	83.6

Table 4. Local Population Participation in Bor and Majdanpek
(Source: Authors)

	Never (%)	Rarely (%)	Occasionally (%)	Frequently (%)	Always (%)
Public debate on a draft law/strategy/ action plan	75.4	12.6	7.2	3.8	1.0
Activist protest	71.2	11.5	6.4	6.4	4.5
Political protest	63.5	11.1	12.5	6.8	6.1
Volunteer action	50.0	26.4	17.2	4.1	2.3
Local community activity	51.5	24.7	13.6	7.1	3.1
Engagement on social media	56.4	13.2	17.6	6.7	6.1
Signing a petition	43.2	17.9	20.9	11.5	6.5
Humanitarian action	17.8	25.3	35.7	11.4	9.8
Voting in political elections	6.5	2.4	7.1	8.5	75.5

Table 4 shows the frequency distribution of participants' responses to the question about how often they engage in the listed activities. The question was formulated using a Likert-type frequency scale with response options including: never, rarely, occasionally, frequently and always. Although Likert-type scales yield ordinal data, it is common in social sciences to treat them as interval-level data when using aggregated measures like the mean, particularly when multiple items are combined into an index. This approach has been widely supported in methodological literature (Carifio and Perla, 2008; Norman, 2010). However, we relied on descriptive statistics to ensure a more accurate interpretation of the data and to avoid the potential imprecision associated with using the mean on ordinal scales.

The local population participates the least in public discussions on proposed laws, strategies, or action plans, with 88% of respondents indicating they have never or rarely participated in such activities. This is followed by participation in activist and political protests, while the highest level of participation is seen in voting during political elections. Voting in elections was reported as frequent or always by 84% of respondents, making it the only activity to stand out among all of those listed. After voting, participation in humanitarian action and signing petitions follow. However, overall, excluding voting, all listed activities show a low frequency of participation by the local population, with only a small percentage participating frequently or always.

DISCUSSION AND CONCLUDING CONSIDERATIONS

The analysis of the survey results showed that the local population is very aware of the negative consequences of mining activities, especially the environmental ones. In addition to the quantitative data confirming this, the surveyors' field reports highlighted that citizens felt the need to further "complain" about air pollution and the deterioration of their daily lives. They vividly described their experiences, such as wiping dust off the lawn every morning, being unable to have an orchard, having to wear masks in their own yards a few years ago, and washing their cars only to find them covered in dust again within 15-20 minutes, among other examples.

It is legitimate to question why, despite such widespread awareness and exposure to the negative effects of mining activities, the population shows a low level of participation in activities important to the local community and low membership in various organizations. The opposing conclusions of Akmentiņa (2020) – highlighting a positive trend in citizen democracy – and UN-Habitat (2023) – noting a global rise in public mistrust toward governments – may also be reflected in the behavior of residents in Bor and Majdanpek. Our findings can also be interpreted in light of the low expectations that the local population has of most actors with regard to solving the problems caused by mining activities. The distrust of citizens in institutions is not specific to mining areas in Serbia. These results align with findings from a study conducted by the Institute for Sociological Research in 2014 (see more in: Petrović, 2014),[2] which highlighted the widespread distrust towards all actors, particularly regarding the professionalization of NGOs in post-socialist Serbia (Petrović, 2014). These findings confirm citizens' distrust of professional activism, which, as mentioned, has contributed to the slow development of participatory environmental activism in post-socialist countries (Vukelić *et al*., 2021). The analysis also revealed the absence of "anti-mining activism".

Distrust toward mining exists on a global scale as well. Due to a lack of trust in both the mining company and the state, citizens are also discouraged from participating in formal decision-making processes (Conde, 2017). This lack of trust may be a key reason why citizen engagement often takes the form of protests and demonstrations rather than formal participation. Community participation is widely recognized as crucial for building trust between mining companies and local communities, especially in the process of obtaining a social licence to operate (SLO) (Milanez *et al.*, 2021; Tuulentie *et al.*, 2019; Zanini *et al.*, 2023). Participation is important for both pragmatic and normative reasons. Pragmatically, it helps improve acceptance of decisions, and it enhances the likelihood of successful implementation (Nadin *et al.*, 2021), facilitates knowledge sharing among stakeholders (Akmentiņa, 2020; Everingham *et al.*, 2020), and increases environmental awareness, which can lead to higher environmental protection standards (Jay *et al.*, 2007). Normatively, involving participants in decision-making

promotes more just and democratic development (Halachmi and Holzer, 2010; Nadin *et al.*, 2021). Public involvement, particularly in the early stages of mining projects (André *et al.*, 2006), provides mining companies with an opportunity to build trust among local communities, ultimately leading to a SLO (Kokko *et al.*, 2015).

Therefore, distrust may be one of the reasons citizens perceive participatory activism as the only viable form of engagement, "from the bottom up", considering the pronounced distrust towards all actors except the citizens themselves. Participatory activism inherently implies a push for independence from public, private, and civil sector institutions. At the same time, the activities in which citizens participated indicate local self-organization.

There is a chance that the potential for participatory activism is greater than what the survey results suggest, since field reports from pollsters noted that citizens, especially those employed in the mine, are afraid of losing their jobs. This fear may have made them respond more cautiously to questions about activism, despite the anonymity guaranteed by their participation in the survey. Fear and marginalization often prevent individuals and communities from engaging in formal decision-making processes, particularly in contexts shaped by historical repression or ongoing power imbalances. As Gaventa (2006) argues, power structures – both visible and invisible – determine whether people feel safe or entitled to participate. In many cases, marginalized groups avoid participation due to fear of retribution, past experiences of exclusion, or the belief that their involvement will not lead to meaningful change. Foucault (1980) emphasizes that power is not only held by governments but also diffused through institutions and social norms, leading individuals to internalize their marginalization and believe they lack the knowledge or legitimacy to engage in formal processes. Cornwall (2004) further highlights that participatory processes are often shaped by elite interests, hence, leaving people feeling tokenized or manipulated. In repressive settings, fear of violence and retaliation can discourage participation, as individuals avoid engagement to protect themselves from potential harm (Arendt, 1970). Also, authoritarian regimes use symbolic compliance to prevent genuine participation, with citizens often opting out of public forums to avoid punishment (Wedeen, 1999). Finally, in contexts of rigid control, marginalized individuals often shift to informal, subversive forms of resistance, bypassing formal participation because of the perceived dangers or futility of engaging with official channels (Bayat, 2010).

The contextual analysis of the mining areas of Bor and Majdanpek, based on secondary sources, showed similar results. The residents of Bor, Majdanpek, and surrounding villages primarily participate in activities organized by local activist groups and citizens' associations. Through collective, continuous, and direct actions, they create grassroots groups, which are close to the participatory type of activism. Since these are smaller social groups rather than mass civic mobilizations characteristic of participatory activism, we consider the term "activist groups" to be more appropriate for interpreting local engagement, rather than the concept of a social movement. The activities of local groups are mainly focused on resisting the proposed expansion of mining operations, through participation in protests, road blockades, and blocking a mountain peak, in the case of the several-months-long activist campaign at Starica Mountain.

These direct collective actions correspond to the conflict-based concept of "ecological distribution conflicts". However, since they are primarily directed not against the mining activities themselves but rather against the harmful environmental consequences of mining, it is difficult to describe them as "anti-mining" activism. Further research should focus on the deeper motivations for resistance, as well as the perspectives of the local population regarding the emerging broader anti-mining ecological movement in Serbia, particularly present in the Šumadija and Western Serbia regions. The experiences of activist groups from Bor and Majdanpek may prove important in organizing resistance strategies to other projects, contributing to the development and strengthening of the grassroots ecological movement in Serbia.

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REFERENCES

Akmentiņa, L. (2020). Participatory planning in post-socialist cities: A case study of Riga, *Architecture and Urban Planning*, Vol. 16, No. 1, pp. 17–25. https://doi.org/10.2478/aup-2020-0004

André, P., Enserink, B., Connor, D., Croal, P. (2006). *Public participation international best practice principles (Special Publication Series No. 4)*. Fargo, USA: International Association for Impact Assessment. http://www.iaia.org/uploads/pdf/SP4.pdf

Arendt, H. (1970). *On violence*. San Diego, New York, London: Harcourt Brace & Company.

Bayat, A. (2010). *Life as politics: How ordinary people change the Middle East*. California: Stanford University Press.

Bice, S., Moffat, K. (2014). Social licence to operate and impact assessment, *Impact Assessment and Project Appraisal*, Vol. 32, No. 4, pp. 257–262. https://doi.org/10.1080/14615517.2014.950122

Bor 030 (2021). Održan protest meštana Slatine. *Bor 030* (In Serbian) [online]. https://www.bor030.net/odrzan-protest-mestana-slatine [Accessed: 25 Mar 2025].

Borras, S. M., Franco, J. C. (2013). Global land grabbing and

political reactions 'from below', *Third World Quarterly*, Vol. 34, No. 9, pp. 1723–1747. https://doi.org/10.1080/01436597.2013.843845

Bosso, C. J. (1999). Environmental groups and new political landscape. In N. J. Vig, M. E. Kraft (Eds.), *Environmental policy*: *Environmental policy in the 1990s* (4th ed.). Washington, DC: CQ Press, pp. 55–76.

Carifio, J., Perla, R. J. (2008). Resolving the 50-year debate around using and misusing Likert scales, *Medical Education,* Vol. 42, No. 12, pp. 1150–1152. https://doi.org/10.1111/j.1365-2923.2008.03172.x

Chiodi, L., Epis, S. (2022). *Eastern Europe: Environment and transnational activism*. Osservatorio Balcani e Caucaso Transeuropa [online]. https://www.balcanicaucaso.org/eng/Areas/Europe/Eastern-Europe-environment-and-transnational-activism-219056 [Accessed: 25 Mar 2025].

Conde, M. (2017). Resistance to mining: A review. *Ecological Economics,* Vol. 132, pp. 80–90. https://doi.org/10.1016/j.ecolecon.2016.08.025

Conde, M., Le Billon, P. (2017). Why do some communities resist mining projects while others do not? *Extractive Industries and Society,* Vol. 4, No. 3, pp. 681–697. https://doi.org/10.1016/j.exis.2017.04.009

Cornwall, A. (2004). Spaces for transformation? Reflections on issues of power and difference in participation in development. In S. Hickey, G. Mohan (Eds.) *Participation: From Tyranny to Transformation?* London: Zed Books, pp. 1–28.

Della Porta, D., Diani, M. (2006). *Social Movements: An Introduction* (2nd ed.). Oxford: Blackwell Publishing.

Eerola, T. (2024). The origin, evolution and impacts of the mining-sceptical movement in Finland, *Extractive Industries and Society*, Vol. 19, Article No. 101486. https://doi.org/10.1016/j.exis.2024.101486

Everingham, J.-A., Svobodova, K., Mackenzie, S., Witt, K. (2020). *Participatory processes, mine closure and social transitions*. Brisbane: Centre for Social Responsibility in Mining, University of Queensland.

Gaventa, J. (2006). Finding the spaces for change: A power analysis, *IDS Bulletin,* Vol. 37, No. 6, pp. 23–33. https://doi.org/10.1111/j.1759-5436.2006.tb00320.x

Gordon, C. (1980). Foucault: Power/Knowledge: Selected Interviews & Other Writings 1972–1977. New York: Pantheon Books.

Halachmi, A., Holzer, M. (2010). Citizen participation and performance measurement: Operationalizing democracy through better accountability, *Public Administration Quarterly,* Vol. 34, No. 3, pp. 378–399. http://www.jstor.org/stable/41288353

Janković, S. R. (1990). Types of copper deposits related to volcanic environments in the Bor district, Yugoslavia, *Geologische Rundschau*, Vol. 79, pp. 467–478. https://doi.org/10.1007/BF01830639

Jay, S., Jones, C., Slinn, P., Wood, C. (2007). Environmental impact assessment: Retrospect and prospect, *Environmental Impact Assessment Review,* Vol. 27, No. 4, pp. 287–300. https://doi.org/10.1016/j.eiar.2006.12.001

Jovanović, S. (2019). Novi protest u Boru zbog prekomernog aerozagađenja. *Balkan Green Energy News* (in Serbian) [online]. https://balkangreenenergynews.com/rs/novi-protest-u-boru-zbog-prekomernog-aerozagadenja/ [Accessed: 25 Mar 2025].

Joyce, S., Thomson, I. (2000). Earning a social licence to operate: social acceptability and resource development in Latin America, *CIM Bulletin*, Vol. 93, No. 1037, pp. 49–53.

Kenarov, D. (2012). Green revolution: How eco-activism made Bulgaria care again, *Balkan Insight* [online]. https://balkaninsight.com/2012/11/28/green-revolution-how-eco-activism-made-bulgaria-care-again/[Accessed: 10 Apr 2025].

Kokko, K., Buanes, A., Koivurova, T., Masloboev, V., Pettersson, M. (2015). Sustainable mining, local communities and environmental regulation, *Barents Studies: Peoples, Economies and Politics,* Vol. 2, No. 1, pp. 50–81. https://urn.fi/URN:NBN:fi:ula-201512211410

Krstić, I. (2023). Odbačena tužba Ziđina protiv aktivista: Sud stao iza toga da je Starica javno vlasništvo. *Mašina* (in Serbian) [online]. https://www.masina.rs/odbacena-tuzba-zidina-protiv-aktivista-sud-stao-iza-toga-da-je-starica-javno-vlasnistvo/ [Accessed: 25 Mar 2025].

Krstić, I. (2022). „Ono u grudima ti ne da, to je ono što nas vodi": Aktivisti protiv miniranja zaštitnog znaka Majdanpeka, *Mašina* (in Serbian) [online]. https://www.masina.rs/ono-u-grudima-ti-ne-da-to-je-ono-sto-nas-vodi-aktivisti-protiv-miniranja-zastitnog-znaka-majdanpeka/ [Accessed: 25 Mar 2025].

Leonard, L. (2020). Ecological conflicts, resistance, collective action and just resilience: What can we learn from a community struggle against a proposed coalmine in Fuleni, KwaZulu-Natal, South Africa, *Politikon*, Vol 48, No. 1, pp. 19–40. https://doi.org/10.1080/02589346.2020.1838235.

Lodhia, S., Hess, N. (2014). Sustainability accounting and reporting in the mining industry: current literature and directions for future research, *Journal of Cleaner Production,* Vol. 84, pp. 43–59. https://doi.org/10.1016/j.jclepro.2014.08.094

Manojlović, B., Kabanga, E. (2023). Extractivism and conflict: Comparative study of Serbia and the DRC, *The Journal of Social Encounters,* Vol. 7, No. 1, pp. 66–86. https://doi.org/10.69755/2995-2212.1162

Maričić, T., Pantić, M., Nenković-Riznić, M. (2022). The criteria and indicators for defining the social aspects in spatial planning of mining regions. In A. Kostov, M. Ljubojev (Eds.), *Proceedings of International Conference on Mining and Metallurgy*. Bor: Mining and metallurgy institute Bor, Technical faculty Bor, University of Belgrade, pp. 19–25.

Martínez-Alier, J. (2001). Mining conflicts, environmental justice, and valuation, *Journal of Hazardous Materials,* Vol. 86, No. 1-3, pp. 153–170. https://doi.org/10.1016/S0304-3894(01)00252-7

Martinez-Alier, J., O'Connor, M. (1996). Ecological and economic distribution conflicts. In R. Costanza, J. Martinez-Alier, O. Segura (Eds.), *Getting down to Earth: Practical applications of ecological economics*. Washington, DC: Island Press/ISEE, pp. 153–183.

Milanez, B., Ali, S., Puppim de Oliveira, J. A. (2021). Mapping industrial disaster recovery: Lessons from mining dam failures in Brazil, *The Extractive Industries and Society,* Vol. 8, No. 2, Article No. 100900. https://doi.org/10.1016/j.exis.2021.100900

Nadin, V., Stead, D., Dąbrowski, M., Fernandez-Maldonado, A. M. (2021). Integrated, adaptive and participatory spatial planning: Trends across Europe, *Regional Studies,* Vol. 55, No. 5, pp. 791–803. https://doi.org/10.1080/00343404.2020.1817363

Nikoletić, D. (2023). Ekološka katastrofa na zlatnim zalihama. *NIN* (In Serbian) [online]. https://www.nin.rs/arhiva/vesti/36992/ekoloska-katastrofa-na-zlatnim-zalihama [Accessed: 25 Mar 2025].

Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics, *Advances in Health Sciences Education,* Vol. 15, pp. 625–632. https://doi.org/10.1007/s10459-010-9222-y

Oliveira, G. de L. T., McKay, B., Liu, J. (2021). Beyond land grabs: New insights on land struggles and global agrarian change, *Globalizations,* Vol. 18, No. 3, pp. 321–338. https://doi.org/10.1080/14747731.2020.1843842

Opačić, A. (2024). Borba za opstanak ljudi i ekosistema: Jezero Zaton presušilo, Majdanpek bez vode, za turiste – mrtva riba. *N1* (In Serbian) [online]. https://n1info.rs/vesti/borba-za-opstanak-ljudi-i-ekosistema-jezero-zaton-presusilo-majdanpek-bez-vode-za-turiste-mrtva-riba/ [Accessed: 25 Mar 2025].

Özdemir, E., Lang, A., Saari, J., Liipo, J. (2024). Recovery of sulfur, copper, and gold by reprocessing old flotation tailings at Bor, Serbia, *Aspects in Mining & Mineral Science*, Vol. 12, No. 2, pp. 1366-1377. https://crimsonpublishers.com/amms/fulltext/AMMS.000783.php

Pellow, D. N., Guo, P. (2018). Environmental Justice. In W. Jenkins, M. E. Tucker, J. Grim (Eds.), *Routledge Handbook of Religion and Ecology* (1st ed.). New York, NY: Routledge, pp. 336–344.

Petovar, K. (2015). *Izveštaj o praksi preseljavanja domaćinstava u Kolubarskom lignitskom basenu*. Subotica: CEKOR.

Petovar, K. (1983). Društveni preduslovi preseljavanja stanovništva sa područja kojima se menja namena korišćenja, *Sociologija sela,* Vol. 21, No. 82, pp. 211-219.

Petrova, T., Tarrow, S. (2007). Transactional and Participatory Activism in the Emerging European Polity: The Puzzle of East-Central Europe*, Comparative Political Studies*, Vol. 40, No. 1, pp. 74–94. https://doi.org/10.1177/0010414006291189

Petrović, J. (2020). *„Ekologija" na periferiji Evrope: stvaranje ekološkog pokreta u Srbiji.* Beograd: Univerzitet u Beogradu – Filozofski fakultet, Institut za sociološka istraživanja.

Petrović, M., Tošović, L., Krčum, A. (2024). Preseljenje stanovništva iz zone rudarskih aktivnosti - primer naselja Krivelj. In M. Joksimović, B. Protić (Eds.), *Lokalna samouprava u planiranju i uređenju prostora i naselja. Zbornik radova mladih istraživača.* Beograd: Asocijacija prostornih planera Srbije, Geografski fakultet Univerzitet u Beogradu, pp. 9–15.

Petrović, M. (2023). Globalno grabljenje zemljišta i novi ekstraktivizam: Postsocijalistička perspektiva, *Zbornik Instituta za kriminološka i sociološka istraživanja,* Vol. 42, No. 2–3, pp. 25–40. https://doi.org/10.47152/ziksi2023032

Petrović, M., Pešić, J. (2023). Potentials and obstacles for the transnationalisation of recent environmental struggles in Serbia, *Sociologija i prostor*, Vol. 61, No. 2(227), pp. 397–422. https://doi.org/10.5673/sip.61.2.7

Petrović, M. (2014). *Društvo i gradovi. Između lokalnog i globalnog.* Beograd: Filozofski fakultet, Institut za sociološka istraživanja.

Popović, P. V. (2022). Srbija – rudarski Eldorado ili zemlja gde se zakoni ne poštuju? *N1* (In Serbian) [online]. https://n1info.rs/zeleni-kutak/srbija-rudarski-eldorado-ili-zemlja-gde-se-zakoni-ne-postuju/ [Accessed: 25 Mar 2025].

Pulido, L. (1998). *Environmentalism and economic justice* (2nd ed.). Tucson: The University of Arizona Press.

Proctor, M. (2022). A slow train crash that can be avoided: Citizen power, the mining of critical raw materials (CRMS) within Europe and the need for investment in political realities, *Journal of Management Policy and Practice*, Vol. 23, No. 1, pp. 19–28. https://doi.org/10.33423/jmpp.v23i1.4980

Proctor, M., MacCallum, C. (2020). The canary in the cage: Community voices and social license to operate in Central Eastern Europe, *Journal of Applied Business and Economics*, Vol. 22, No. 14, pp. 93–103. https://doi.org/10.33423/jabe.v22i14.3968

Radio Slobodna Evropa (2022). Meštani sela kod Bora na istoku Srbije protestuju zbog širenja kineskog rudnika. (In Serbian) [online]. https://www.slobodnaevropa.org/a/bor-protest-kineski-rudnik/31708485.html [Accessed: 25 Mar 2025].

Roy, A. (2014). The NGO-ization of resistance. *Toward Freedom*. https://towardfreedom.org/story/archives/globalism/arundhati-roy-the-ngo-ization-of-resistance/ [Accessed: 25 Mar 2025].

Scheidel, A., Temper, L., Demaria, F., Joan Martínez-Alier, J. (2018). Ecological distribution conflicts as forces for sustainability: An overview and conceptual framework, *Sustainability Science,* Vol. 13, pp. 585–598. https://doi.org/10.1007/s11625-017-0519-0

Schlosberg, D. (2004). Reconceiving environmental justice: global movements and political theories, *Environmental Politics,* Vol. 13, No. 3, pp. 517–540. https://doi.org/10.1080/0964401042000229025

Scott, D. N., Smith, A. A. (2017). "Sacrifice zones" in the green energy economy: Toward an environmental justice framework, *McGill Law Journal*, Vol. 62, No. 3, pp. 861–898. https://doi.org/10.7202/1042776ar

Sotirov, M., Lovric, M., Winkel, G. (2015). Symbolic transformation of environmental governance: Implementation of EU biodiversity policy in Bulgaria and Croatia between Europeanization and domestic politics, *Environment and Planning C: Government and Policy,* Vol. 33, No. 5, pp. 986–1004. https://doi.org/10.1177/0263774X15605925

Stojmenović, D. (2024a). Krivelj – o selu. Digitalni zavičaj. Narodna biblioteka Bor (in Serbian) [online]. http://www.digitalnizavicaj.org.rs/krivelj/selo.php [Accessed: 25 Mar 2025].

Stojmenović, D. (2024b). Krivelj – o seljenju. Digitalni zavičaj. Narodna biblioteka Bor (in Serbian) [online]. http://www.digitalnizavicaj.org.rs/krivelj/seljenje.php [Accessed: 25 Mar 2025].

Szabo, A., Shriver, T. E., Longo, S. (2022). Environmental threats and activism against extractive industries: The case of gold mining in Roșia Montană, Romania, *Journal of Rural Studies,* Vol. 92, pp. 26–34. https://doi.org/10.1016/j.jrurstud.2022.03.017

Terminski, B. (2013). *Mining-Induced Displacement and Resettlement: Social Problem and Human Rights Issue (A Global Perspective)*. University of Geneva Research Paper No. 9. Available at SSRN: https://ssrn.com/abstract=2026410 [Accessed: 25 Mar 2025].

Tuulentie, S., Halseth, G., Kietäväinen, A., Ryser, L., Similä J. (2019). Local community participation in mining in Finnish Lapland and Northern British Columbia, Canada – Practical applications of CSR and SLO, *Resources Policy,* Vol. 61, pp. 99–107. https://doi.org/10.1016/j.resourpol.2019.01.015

UN-Habitat (2023). *Enabling meaningful public participation in spatial planning processes: A toolkit.* Nairobi: UN-Habitat. https://unhabitat.org/sites/default/files/2023/01/final_enabling_meaningful_public_participation_in_spatial_planning_processes.pdf [Accessed: 25 Mar 2025].

Urkidi, L., Walter, M. (2011). Dimensions of environmental justice in anti-mining movements in Latin America, *Geoforum,* Vol. 42, No. 6, pp. 683–695. https://doi.org/10.1016/j.geoforum.2011.06.003

Urošević, S., Vuković, M., Pejčić, B., Štrbac, N. (2018). Mining-metallurgical sources of pollution in Eastern Serbia and environmental consciousness, *Revista internacional de contaminación Ambiental,* Vol. 34, No. 1, pp. 103–115. https://doi.org/10.20937/rica.2018.34.01.09

Veltmeyer, H., Petras, J. (2014). *The new extractivism: A post-neoliberal development model or imperialism of the twenty-first century?* London: Bloomsbury Publishing.

Vukelić, J., Petrović, M., Kukuridi, A. (2021). Environmental activism in Serbia: Challenges to cooperation between professional and grassroots organisations, *Balkanologie,* Vol. 16, No. 2, pp. 1-17. https://doi.org/10.4000/balkanologie.3485

Vukelić, J., Stanojević, D. (2012). Environmental activism as a new form of political participation of the youth in Serbia, *Sociologija,* Vol. 54, No. 2, pp. 387–399. https://doi.org/10.2298/SOC1202387V

Vuković, M. (2008). International water disputes and cooperative responses to water stress, *Sociološki pregled,* Vol. 42, No. 2, pp. 241–260. https://scindeks-clanci.ceon.rs/data/pdf/0085-6320/2008/0085-63200802241V.pdf

Wallerstein, I. (1976). Semi-peripheral countries and the contemporary world crisis, *Theory and Society,* Vol. 3, No. 4, pp. 461–483. http://www.jstor.org/stable/656810

Wedeen, L. (1999). *Ambiguities of domination: Politics, rhetoric, and symbols in contemporary Syria*. Chicago: University of Chicago Press.

Ye, J., van der Ploeg, J. D., Schneider, S., Shanin, T. (2019). The incursions of extractivism: Moving from dispersed places to global capitalism, *The Journal of Peasant Studies*, Vol. 47, No. 1, pp. 155–183. https://doi.org/10.1080/03066150.2018.1559834

Za Media (2024). Meštani Krivelja i dalje blokiraju put kroz selo jer im ništa od obećanog nije ispunjeno. *ZA Media* (In Serbian) [online]. https://zamedia.rs/2024/02/09/mestani-krivelja-i-dalje-blokiraju-put-kroz-selo-jer-im-nista-od-obecanog-nije-ispunjeno-video/ [Accessed: 25 Mar 2025].

Zanini, M. T. F., Migueles, C. P., Gambirage, C., Silva, J. (2023). Barriers to local community participation in mining projects: The eroding role of power imbalance and information asymmetry, *Resources Policy,* Vol. 86, Part B, No. 104283. https://doi.org/10.1016/j.resourpol.2023.104283

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TERRITORIAL CAPITAL AS A DRIVER OF REGIONAL COMPETITIVENESS: A THEORETICAL FRAMEWORK

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The paper analyzes contemporary theoretical approaches to explaining the elements of territorial capital, which are recognized as key drivers of improving regional competitiveness. Special emphasis is placed on the decomposition of territorial capital depending on ownership structure and materiality. The paper thoroughly examines the characteristics of the elements of territorial capital, with a particular focus on their contribution to the growth of regional competitiveness. The research is based on the application of descriptive economic analysis, enriched with visual representations that depict the concept of territorial capital and regional competitiveness. Descriptive analytical tools have enabled the precise description of the essential features of various components of territorial capital, while visual representations have further enhanced the understanding and interpretation of the core concepts investigated in the study. In the course of the research, classical and contemporary sources were utilized to analyze the nature and key determinants of endogenous growth, as well as the essence of the concepts of regional competitiveness and territorial capital. A specific methodological approach was directed towards the systematization and analysis of territorial capital categories, with typological research methods predominantly employed to achieve precise classification and interpretation of relevant components. The results of the research indicate that the improvement of regional competitiveness largely depends on the efficient and effective utilization of available territorial capital. The primary task of policymakers is to facilitate networking, cooperation, and coordination among entrepreneurial and other participants in developmental processes, with the goal of creating synergies that contribute to sustainable development and regional competitiveness.

***Key words*: territorial capital, factors, policies, regional competitiveness.**

INTRODUCTION

Refining the Conceptual Scope of Regional Competitiveness (RC) is far from being fully understood (Huggins *et al*., 2014). At its most basic level, RC can be described as the success by which regions are compared to one another (Kitson *et al*., 2004). In other words, it refers to a region's potential to ensure sustained economic growth over time, including the ability to attract and retain productive capital and skilled human resources to foster innovation in the broadest sense (Vuković, 2013).

It is important to note that the conceptual scope of competitiveness encompasses issues ranging from productivity to the structure of existing markets and the nature of institutional arrangements in place (Porter, 1980; 1990). Moreover, a given territory, including a region, may feature highly competitive firms, but if these firms generate relatively low added value per employee, then the region cannot be considered competitive (Cvetanović *et al*., 2015a). This implies that the RC concept highlights the quality of life of people in a specific territorial segment of the national economy.

Capello *et al*. (2008) emphasize that the territory of a region should be regarded as an autonomous production factor, that is, as a source of both static and dynamic advantages for economic agents operating within that space. Based on this theoretical framework, the research in this paper is directed toward achieving the following objectives:

- a critical analysis of paradigm shifts in the identification of key drivers of regional growth and regional competitiveness within contemporary regional economics;

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- a conceptual elaboration of the categorical framework of the concepts of regional competitiveness and territorial capital, with particular emphasis on territorial capital as a fundamental driver of enhancing regional competitiveness in a globalized market environment;
- precise delineation of the core constitutive elements of the category of territorial capital; and
- the formulation of normative policy recommendations for regional development policymakers, grounded in the theoretical foundations of endogenous regional development theory.

The research objectives outlined in this study not only involve identifying changes in the economic realities of regions, but also imply a departure from the logic of conventional explanations for drivers of RC improvement, as proposed by neoclassical and Keynesian theories and policies. Simultaneously, the study advocates for the acceptance of the core messages of endogenous economic theory. By employing a descriptive-analytical approach and perspectives on the significance of territorial capital as a driver of RC, this paper attempts to articulate clear and unequivocal messages to policymakers for managing RC under contemporary economic conditions.

SHIFT IN FOCUS IN THE ANALYSIS OF ESSENTIAL DRIVERS OF REGIONAL DEVELOPMENT IN THE 21ST CENTURY

Economic theory has undergone a threefold shift in its perspective on the factors of economic growth (Figure 1). According to Despotovic and Cvetanovic (2017) the primary directions of these paradigm changes include:

- from developmental factors to innovative factors;
- from "hard" factors to "soft" factors, which are intangible – such as local synergy among stakeholders, effective governance, a high level of human capital, and knowledge-based assets; and
- from a functional approach to a cognitive approach, which is particularly significant in the context of the defined subject and objectives of this research (Stimson *et al*., 2011, p. 214).

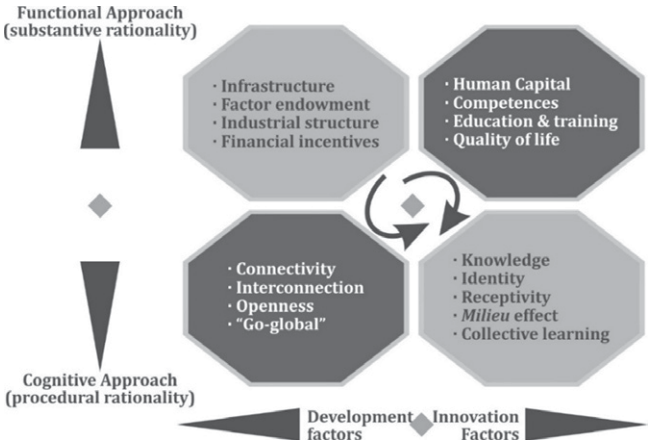

Figure 1. Changes in focus in factor analysis of regional development note
(Source: Stimson et al., 2011, p. 215, modified by the Authors)

The cognitive approach, which replaces the traditional perspective, emphasizes the importance of factors that are specific to a particular region and, as such, contribute to the ability of economic entities within the region to develop their own capacities for stimulating private and public investments. This approach is predominantly based on cooperation, trust, and a sense of belonging and connection among relevant stakeholders, rather than solely on the availability of capital. Furthermore, it highlights the significantly greater importance of creativity compared to the availability of labor, as well as the receptiveness of the workforce to new business ideas and organizational solutions, in contrast to earlier periods. Ultimately, the cognitive approach focuses more on connections, cooperation, and the quality of relationships, rather than mere availability. Particular attention is given to categories such as regional identity, efficiency, and quality of life, as analyzed in the respective region. All these elements of the cognitive approach, combined with the traditional functional approach, constitute the concept of territorial capital.

CONCEPTS OF TERRITORIAL CAPITAL AND REGIONAL COMPETITIVENESS

The concept of territorial capital was first introduced in the OECD publication *Territorial Outlook* in 2001 (OECD, 2001), and in 2005 it was incorporated into the *Commission of the European Communities* (CEC, 2005) report. This document highlights that every region possesses its own territorial capital, distinct from that found in other regions. As such, it enables greater returns within a region, as investment endeavors in that area benefit from utilizing its territorial capital in the most efficient manner possible. In brief, territorial capital refers to the set of factors within a specific geographic area that attract investments, making investments in that region more profitable with higher returns than in other areas. Essentially, territorial capital replaces the earlier term "overall development potential" of the observed area (De Rubertis *et al*., 2019). In other words, territorial capital encompasses not only material assets, but also intangible ones, contributing to a deeper understanding of the essence of regional development and RC. A high level of territorial capital enables some regions to achieve high economic efficiency and competitiveness, as well as a satisfactory degree of prosperity and living conditions for their inhabitants.

In an analytical context, the concept of RC is positioned between the micro and macro levels, implying their inseparable connection, as graphically presented in Figure 2.

The phenomenon of regional competitiveness (RC) in economic science has been studied since the beginning of the 21st century. Since then, the assessment of RC has attracted increasing interest due to the significant role of regional authorities in shaping competitiveness, as well as the dynamic potential of regions as spatial units in utilizing knowledge and attracting investments (Annoni and Dijkstra, 2017). Given the complexity of economic parameters, the concept of RC in the European context gained particular importance following the adoption of the European Union Development Strategy in Lisbon in 2000. In this document, enhancing the competitiveness of European regions in the 21st century was defined as one of the key objectives of

Figure 2. The concept of RC note
(Source: Cvetanović et al., 2015a, p. 15, modified by the Authors)

the EU's economic development. Subsequently, the evaluation of RC has become a subject of intensive research interest within the field of regional development, which is justified considering the role of regional authorities in knowledge application and investment attraction as drivers of regional development (Annoni and Dijkstra, 2017).

The approach to analyzing drivers of RC fully aligns with the approach to examining fundamental drivers of regional economic growth, not only in economically advanced countries, but also in emerging economies. Unlike traditional policies for economic growth and RC, which primarily focused on redistributing financial resources between developed and less-developed regions, the fundamental basis of the new approach to regional development management in this century lies in strengthening the endogenous potentials of regions. In the modern era, the argument that messages from endogenous economic theory serve as the most significant starting point in policies for enhancing RC is foundational for understanding this concept in the 21st century (Vázquez-Barquero and Rodríguez-Cohard, 2019). The economic crises of 2008 and 2019 further reinforced this perspective.

The literature highlights numerous approaches to classifying key drivers of RC improvement. One such approach identifies the following factors of RC: economic structure, innovation, regional accessibility, workforce skill levels, social structure, decision-making centers, and regional identity (Lengyel and Rechnitzer, 2013). The *Atlas of RC* operates with seven key variables: economic performance, employment and labor markets, education of employees, innovation, telecommunication networks, transportation, and internationalization (Eurochambers, 2007).

Some authors distinguish between the static and dynamic factors of RC. Static factors serve as the source of a region's competitive advantage based on its geographical predispositions. Dynamic factors, on the other hand, are the source of a region's evolving competitive advantage; they are not the result of a region's natural-geographic attributes but are developed over time. These factors are created and enhanced by firms and regional institutions. Regions characterized by a diverse range of factors, such as human capital, cluster organization, strong institutions, favorable geographical location, and developed infrastructure, hold stronger competitive positions. Thus, RC is based on the cumulative outcomes derived from the existence of endogenous factors within a region (Huggins *et al*., 2014).

Referring to the OECD report (OECD, 2001, p. 15), Stimson *et al*. (2011) highlight two groups of territorial capital elements. The first group includes factors such as the geographic location of the area, the size of the territory, availability of production factors, climate, tradition, availability of natural resources, quality of life, and economies of agglomeration that emerge and operate in urban areas. This group also encompasses business incubators, industrial clusters, and business networks. The second group comprises customs and informal rules that enable economic actors to operate under conditions of uncertainty, as well as solidarity, mutual assistance, and the exchange of ideas – often arising within clusters of small and medium-sized enterprises in the same sector (OECD, 2001).

This report highlights a comprehensive list of factors that function as determinants of territorial capital, ranging from traditional material to modern intangible factors (Camagni and Capello, 2013). These determinants may include geographic location and territorial "size, the availability of production factors, climate, tradition, natural resources, quality of life, or economies of agglomeration" (OECD, 2001, p. 15) that emerge and operate in urban areas of a specific region. However, they also encompass categories such as business incubators and industrial clusters or other types of business networks, which contribute to lowering transaction costs. Another set of factors includes "customs and informal rules that enable economic actors to operate under conditions of uncertainty. These include solidarity, mutual assistance, and the exchange of ideas, which often arise and develop within clusters of small and medium-sized enterprises from the same industry" (Camagni, 2008). These factors are often collectively referred to as social capital. Lastly, there exists an intangible factor, referred to as "something in the air", which can be described as "ambiance". This ambiance is the result "of a combination of institutions, rules, practices, producers, researchers, and policymakers (Camagni, 2008), which collectively create an environment conducive to creativity and innovation (Molnar, 2013).

Camagni (2009) categorized the elements of territorial capital based on a "three-by-three" matrix, utilizing two dimensions sufficient for classifying potential sources of territorial capital:

- Rivalry of goods in terms of ownership: public goods, private goods, and the intermediate class of societal and mixed public goods; and
- Materiality: tangible goods, intangible goods, and the intermediate class of so-called mixed goods.

The four "extreme" groups – those characterized by high and low rivalry between goods, as well as tangible and intangible goods – represent the traditional sources of territorial capital commonly recognized in theory and policy. These groups occupy positions within what is referred to as the "traditional square" on the schematic diagram (depicted on the left in Figure 3). In contrast, the four groups of goods classified as "mixed", rather than "pure", based on the dimensions and classification applied, represent innovative elements that require particular attention in contemporary economic contexts. These groups are situated in positions within the schematic diagram that can be identified as the "innovative cross" (depicted on the right in Figure 3).

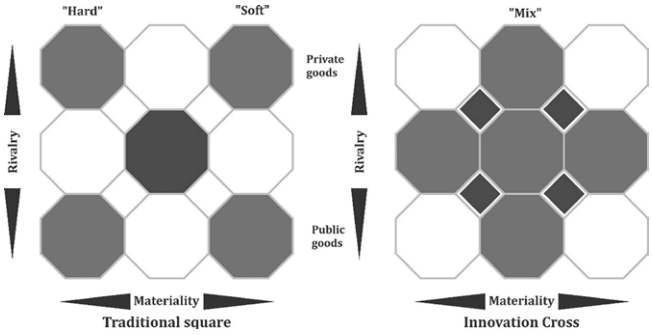

Figure 3. Traditional and innovative determinants of territorial capital note
(Source: Camagni, 2009, p. 122, modified by the Authors)

On the horizontal axis, the types of capital are sorted according to materiality. They are divided into tangible resources ("hard"), combined ("hard" + "soft"), and intangible ("soft"). Combined material resources are those that possess the ability "to translate virtual and intangible elements into concrete activities, cooperation, public-private partnerships" (Camagni, 2009), or to transform potential relationships and interactions into tangible connections between economic actors. On the vertical axis, the types of goods/capital are classified based on the nature of ownership. In this context, "rivalry" represents the inability of goods to be simultaneously utilized by multiple users.

COMPREHENSIVENESS OF REGIONAL TERRITORIAL CAPITAL ELEMENTS

Taking the elements of territorial capital presented in Figure 3 from the previous section as a starting point on the one hand, and the territory of the region on the other, Camagni (2009) provided a detailed concretization of specific elements of territorial capital, as illustrated in Figure 4.

Public goods (Segment A in Figure 4) are those goods from which everyone benefits, which are inexhaustible and indivisible (e.g., air). These goods are characterized by "two main features: non-excludability and non-rivalry in consumption. Non-excludability means that an individual cannot be excluded from using the good, while non-rivalry

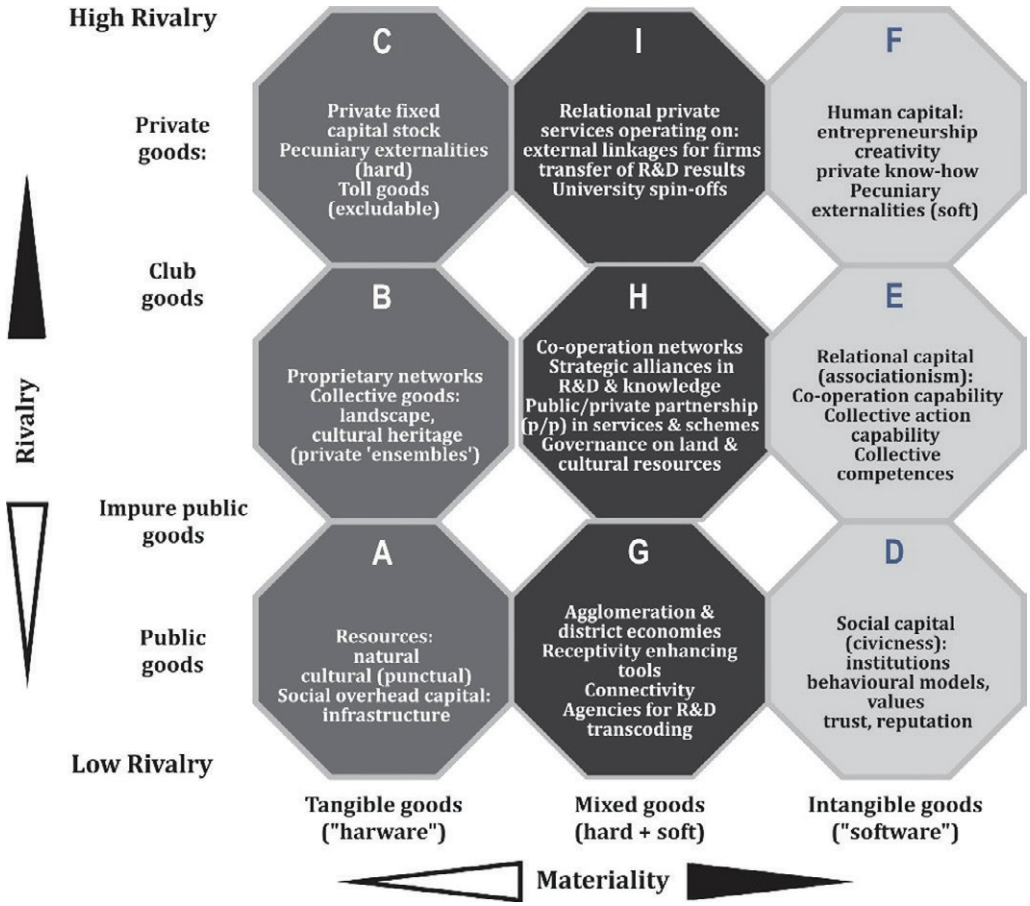

Figure 4. The elements of territorial capital note
(Source: Camagni, 2009, p. 123, modified by the Authors)

means that one person's use of the good does not reduce its availability to others" (De Rassenfosse, 2024). Public goods and resources are tangible and under public ownership (Stiglitz, 2000). Traditionally, these goods include infrastructure, natural resources, cultural, and ecological resources. They form the foundation of a territory's general attractiveness. Two main factors limit the use of these resources: availability and the increase in natural rents, which reduce profitability for those who pay for their use. Instruments that can be applied to protect these goods include improving regulations and implementing the principle that the "polluter pays" (Harris and Roach, 2021).

Mixed, or common tangible goods (Segment B in Figure 4) are essentially public goods, but there are certain restrictions on their use. These include ownership networks functioning through licensing in sectors like transport, communications, and energy; public goods exposed to congestion effects; and collective goods that combine public and private characteristics, such as urban and rural landscapes or assets of cultural heritage and identity. In a production sense, a specific territory often nurtures or constructs a territorial identity, which is then valorized through various products and services offered to users in the regional space.

Networks represent an integral component of public life, enabling actors to efficiently pursue and realize a broad spectrum of shared objectives. The literature widely recognizes networks as a fundamental precondition for the development of social capital (Stokman, 2004; Barr, 1988). Active participation in multiple networks and interpersonal relationships significantly enhances individuals' prospects of attaining specific rights or benefits in a more effective and sustainable manner (Cvetanović *et al*., 2015b).

In recent years, the literature dedicated to the study of networks and the significance of networking has experienced notable development, particularly within the fields of economic geography and regional planning (Sebestyén and Varga, 2019; Aalbers and Rossi, 2007). Networks have most commonly been interpreted as organizational expressions of globalization, especially within the framework of the thesis on the rise of the network society. In this context, the concepts of networks and networking have predominantly been portrayed as progressive and transformative categories in the social sciences and political discourse. Nevertheless, theoretical discussions regarding the implications of using networks as a social metaphor have received relatively limited attention, especially concerning their role in territorial development governance (Aalbers and Rossi, 2007). A key issue here is the dominance of conceptual approaches that overlook the structural asymmetries, inequalities, and democratic deficits inherent in existing network configurations (Hadjimichalis and Hudson, 2006).

In the case of transport, communications, and energy, public regulation is more prevalent, contributing to supply stability, protection from monopolistic pricing, quality maintenance, and network innovation. Regarding appearance, landscapes, cultural heritage, etc., regulation is often insufficient as these are resources of combined ownership, with unclear boundaries in responsibility, costs, and benefits. Numerous actors may emerge who do not wish to pay for the use of these resources or their positive effects. Therefore, private owners must cooperate with public authorities so that everyone in the locality benefits from these resources. A strong sense of belonging and connection to a locality ("territorial loyalty") can contribute to preventing opportunistic behavior toward resources through joint activity. Spatial integration and territorial loyalty, two main forces of a region's economic dynamism, have led to the formation of many business clusters (Pallares-Barbera *et al*., 2004).

Private goods (Segment C in Figure 4) primarily refer to basic assets in private ownership and public goods that require payment for use. These are traditional elements of territorial capital. As mobile capital, the locality's environment must be shaped to attract and retain these assets. This group also includes so-called monetary externalities related to private capital, such as high-quality capital goods or locally produced goods known in broader contexts (products with geographical origin). Public goods for which a fee is charged for use can also be included in this group.

Social capital (Segment D in Figure 4) as part of territorial capital, plays an essential driving role in developing and enhancing RC. Social capital is the capital of cooperation, interaction, mutual trust, and mutual assistance among people in economic processes. It cannot be privately owned and has attributes of a public good (Cvetanović *et al*., 2015). To a large extent, it represents the result of the legal, political, and institutional environment in which economic actors operate, perform their functions, and achieve goals. It is a form of capital rooted in durable and, to some extent, institutionalized relationships between individuals and organizations, fostering the creation of economic values. Some researchers argue that only people's participation in formal organizations leads to creating social capital, but contrasting views also exist, suggesting that minimal participation in social movements represents a component of social capital.

Coleman (1990), one of the creators of the concept of social capital, defines this category through its functions. He believes that social capital enables individual successes, as individuals derive benefit from it. It represents a special form of public good potentially available to everyone involved in a system of social ties and relationships. According to Putnam (1993), social capital consists of attributes of social organization such as trust, norms, "and various networks that can enhance social efficiency through coordinated action" (Liu *et al*., 2024).

Social capital comprises "institutions, relationships, attitudes, and values that govern interpersonal interactions and contribute to broader economic and social development. It is largely the result of the legal, political, and institutional environment in which economic actors operate and achieve their goals" (Cvetanović *et al*., 2015b, p. 76). Social capital is a sort of "glue" that holds communities together. For economists, social capital includes intangible assets (such as rules, habits, and relationships) that facilitate exchange and innovation processes, leading to economic growth and enhanced RC. The functioning of the market mechanism presupposes the existence of widely accepted norms, institutions, and behavioral patterns that reduce transaction costs, guarantee contract compliance, and enable the quick resolution of potential disputes.

If "additional elements of social capital" (Cvetanović *et al*., 2015a) are considered – "a sense of belonging to a community that shares the same values and nurtures similar behavioral patterns, and the participation of the civil sector in decision-making processes" (Cvetanović *et al*., 2015a) are crucial for community development – then localities with high levels of social capital create a "climate" that stimulates responsibility, cooperation, and synergy (Osborne *et al*., 2007). Such a climate positively affects the productivity and creativity of individual regions (Iyer *et al*., 2005).

Relational capital (Segment E in Figure 4) is interpreted as a set of bilateral and multilateral relationships developed by local actors, both within and beyond their local territory (Camagni *et al*., 2011). In this context, the concept of relational capital is equated with the processes in which integrated local production systems (supply chains), local production culture, joint learning, and similar phenomena are created. Geographical proximity and connectivity are associated with social and cultural similarity – the existence of shared behavioral models, mutual trust, and common moral norms. In the context of economic theory, the role of relational capital is significant in that it greatly contributes to the quality of the mechanism for the flow of information and cooperation among all market actors. Three basic types of influence of this form of capital can be identified, through which its mentioned role is achieved:

- it reduces uncertainty in decision-making processes and innovation;
- it ensures ex-ante coordination among market actors, thereby promoting collective activity; and
- it fosters collective learning (Molnar, 2013).

Relational capital is a typical example of a mixed good, which is not public, since the benefits are available only to selected partners/actors who are located in a particular locality and possess a specific identity while sharing similar interests and values. It should be noted that relational capital holds particular importance in the domain of guarantees for fulfilling contractual obligations. Namely, when stable relations exist among partners, or interpersonal networks are in place, it is possible to completely avoid expenditures for supervision and forced execution of contractual obligations. Partners feel a special responsibility toward their collaborators, customers, and suppliers, and they do not allow themselves to violate the agreements reached, as the group they belong to can easily "exclude" them, which would have very negative consequences on their business reputation and future business performance.

Human capital (Segment F in Figure 4) has proven significance in endogenous growth theory models. However, in the context of considering the concept of territorial capital, it should be viewed differently. These are the economic effects generated within a territory through the provision of sophisticated services that imply the existence of a high level of human capital – such as financial services, marketing consulting, software services, etc. A high level of human capital within a locality is a source for creating a creative milieu where creative industries and creative individuals are located. In achieving RC, the development policy and strategy of regional human capital play a very important role. In fact, the human capital of a community is the foundation of its long-term socio-economic growth and development. Additionally, this form of capital plays a crucial role in building sustainable RC because: a) it raises the awareness of the population in a region about sustainability (ecological and social responsibility), b) it defines the legal and institutional environment of the region, and c) it demonstrates and articulates the relationships among various actors in the economic and social life of the region. Human capital generates a special resource base for the competitive advantage of a region (Jovanović *et al*., 2018).

Agglomeration economies (Segment G in Figure 4), connectivity, receptiveness, and public development agencies are resources that possess characteristics of both "hard" and "soft" goods, and they are of a public nature. In economic terms, agglomeration refers to the clustering of multiple entities into one, most commonly an urban or city agglomeration formed by the merging of several local self-government units into one entity. The development of urban agglomerations is one of the rational forms of territorial organization, consisting of the socio-economic associations of territories and the allocation of various functions that ensure their development. Agglomeration strategies should enable territories to compete for investment and highly qualified labor, and to become more attractive places for living, working, and doing business, thereby fostering dynamic enterprise development in both specific areas and the agglomeration as a whole (Pandas, 2018). Giuliano *et al*. (2019) state that economic reasons are the fundamental explanation for the existence of agglomerations or cities. Spatial clustering provides various external benefits, such as workforce consolidation, supplier sharing, and specialization, which in turn contribute to accelerated economic growth and improved competitiveness.

By nature, these are elements of territorial capital related to:

- agglomeration economies due to the concentration of economic activities;
- connectivity resulting from physical accessibility, which individual actors use for gathering information, organizing business, and exchanging messages effectively;
- receptiveness – the ability to extract the maximum benefit from access to a locality, services, or information; and
- the existence of public agencies that contribute to the accumulation and diffusion of knowledge by facilitating and encouraging interactions between research centers, universities, and companies (Molnar, 2013).

Cooperative networks (Segment H in Figure 4) represent a key element of territorial capital, positioned at the center of the square (Figure 4), where combined ownership rights (public and private) merge with characteristics of both tangible and intangible resources. These networks integrate "hard" and "soft" resources, which are typically developed through public-private partnerships. The first category refers to strategic alliances that serve as foundations for knowledge creation and research and development activities, supported by public agencies in the dissemination and diffusion of knowledge, representing a core dimension

of implementing the concept of a knowledge-based society. However, the partnership between the public and private sectors is not limited only to activities related to knowledge diffusion. The second aspect in which cooperative networks manifest as a significant element of territorial capital is their role in cooperation and coordination in the field of regional development management. This cooperation in the planning process allows the private sector to achieve profits while simultaneously enabling the public sector to remain efficient and focused on the public interest. The third key domain in which cooperative networks manifest is through a strategic approach to spatial planning and optimal land use. In all of the previously mentioned cases, the use of the term "capital" is justified, as these networks enable the accumulation and concentration of resources crucial for regional development.

Regional development requires the participation of various stakeholders, including social and economic factors that influence the regional level. Regional development networks encompass hierarchical structures, which may be characterized by the dominance of certain actors. The informal nature of these networks can lead to uncertainty in the decision-making process, which in certain cases can result in unclear and inefficient outcomes, thereby jeopardizing the functionality of the network. Leadership is critical to the success of regional development networks, but poses a challenge in the absence of formal decision-making frameworks and control structures. The attributes of networks, such as hierarchy and dominance, require detailed consideration and resolution to enhance the network efficiency and sustainability (Khodabandehloo, 2014). Interventions supporting inter-regional knowledge networks have become increasingly important tools in regional development policies, especially under contemporary economic conditions (Hadjimichalis and Hudson, 2006).

Private services (Segment I in Figure 4) refer to the presence of specialized institutions and companies within the observed territory that provide services to local businesses. These include services such as identifying business partners, suppliers, facilitating technology transfer, and lobbying services. In this context, universities within a specific locality can also play a significant role, especially in terms of collaboration with the private sector. This collaboration can manifest through specialized education for future workforce development, as well as through joint projects in the research and development of new products, technological solutions, and innovations. Such collaboration contributes to strengthening the competitiveness and sustainability of local economies.

MESSAGES TO POLICYMAKERS FOR ENHANCING REGIONAL COMPETITIVENESS

Modern economic growth policies and strategies for improving RC emphasize the importance of key components of territorial capital in driving long-term economic growth and the competitiveness of specific regions (Camagni and Capello, 2013; Orsi *et al*., 2024). The economic role and significance of territorial capital lie in its ability to enhance the efficiency, productivity, and competitiveness of regional activities.

The considerations presented here have significant implications for defining and implementing economic development and RC policies. These policies should focus on fostering collaboration and connections between relevant actors. This approach suggests a new role for regional policymakers: they should facilitate and encourage networking, collaboration, and cooperation among both microeconomic entities and territories. Financial resources should not be directed toward individual beneficiaries but should instead fund projects that generate broader social benefits through collaboration among a larger number of market participants.

Moreover, RC policies should not solely provide financial assistance to underdeveloped areas. Instead, they should support projects that foster collaboration between developed and underdeveloped regions, ensuring mutual benefits and the availability of resources for both. Priority should be given to projects initiated by stakeholders themselves, as they are best positioned to identify their own needs and desired outcomes. This approach ensures balanced regional development, tailored to each territory's capacities, goals, and requirements, while aligning with the broader territorial organization.

Territories must recognize their role within the regional hierarchy, and to become equal partners, they must be capable of absorbing incentives and opportunities from their environment. Achieving this requires the development of nearly all components of territorial capital.

In contemporary conditions, RC takes place in the context of inter-territorial competition amid increasing complexity and uncertainty (Byrne, 2018). Consequently, new cognitive models have emerged, requiring a different approach to decision-making processes in regional growth and competitiveness policies (Martin, 2004; Capello and Nijkamp, 2019). Flexibility, partnerships among stakeholders, and iterative decision-making, monitoring, and evaluation processes characterize modern RC policies. These policies aim to enable each region to maximize its potential – developed regions continue to advance, while less developed regions activate and improve their territorial capital. This allows them to independently foster business activity through endogenous processes and absorb development impulses from more developed regions.

Such an integrative development approach combines sectoral and spatial public policies (Molnar, 2013). The effects of sectoral policies are no longer evaluated solely based on direct outcomes, such as employment growth or income levels. Instead, their impact on the overall competitiveness of the region is also considered. In summary, regional development today is understood as a complex, multidimensional phenomenon, free from illusions of simple and quick solutions that dominated earlier periods. The overarching long-term trend incorporates new elements that must be managed to guide modern territorial development policies.

According to Camagni (2008), instruments of regional competitiveness (RC) policy should be strategically reoriented in order to enhance:

- the capacity of territories to foster and internalize innovation processes;
- their adaptability to the dynamics of an increasingly volatile and interdependent global environment; and
- their absorptive capacity for new business activities, investment flows, and organizational models originating from external sources.

The importance of inter-territorial and inter-business cooperation should be emphasized, rather than merely offering financial incentives. A bottom-up development approach should be promoted over a top-down model. All components of territorial capital, and their continuous improvement, aim to create a favorable environment within a region for attracting and supporting businesses that will form the foundation of economic and social development. The quality of territorial capital determines the economic structure of a region. These components, acting together, should contribute to shaping and adapting regional economic structures to contemporary changes and needs. This approach to understanding the fundamental components of territorial capital has significant implications for RC management, focusing on fostering collaboration and connections among relevant actors. It highlights the importance of synergy creation, promoting cooperation and partnerships, and recognizing the value of local-level actor relationships, local culture, and cultural heritage, as well as social and relational capital (Todaro and Smith, 2022).

Unlike exogenous models of social development, which rely on external forces, endogenous models are driven by internal resources and processes. Endogenous development is characterized by local participation in decision-making and the trajectory of development, aiming to retain the benefits of growth within the local economy and align development with local values (Bogdanov and Janković, 2013). This underscores the importance of managing RC by leveraging local resources and fully utilizing territorial capital (Camagni, 2009).

CONCLUSIONS

RC is a relatively new phenomenon in economic science. It has only been explored since the late 20th and early 21st century (Cvetanović *et al*., 2015a), a period that coincides with changes in the interpretation of key drivers of economic growth and regional development. Research in this area is advanced and primarily conducted in highly developed economies.

The intensity of economic growth and the quality of regional development increasingly depend on internal strengths and the competence of local development policies, rather than on external forces. A new interpretation of regional growth and development emphasizes the importance of cognitive components in fostering economic growth and enhancing RC. This cognitive approach highlights factors that improve the capacities of regional entities by increasing their sensitivity to both private and public investments, as well as their ability to respond creatively to such stimuli. It represents a departure from the Keynesian and neoclassical assumptions of economic growth, offering a better understanding of regional realities in the 21st century.

Explaining the key factors behind economic growth and RC through the lens of endogenous theories signifies a qualitative shift compared to traditional views in regional economics. The endogenous analysis of factors contributing to RC underscores the significance of non-material drivers characterized by a high cognitive content of competitiveness. One of the leading analytical categories in this field is the concept of territorial capital, which has become central to examining the drivers of economic growth, RC, and the messages conveyed by contemporary regional policies shaped by endogenous development theories.

The concept of territorial capital is founded on the belief that every locality possesses certain developmental potentials. These potentials are inherently diverse, and development outcomes need not be uniform. Territorial capital enhances RC by enabling regions to leverage their own resources, adapt to global trends, and improve their market position. However, many localities have yet to fully utilize their developmental capacities. Similarly, a significant number of once-developed areas have failed to sustain their growth by neglecting internal opportunities and external changes, leading to stagnation or decline.

The critical task is for all regions to maximize their development predispositions, improve existing capacities, and actively collaborate with more developed regions to integrate into broader territorial systems. In doing so, they must offer their unique qualities for living and working. The concept of territorial capital encompasses collaboration, trust, and networking among relevant economic actors within a given space. Understanding its essence enables regional authorities to implement incentive measures that attract both private and public investors, accelerate economic growth, and enhance competitiveness.

It is important to note that the content and scope of this concept vary across regions, reflecting their specific needs, capacities, and developmental goals. Therefore, the successful application of territorial capital principles requires tailored strategies that align with the unique characteristics of each region, fostering sustainable growth and long-term competitiveness.

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REFERENCES

Aalbers, M. B., Rossi, U. (2007). A coming community: young geographers coping with multi-tier spaces of academic publishing across Europe, *Social & Cultural Geography*, Vol. 8, No. 2, pp. 283–302. https://doi.org/10.1080/14649360701360220

Annoni, P., Dijkstra, L. (2017). Measuring and monitoring regional competitiveness in the European Union, Part I, Chapter 3. In R. Huggins, P. Thompson (Eds.), *Handbook of Regions and Competitiveness*. Cheltenham, UK: Edward Elgar Publishing, pp. 49–79. https://doi.org/10.4337/9781783475018

Barr, A. (1998). *Enterprise performance and the functional diversity of social capital.* CSAE Working Paper Series 1998-01, Centre for the Study of African Economies, University of Oxford, Oxford, UK [online]. https://ideas.repec.org/p/csa/wpaper/1998-01.html [Accessed: 10 Jun 2025].

Bogdanov, N., Janković, D. (2013). Territorial capital of rural areas: An example of analysis of potential for rural tourism development in Serbia. In D. Škorić, D. Tomić, V. Popović (Eds.), *Agri-food Sector in Serbia: State and Challenges*. Belgrade, Serbia: Serbian Association of Agricultural Economists, pp. 201–232. https://doi.org/10.22004/ag.econ.157552

Byrne, E. (2018). Handbook of Regions and Competitiveness: Contemporary Theories and Perspectives on Economic Development, *Competitiveness Review*, Vol. 28, No. 3, pp. 332-334. https://doi.org/10.1108/CR-03-2018-0021

Camagni, R., Capello, R. (2013). Regional competitiveness and territorial capital: A conceptual approach and empirical evidence from the European Union, *Regional Studies*, Vol. 47, No. 9, pp. 1383-1402. https://doi.org/10.1080/00343404.2012.681640

Camagni, R., Caragliu, A., Perucca, G. (2011). Territorial capital, relational and human capital [online]. http://www.grupposervizioambiente.it/aisre/pendrive2011/pendrive/Paper/Camagni_Caragliu_Perucca.pdf [Accessed: 08 Nov 2024].

Camagni, R. (2009). Territorial capital and regional development, Chapter 7. In R. Capello, P. Nijkamp (Eds.), *Handbook of Regional Growth and Development Theories*. Cheltenham, UK: Edward Elgar Publishing, pp. 118–132. https://doi.org/10.4337/9781848445987.00014

Camagni, R. (2008). Regional competitiveness: towards a theory of territorial capital (Chapter 2). In R. Capello, R. Camagni, P. Chizzolini, R. Frasati (Eds.), *Modelling regional scenarios for the enlarged Europe: European competitiveness and global strategies*, pp. 33-47. Berlin: Springer-Verlag.

Capello, R., Nijkamp, P. (Eds.) (2019). *Handbook of Regional Growth and Development Theories: Revised and Extended Second Edition*. Cheltenham, UK: Edward Elgar Publishing. https://doi.org/10.4337/9781788970020

Capello, R., Camagni, R., Chizzolini, B., Fratesi, U. (2008). *Modelling Regional Scenarios for the Enlarged Europe*. Heidelberg: Springer.

Coleman, J. S. (1990). *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.

Commission of the European Communities (CEC) (2005). *Territorial State and Perspectives of the European Union*. Brussels: CEC.

Cvetanović, S., Filipović, M., Nikolić, M., Belović, D. (2015a). Endogenous growth theory and regional development policy, *Spatium*, No. 34, pp. 10–17. https://doi.org/10.2298/spat1534010c

Cvetanović, S., Despotović, D., Filipović, M. (2015b). The concept of social capital in economic theory, *Ekonomika*, Vol. 61, No. 1, pp. 73-84.

De Rassenfosse, G. (2024). The Role of Patents: Incentivizing Innovation or Hindering Progress?, *The Patentist Living Literature Review*, Vol. 1, pp. 1-5, https://doi.org/10.48550/arXiv.2412.14370

De Rubertis, S., Ciavolino, E., Labianca, M. (2019). Rethinking territorial capital, *Bollettino della Società Geografica Italiana*, Vol. 14, No. 2, pp. 91-104. https://www.bsgi.it/index.php/bsgi/article/view/715/643

Despotovic, D., Cvetanovic, S. (2017). The theoretical explication of the factors of regional growth and the economic convergence (divergence) of the region, *Economic Horizons*, Vol. 19, No. 2, pp. 111-125. https://doi.org/10.5937/ekonhor1702109D

Eurochambers (2007). *Atlas of Regional Competitiveness: Key Variables in Economic Performance*. Brussels, Belgium: Eurochambers.

Giuliano, G., Kang, S., Yuan, Q. (2019). Agglomeration economies and evolving urban form, *The Annals of Regional Science*, Vol. 63, pp. 377–398. https://doi.org/10.1007/s00168-019-00957-4

Hadjimichalis, C., Hudson, R. (2006). Networks, regional development and democratic control, *International Journal of Urban and Regional Research,* Vol. 30, No. 4, pp. 858–872. https://doi.org/10.1111/j.1468-2427.2006.00687.x

Harris, J., Roach, B. (2021). *Environmental and Natural Resource Economics: A Contemporary Approach* (5th ed.). New York, NY: Routledge. https://doi.org/10.4324/9781003080640

Huggins, R., Izushi, H., Prokop, D., Thompson, P. (2014). *The Global Competitiveness of Regions*. London, UK: Routledge. https://doi.org/10.4324/9780203799130

Iyer, S., Kitson, M., Toh, B. (2005). Social capital, economic growth and regional development, *Regional Studies,* Vol. 39, No. 8, pp. 1015–1040. https://doi.org/10.1080/00343400500327943

Jovanović, M., Rađenović, T., Stanojević, J. (2018). Human capital as the determinant of development of the EU rural areas, *Economic challenges,* Vol. 7, No. 13, pp. 1–16.

Khodabandehloo, A. (2014). Networking for regional development: A case study, *EuroMed Journal of Business*, Vol. 9, No. 2, pp. 149–163. https://doi.org/10.1108/EMJB-10-2013-0045

Kitson, M., Martin, R., Tyler, P. (2004). Regional competitiveness: An elusive yet key concept?, *Regional Studies*, Vol. 38, No. 9, pp. 991–999. https://doi.org/10.1080/0034340042000320816

Lengyel, I., Rechnitzer, J. (2013). Drivers of Regional Competitiveness in the Central European Countries, *Transition Studies Review*, Vol. 20, pp. 421–435. https://doi.org/10.1007/s11300-013-0294-2

Liu, Y., Fu, Y., Liang, Z., Liu, Y. (2024). Cluster social capital's influence on regional public brands in specialty agriculture: a value co-creation perspective*, Asia Pacific Journal of Marketing and Logistics*, Vol. 36, No. 11, pp. 3213-3235. https://doi.org/10.1108/APJML-11-2023-1178

Martin, R. (2004). A study on the factors of regional competitiveness. *A draft final report for the European Commission Directorate-General Regional Policy*. European Commission.

Molnar, D. (2013). *Regionalne nejednakosti i privredni rast : primer Srbije* (in Serbian). (Doctoral dissertation, Univerzitet u Beogradu – Ekonomski fakultet). https://hdl.handle.net/21.15107/rcub_nardus_2223 [Accessed: 10 Jun 2025].

Organisation for Economic Co-operation and Development (OECD) (2001). *Territorial Outlook*. Paris: OECD Publishing.

Orsi, F., Cavaco, C., Gil, J. (2024). From territorial capital to regional design: A multidimensional model for territorial analysis and scenario evaluation, *Planning Practice & Research*, Vol. 39, No. 1, pp. 116–135. https://doi.org/10.1080/02697459.2022.2120490

Osborne, M., Sankey, K., Wilson, B. (2007). *Social Capital, Lifelong Learning and the Management of Place: An*

International Perspective. London, UK: Routledge. https://doi.org/10.4324/9780203945537

Pallares-Barbera, M., Tulla, A., Vera, A. (2004). Spatial loyalty and territorial embeddedness in the multi-sector clustering of the Berguedà region in Catalonia (Spain), *Geoforum*, Vol. 35, No. 5, pp. 635–649. https://doi.org/10.1016/j.geoforum.2004.03.004

Pandas, A. (2018). Strategy of socio-economic development of agglomeration, *International Journal Vallis Aurea*, Vol. 4, No. 1, pp. 29–36 [online]. https://hrcak.srce.hr/file/302869 [Accessed: 10 Jun 2025].

Porter, M. E. (1990). The Competitive Advantage of Nations, *Harvard Business Review*, Vol. 68, No. 2, pp. 73–93.

Porter, M. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York, NY: Free Press.

Putnam, R. D. (1993). The Prosperous Community: Social Capital and Public Life, *The American Prospect* [online]. https://prospect.org/infrastructure/prosperous-community-social-capital-public-life/ [Accessed: 10 Jun 2025].

Sebestyén, T., Varga, A. (2019). Knowledge networks in regional development: An agent-based model and its application, *Regional Studies,* Vol. 53, No. 9, pp. 1333–1343. https://doi.org/10.1080/00343404.2019.1622663

Stiglitz, J. E. (2000). *Economics of the Public Sector* (3rd ed.). New York, NY: W. W. Norton & Company.

Stimson, R., Stough, R. R., Nijkamp, P. (2011). Chapter 1: Endogenous Regional Development: Perspectives, Measurement and Empirical Investigation. In R. Stimson, R. R. Stough, P. Nijkamp (Eds.), *Endogenous Regional Development – Perspectives, Measurement and Empirical Investigation*. Cheltenham: Edward Elgar Publishing, pp. 1-19. Cheltenham, UK: Edward Elgar Publishing. https://doi.org/10.4337/9781849804783.00006

Stokman, F. (2004). Frame-dependent modeling of influence processes. In A. Diekmann, T. Voss (Eds.), *Rational-Choice-Theorie in den Sozialwissenschaften: Anwendungen und Probleme*. Munich, Germany: Oldenbourg Verlag, pp. 113–127 [online]. https://research.rug.nl/files/9827261/13531.pdf [Accessed: 10 Jun 2025].

Todaro, M. P., Smith, S. C. (2022). *Economic Development* (13th ed.). London: Pearson Education Limited.

Vázquez-Barquero, A., Rodríguez-Cohard, J. C. (2019). Local development in a global world: Challenges and opportunities, *Regional Science Policy & Practice*, Vol. 11, No. 6, pp. 885–899. https://doi.org/10.1111/rsp3.12164

Vuković, D. (2013). *Model regionalne konkurentnosti: teorijsko-metodološka analiza i mogućnosti primene u Srbiji* (in Serbian). (Doctoral dissertation, Univerzitet u Kragujevcu, Ekonomski fakultet, Kragujevac, Srbija). https://hdl.handle.net/21.15107/rcub_nardus_3522 [Accessed: 10 Jun 2025].

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URBAN LAND USE AND THE SPATIAL TARGETS OF TERRORIST ATTACKS IN MAIDUGURI CITY, NORTHEAST NIGERIA

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This research investigates the relationship between urban land use and terrorist attacks in target locations of Maiduguri, Northeast Nigeria – a city significantly affected by insurgency and urban vulnerabilities. Analysing 402 terrorist incidents recorded between 2010 and 2020, the research identifies critical correlations between land use and attack types. The results revealed that tertiary institutions, motor parks, and Jumaat mosques were the highest risk facilities for bomb attacks, increasing their likelihood by 265%, 205%, and 218%, respectively, due to their capacity to attract large crowds and influence routine activities. Markets and schools were found to be key predictors of armed assaults. At the same time, facilities such as public offices, hotels, and recreation areas demonstrated resilience to bomb attacks, reducing their likelihood by 63%, 90%, and 79%, respectively, due to their controlled access and security measures. Notably, certain land uses, including markets and IDP camps, exhibited no significant correlation with bomb attacks, contrary to expectations. These findings highlight the critical role of urban planning in mitigating vulnerabilities by strategically integrating high-risk and resilient land uses. The study emphasizes the need for urban planners and policymakers to incorporate counterterrorism measures into land-use planning, in order to foster safer and more resilient cities in conflict-prone regions.

Keywords: **land use, Maiduguri city, measures, terrorist attacks, vulnerabilities.**

INTRODUCTION

Urban centres, especially in developing countries, are increasingly vulnerable to the impacts of terrorism, which disrupts economic growth, social cohesion, and security (Beall, 2007; Graham, 2010). Maiduguri, the capital of Borno State in north-eastern Nigeria and the birthplace of Boko Haram, epitomises this challenge (Tar and Ayegba, 2021). Over the past decade, Maiduguri has become a critical battleground between terrorists and state forces, with its urban fabric both a target and a tool for terrorist manoeuvres (Onuoha, 2014; Ezeugo, 2016). The protracted terrorist attacks have claimed thousands of lives, displaced millions, and disrupted livelihoods and urban development (Iweze, 2020; Tar and Ayegba, 2021).

Land uses are the skin coat that defines the activity function of the urban area, as well as the distributing factor of activities (Lynch and Rodwin, 2007). The functions of land use in urban areas include providing identity and image (Silke, 2011), determining population concentration (Medina *et al*., 2011) and determining the routine activities of dwellers (Vilalta and Fondevila, 2021). Land use, defined as the way urban space is utilised for residential, commercial, industrial, institutional, and recreational purposes, plays a pivotal role in shaping urban vulnerabilities and resilience to terrorist attacks (Tillyer and Walter, 2019). Certain land use types, such as densely populated residential areas (Alasdair *et al*., 2020; Kim *et al*., 2022), informal settlements (Pakoz

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and Gun, 2016), crowded marketplaces (Sohn *et al*., 2018), and transportation hubs (Loukaitou-Sideris *et al*., 2002), are often targeted by terrorists due to their high population density, economic importance, and limited surveillance infrastructure. In contrast, well-planned institutional zones, military installations, and controlled-access areas are more resistant to attacks because of enhanced security and restricted entry (O'Brien *et al.*, 2022).

In Maiduguri, rapid urbanisation and weak planning frameworks have resulted in informal settlements that lack essential infrastructure and are challenging to the police (Gusau and Dauda, 2010). These areas often serve as recruitment grounds or operational bases for terrorists. Similarly, bustling marketplaces like Monday Market and Gamboru Market (two of the major markets in the city) have frequently been targeted due to their crowded and chaotic nature, which maximises casualties and economic disruption. For example, 20% of bomb attacks in Maiduguri between 2013 and 2017 occurred in Monday Market, and 27% occurred at the University of Maiduguri (Institute for Economics & Peace, 2019), highlighting their vulnerability due to their status as a major commercial hub and major tertiary institution respectively, with both located on an important transport node. This raises an important question – if attacks occur at these places, what is the motive for such actions since attack targets are symbols embodying land users?

The relationship between land use and terrorist activity is particularly significant in the context of developing countries like Nigeria, where urban planning challenges intersect with poverty, unemployment, and political instability. Poorly planned urban areas often become hotbeds for violence and insecurity, emphasising the need for integrated urban governance and counterterrorism strategies (Drake, 1998). Studies suggest that understanding the urban structure and spatial distribution of attacks can contribute to creating safer and more resilient cities (Sharifi, 2018, 2019). For instance, Boko Haram does not choose its targets randomly; rather, its target selection involves careful consideration of spatial factors to maximise impact (Torres-Soriano, 2019).

This study investigates how different urban land-use types influence the spatial distribution of terrorist attacks in Maiduguri, with the aim of identifying patterns of vulnerability and informing land-use planning strategies that enhance urban safety and resilience in a conflict-prone setting. The findings provide critical insights for urban planners, policymakers, and security agencies to develop strategies that balance development and security priorities in conflict-prone regions. Additionally, this research underscores the importance of integrating land-use planning into counterterrorism frameworks, particularly in fragile urban environments, in order to foster sustainable urban development and resilience.

LITERATURE REVIEW

Concept of terrorist attacks

Terrorism is a persistent urban threat involving politically motivated violence by sub-state actors, such as the Provincial Irish Republican Army (PIRA) in Northern Ireland, the Spanish Euskadi ta Askatasuna (ETA), Basque Homeland and Freedom, Liberation Tiger of Tamil Eelam (LTTE) in Sri Lanka, Alqaeda, and Boko Haram in North-eastern Nigeria (Lafree *et al*., 2012; Chuku *et al*., 2017). These attacks vary in form, including shootings, bombings, assassinations, arson, and kidnapping, and later, tactics like suicide bombings and vehicle-borne attacks. Targets are broadly categorised as iconic, symbolic, or arbitrary, and the choice of place and time is shaped by the attack type and desired psychological impact (Marchment, 2019). In Nigeria, the Terrorism (prevention and prohibition) Act (2022) defines terrorist attacks as intentional and malicious actions aimed at intimidating the population, coercing government or international organisations, or seriously destabilising political, economic, or social structures (Okoye, 2021). The law emphasises both the intent and consequences of such acts, particularly when they endanger human life or result in significant economic or social disruption. The responsibility for fighting terrorism is shared among key security agencies, with the Department of State Services (DSS) and the Nigeria Police Force playing central roles in intelligence, investigation, and enforcement (Olalere and Tunde, 2024). The Nigerian Armed Forces support counterterrorism operations in high-risk areas, while the Office of the National Security Adviser oversees national counterterrorism strategy.

The concept of place

The concept of "place" is complex, shaped by activities, characteristics, and spatial contexts. Cities are exemplified by their layered nature, with transportation networks playing a vital role in defining their structure, connectivity, and identity (Kronkvist, 2022). Kevin Lynch's framework emphasises the importance of transportation corridors in shaping urban environments. The design of streets and networks can influence a city's development trajectory, leading to positive or negative outcomes (Sharifi, 2018). Places within cities are often defined by land use and social dynamics, with slums being characterised by deterioration, social isolation, and high crime rates (Amoako, 2021). Land use patterns influence the spatial distribution of activities and associated risks, including terrorism and social disorganisation. Public places, shaped by socioeconomic factors and security concerns, often form homogeneity or exclusion, creating "islands" of different social groups (Favarin, 2018).

Target locations delineation

Bombs are the most devastating weapons of destruction, both in warfare and terrorism. Improvised explosive devices (IEDs) are widely used by terrorists rather than factory-manufactured bombs due to restrictions on purchasing type, clearance, and transportation. IEDs require expert bombmakers and materials to assemble, and most terrorist bomb attacks involve IEDs like planted bombs, suicide vests, and bomb-laden vehicles (Silke, 2011). The National Counterterrorism Centre and the US Department of Homeland Security have established a template for public safety during a terrorist bomb attack, which covers a mandatory evacuation zone (red zone) accessible only to armed military personnel, and a preferred safe zone for humanitarian workers and the press (National

Counterterrorism Centre, 2007). Bomb attacks are the most studied terrorist attack typology due to their uniqueness and because they make headlines.

Armed assault, assassination, and hostage-taking are similar attacks, due to sporadic shootings. Armed assault involves engaging security personnel at checkpoints, bases, or patrols. Assassination involves capturing symbolic figures through sporadic shooting, while hostage-taking is similar to assassination. These attacks require rigorous intelligence networks and surveillance to track and engage targets. Graham (2010) suggests that sporadic shooting-related assaults should be enclosed in a buffer to prevent free-fire areas. Young's (2016) analysis of officer deaths from 1885-2014 and 2005-2014 found high numbers of officer victims at distances less than 21 feet, and fewer victims at more than 50 feet. Safe zones for armed personnel are tagged at 50 feet.

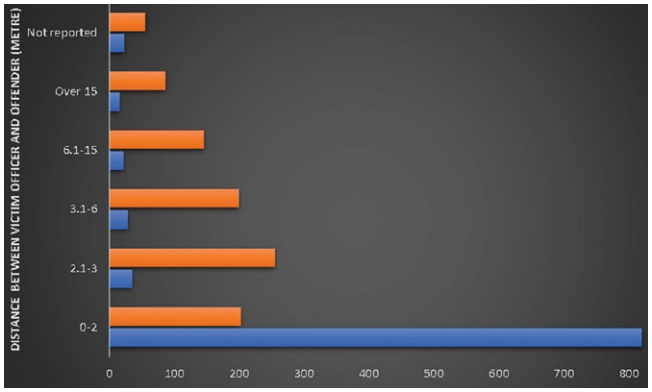

Figure 1. Safe distance for officers in a shoot-out (Source: Young (2016) – modified by the Authors)

Arson attacks involve terrorists setting a target ablaze, often aiming to raze them to the ground or impede their operations. The target area is usually secured by the terrorists to ensure a successful attack. There is no known or documented delineation for areas under arson attacks, but the maximum expected situation can suffice. Arson attacks can be equalised to bomb attacks due to their maximum impact and the use of other methods such as assassination, armed assault, IEDs, hostage barricading, building takeover, and kidnapping (Pfeifer, 2013). Terrorists have found arson attacks advantageous over other tactics due to their potential for mass casualties, economic destruction, and depletion of emergency service resources.

Urban dynamics and terrorist attacks

City development and management require professional skills and rely heavily on standards for urban areas (Coaffee and Rogers, 2008). However, the dynamic nature of urban areas presents challenges, such as terrorism. The human-inclined nature of cities can undermine counterterrorism operations, and environmental features remain major factors aiding terrorist attacks. Therefore, urban planners must adapt to these dynamic challenges to ensure the safety and security of urban areas.

Protecting the city as a whole, therefore, appears unachievable because the "… size of a major city makes it difficult to protect all possible targets, particularly if the range of targets is broad. As long as a terrorist group is operating effectively, it is simply impossible to provide absolute physical protection to the entire transport and commercial structure of a major city. Attempts to do so over the long term would be prohibitively costly and would deplete the resources available to protect specific potential targets" (Drake, 1998, p. 107).

As asserted by Cozens (2011), the urban planner should remain at the forefront of securing the city from terrorist attacks by employing professional expertise and input from security operatives. Since the urban form tends to directly influence city safety or otherwise, it becomes pertinent for urban planners to deploy the right techniques for ensuring city-wide resilience. This can be achieved because "the very design of an urban area may be affected by the desire to hamper terrorists' operations. Such considerations are not new to town planning. The broad, straight Parisian boulevards […] allow charges by the police, infantry, and cavalry to be more effective, and to make it difficult for rebels to erect barricades successfully" (Drake, 1998, p. 109).

Cities face both internal and external threats that need to be managed to ensure their success. Safety is crucial for social and economic progress. Terrorist attack threats can cause panic, damage the social order, and negatively impact economic activities (Li and Wu, 2017). To mitigate these factors, techniques like Crime Prevention Through Environmental Design (CPTED), gated communities, surveillance systems, and architecture of fear can be used. However, creating safer cities may also hinder free flow and public rights. Surveillance systems can be the most inclusive strategy for evading attacks if well incorporated in cities.

Land use and terrorist attacks

Several environmental features have been identified and demonstrated in studies as tending to attract, generate, mar or aid attacks (Kinney *et al*., 2008). These features exist and are tangible in space, and their number is easily estimated. Therefore, the number of available features is collected, no matter how many. The utilisation of geospatial techniques happens to simplify the process of data collection as long as the geolocation of features is ascertained.

Land uses are not always categorised based on their functions, as different features have different influences. Jumaat mosques, which perform the same function as other mosques but have a greater significance for Friday congregational prayer services, are at a higher risk of attack due to their special functional service. Studies have shown that having a few Jumaat mosques concentrated in a place can create more crowds on Friday afternoons and make them a suitable terrorist target (Onat, 2016; Onat and Gul, 2018). Commercial facilities such as pubs, grocery stores, bakeries, shopping malls, clubs, markets, and restaurants are also considered risky. Studies have found that grocery stores, restaurants, offices, and shopping centres have a greater concentration of burglaries (Steinman *et al*., 2020). In San Antonio, Texas, businesses located in block groups, with many commercial uses and high vehicular traffic experience more crime. However, the interaction between busy locations and businesses does not increase crime at business zones outside their major effect as commercial activities (Tillyer and Walter, 2019).

Cities are complex systems that can protect themselves based on the arrangement of land uses. Studies have shown

that schools, bus stops, and police stations can deter burglary in Milan, Italy. In Los Angeles, areas with derelict establishments, empty parking lots, and public storage buildings can foster crime. In Philadelphia, areas exposed to bars and subway stations are positively associated with violence, property and disorder crime types at 400, 800 and 1200 ft thresholds, respectively. Miller *et al.* (2016) found that crime-prone housing is a significant determinant for offenders' rearrest and revocation. Klakla *et al.* (2021) found that crime is highest within an average of 50 meters from monitoring systems. Yusof and Fauzi (2019) found that crime incidences are concentrated close to residential commercial and recreational areas. Kim *et al.* (2022) found that night-time lights, single-person households, disadvantaged neighbourhoods, many companies, and mixed land uses are likely to aggravate theft and sexual assault in South Korea.

THE STUDY AREA

Maiduguri stands as one of the most important cities in North-Eastern Nigeria, with a rich history rooted in the Kanem Borno Empire. The city's establishment at its present location on January 7, 1907, was influenced by the advice of the British, leading to the arrival of Shehu Abubakar Garbai El-Kanemi (Haribarren, 2017). However, smaller settlements, including one called Maiduguri, existed in the area as early as the 17th century. Maiduguri has a vast land-use distribution, with 60% of the developed area being residential. Amidst the residential development, the rest of the support uses include corner shops and other smaller retail activities. A total of 40% of the built-up area is for public use (government offices, schools, recreation centres, among others), as well as commercial and industrial areas. Located between longitude 11°40'N, 11°54'N and latitude 13°4'E, 13°14'E, Maiduguri lies within the Sudan-Sahel transition zone and covers an area approximately 15–18 km long and 11–15 km wide (Waziri, 2009) (see Figure 2). Recent population estimates for 2021, provided by Action Against Hunger in collaboration with the National Emergency Management Agency (NEMA), the International Organization for Migration (IOM), and the Nigerian Bureau of Statistics (NBS), place the population at 1,217,432 (International Office of Migration, 2021).

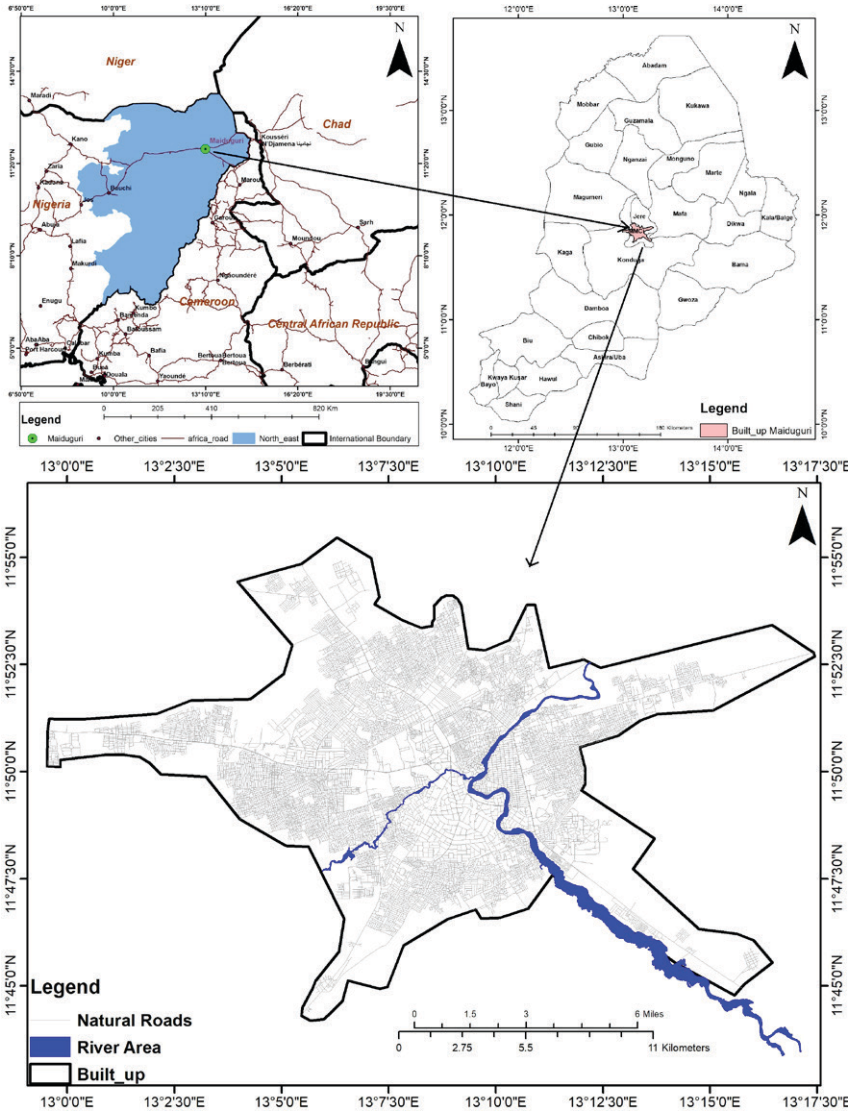

Figure 2. Location and extent of Maiduguri
(Source: OSGOF Admin Boundary data 2020 and direct digitisation by the authors based on Google Satellite Imagery, 2021)

METHOD

Data requirement

Terrorist attack data

Terrorist attack (point) data were obtained from the open-source repository called Global Terrorism Database (GTD, 2025). GTD database provides the point of attack (in longitude and latitude) and its corresponding characteristics like time of attack, casualties, assailants, type of weapon used, type of attack, and attack description, amongst others. After plotting the data, it was discovered that some of the registered coordinates of the locations were inaccurate. Helpfully, the attack description was much more accurate based on sources extracted from electronic and print media (such as all local media houses of Nigeria, the BBC, CNN, and CFI, amongst others) that GTD relied on; and the authors' familiarisation with the study area was also employed. Ground truthing was utilised to ascertain the correct locations since the attack description was found to be correct. A total of 573 attack locations were obtained at first from GTD descriptions. After the correction exercise, only 402 (80%) attacks were found to be authentic and were included in the study. Of these data, 247 were bomb attacks, 100 were armed assaults, 14 were assassination attacks, 28 were arson attacks, and 13 were hostage-taking, making up the 402 cases of terrorist attacks (see Figures 3 and 4). Security personnel were consulted for terrorist attack data to corroborate the GTD data but were unsuccessful.

Figure 4. Road network and attack type distribution in Maiduguri

Administrative boundary and road network data

The administrative boundary of Maiduguri is not distinctively defined. The built-up area of the city was utilised as the basis for delineation. In this regard, two factors were considered for demarcating the extent of the city. Firstly, the trench dug by the military around the city due to the Boko Haram crisis. Even though the basis for the trench is not disclosed, some important fringe settlements were excluded. Secondly, the major factors that determine the extent of an urban area

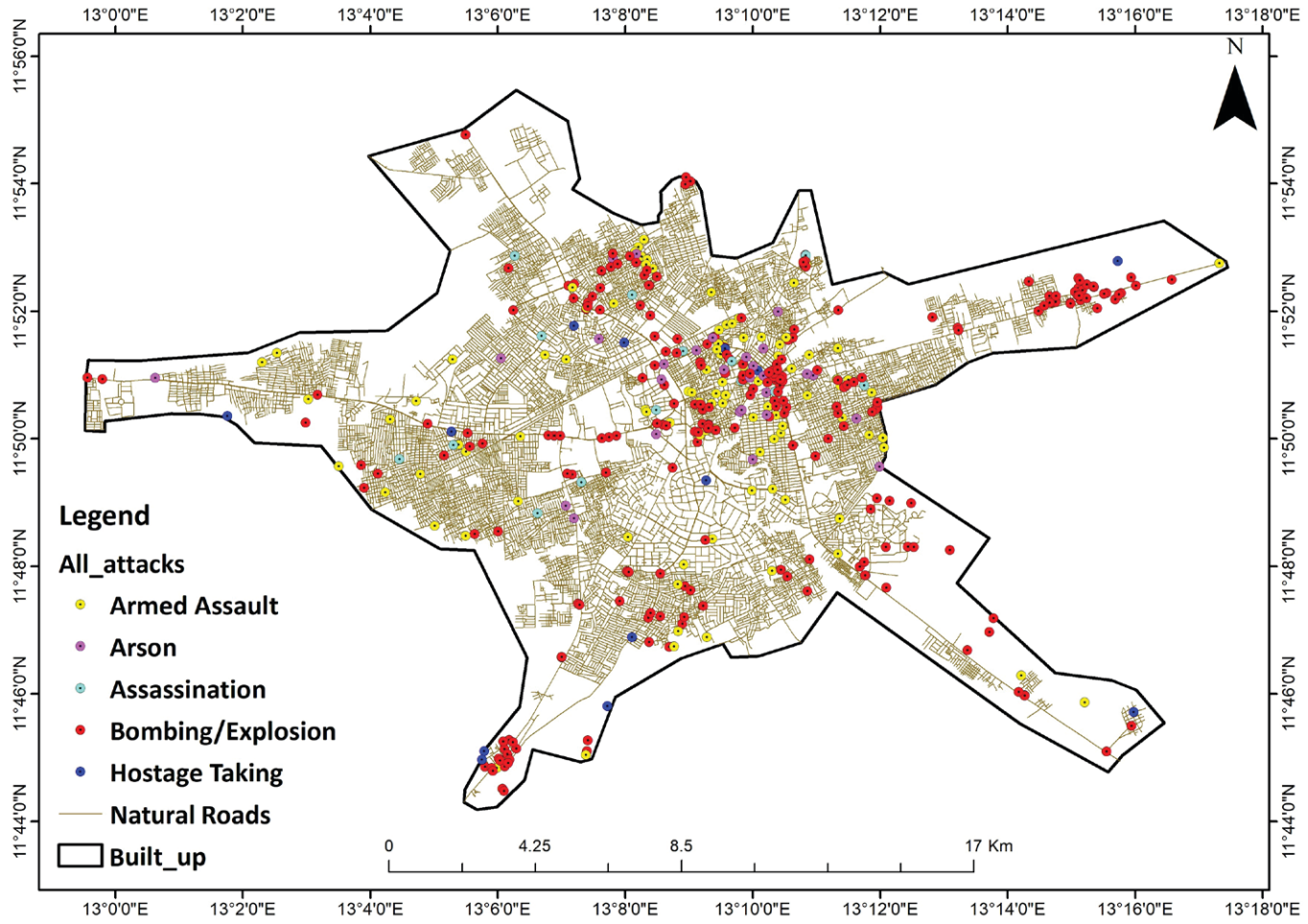

Figure 3. Road network and attack type distribution in Maiduguri

were considered. These are Population, urbanisation, and agglomeration (Mboup, 2019; Hendrigan, 2020). Both the extent and road network of the town were digitised from a high-resolution 0.3 m pixel satellite imagery of the city and environs obtained from the Google Earth repository. The streets were further processed using Axwoman 6.3 (an extension for ArcGIS desktop 10.3.1) to acquire natural roads after removing all isolated streets (Guo, 2019). A total of 7,374 natural streets were obtained. Only 219 (3%) streets in the study area had seen attacks, and these were the ones utilised for the study. Natural streets (roads) are a collection of connected street segments based on the principle of self-best fit, best fit, and every best fit. They are based on the level of connectedness of segments regarding linearity and a small deflection angle. Jiang *et al*. (2008) posited that a deflection angle of 45 degrees is the best. The self-best fit principle was adopted because segments were considered at a small deflection angle (Pung *et al.*, 2022).

Land uses data

Point shapefiles for facilities or spatial correlates were obtained from GRID3 Nigeria. Land uses not provided or partly captured by GRID3 Nigeria were marked and obtained from 0.3 m pixel high-resolution satellite imagery from the Google repository. This was possible because of the researchers' familiarisation with the study area. Unidentifiable features from satellite imagery were captured directly with a GPS-supported Nokia 5.1 plus smartphone. The application Mobile Topographer for Android smartphones, with its high accuracy (as low as 0.1 m), was utilised to acquire the geolocation of features. The application has enhanced inbuilt data collection, storage, collation, retrieval and analysis capabilities (see Table 1).

Data analysis

The locations of land uses were collected with GPS directly through mapping and remote sensing techniques. They were collated by type in individual Excel sheets (.csv format) with their respective coordinates, and converted to shapefiles. We ensured all the shapefiles were in the same coordinate reference system (CRS) for easy merging and plotting. Centroids of the polygons obtained from GRID3 Nigeria were also computed. All the operations were done in ArcGIS 10.3.1 to ensure that shapefiles of all land uses were utilised as points for easy interpolation and display.

Locations targeted by terrorists are established based on the affected area to the line of the safe distance for the press. The safe distance is described as the area around or outside the lethality of the attack that can accommodate non-combatants like press or humanitarian activities during an attack or hostile situation (National Counterterrorism Centre, 2007; Young, 2016). It also refers to areas not impacted by the attack. Bomb attacks (IEDs in Maiduguri) were the most catastrophic attack type, and safe distances based on the National Counterterrorism Centre (2007) standards were established according to the bomb type utilised in the attack. There were a total of 82 planted bomb attacks, 148 suicide bomb attacks and 17 vehicle bomb attacks, respectively, from 2010 to 2020 in Maiduguri. In this regard, buffers were created for the different attack typologies based on the safe distances or zones with the

Table 1. Counts of land uses in Maiduguri

S/N	Facilities	Number	Source
1	Churches	32	GRID3 and Remote sensing
2	IDP camps	125	GRID3 and Remote sensing
3	Other mosques	113	GRID3 and Remote sensing
4	Primary and secondary schools	129	GRID3 and Remote sensing
5	Symbolic targets (traditional chief, top political and religious cleric's residence)	37	Direct collection
6	Private offices	101	Direct collection
7	Hotels	20	Direct collection
8	Shopping outfits/areas	274	Direct collection
9	Jumaat mosques	67	GRID3, Direct collection and Remote sensing
10	Motor parks	14	Direct collection
11	Tertiary institutions	8	Direct collection and Remote sensing
12	Military Barracks	6	Direct collection and Remote sensing
13	Markets	21	Direct collection and Remote sensing
14	Public offices	40	Direct collection
15	Recreational areas	5	Direct collection
16	Banks	19	Direct collection and Remote sensing
17	Paramilitary outfits	22	Direct collection and Remote sensing
18	Derelict buildings	9	Direct collection
19	Uncompleted buildings	562	Direct collection
20	Depression areas/points	10	Direct collection
	Total	1614	

buffer tool. Overlapping buffers were merged as one attack place based on attack typologies. After merging bombs and armed assaults, attacks returned 38 and 97 attack places, respectively. Arson, Hostage-taking, and assassination attacks maintained 28, 13 and 14 attack places, respectively. The latter had attack places equal to the number of attacks because they had small buffer areas. Planted bombs, which can be in bags, briefcases, or projected, among others, were designated for a safe distance of 564 m. Suicide vests carry fewer explosives than planted bombs and were designated a safe distance of 518 m. Vehicle bombs in Maiduguri were in sport utility vehicles (SUVs) and station wagons only. They have the greatest impact because apart from the massive amount they can carry, gas cylinders are also utilised.

Armed assaults and Arson attacks were designated to have a safe distance of 45 m. This is because they have a similar modus operandi. However, Pfeifer (2013) equated arson to bomb attacks because it registers a massive impact and also utilises other attack types. Regarding armed assault, Young (2016) asserted that for armed assault, armed personnel should engage at a distance of 15 m while unarmed personnel should be more than 15 m away. Hostage-taking and assassination also have similar operational strategies. Graham (2010) proposed an enclosed buffer to serve as a safe zone for shootings. For this analysis, 20 m was utilised for the two attack types.

The spatial join tool of ArcGIS 10.3.1 was utilised to count the number of attacks by type and the number of land-use features in each buffer. Attack types were employed as the dependent variable, while land uses were the explanatory variable. By virtue of the nature of the dependent variable being an incident (count) data, descriptive statistics were first run for all attack types to understand the best-fit model for the analysis. This revealed that with the exception of bomb attacks being over-dispersed (variance exceeding the mean), all other attack-type data were under-dispersed (mean exceeding the variance). Negative Binomial regression models were returned as best fit for bomb attacks. Harris *et al.* (2012) suggested a Poisson regression model for under-dispersed and equi-dispersed distributions if the data obeys the rule of thumb (being more than 30 datasets); otherwise, truncated negative binomial regression was utilised. In this case, the other attack-type data were under-dispersed but possessed few datasets, and truncated negative binomial regression is the best fit for them (see Table 2). These models were preferred as a result of their skewed distribution, and they showed the tendency to test countable datasets (Favarin, 2018; Harris *et al.*, 2012; Yue and Zhu, 2019). The best-fit model for each attack dataset is shown in Table 2.

RESULTS AND FINDINGS

This section presents how different land-use types influence the likelihood of terrorist attacks in Maiduguri, by applying regression models to assess the relationship between land use and specific attack types. Table 3 presents the results of a Negative Binomial Regression model used for bomb attacks, while Table 4 displays findings from a Generalised Poisson Regression model for armed assaults. The tables include the regression coefficients, significance values and incidence rate ratios (IRR) to highlight which land-use types are statistically associated with increased or reduced risk.

Table 2. Presentation of best-fit model for analysis

Variable	Arson places	Armed assault places	Assassination places	Bomb attack places	Hostage-taking places
Nature	Under dispersed	Under dispersed	Under dispersed	Over dispersed	Under dispersed
Best fit model	Truncated Negative Binomial Regression	Generalised Poisson Regression	Truncated Negative Binomial Regression	Negative Binomial Regression	Truncated Negative Binomial Regression

Table 3. Negative Binomial Regression model for bomb attacks and land uses in attack places

Land use	Bomb Attacks		
	β	Incident Rate Ratio (IRR)	Sig.
Tertiary institutions	1.2945	3.6492	0.050
Symbolic targets	-0.1111	0.8948	0.772
Military	-0.1822	0.8334	0.795
Mosques	-0.1541	0.8572	0.024
Motor parks	1.1135	3.0451	0.010
Paramilitary	-0.8813	0.4143	0.133
Private offices	0.3752	1.4553	0.044
Primary and secondary schools	0.6522	1.9197	0.050
Public offices	-1.0071	0.3653	0.002
Recreation	-1.5694	0.2082	0.050
Shopping	-0.1197	0.8872	0.169
Banks	-0.1646	0.8482	0.072

Land use	Bomb Attacks		
	β	Incident Rate Ratio (IRR)	Sig.
Churches	-0.4367	0.6462	0.433
Hotels	-2.3057	0.0997	0.029
IDP camps	0.0085	1.0084	0.857
Jumaat mosques	1.1584	3.1849	0.000
Markets	-0.1524	0.8587	0.649
Derelict buildings	1.8594	6.4198	0.126
Uncompleted buildings	-0.0023	0.9974	0.904
Depression areas/points	-0.0003	1.0000	0.471

The likelihood ratio test of α=0 (see Table 3) signifies that the Negative Binomial Regression model is fit for the bomb attack.

As presented in Table 3, tertiary institutions, Mosques, Motor parks, Private offices, Primary and Secondary Schools and Jumaat Mosques were positively correlated with bomb attacks. This result signifies that an increase in the presence of tertiary institutions, Mosques, Motor parks, Private offices, Primary and Secondary Schools and Jumaat Mosques (at α=0) was found to be associated with an increase in bomb attacks. Tertiary institutions, motor parks and Jumaat mosques were returned as the riskiest facilities in bomb attack places. In these places, bomb attacks are more likely by 265% (IRR=3.6492), 205% (IRR=3.0451) and 218% (IRR=3.1849), respectively. There is the likelihood of experiencing 3.64-times, 3.04-times and 3.18-times bomb attacks in such places. These are facilities with global and/or local influences that affect the routine activities of commuters (Brantingham and Brantingham, 1995; Curman *et al.*, 2015). Tertiary institutions and motor parks, apart from their major function, were established as perfect spots for commercial activities, since they are always crowded. Jumaat mosques are similar, except that they are crowded for shorter times on a weekly basis (Friday afternoons). Private offices and primary and secondary schools were returned as lower-risk facilities in terms of their potential for a bomb attack. In these places, bomb attacks are more likely by 45.53% (IRR=1.4553) and 91.97% (IRR=1.9197), respectively. There is a 1.45-time and 1.91-time likelihood of experiencing bomb attacks. Unlike primary and secondary schools, private offices can be single or combined in a complex with few or large employee bases. Private offices have more of a global influence compared to primary and secondary schools. It is not surprising that they are at a lower risk regarding bomb attacks because they keep fewer crowds, have less routine activity, and less time for maintaining crowds at once. The coefficients for Markets, Churches and IDP camps were not significant.

Mosques, public offices, recreation areas and hotels were negatively correlated with bomb attacks. This indicated that a decrease in the presence of Mosques, public offices, recreation areas and hotels (at α=0) was found to be associated with a decrease in bomb attacks. Mosques, public offices and recreation areas were returned as the greatest mitigators of bomb attacks. in these places bomb attacks are less likely by approximately 14.3% (IRR=0.8572), 63.47% (IRR=0.3653), 79.18% (IRR=0.2082) and 90.03% (IRR=0.0997). Being in areas with public offices and hotels have a less likelihood for bomb attacks by 63.48% and 90.03%, respectively.

The likelihood ratio test of δ=0 (see Table 4) signifies that the Generalised Poisson Regression model is fit for armed assaults.

Markets and primary and secondary schools returned a positive correlation with armed assaults. An increase in the presence of markets, primary and secondary schools (at δ=0) was found to be associated with an increase in armed assaults. Markets and primary and secondary schools are more likely to experience armed assaults by 97.8% (IRR=1.9780) and 86.91% (IRR=1.8691), respectively (see Table 4).

Table 4. Generalised Poisson model for armed assaults and land uses in attack places

Land uses	Armed assault		
	β	Incident Rate Ratio (IRR)	Sig.
Mosques	-0.1085	0.8972	0.856
Jumaat mosques	-0.1886	0.8281	0.805
Markets	0.6821	1.978	0.048
Churches	0.0951	1.0998	0.852
Primary and secondary schools	0.6254	1.8691	0.050
Military	0.2195	1.2454	0.709
Public offices	-0.0066	0.9934	0.993
Symbolic targets	0.4428	1.5571	0.158
Uncompleted building	0.1222	1.1076	0.803

DISCUSSION AND CONCLUSIONS

Places have been known to encompass certain activities in space that give them the identity to be recognised (Lynch, 1960; Lynch and Rodwin, 2007). All inhabitants of the city are entitled to this place as it contributes to shaping and determining their routine activities. This study demonstrated the extent to which land uses or facilities within locations targeted by terrorists can predict terrorist attacks. The study findings showed that tertiary institutions, motor parks and Jumaat Mosques are the greatest predictors of bomb attacks in attack places. Given the fact that bomb attacks are perpetrated either by planting, suicide or the use of vehicles (National Counterterrorism Centre, 2007), with the intention of massive damage, these facilities are attractive for such action. Jumaat mosques, unlike other smaller mosques, encourage massive gatherings on a weekly basis. Motor parks and tertiary institutions, apart from pulling crowds, encourage ambient populations. This result supported the findings of Kliot and Charney (2006), which demonstrated that suicide bomb attacks take advantage of agglomerations.

Conversely, markets, IDP camps and Churches were not significantly correlated despite being places of large populations and crime attractors, as shown in studies (Favarin, 2018; Onat and Gul, 2018). Indeed, the number of markets in Maiduguri is considerably lower than that of Jumaat mosques. There are few IDP camps and churches in Maiduguri. Movement in and out of camps is heavily restricted, and mitigating routine activities take place around them. The same applies to churches, except for a single crowded day in the week. Also, selecting them as targets can be exhausted after a small number of attacks. This is not surprising, because a study by Onat (2016) in Spain found bakeries to be stronger predictors compared to shopping areas and public offices, which would have been expected to be number one on the terrorist target list. This is because bakeries define pedestrian routine activities and are the source of bread, which is a major staple food in Spain.

Another significant finding in this study is that mosques, public offices, recreation areas and hotels were found to be mitigators of bomb attacks. This can be attributed to the level of defensiveness created around the facilities. On the one hand, public offices and hotels, including their vicinities, are well-guarded. On the other hand, there are restricted entrances and exits into them. They are enveloped in routine security checks throughout. Hence, public offices and hotels appear to be good mitigating factors for bomb attacks. Kliot and Charney (2006) asserted that access is crucial for aspiring terrorists. In this regard, the presence of encumbrances to targets is a discouragement as it costs more to remove them and overall leads to failed attacks or reduced impacts.

Additionally, mosques were found to be negatively correlated with bomb attacks, while Jumaat mosques are positive. Other Mosques (also called Kamsu Salawat mosques) are utilised only for five daily prayers. They are greater in number, serving and influencing local neighbourhoods. The majority of them hold smaller crowds at prayer times, influencing local routine activities. Jumaat mosques hold much larger crowds and have a global influence. At the same time, they perform the functions of other mosques. It is obvious, therefore, that Jumaat mosques will appear more attractive as a target for terrorist bomb attacks than other mosques.

With regard to armed assaults, markets and primary and secondary schools were shown to be positive crime predictors. It is expected that markets, and primary and secondary schools are very risky areas in a terrorist situation. Apart from defining routine pedestrian and vehicular activities, they also have large crowds. Markets maintain commercial activities throughout the day, giving an extended timeframe for terrorists to attack. At the same time, the large population makes it an attractive target that is liable to bring about mass casualties, as asserted by Medina *et al*. (2011). Primary and secondary school activities take place from morning to the afternoon. They involve a smaller number of people compared to markets, and are therefore expected to have less influence.

None of the facilities were significant for arson, hostage-taking or assassination attacks. From the data utilised for this study's analysis, arson, hostage-taking and assassination attacks were registered for telecommunication facilities and primary/secondary schools. Arson attacks, which are used less frequently than bombings or armed assaults, are often accompanied by shootings to deter or suppress immediate resistance (Pfeifer, 2013). Li *et al.* (2014) asserted that arson attacks are carried out on facilities contrary to a terrorist group ideology or are an impediment to their course. This is an indication that arson attacks are expensive to embark on. In this vein, it is possible to embark on another strategy of attack or replace the typology since cost consideration is an important aspect verified before attacks (Drake, 1998; Gill *et al*., 2018).

Counterterrorism measures should, in this case, go beyond conventional policing with regard to mounting rhythmic checkpoints, barricades, target hardening or frequent patrols to get the job done. Governments have viewed this strategy as a magic wand that has eventually produced unsatisfactory results. New grounds should be explored which will serve as a significant corroborator of the existing strategy. From the findings in this study, land use tends to have a significant influence on terrorist attacks. As a result, urban planners need to go beyond conventional crime prevention (Cozens, 2011) and tackle terrorism in urban at all planning stages (Vogelbacher *et al.*, 2016). Given the nature of cities in developing countries – that are mostly spontaneous and undergoing replanning – the siting and distribution of land uses should occupy the central stage of setting out the structure of the city. Urban planners should not totally rely on standards alone but rather consider the level to which a certain land use can influence attacks. Tertiary institutions and Jumaat mosques for instance, are the riskiest facilities and should be treated as such. Additionally, a combination of land uses should be fundamental factor for distribution in urban space. Land uses that tend to have a repelling tendency for attacks should be sited close to aggravating land uses to create not just harmony but a balance for achieving resilience.

This study has demonstrated how land uses or environmental features influence terrorist attacks in Maiduguri. It is evident that several studies have attempted similar approaches, yielding tremendous results. To the best of our knowledge, studies attempting a qualitative approach to this subject matter appear to be missing in the literature. It would be worthwhile for such an attempt to provide in-depth results for a greater understanding of spatial systems in cities.

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REFERENCES

Alasdair, B., Chmutina, K., Bosher, L. (2020). Protecting Crowded Places: Challenges and Drivers to Implementing Protective Security Measures in the Built Environment, *Cities*, Vol. 107, 102891. https://doi.org/10.1016/j.cities.2020.102891

Amoako, E. A. (2021). A spatial Analysis of Crime and Neighborhood Characteristics in Detroit Census Block Groups, *Proc. Int. Cartogr. Assoc.*, Vol. 4. https://doi.org/10.5194/ica-proc-4-5-2021

Beall, J. (2007). *Cities, Terrorism and Urban Wars of the 21st Century*. London: Crisis States Research Centre.

Brantingham, P. J., Brantingham, P. L. (1995). Criminality of Place: Crime Generators and Crime Attractors, *European Journal on Criminal Policy and Research*, Vol. 3-3, pp. 5–26.

Chuku, C., Abang, D., Isip, I. (2017). *African Development Bank Group*. Working Paper 284 - Growth and Fiscal Consequences of Terrorism in Nigeria. [online]. https://www.afdb.org/en/documents/document/working-paper-284-growth-and-fiscal-consequences-of-terrorism-in-nigeria-98159 [Accessed: 27 Jun 2025].

Coaffee, J., Rogers, P. (2008). Rebordering the City for New Security Challenges :From Counter-terrorism to Community Resilience, *Space and Polity*, Vol. 12, No. 1, pp. 101–118. https://doi.org/10.1080/13562570801969556

Cozens, P. M. (2011). Urban Planning and Environmental Criminology : Towards a New Perspective for Safer Cities, *Planning Practice & Research*, Vol. 26, No. 4, pp. 481–508. https://doi.org/10.1080/02697459.2011.582357

Curman, A. S. N., Andresen, M. A., Brantingham, P. J. (2015). Crime and Places: A Longitudinal Examination of Street Segment Patterns in Vancouver, BC, *Journal of Quantitative Criminology*, Vol. 31, pp. 127-147. https://doi.org/10.1007/s10940-014-9228-3

Drake, C.J.M. (1998). *Terrorists' Target Selection*. London: Palgrave Macmillan. https://doi.org/10.1057/9780230374676

Ezeugo, I. N. (2016). *The Terror of Terrorism*. Ibadan: Scripture Union Press.

Favarin, S. (2018). This must be the Place (to Commit a Crime): Testing the Law of Crime Concentration, *European Journal of Criiminology*, Vol. 15, No. 6, pp. 1–28. https://doi.org/10.1177/1477370818757700

Gill, P., Marchment, Z., Corner, E., Bouhana, N. (2018). Terrorist Decision-Making In The Context of Risk, Attack Planning and Attack Commission, *Studies in Conflict & Terrorism*, Vol. 43, No. 2, pp. 1-25. https://doi.org/10.1080/1057610X.2018.1445501

Global Terrorism Database (GTD) (2025). *START - National Consortium for the Study of Terrorism and Responses to Terrorism*. Global Terrorism Database (GTD) [online]. https://www.start.umd.edu/data-tools/GTD [Accessed: 16 Jun 2025].

Graham, S. (2010). *Cities Under Siege: The New Military Urbanism*. London: Verso.

Guo, Z. (2019). *Tutorial for Generating Natural Streets and Analyzing their Scaling Structure* [online]. https://livablecitylab.hkust-gz.edu.cn/binjiang/Axwoman/TutorialNaturalStreets14.pdf [Accessed: 5 Mar 2021].

Gusau, I. U., Dauda, S. (2010). Maiduguri: A City without Street Names and Numbers. *Daily Trust News* [online]. https://dailytrust.com/maiduguri-a-city-without-street-names-and-numbers/ [Accessed: 12 Aug 2020].

Haribarren, V. (2017). *A History of Borno: Trans-Saharan African Empire to Failing Nigerian State*. London: Hurst and Company Ltd.

Harris, T., Yang, Z., Hardin, J. W. (2012). Modeling Underdispersed Count Data with Generalized Poisson Regression, *The Stata Journal*, Vol. 12, No. 4, pp. 736–747. https://doi.org/10.1177/1536867X1201200412

Hendrigan, C. (2020). *A Future of Polycentric Cities: How Urban Life, Land Supply, Smart Technologies and Sustainable Transport Are Reshaping Cities*. Singapore: Springer Nature Private Limited. https://doi.org/10.1007/978-981-13-9169-9

Institute for Economics & Peace (2019). *Global Terrorism Index 2019: Measuring the Impact of Terrorism*. Sydney: Institute for Economics & Peace [online]. https://www.visionofhumanity.org/wp-content/uploads/2020/11/GTI-2019-web.pdf [Accessed: 11 Feb 2022].

International Office of Migration (2021). *International Office Migration Nigeria Displacement Tracking Matrix (DTM)* [online]. https://dtm.iom.int/dtm_download_track/72506?file=1&type=node&id=48651 [Accessed: 20 May 2022].

Iweze, D. (2020). Insurgency in the Northeast region of Nigeria and its implications on inter-state and trans-border mobility, 2009-2016, *Canadian Journal of African Studies / Revue canadienne des études africaines*, Vol. 54, No. 2, pp. 319–327. https://doi.org/10.1080/00083968.2019.1700809

Jiang, B., Zhao, S., Yin, J. (2008). Self-organized natural roads for predicting traffic flow: a sensitivity study, *Journal of Statistical Mechanics Theory and Experiment*, pp. 1–23. https://doi.org/10.1088/1742-5468/2008/07/P07008

Kim, H., Lee, S., Lee, J. (2022). Built Environment and Crime in a South Korean Context, *International Journal Civil Engineering and Urban Planning (CiVEJ)*, Vol. 9, No. 1, pp. 11–29. https://doi.org/10.5121/civej.2022.9102

Kinney, J. B., Brantingham, P. L., Wuschke, K., Kirk, M. G., Brantingham, P. J. (2008). Crime Attractors, Generators and Detractors: Land Use and Urban Crime Opportunities, *Built Environment*, Vol. 34, No. 1, pp. 62–74. https://www.jstor.org/stable/23289741

Klakla, J. B., Radomska, E., Szafrańska, M. (2021). Land Use and Facilities and the Spatial Distribution of Urban Poverty Crime, *Acta Univarsiitatis Lodziensis Folia Iuridica,* Vol. 94, pp. 65–95. https://doi.org/10.18778/0208-6069.94.05

Kliot, N., Charney, I. (2006). The Geography of Suicide Terrorism in Israel, *GeoJournal*, Vol. 66, pp. 353–373. https://doi.org/10.1007/s10708-006-9034-z

Kronkvist, K. (2022). *Locating Place, Crime and the Fear*

of Crime: Methodological and Theoretical Considerations (Doctoral Dissertation, Malmö University, Faculty of Health and Society, Malmö, Sweden). https://doi.org/10.24834/isbn.9789178773022 [Accessed: 13 Oct 2023].

Lafree, G., Dugan, L., Xie, M., Singh, P. (2012). Spatial and Temporal Patterns of Terrorist Attacks by ETA 1970 to 2007, *Journal of Quantitative Criminology*, Vol. 28, pp. 7–29. https://doi.org/10.1007/s10940-011-9133-y

Li, S. Y., Ni, S. J., Shen, S. F. (2014). Risk Analyzing on Target Type of Arson Attack, *Procedia Engineering*, Vol. 71, pp. 502–511. https://doi.org/10.1016/j.proeng.2014.04.072

Li, Y., Wu, Y. (2017). Research on the Impact of Crisis Events on Urban Development — A Case Study of Kunming Railway Station Terrorist Attack. In Y. Wu, S. Zheng, J. Luo, W. Wang, Z. Mo, L. Shan (Eds.), *Proceedings of the 20th International Symposium on Advancement of Construction Management and Real Estate*. Singapore: Springer Singapore, pp. 139–144. https://doi.org/10.1007/978-981-10-0855-9

Loukaitou-Sideris, A., Liggett, R., Iseki, H. (2002). The Geography of Transit Crime: Documentation and Evaluation of Crime Incidence on and around the Green Line Stations in Los Angeles. *Journal of Planning Education and Research*, Vol. 22, No. 2, pp. 135–151. https://doi.org/10.1177/0739456X02238443

Lynch, K., Rodwin, L. (2007). A Theory of Urban Form. *Journal of the American Institute of Planners*, Vol. 24, No. 4, pp. 201–214. https://doi.org/10.1080/01944365808978281

Lynch, K. (1960). *The Image of the City*. Massachusettes: MIT Press.

Marchment, Z. (2019). *Spatial decision making of terrorist target selection*. (Doctoral Dissertation, University College London, Department of Security and Crime Science, London, UK). https://discovery.ucl.ac.uk/id/eprint/10072782/1/Zoe%20Marchment%20Thesis%20COMPLETE.pdf [Accessed: 11 Mar 2020].

Mboup, G. (2019). Africa's Smart City Foundation: Urbanization, Urban Form and Structure, Land Tenure and Basic. In G. Mboup, B. Oyelaran-Oyeyinka (Eds.), *Smart Economy in Smart African Cities, Advances in 21st Century Human Settlements*, pp. 95–147. https://doi.org/10.1007/978-981-13-3471-9_3

Medina, R. M., Siebeneck, L. K., Hepner, G. F. (2011). A Geographic Information Systems (GIS) Analysis of Spatiotemporal Patterns of Terrorist Incidents in Iraq 2004 – 2009, *Studies in Conflict & Terrorism*, Vol. 34, No. 11, pp. 862–882. https://doi.org/10.1080/1057610X.2011.611933

Miller, J., Caplan, J. M., Ostermann, M. (2016). Home Nodes, Criminogenic Places, and Parolee Failure: Testing an Environmental Model of Offender Risk, *Crime & Delinquency*, Vol. 62, No. 2, pp. 169–199. https://doi.org/10.1177/0011128713478130

National Counterterrorism Centre (2007). *JCAT Counterterrorism Guide For Public Safety Personnel*. National Counterterrorism Centre [online]. https://www.dni.gov/nctc/jcat/references.html [Accessed: 11 Jun 2020].

O'Brien, D. T., Ciomek, A., Tucker, R. (2022). How and Why is Crime More Concentrated in Some Neighborhoods than Others?: A New Dimension to Community Crime, *Journal of Quantitative Criminology*, Vol. 38, pp. 295–321. https://doi.org/10.1007/s10940-021-09495-9

Okoye, I. E. (2021). Critical Analysis of Nigeria's Terrorism Prevention Acts of 2011 and 2013 (Amendment) and Implications on Human Rights, *Journal of Law, Policy and Globalization*, Vol. 109, pp. 20-30. https://doi.org/10.7176/jlpg/109-04

Olalere, U. B., Tunde, A. (2024). Assessing Nigerian Government's efforts in safeguarding citizens, utilities, and infrastructure from terrorist attacks, *Journal of Social Sciences*, Vol. 7, No. 1, pp. 100–113. https://doi.org/10.52326/jss.utm.2024.7(1).08

Onat, I., Gul, Z. (2018). Terrorism Risk Forecasting by Ideology, *European Journal on Criminal Policy and Research*, Vol. 24, pp. 433–449. https://doi.org/10.1007/s10610-017-9368-8

Onat, I. (2016). An analysis of spatial correlates of terrorism using risk terrain modeling. *Terrorism and Political Violence*, Vol. 31, No. 2, pp. 277-298. https://doi.org/10.1080/09546553.2016.1215309

Onuoha, F. C. (2014). Why Do Youth Join Boko Haram?, *Special Report 348 of the United States Institute of Peace*. https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.usip.org/sites/default/files/SR348-Why_do_Youth_Join_Boko_Haram.

Pakoz, M. Z., Gun, A. (2016). The transformation and reorganization of cities in Southeastern Turkey: An examination from the safety perspective, *52nd ISOCARP Congress*, pp. 1–13.

Pfeifer, J. W. (2013). Fire as a Weapon in Terrorist Attacks, *CTC-SENTINEL*, Vol. 6, No. 7, pp. 5–7. https://ctc.westpoint.edu/fire-as-a-weapon-in-terrorist-attacks/

Pung, J., D'Souza, R. M., Ghosal, D., Zhang, M. (2022). A road network simplification algorithm that preserves topological properties, *Applied Network Science*, Vol. 7, No. 79, pp. 1–16. https://doi.org/10.1007/s41109-022-00521-8

Sharifi, A. (2019). Urban form resilience: A meso-scale analysis, *Cities*, Vol. 93, pp. 238–252. https://doi.org/10.1016/j.cities.2019.05.010

Sharifi, A. (2018). Resilient urban forms: A review of literature on streets and street networks, *Building and Environment*, Vol. 147, pp. 171-187. https://doi.org/10.1016/j.buildenv.2018.09.040

Silke, A. (2011). Understanding Terrorist Target Selection. In A. Richards, P. Fussey, A. Silke (Eds.), *Terrorism and the Olympics*, New York: Routledge.

Sohn, D.-W., Yoon, D. K., Lee, J. (2018). The impact of neighborhood permeability on residential burglary risk: A case study in Seattle, USA, *Cities*, Vol. 82, pp. 27–34. https://doi.org/10.1016/j.cities.2018.05.002

Steinman, H., Drawve, G., Datta, J., Harris, C. T., Thomas, S. A. (2020). Risky Business: Examining the 80-20 Rule in Relation to a RTM Framework, *Criminal Justice Review*, Vol. 46, No. 1, pp. 20–39. https://doi.org/10.1177/0734016820938859

Tar, U. A., Ayegba, S. B. (2021). The Boko Haram Insurgency and Regional Security in the Lake Chad Basin : Understanding the Growth and Development Consequences. In K. Omeje (Ed.), *The Governance, Security and Development Nexus,* pp. 193–212. Cham: Palgrave Macmillan. https://doi.org/10.1007/978-3-030-49348-6_10

Tillyer, M. S., Walter, R. J. (2019). Busy Businesses and Busy Contexts: The Distribution and Sources of Crime at Commercial Properties, *Journal of Research in Crime and Delinquency*, Vol. 56, No. 6, pp. 816–850. https://doi.org/10.1177/0022427819848083

Torres-Soriano, M. R. (2019). How Do Terrorists Choose Their Targets for an Attack? The View from inside an Independent Cell How, *Terrorism and Political Violence*, Vol. 33, No. 7, pp. 1363-

1377. https://doi.org/10.1080/09546553.2019.1613983

Vilalta, C., Fondevila, G. (2021). Testing Routine Activity Theory in Mexico, *British Journal of Criminology*, Vol. 61, No. 3, pp. 754–772. https://doi.org/10.1093/bjc/azaa089

Vogelbacher, G., Harign, I., Fischer, K., Riedel, W. (2016). Empirical Susceptibility, Vulnerability and Risk Analysis for Resilience Enhancement of Urban Areas to Terrorist Events, *European Journal of Security Resources*, Vol. 1, pp. 151–186. https://doi.org/10.1007/s41125-016-0009-x

Waziri, M. (2009). *Spatial Pattern of Maiduguri City. Researchers' Guide*. Kano city: Adamu Joji Publishers.

Young, M. (2016). Officer Survival Spotlight: What Is a Safe Distance? — LEB, *FBI Law Enforcement Bulletin* [online]. https://leb.fbi.gov/spotlights/officer-survival-spotlight-what-is-a-safe-distance [Accessed: 9 Feb 2022].

Yue, H., Zhu, X. (2019). The influence of Urban Built Environment on Residential Burglary in China: Testing the Encounter and Enclosure Hypotheses, *Criminology & Criminal Justice*, Vol. 21, No. 4, pp. 508-528. https://doi.org/10.1177/1748895819874868 (Original work published 2021).

Yusof, I., Fauzi, R. (2019). The Spatial relation between Land use and Crime, *Malaysian Journal of Society and Space*, Vol. 15, No. 2, pp. 102–116. https://doi.org/10.17576/geo-2019-1502-08

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CONTINUOUS URBAN PLANNING IN THE CONTEXT OF AUTHORITARIAN NEOLIBERALISM

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The paper is dedicated to exploring the applicability of continuous urban planning as an existing instrument of urban planning to contemporary authoritarian-neoliberal tendencies. The aim is to illuminate, through a scientific and methodological approach, the extent to which urban planning is capable of adequately managing the changes manifested in the socio-spatial matrix of authoritarian neoliberalism using its decades-long developed instrument. The research focuses on identifying and analyzing aspects of continuous urban planning and authoritarian neoliberalism, based on relevant theoretical frameworks and empirical analysis within the context of Belgrade, which interpret the role and position of continuous urban planning in the challenges of the contemporary context of authoritarian neoliberalism. The research results show how the illuminated authoritarian neoliberal mechanisms, principles and tendencies in urban development reshape the role and position of contemporary urban planning instruments, with potential directions for their improvement aimed at increasing the resilience of urban planning to contemporary societal challenges.

***Key words*: continuous urban planning (CUP), instrument, authoritarian, neoliberalism, challenges.**

INTRODUCTION

The complex and dynamic nature of contemporary social changes presents a significant potential for transforming the established societal role and legitimacy of modern urban planning. Understanding the nature of these changes, the mechanisms, and the principles of their impact on urban planning, and the ability of urban planning to manage these changes while preserving strategic values and goals as part of its integrity, has become a priority in urban development. Based on theoretical insights, Continuous Urban Planning (CUP) is interpreted in this study as a traditional instrument of urban planning used to manage urban development under conditions of uncertainty and dynamic changes – such as processes, phenomena, states, and/or events – in the social environment and in urban planning itself, which are unknown at the time planning policies are created. The concept of CUP emerged in the second half of the 20th century, during the post-war reconstruction of cities on a global scale, where cities were seen as dynamic organisms whose new urbanization required abandoning pre-war static master planning in favor of process-oriented, continuous urban planning (Branch, 1981; Vuksanović-Macura *et al*., 2020; Macura *et al*., 2020). Its crucial goal is to increase certainty within the urban community in conditions of an uncertain future for urban development (Branch, 1975; Branch, 1981; Abbott, 2005; Vuksanović-Macura *et al*., 2020; Macura *et al*., 2020). CUP represents a system of permanent planning, applicable at all levels of planning, in which the plan is understood as a tool for regulating urban development, rather than being its goal or a static entity (Stojkov, 1972; Švabić, 1972; Stojkov, 1992; Macura *et al*., 2020). The intention is to achieve flexibility in urban planning in order to ensure stable urban development. This is made possible through a planning framework – including governance, institutional, legal, and planning elements – that enables the plan to follow urban development, adapt to its needs, and remain aligned with strategic commitments and value frameworks. CUP also exhibits certain weaknesses that need to be mitigated, such as being the prerequisite for a high level of competence and a holistic approach to planning by authorities, the administration, and professionals, the oversaturation of actors in the planning process due to frequent revisions, its vulnerability to authoritarian societal tendencies, and voluntarism (Vuksanović-Macura *et al*., 2020).

Neoliberalism represents the contemporary global context of social relations and processes, which, according to

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numerous studies and authors, has exhibited authoritarian characteristics and the strengthening of anti-democratic tendencies following the global crisis of 2007. As a result, it is conceptualized as authoritarian neoliberalism (AN) (Bruff, 2014; Bruff and Tansel, 2019; Laub, 2021; Piletić, 2022). This crisis highlights the unprecedented dynamics and complexity of current changes, bringing to the forefront the astonishing interconnection between economic, financial, monetary, and social development, which presents a challenge for contemporary planning systems regardless of the social order (De Roo *et al*., 2020a). The theoretical debate about a unified definition of AN is still ongoing within the academic community. Based on existing theoretical insights, this paper adopts the interpretation of AN as being characterized by the dominance of capital over the state, with regimes serving as instruments for implementing policies in line with this, regardless of the degree of democracy in society. Theoretical research on AN so far indicates that one of the key social areas undergoing transformation is urban space, primarily through a hegemonic discourse in the creation of urban policies, urban planning, and planning systems, which become subject to reconceptualization and redefinition in the interest of economic capital (Borén *et al*., 2021; Laub, 2021; Piletić, 2022).

By examining CUP from the theoretical perspective of AN, this study problematizes the interrelation between the implementation of traditional urban planning instruments and disruptive capital-driven interventions in urban space, serving as a motivation for the theoretical and empirical examination of these concepts. It is to be expected that the CUP in the context of AN will demonstrate its decades-long developed ability to adequately manage changes and continuously ensure balanced urban development, which is noticeably lacking. The central argument is that a potentially useful traditional instrument of urban planning in managing urban development (CUP), under the influence of AN, becomes instrumentalized in the interest of capital rather than the proclaimed sustainable urban development, which consequently significantly alters urban planning itself. The specific aim is to, through theoretical and empirical insights into these concepts and their interrelation, examine the causes of this phenomenon and the role and position of CUP in the context of AN, with the aim of strengthening the planning capacity to address contemporary societal challenges. The study begins by analyzing CUP as a planning instrument for managing uncertainties and dynamic changes in urban development and planning from historical, theoretical, and planning perspectives. Following this, CUP is considered within the framework of AN, where, through theoretical recognition of the urban-spatial aspect and the illumination of the mechanisms and principles of this concept, its impacts on the transformation and rapid urbanization of cities are explored, as well as the ability of contemporary urban planning to adequately manage these changes with its currently developed mechanisms. Through an empirical analysis of the Belgrade context, the understanding of AN manifestations in the application of CUP in planning practice is concretized. The concluding considerations summarize the results of examining the role and position of CUP within the socio-spatial matrix of AN, with the aim of enhancing this urban planning instrument and indirectly increasing urban resilience to the impending challenges of contemporary society.

Methodology

The methodological approach is based on a systematic literature review and critical analysis of scientific texts in the domains of CUP and AN, and empirical analysis of the Belgrade context. Based on a relevant theoretical framework, aspects significant for understanding, interpreting, and drawing conclusions about the concepts examined in this study, their mutual influences, and their impacts on urban planning and urban development are identified and analyzed. This method involves examining CUP through an analysis of historical aspects, with a focus on the general urban plans of Belgrade and the legal foundation of CUP starting from 1972, as well as theoretical and planning aspects in the context of Belgrade. AN is analyzed by exploring its conceptualization and periodization, with a focus on differentiating it from neoliberalism, theoretically recognizing the urban-spatial aspects of AN, and examining the authoritarian neoliberal mechanisms and principles in urban development based on the literature. The empirical analysis focuses on the level of general urban planning in Belgrade during the period of post-socialist transition, aiming to examine AN tendencies in the application of CUP in planning practice, through a chronological review and the characteristics of changes in urban planning. The level of general urban planning in Belgrade, as the framework for establishing CUP within the national context, provides relevant insights into its application in planning practice. According to theoretical insights (Piletić, 2022), AN tendencies in urban development and planning emerged during the post-socialist transition period (Maruna *et al.*, 2023). The empirical analysis relies on the application of CUP at the level of general urban planning in Belgrade between 2003 and 2016, as presented by Macura and other authors (Macura *et al*., 2020), but interprets CUP from the perspective of AN tendencies. The analysis by Macura *et al.* (2020) covers all adopted General Urban Plans (GUP) of Belgrade with amendments from 2003 to the present: (1) GP Belgrade 2021 (2003 GUP) (Službeni list grada Beograda, 27/2003, 25/2005, 34/2007, 63/2009, 70/2014); (2) the Special Purpose Spatial Plan from 2015 (2015 SPPP) (Službeni glasnik RS, 7/2015), which evolved from the amendments to the 2014 GUP; and (3) the GUP Belgrade from 2016 (2016 GUP) (Službeni list grada Beograda, 11/2016). As a supplement to the analysis by Macura *et al.* (2020), this study also considers the General Regulation Plan of Belgrade from 2016 (2016 GRP) (Službeni list grada Beograda, 20/2016), which is an integral part of the implementation of the 2016 GUP and, as such, can be indirectly considered part of CUP, with significant implications for urban development. This research then discusses and summarizes the key findings.

CONTINUOUS URBAN PLANNING

Historical background of continuous urban planning

CUP, as a system of permanent planning in contrast to the static nature of a single adopted document (Stojkov, 1972; Švabić, 1972; Macura *et al*., 2020), has emerged as a recurring theme in the history of American and European

urban planning over the past fifty years, as well as in the development of the most recent strategic urban plans for Belgrade (Macura, 2018).

Although the concept of CUP originated in the second half of the 20th century, linked to the post-war reconstruction of cities globally, it has undergone decades of modifications and transformations. Nowadays, the concept of CUP exists in many European countries, such as Norway, Denmark, Finland, Germany, England, and others, adapting to local specificities, including planning cultures, systems, and conditions (Branch, 1981; Vuksanović-Macura *et al*., 2020; Macura *et al*., 2020).

Today, the concept of sustainable development represents the contemporary global context in which CUP operates. It serves as a decades-long strategic and value framework for balanced urban development, with principles and goals proclaimed in global and national development documents that are legally binding in urban planning (Teofilović, 2024). Theoretically, sustainable development is conceptualized through the balance of three widely accepted dimensions of sustainable development: economic growth, social inclusion, and ecological balance, which also encompass the key critiques of this concept as a paradox of continuous economic growth and balanced development (Redclift, 2005). According to Teofilović (2024), the concept of sustainability is a fragile value framework for urban development, subject to various interpretations, meanings, translations, and interests over time, and dependent on political influences and contexts. Urban planning, with its instruments for managing urban development within such a value framework, has often blurred goals and outcomes, making it susceptible to being instrumentalized by more structured concepts, most commonly neoliberal ones in the contemporary context.

In the context of Belgrade, the idea of CUP as a form of permanent spatial development planning first appeared in the General Urban Plan of Belgrade from 1972 (1972 GUP) (Službeni list grada Beograda, 17/1972) (Stojkov, 1972). In the 2003 GUP, the term "continuous planning" was introduced instead of CUP. Conceptually, it did not significantly differ from the previous one, except in the methodological approach, which was adapted to the planning system of that time and had brief legal backing between 2004 and 2009 (Macura, 2018). In the 2016 GUP, the plan's implementation included a specific measure prescribing the evaluation and revision of the plan within a defined timeframe to ensure the vertical and horizontal alignment of planning documents. However, the concept of and the term CUP were omitted. Nevertheless, the Law on the Planning System of the RS (Službeni glasnik RS, 30/2018) introduced the principle of continuity in planning, which contains elements of CUP, thereby leaving legal space for further development and implementation of this concept.

The results of insights into the historical background indicate that the idea of CUP as a planning instrument has been continuously present in Belgrade's urban planning. The concept has never been fully implemented through planning documents or the legal framework. There is a persistent lack of (a) conceptual consistency in the planning framework and legislation, (b) continuous legal grounding, (c) a unified methodological approach, and (d) resilience against being instrumentalized for particular interests. The periodic legal and continuous planning presence of ideas related to CUP highlights the significant need for such or similar instruments in modern planning systems and the necessity for its comprehensive development and refinement, especially in response to contemporary societal trends, by addressing the recognized weaknesses.

Theoretical aspect of continuous urban planning

Initially designed as a more complex and flexible approach compared to static strategic planning, CUP enables a more effective response to changes, aiming to exert a certain level of control over urban growth and development (Stojkov, 1972). In the face of increasing global and local changes and uncertainties, recent discourses are shifting urban planning from being a process of guiding and controlling based on decisions, to one of monitoring and responding (De Roo *et al*., 2020b).

One interpretation of CUP is continuous spatial development planning that includes processes of permanence, cyclicality, and the interdependence of different levels of planning, as conceptualized in the 1972 GUP (Stojkov, 1972; Stojkov, 1992). With each cycle, CUP becomes enriched and advanced with new knowledge and experience (Vuksanović-Macura *et al*., 2020). From the perspective of planning practice, the conceptualization of CUP is as a determined spiral of planning processes, where the Planning Law is central, surrounded by other elements of CUP, and as a flexible, legally grounded process of revising strategy and long-term planning within relatively short political mandates and budgetary intervals. This becomes clearer when examined through the examples of Stavanger in Norway and Belgrade in Serbia (Vuksanović-Macura *et al*., 2020). CUP is further grounded in the context of managing uncertainties that inevitably arise from the social context of planning, the environment, and the planning process itself (Abbott, 2005). From a legal perspective, CUP can also be seen as a means of preventing plan entropy by maintaining the plan's freshness and relevance through a process of constant amendments and updates within a specific timeframe, as illustrated by the Belgrade context (Macura *et al*., 2020). The latest theoretical frameworks related to CUP are found in the fields of adaptive planning and urban adaptability. However, advocates also acknowledge that connecting adaptability with issues such as legal certainty, reliability, and sustainability still characteristic of traditional planning is challenging and requires further systematic research (De Roo *et al*., 2020a; De Roo *et al*., 2020b). This trajectory aligns with contemporary theoretical insights on urban resilience, which is viewed as the capacity of an urban system to absorb initial shocks, minimize the impact of disruptions, adapt to system changes that limit adaptive capacity, and return to a balanced state (Ribeiro and Gonçalves, 2019). The paradox of CUP lies in the need to reconcile the contradictory concepts of permanence and simultaneous change over time and space (Stojkov, 1972), to balance stability and change in long-term planning (Vuksanović-Macura *et al*., 2020), and to navigate between certainty and uncertainty in the social environment (Branch, 1975; Abbott, 2005). When

uncertainty and unpredictability are viewed through the lens of urban plans, long-term planning is often associated with greater uncertainty compared to short-term plans, which are characterized by a high level of predictability (Abbott, 2005).

The interpretation of CUP from various theoretical perspectives indicates the beauty of contemporary theories that provide a foundation for this concept. Given the dynamic nature of urban development and growth processes, the planning process itself, along with the plans that are its products, must possess characteristics that render them purposeful. This implies that the analysis of the system cannot be limited only to its constituent parts, and it is necessary to understand that the parts of the system, the system as a whole, and the context in which the system exists continuously establish and rearrange their interrelations (De Roo *et al*., 2020a).

Understanding the complexity of these changes is a prerequisite for developing adequate urban planning instruments capable of managing such changes.

Planning aspect of continuous urban planning

According to Vuksanović-Macura *et al*. (2020) the key characteristics of CUP are: ***legislation*** that represents a safety factor towards safe and quality urban development, legitimate use of political power, transparency of methodologies and processes, with defined responsibility for outcomes; ***participativeness*** – by including all actors in the planning process, the legitimacy of planning is ensured through consensual decision-making on the directions of future urban development and the improvement of communication tools; ***uncertainty and flexibility –*** modern society is exposed to numerous uncertainties and crises, which is why it is necessary to ensure the stability of urban development through flexible tools with the sequence of phases: monitoring-uncertainty-flexible response-certainty; ***changeability and protectiveness*** – achieving a balance between the need for change and the need for an unchanged state of the various actors in urban planning; and ***security***, as a form of uncertainty management, a response to humanity's needs for a more certain life in an urban environment, which strengthens public trust in the planning process and reduces tensions between public and private interests in planning.

In the context of planning systems, the essence of the CUP process is a strategic urban plan that determines the long-term strategic vision, framework and goals of urban development, which is subject to medium-term revisions that are supported by short-term updates in order to link the budget, annual action plans and the continuity of their implementation (Stojkov, 1972; Švabić, 1972; Branch, 1981; Macura *et al*., 2020). This type of traditional planning is suitable when managing predictable changes, but far less effective when it comes to unpredictable changes in the future, primarily because it is based on procedures and decisions that are expected to ensure the desired future, which is largely absent, rarely taking into account that the very processes of research, creation, decision-making and implementation of ideas, the actors involved and their interrelationships in planning can be variable and changeable (De Roo *et al*., 2020b). By conceptualizing CUP as an urban planning instrument in the management of urban development that is separate from the vision represented, it leaves the possibility of using CUP for very different goals, not necessarily based on the principles of sustainable development (Macura *et al*., 2020).

In Serbia, the Law on the Planning System (Službeni glasnik RS, 30/2018) made it possible to integrate broader development policies into one urban document for the first time. The GUP is the only urban document that appears both in the Law on Planning and Construction and in the Law on the Planning System, which positions it as a link between strategies and detailed urban planning, i.e. leaves the possibility for the implementation of development policies in urban plans (Graovac *et al*., 2021). At the same time, the GUP is considered the initial urban planning document of CUP, while the legal regulation of this process is interpreted as a form of multi-layered security in development processes and the legitimate use of political power (Stojkov, 1972; Macura, 2018; Vuksanović-Macura *et al*., 2020).

The results of insights into the planning framework indicate the existence of theoretical assumptions about the characteristics of CUP and its positioning within the planning system, but its effectiveness is questionable due to complex procedures and decision-making, and its detachment from the vision of urban development. In stable democracies, CUP has a clear methodology, processes, time intervals, and goals aligned with local specificities, whereas in countries with transitional contexts undergoing social transformations, this process is hindered and inconsistent due to the instability of the social system (Macura *et al*., 2020). In the local context, despite efforts in different socio-economic systems to methodologically and legally design planning systems in line with the CUP concept, there has consistently remained the possibility for voluntarism and random changes driven by particular interests (Macura *et al*., 2020), which undermines the credibility of the planning instrument itself.

AUTHORITARIAN NEOLIBERALISM

Conceptualization and periodization of authoritarian neoliberalism

The rise of authoritarian neoliberalism is linked to the period of the global economic crisis after 2007 (Bruff, 2014; Lendvai-Bainton and Szelewa, 2021). The continuity of crises over the last two decades has led states and institutions to implement intensified repressive measures to protect capital and social relations (Juego, 2018). For a general conceptual understanding of the essential aspects of AN, it is considered crucial to differentiate it from neoliberalism. It is situated beyond the simplistic view of neoliberalism as a free market and is instead explored in the domain of supporting and protecting capital accumulation in the name of the free market, leading to the growth of unequal social relations (Bruff, 2014; Bruff and Tansel, 2019). The novel, currently relevant, and simultaneously evolving character of AN raises important questions about understanding this novelty and the historicity of practices associated with it. At the same time, it is suggested that the questions of

conceptualization and periodization should remain open, as strictly scientific determination could be counterproductive in creating broader scientific perspectives for understanding this concept (Bruff and Tansel, 2019).

The most widely accepted interpretation of AN is that it is a concept on the rise, referring to the investigation of processes occurring simultaneously (without any historical distance), and it is rooted in the reconfiguration of the state into a less democratic entity that seeks to be insulated from social and political conflicts through constitutional and legal changes to protect capital (Bruff, 2014; Bruff and Tansel; Laub, 2021; Piletić, 2022). A somewhat broader interpretation is that AN should be viewed not only as an organizational entity like the state but also as a form of social relations, or a specific form of capitalist social regime in which the relations between the political and economic spheres are organically connected (Juego, 2018; Piletić, 2022). The term is also used to denote regimes that use authoritarian political leadership to further neoliberalize the market, which can be understood more clearly through the examples of Serbia, Hungary, and Poland (Borén *et al*., 2021; Lendvai-Bainton and Szelewa, 2021; Piletić, 2022).

However, in addition to this understanding of the intertwining of authoritarian statism and neoliberal reforms, other theoretical trajectories are also present, such as: the frequent invocation of the lack of material resources as a justification for the state's inability to halt and reverse processes like growing social inequality, based on the example of London, UK (Bruff, 2014; Laub, 2021); the intensification of state control and the restriction of rights and freedoms as illustrated by the examples of the cities of Gdańsk, Poland and London, UK (Borén et al., 2021; Laub, 2021); and/or the questioning of the welfare state in light of social polarization and the new divisions it generates in light of the examples of Hungary and Poland (Lendvai-Bainton and Szelewa, 2021). In summary, these theoretical trajectories tend to overlap, and the conceptualization of AN should be sought along their trajectories and at their intersection points. AN also exhibits certain weaknesses inherent to the concept itself, which are primarily reflected in the challenges of resolving conflicts between competing elements of capital that require mediation mechanisms and the assumption of responsibility in the relationship between the market and the state, something that is foreign and unacceptable to most authoritarian regimes (Juego, 2018). In the context of these interpretations, AN can also be seen as a set of mutually contradictory practices that, due to crises, simultaneously strive for domination but also constantly generate resistance, which means that AN cannot be considered a final state of existence but rather a process that aims for constant self-preservation (Bruff and Tansel, 2019).

Although the rise of AN is linked to the global crisis after 2007, it is not denied that neoliberalism exhibited authoritarian characteristics even before this historical moment, which became clearly illuminated and dominant after the crisis. What is now in focus is how today's practices differ from established logics of capitalist governance and why capitalism is prone to producing authoritarian governance (Bruff and Tansel, 2019).

The mechanisms characteristic of this concept have historical parallels in the political philosophies and systems of the 20th century. However, AN is primarily understood as a more aggressive form of neoliberalism, marked by the further development of specific mechanisms of coercion, repression, social inequality, and the reconfiguration of social systems and relations to protect the unimpeded flow of capital and the interests of privileged social strata. In all social spheres, particular interests dominate public ones, secured through constant institutional and regulatory restructuring until the ultimate goal – capital accumulation – is achieved. The state is subordinated to the interests of capital, while marginalized social groups and social policies are lightly assigned the role of bearing the burden of socio-economic crises, which capital itself is highly prone to creating. The state has always tended to protect capital, but capital was once created in a more static social environment compared to the dynamics of contemporary changes and the general uncertainty they produce.

Urban spatial aspect of authoritarian neoliberalism

Theoretical considerations of AN in urban planning so far increasingly acknowledge the coercive and authoritarian transformation of cities, but urban redesign and spaces are more often viewed through the prism of capital, with less direct connection to the state itself (Borén *et al*., 2021; Laub, 2021; Piletić, 2022). In the context of ongoing debates on the predominantly political and economic conceptualization of AN, it is noted that one of the key social areas undergoing transformation is the urban space, with particular emphasis on understanding the struggle around the concept of "public," whether it refers to public services, public spaces, or public goods (Bruff and Tansel, 2019). Urban policies and planning systems are particularly exposed to the reconceptualization and redefinition of both the role and purpose of public space and the role of land through institutional mechanisms for amending legal and planning regulations, as illustrated by the examples of the cities of Gdańsk in Poland, London in the UK, and Belgrade in Serbia (Borén et al., 2021; Laub, 2021; Piletić, 2022). The examples of these cities suggest that neoliberal urbanism can be viewed from the perspective of cities recognized as important economic, political, cultural, and social actors in global capital flows and international policies. In summary, neoliberal projects as spatial manifestations of AN can be seen as a key channel for establishing an authoritarian regime through the introduction of new flows of international capital and the reformulation of the city's relationship with national structures through legal, urban-planning, and administrative restructuring (Borén *et al*., 2021; Lendvai-Bainton and Szelewa, 2021; Piletić, 2022; Maruna *et al.,* 2023).

Authoritarian-neoliberal mechanisms and principles in urban development

In the context of urban-spatial analysis of AN based on the literature analyzed, specific mechanisms and principles of its operation in urban development have been identified. These are: (a) reshaping of the city structure in the process of forming cultural and creative urban policies through multiscalar connections – the example Gdansk, Poland

(Borén *et al*., 2021); (b) spatial transformations supported by state reconfiguration in the interest of capital and the social elite – the example of London, UK (Laub, 2021); and (c) the implementation of AN urban projects through, related to the first mechanism, the process of regulatory rescaling and reconfiguration of relations within the state – the example Belgrade, Serbia (Piletić, 2022).

Analyzing the three identified mechanisms of the urban-spatial aspect of AN, their common principles are observed: (a) socio-political relations surrounding the implementation of neoliberal projects, rather than their spatial or territorial interpretation and impacts; (b) neoliberal projects represent a key method for capital accumulation, which drives significant pressure to restructure institutional and legal frameworks at all levels to ensure the uninterrupted flow of capital and particular interests; and (c) viewed in this way, urban space becomes the physical embodiment of AN social relations and the protection of capital and powerful interests. The specificity of the mechanisms is manifested through a wide range of social spheres that are subject to the influences of AN.

Authoritarian-neoliberal tendencies in the application of CUP at the level of general urban planning in Belgrade during post-socialist transition

The empirical analysis, thoroughly explained in the methodology section, enabled conclusions regarding the manifestation of AN tendencies in the application of CUP in Belgrade's planning practice:

- Trend of frequent changes within a short time period – over 13 years, eight planning documents were adopted, with four of them issued in the last two years;
- Trend of increasing complexity of changes over time – from minor but significant changes regarding the transformation of planned uses and the increase in construction capacity at specific locations (2005, 2007, 2009), the process culminates in major systemic changes in urban planning between 2014 and 2016. On the legislative level, these changes are reflected in the disruption of the established hierarchy of plans (with the adoption of the 2015 SPPP suspending the GUP on part of its central territory; the introduction of the 2016 PGR formalizes the GUP) (Graovac *et al*., 2021; Piletić, 2022), while on the planning level, they are expressed through the relativization of overall planning solutions (2016 GRP) (Maruna *et al*., 2023). The absence of changes or a new GUP since 2016, despite the previous dynamic planning activity, suggests that under the influence of AN tendencies, the focus has shifted to lower levels of planning;
- Trend of decision making within political and governance structures – since 2009, new study foundations and annual monitoring and evaluation of the implementation of the planning document, as required by the 2003 GUP, have been absent (Macura *et al.*, 2020). This indicates a trend of marginalization of the professionals and academics in the planning process, the disregard of prescribed procedures, and the neglect of social and ecological effects of planned changes, calling into question the justification of planning decisions; and
- Trend of revision of the legislative framework – this begins with enabling phased implementation of changes to the 2003 GUP (2007, 2009) and culminates in legislative changes allowing the implementation of the neoliberal project on the central territory of the GUP through the 2015 SPPP (Piletić, 2022). This reduces the potential for legitimate use of political power and the transparency of the planning process, and it redefines the very practice of planning (Piletić, 2022).

The results of the empirical analysis indicate that although the neoliberal character of changes is present throughout the entire period analyzed, they exhibit a cumulative effect over time, culminating in significant systemic changes in urban planning during the later stages of CUP application. According to Piletić (2022), this temporal and conceptual alignment coincides with the rise of AN tendencies at the local level. The open and flexible approach to CUP in relation to capital gradually transforms it into an instrument, under the influence of AN tendencies, that can manipulate the established planning system at legislative, hierarchical, managerial, and procedural levels. The initial focus on transforming individual locations in the process of applying CUP gradually shifted towards establishing an AN planning principle (Službeni list grada Beograda, br. 11/2016), in which changes in urban space are no longer conditioned by alterations to the planning basis. This principle facilitates the flow of capital, independent of specific locations in space, through simpler procedures at lower planning levels. The high efficiency of the established principle, the formalization of the role of the GUP, and the marginalization of strategic planning are evident in the absence of changes or new GUPs since 2016. The trends suggest that the effects of these changes are neither short-term nor limited to specific neoliberal projects, but rather exhibit an evolutionary character over time, with long-term systemic consequences for urban planning. These insights are consistent with the third identified theoretical mechanism of AN.

CONTINUOUS URBAN PLANNING IN AUTHORITARIAN NEOLIBERALISM

Based on the analysis, AN represents the current context in which urban development takes place. It emerges as a novelty resulting from socio-economic crises and can be seen as an unexpected shift from established social conditions or, from the perspective of previous urban planning, as an uncertainty faced unplanned. In this sense, AN can be viewed as a fitting test for the concept of CUP, illuminating its fundamental scope and weaknesses, as well as roles and positions in social reality.

The analyses indicate that within the context of AN, CUP retains its role as a traditional urban planning instrument, but its position has shifted from the principle of achieving balanced and sustainable urban development to primarily serving the interests of capital. With this shift, CUP becomes susceptible to instrumentalization in the implementation of AN tendencies in urban space, thereby contributing to the imbalance of urban development, which contradicts its fundamental conceptual foundations. Therefore, it can be concluded that while the current conception of

CUP is generally applicable in urban planning practice, the outcomes of its application in AN contexts raise ethical dilemmas, making it unsuitable as an effective urban planning instrument in specific AN circumstances. Preserving the initial conceptual position of CUP, which entails acting upon dynamic contexts rather than adapting its position to the prevailing context, would enable the CUP to manage changes more effectively, regardless of contextual specificities. The implementation of CUP in accordance with the principles of sustainable development is an indicator of the resilience of urban planning to AN tendencies. The causes of the CUP's sensitivity to the AN context, which prevent it from being considered an adequate planning instrument in this specific environment, while also serving as guidelines for its improvement, lie both in the complexity of AN and in the conceptual framework and application of CUP itself. These factors are summarized below.

Firstly, the identified mechanisms of the urban-spatial aspect of AN, in line with the findings of authors Boren *et al*. (2021), Laub (2021), and Piletić (2022), indicate its aggressive impact on urban development through the transformation and reshaping of all aspects of urban planning. This includes urban policies, planning systems, urban spaces, planning and decision-making processes and levels, and the exclusion of subordinate social groups and their interests. Analysis of the Belgrade context indicates that the changes occur rapidly and within a short time, leaving no room for the consolidation of planning practices. In terms of CUP, this requires demonstrating the practical ability of urban planning to manage multi-layered uncertainties within the planning system, acting at the moment of change, and the local and global context. The complexity of the AN context, as highlighted by authors Bruff (2014), Bruff and Tansel (2019), Laub (2021), and Piletić (2022), reveals the weakness of CUP's capacity to maintain its position under such circumstances. Instead of managing complex economic, social, and environmental changes, it becomes a tool for implementing capital-driven disruptive changes in urban space. This transformation of CUP's position influenced by AN tendencies contributes to a shift in the very nature of urban planning, steering it toward deregulation, formalization, and catering to the interests of capital. The placement of capital in urban space, accompanied by the consistent application of sustainability principles, would significantly reduce these negative effects.

Furthermore, the empirical analysis highlights CUP's inability to preserve the integrity of its conceptual framework under AN influences. Instead, it demonstrates susceptibility to interest-driven selective application of its fundamental elements. AN exploits this weakness of CUP in order to retain and exploit beneficial elements, such as principles of flexibility, formal procedures, and constant plan revisions, while discarding elements of CUP that restrict capital flow and accumulation. These discarded elements include strategic policies, values, and goals related to sustainable and balanced urban development, protection of the public interest, and the participation of subordinate social groups in decision-making. As a result, planning loses its important role as a corrective factor for the free market (Graovac *et al*., 2021). In terms of legislation, the AN restructuring of institutional, legal, and planning frameworks, as presented by Piletić (2022), has intensified legal uncertainty and unpredictability within the social and planning systems. It has strengthened political influence in planning while bypassing the formal legal procedures of CUP. Additionally, regarding the management of uncertainty and flexible planning approaches, there is a lack of systematic and methodological monitoring of the implementation of adopted strategic directions – an essential part of CUP. Instead, goals are achieved through coercive, random, and discontinuous solutions driven by particular interests.

Through its subtle mechanisms, AN, by weakening the state and through institutional, economic, and legal reconceptualization as presented by Laub (2021) and Piletić (2022), increases social inequality, making subordinate social groups more vulnerable and disenfranchised on various grounds and rights, in order to enable and protect the uninterrupted flow of capital. It formalizes their involvement and eliminates the possibility of achieving broad social compromise and consensus.

The conceptual premise that CUP serves as an instrument for urban development management independent of the vision it represents, allows for the instrumentalization of the legitimate planning process for particular interests as presented by Macura *et al.* (2020). If sustainable urban development, based on adopted public policies, is the goal of urban planning, then CUP, as an instrument of urban planning, must aim towards the proclaimed goal or vision. Establishing a clear link between CUP and the vision of urban development strengthens CUP's position, enabling it to implement decisions based on sustainability principles and persistence towards established sustainable development goals, despite pressures from societal realities.

Ultimately, the potential neoliberal foundations of CUP manifest through advocating for openness and flexibility in urban planning toward investments, while respecting the public interest, as emphasized by Macura et al. (2020), which often remains neglected in planning practice exposed to AN tendencies. By focusing on economic interests amid legal, planning, and methodological shortcomings, CUP in planning practice – under the influence of AN – tolerates the neglect of the social and environmental impacts of such interventions. Thus, in accordance with Redclift's interpretation (2005), it fails to consider and manage the overall distribution of burdens created by these actions, which are most often borne by subordinate social groups. The insight that the CUP is potentially more inclined toward developmental rather than principles of urban development can be considered the root of the easy manipulation of AN tendencies with this urban planning instrument and its inadequacy, in its current form, as a framework for overcoming urban planning issues in AN contexts.

CONCLUDING CONSIDERATIONS

The traditional grounding in planning practice of many planning cultures makes CUP a respected and useful instrument in modern urban planning. In the context of AN, there is a pronounced tendency to use traditional planning tools to secure planning legitimacy for particular

interests, independent of the proclaimed values of urban development. For CUP to be an effective urban planning instrument, it requires a robust and structured value framework with precise goals to guide every decision-making process. The concept of sustainable development has so far failed to ensure this, and the context of AN has highlighted and exploited this failure. It has shown how changes can be intense, comprehensive, and devastating to urban spaces and modern urban planning, which exhibits significant fragility and servility towards political and economic interests instead of readiness to manage changes and, especially, defend strategic values and sustainable urban development goals. By intervening in management structures, legal regulations, and planning processes, AN ensures the dominance of continuous economic growth over other aspects of sustainable development, not only by neglecting them but also by intentionally suppressing and marginalizing them.

Strengthening the concept of CUP in response to contemporary social trends should focus on reinforcing and maintaining a consistent value framework for urban planning. At the same time, it should aim to reconceptualize the foundational principles of CUP as a value- and ethically-oriented approach, rather than merely an operational and developmental tool, to be consistently implemented in planning practice.

Positioning CUP as part of the planning system potentially provides a more comprehensive foundation through value-based, legal, and methodological determination. However, AN actions have highlighted significant shortcomings in the planning system, revealing its vulnerability to contemporary social changes that lead to unsustainable outcomes in urban development. This is evident not only in the system's inability to recognize and manage modern changes but also in how these changes develop mechanisms to adapt the system and its elements to their interests, leading to the eventual transformation or takeover of the system itself. A key mechanism in this process is reliance on political and administrative structures of the system while marginalizing the influence of other actors in decision-making about urban development. In such dynamics, interests overshadow values, and urban development tends towards imbalance.

Contemporary planning systems clearly need further development and refinement of planning instruments related to CUP. Theoretical, institutional, legal, planning, and methodological structuring of CUP as a planning instrument can be considered urgent in modern urban planning, given the changes it faces. Addressing the challenges that urban planning and its instruments encounter in the current context seems to lie in the trends of modifying traditional approaches in line with the principles of adaptive and resilient planning to enhance the resilience of urban planning against the pressures of societal realities.

Although AN appears to be a highly structured and resilient concept with potential for longevity, deepening social polarization is a primary source of resistance to this concept, with the capacity to both transform and undermine it in the future. Its continued rise seems contingent on the dynamics between societal pressures and resistance, with its strength tending to wane as society moves toward more balanced urban development. Shifting the theoretical focus from an exclusive examination of AN through large neoliberal projects to contemporary trends and processes in urban planning could further illuminate the impact of this concept on urban transformation and rapid urbanization, thereby contributing to the refinement of planning instruments for a more balanced, sustainable, and predictable urban development.

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REFERENCES

Abbott, J. (2005). Understanding and managing the unknown: The nature of uncertainty in planning, *Journal of Planning Education & Research*, Vol. 24, No. 3, pp. 237–251. https://doi.org/10.1177/0739456X04267710

Borén, T., Grzyś, P., Young, C. (2021). Spatializing authoritarian neoliberalism by way of cultural politics: City, nation and the European union in Gdańsk's politics of cultural policy formation, *Environment and Planning C: Politics and Space,* Vol. 39, No. 6, pp. 1211-1230. https://doi.org/10.1177/2399654420965239

Branch, M. C. (1981). *Continuous city planning: Integrating municipal management and city*. New York: John Wiley & Sons.

Branch, M. C. (1975). (Ed.), *The comprehensive planning process: Several views*. Washington: American Institute of Planners, pp. 31–55.

Bruff, I., Tansel, C. B. (2019). Authoritarian neoliberalism: Trajectories of knowledge production and praxis, *Globalizations,* Vol. 16, No. 3, pp. 233-244. https://doi.org/10.1080/14747731.2018.1502497

Bruff, I. (2014). The rise of authoritarian neoliberalism, *Rethinking Marxism,* Vol. 26, No. 1, pp.113-129. https://doi.org/10.1080/08935696.2013.843250

De Roo, G., Rauws, W., Zuidema, C. (2020a). Adaptive planning and the capacity to perform in moments of change. Chapter 5. In G. De Roo, C. Yamu, C. Zuidema (Eds.), *Handbook on Planning and Complexity*. Cheltenham: Edward Elgar Publishing, pp. 85-109. https://doi.org/10.4337/9781786439185.00010

De Roo, G., Rauws, W., Zuidema, C. (2020b). Rationalities for adaptive planning to address uncertainties. Chapter 6. In G. De Roo, C. Yamu, C. Zuidema (Eds.), *Handbook on Planning and Complexity*. Cheltenham: Edward Elgar Publishing, pp. 110-150. https://doi.org/10.4337/9781786439185.00011

Graovac, A., Đokić, J., Teofilović, A., Teofilović, V. (2021). Uloga i dometi generalnog urbanističkog plana u savremenom planiranju Beograda (in Serbian), *Arhitektura i urbanizam*, No. 52, pp. 7-15. https://doi.org/10.5937/a-u0-28741

Juego, B. (2018). Authoritarian neoliberalism: Its ideological antecedents and policy manifestations from Carl Schmitt's political economy of governance, *Halduskultuur,* Vol. 19, No. 1, pp. 105-136. https://doi.org/10.32994/ac.v19i1.209

Laub, M. M. (2021). Policing authoritarian neoliberalism in South London, *Political Geography,* No. 90, 102471. https://doi.org/10.1016/j.polgeo.2021.102471

Lendvai-Bainton, N., Szelewa, D. (2021). Governing new authoritarianism: Populism, nationalism and radical welfare reforms in Hungary and Poland, *Social Policy and*

Administration, Vol. 55, No. 4, pp. 559-572. https://doi.org/10.1111/spol.12642

Macura, V., Ferenčak, M., Gvozdić, M., Tomić, V. (2020). Generalni plan Beograda 2021 i njegove revizije: Kontinuirano planiranje grada (in Serbian), *Godišnjak grada Beograda*, No. 66/67, pp. 89–150.

Macura, V. (2018). Sećanje na akciju: Generalni plan Beograda iz 2003 za 2021 (in Serbian). In Ž. Gligorijević, A. Graovac (Eds.), *70 godina Urbanističkog zavoda Beograda*. Belgrade: Urbanistički zavod Beograda, pp. 24–32.

Maruna, M., Teofilović, V., Milovanović Rodić, D. (2023). Transformacija institucionalne strukture urbanističkog planiranja u post-socijalističkoj tranziciji: primer Savskog keja na Novom Beogradu (in Serbian), *Arhitektura i urbanizam*, No. 57, pp. 5-16. https://doi.org/10.5937/a-u0-45379

Piletić, A. (2022). The role of the urban scale in anchoring authoritarian neoliberalism: A look at post-2012 neoliberalization in Belgrade, Serbia, *Globalizations*, Vol. 19, No. 2, pp. 285-300. https://doi.org/10.1080/14747731.2021.1882817

Redclift, M. (2005). Sustainable development (1987–2005): an oxymoron comes of age, *Sustainable development*, Vol. 13, No. 4, pp. 212-227. https://doi.org/10.1002/sd.281

Ribeiro, P. J. G., Gonçalves, L. A. P. J. (2019). Urban resilience: A conceptual framework, *Sustainable Cities and Society,* No. 50, 101625. https://doi.org/10.1016/j.scs.2019.101625

Službeni glasnik RS (br. 30/2018). *Zakon o planskom sistemu* (in Serbian). Belgrade: JP „Službeni glasnik".

Službeni glasnik RS (br. 7/2015). *Uredba o utvrđivanju Prostornog plana područja posebne namene uređenja dela priobalja grada Beograda - područje priobalja reke Save za projekat „Beograd na vodi"* (in Serbian). Belgrade: JP „Službeni glasnik".

Službeni list grada Beograda (br. 20/2016). *Plan generalne regulacije građevinskog područja sedišta jedinice lokalne samouprave - grad Beograd (celine I – XIX)* (in Serbian). Belgrade: JP „Službeni glasnik".

Službeni list grada Beograda (br. 11/2016). *Generalni urbanistički plan Beograda* (in Serbian). Belgrade: JP „Službeni glasnik".

Službeni list grada Beograda (br. 27/2003, 25/2005, 34/2007, 63/2009 i 70/2014). *Generalni plan Beograda 2021* (in Serbian). Belgrade: JP „Službeni glasnik".

Službeni list grada Beograda (br. 17/1972). *Odluka o Generalnom urbanističkom planu Beograda* (in Serbian). Belgrade: JP „Službeni glasnik".

Stojkov, B. (1992). *Plan i sudbina grada* (in Serbian). Beograd: Građevinska knjiga.

Stojkov, B. (1972). Trajno planiranje prostornog razvoja, *Urbanizam Beograda,* No. 18, pp. 19–22. https://www.urbel.com/uploads/Urbanizam_Beograda/UB18.pdf

Švabić, M. (1972). Ekspoze Mihaila Švabića predsednika Saveta za urbanizam (in Serbian), *Urbanizam Beograda*, No. 19, pp. 4-12. https://urbel.com/uploads/Urbanizam_Beograda/UB19.pdf

Teofilović, V. (2024). Implementacija globalnih razvojnih koncepata u urbanističko planiranje na primeru koncepta održivosti. In A. Jevtić (Ed.), *20th Scientific-Professional Conference with International Participation Urban and Sustainable Development*. Belgrade: Udruženje urbanista Srbije, pp. 105-111. DOI: 10.46793/Urbanizam24.105T. https://doi.ub.kg.ac.rs/doi/zbornici/10-467932-urbanizam24-105/

Vuksanović-Macura, Z., Gvozdic, M., Macura, V. (2020). Continuous Planning: Innovations from Practice in Stavanger (Norway) and Belgrade (Serbia), *Planning Theory & Practice*, Vol. 21, No. 5, pp. 727-747. https://doi.org/10.1080/14649357.2020.1849776

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REFLECTIONS ON CLIMATE CHANGE CHALLENGES IN FAMILY HOUSE DESIGN

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Climate change is increasingly influencing how residential spaces are designed and used. While much attention has been given to dense urban environments, single-family homes in suburban and rural areas remain largely absent from mainstream climate strategies, despite their significant environmental footprint. This paper introduces a conceptual framework for climate-resilient housing, built around four key strategies: adaptation, mitigation, prevention, and compensation. It takes into account not only technical performance but also the spatial, ecological and social dimensions of housing. The study applies a qualitative and interpretive research approach, combining typological building analysis, environmental performance data, and literature on sustainable planning. To explore how the framework might be implemented in practice, three European case studies are used: Vauban in Freiburg, BedZED in London, and Aspern Die Seestadt in Vienna. Each of these offers a distinct model of sustainable housing development and provides a valuable basis for comparative analysis. By connecting local housing typologies with broader environmental systems, the framework contributes to a more integrated understanding of how single-family homes can actively support climate resilience. The findings offer a foundation for developing more adaptive, resource-conscious and socially inclusive approaches to residential design.

***Key words*: climate change, single-family housing, sustainability, adaptation.**

INTRODUCTION

This article addresses the challenges of climate change in the design of single-family homes. This theme is fundamental for human development, namely housing. As humankind has evolved, so has housing, from caves converted to living spaces to the permanent houses we see today. Since the time of cave dwelling until today, accommodation and residential functions have been inextricably linked.

The primary function of a shelter was and is protection from the elements. At the same time, it enables community life and forms the core of society. Over time, people have added more features to their dwellings within the built environment. The dominant European view is that history "always begins with hunters, then passes to a stage of pastoralism, then to agriculture, and only then finally to the contemporary stage of urban commercial civilization" (Graeber and Wengrow, 2021, p. 60). Consequently, housing represents a status symbol associated with property since "cash income, political power, calorie intake, house size, number and quality of personal possessions" (Graeber and Wengrow, 2021, p. 74) define social status today. In particular, the protective function is becoming increasingly important nowadays, since climate change poses a threat in many ways, as illustrated in Figure 1.

Germany has recorded an average of 5,000 heat deaths per year in the last five years. Between 2018 and 2023, the numbers vary between an estimated 8,300 deaths in 2018 and an estimated 1,900 deaths in 2021 (Winklmayr and an der Heiden, 2022). Figure 2 shows that in 2018 there were many weeks with an average temperature of more than 20°.

In 2021, it was significantly less. Therefore, the connection between heat and the number of deaths is obvious and implies that living space is becoming less and less protective against heat (Winklmayr and an der Heiden, 2022). According to Läpple (2022), hardly any other area of the economy or society has such a large ecological footprint as the construction industry. The industry relies on fossil energy sources and uses many non-renewable resources.

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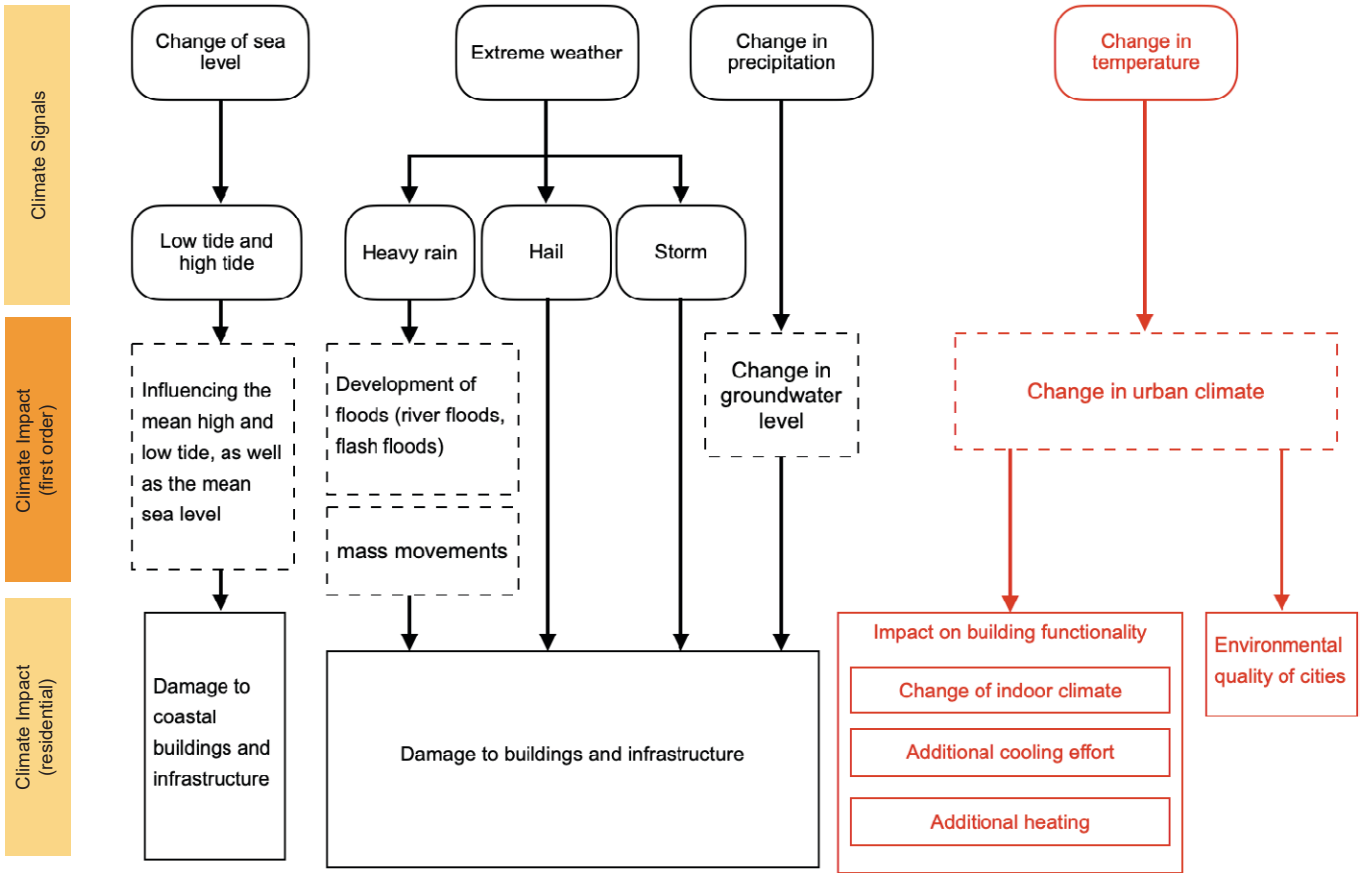

Figure 1. Climate signals and climate impact on buildings
(Source: Author's design, based on adelphi / PRC / EURAC et al. (2015, p. 419))

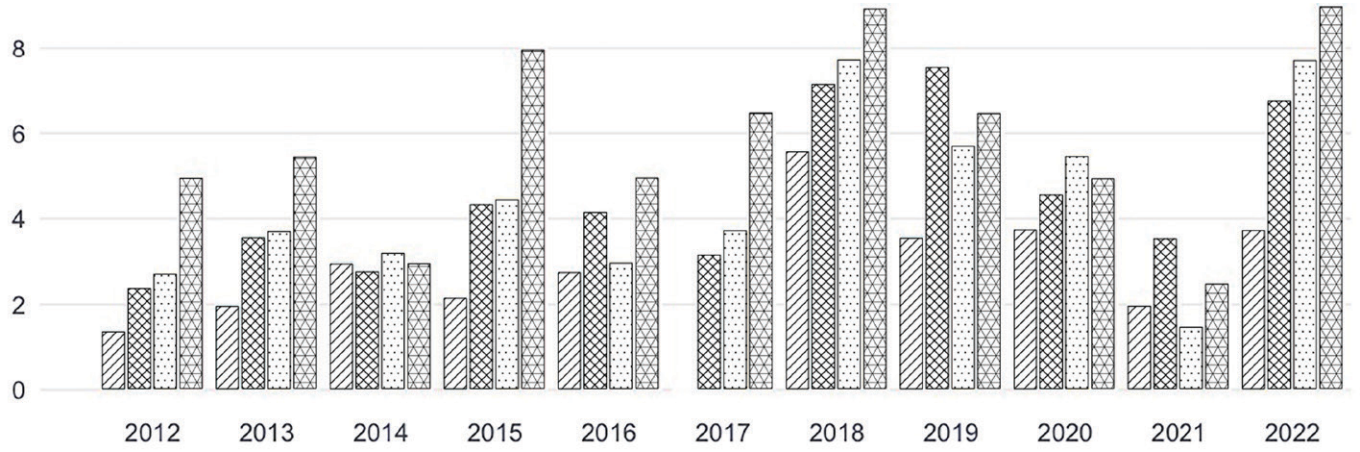

Figure 2. Hot weeks per year in Germany's north (diagonal lines hatch), east (squares hatch), west (dots hatch) and south (triangles hatch)
(Source: Winklmayr and an der Heiden (2022, p. 5))

While much of the focus in climate policy and research has been directed toward dense urban areas, a large part of the population resides in suburban and semi-rural single-family homes – spaces that remain underrepresented in current transformation efforts.

This gap is problematic, both in environmental and strategic terms. Single-family homes consume more land, energy and materials per capita than multi-family housing, and they are often built using outdated construction methods with limited integration into climate policy frameworks. Yet, these homes also offer significant potential: through direct ownership, long-term use and the flexibility to adapt or retrofit, they can become key sites of climate action – if approached with the right strategies.

Contrary to the widespread perception that the Paris Agreement of 2015 marked the beginning of international climate awareness, earlier milestones such as the Kyoto Protocol (UNFCCC, 1997) and the Copenhagen Summit (UNFCCC, 2009) laid essential foundations. They emphasized the role of the building sector in climate mitigation, a message later reinforced by the IPCC's 2014 assessment, which highlighted residential buildings as central to global decarbonization efforts.

Despite this, current policies often prioritize high-density urban development, leaving low-density residential areas largely unexplored. To address this, researchers have developed building typologies that allow for a more systematic understanding of energy use and renovation potential in these settings. The National Typology of Residential Buildings in Serbia (Jovanović Popović and Ignjatović, 2013) and related studies like Novikova *et al*. (2015) demonstrate how typological classification can serve as a foundation for climate-focused design and retrofitting strategies.

On a global level, reports by UN-Habitat (2009, 2011, 2016) have called for more inclusive and climate-responsive housing policies. These documents stress the importance of linking environmental goals with social equity, spatial justice and long-term resilience – not only in cities, but in all types of human settlements.

In response to these challenges and opportunities, this paper introduces a conceptual framework for climate-resilient single-family housing. The model integrates four strategic components – adaptation, mitigation, prevention and compensation – and proposes an approach that is both technically robust and socially grounded. To test its applicability, the study looks at three real-world examples: Vauban (Freiburg), BedZED (London) and Aspern Die Seestadt (Vienna). These case studies provide insight into how sustainability can be embedded in residential design, governance and everyday life – paving the way toward more inclusive, resilient and climate-conscious living environments.

METHODOLOGY AND MATERIALS

This paper sets out to close a gap between theory and practice in the context of climate-resilient single-family housing. While much of the current research focuses on urban settings, this study shifts the perspective toward suburban and rural homes. These areas are often defined by private ownership, individual renovation decisions and more dispersed spatial structures. Although they are frequently overlooked in climate policy, they play a crucial role in shaping sustainable futures. Their diversity and flexibility offer unique opportunities to rethink housing strategies in a more inclusive and context-sensitive way.

The research follows a qualitative and interpretive approach. Rather than testing a specific hypothesis, it builds a conceptual framework based on a combination of sources. These include typological studies of residential buildings, such as those developed in Serbia, which provide structured insights into building stock characteristics. Further input comes from studies conducted in countries similar to Germany, where environmental standards and innovative housing strategies have already been implemented. In addition, the framework incorporates environmental performance data and academic literature on climate adaptation, mitigation and housing policy. Together, these resources offer a basis for understanding how homes function not just as technical systems, but as social and environmental spaces shaped by daily life, infrastructure and policy.

To explore how this framework can be applied in practice, the next research phase will focus on three case studies in Europe. These have been selected because they represent different approaches to sustainable housing and vary in terms of climate, scale and governance. Vauban in Freiburg is a neighborhood built on the principles of car-free living, strong community involvement, and passive energy design. BedZED in London is an early example of large-scale sustainable housing, integrating renewable energy, green construction and closed loop waste systems. Aspern Die Seestadt in Vienna shows how climate goals can be embedded in a large state-led urban expansion, combining energy positive buildings, efficient public transport and mixed-use development. By analyzing these projects, the study will test how the proposed framework – adaptation, mitigation, prevention and compensation – can respond to real life conditions and inform future policy and design in a range of European contexts.

The framework is structured around four dimensions. Adaptation focuses on how buildings respond to climate related stress, for example through natural ventilation, shading or materials that regulate temperature. Mitigation looks at ways to reduce the environmental footprint of homes, using strategies such as renewable energy systems, compact layouts or smart technologies. Prevention involves designing with the future in mind, including circular material use, long-term durability, and planning for maintenance and change. Compensation addresses the wider impact of housing by integrating ecological functions, enhancing social inclusion and contributing to the broader environmental balance.

Since this is a conceptual study, no empirical fieldwork has been conducted yet. Instead, the aim is to lay a foundation for future application and testing. By linking international climate frameworks with practical design knowledge and regional housing typologies, this research contributes to a more comprehensive understanding of how single-family homes can become part of a sustainable and resilient built environment.

CONSEQUENCES AND CHALLENGES OF CLIMATE CHANGE ON DWELLING FUNCTION AND STRUCTURAL DEVELOPMENT

Before delving into the consequences and challenges of climate change on the dwelling function and physical structure of residential buildings, it is crucial to emphasize that these should not only be viewed as problems, but also as opportunities. Particularly in the context of residential function, the impacts of climate change can serve as catalysts for innovative housing concepts. The challenge lies not just in recognizing problems but also in identifying opportunities for adaptation and shaping a more sustainable future.

Definition of residential function and structure

However, the first goal of climate-friendly construction is protecting people; the second goal is the long-term use of local resources. Due to the limited availability of building materials, construction technology with a high degree of efficiency in terms of durability and energy is required. Comfort functions complement the protective function, although the comfort aspect is not provided in autochthonous construction (Häupl, 2017).

Central terms in the discussion about climate-friendly buildings are the living function and the structure of living. For architecture, the concept of function is linked to action and the part-whole relationship (Poerschke, 2014). The part-whole relationship is evident in the rules of proportion and the variability that activity represents. These components defining the concept of function are also reflected in the natural sciences and the Latin origin of the term (Poerschke, 2014). Sociological approaches, such as the question of purpose and system, have led to discussions about the functional understanding of architecture. As cities and buildings serve a function but also a purpose, design serves the purpose of artistic expression and sustainability. Climate protection must be a priority. In order to distinguish function from purpose, the function should therefore be understood as an overarching construct (Poerschke, 2014).

In architecture, the structure of living refers to the inner order, the mental context underlying the arrangement, and the interaction of a building's components (Schneider, 2019). Therefore, structural development means changing these orders and arrangements to enable different interactions and connections.

In the context of climate-resilient housing design, the integration of dwelling processes within the home and the adaptation of the physical structure of buildings are two pivotal aspects. These two dimensions are interwoven and form the foundation for creating homes that not only accommodate residents' needs and activities but also withstand the challenges posed by a changing climate. In the following sections, we will delve into the intricate relationship between these aspects, exploring how they interact to forge resilient living environments.

To visually illustrate this dual focus, consider the following schematic representation (Figure 3).This figure showcases the synergistic relationship between the processes within the house and the aspects of building structures, highlighting their interconnectedness in achieving climate resilience. It serves as a guiding framework for the subsequent exploration of these two critical aspects in our climate-resilient housing design approach.

Consequences and challenges for the residential function

Climate change is the greatest global challenge of our generation. Very many sectors are affected, including housing. Against this backdrop, housing faces many challenges and consequences that require strategies for adaptation or mitigation, since houses are not only places to live, but above all they provide comfort, security and community.

A direct consequence of climate change is the increase in extreme weather events, for example hurricanes, floods and forest fires. These frequent events cause a great deal of damage to residential buildings and often result in people being displaced from their homes, or even loss of life (IPCC, 2012). Heavy rain events also pose a hazard to residential buildings as they can lead to flooding, which can cause severe damage to buildings. They can also affect infrastructure,

Climate-Resilient Housing

	Dwelling Function	Physical Structure
Adaptation	Climate-Resilient Activities Emergency Areas	Climate-Resilient Materials Smart Home Technologies for Climate Adaptation
Mitigation	Energy-Efficient Activities Educational campaigns	Transition from Fossil Fuels Sustainable Construction Practites
Prevention	Water Conservation Sustainable Lifestyle Waste Reduction	Use of Local, Renewable, and Recycled Building Materials Reducing Solar Radiation and Temperature Fluctuations
Compensation	Biodiversity Promotion Water Conservation and Recycling Waste Minimization	Renewable Energy Sources Modular Construction Methods Build-up To Unbuilt Area

Figure 3. Climate-Resilient Housing

which can result in power outages, telecommunications failure, or restriction of transport infrastructure. These occurrences can be quite harmful and affect the quality of life on many levels (Reicher and Söfker-Rieniets, 2022). Figure 1, presented above, provides an overview of the consequences.

Rising temperatures are also a terrible consequence of climate change. This turns houses into unbearable saunas, posing a particular danger to vulnerable groups, particularly the elderly and those with disabilities (ARD alpha, 2023).

At the same time, energy demand also increases as a result of increased temperatures, putting a strain on energy resources and impacting household energy consumption.

Consequences and challenges for the physical residential environment

The effects of climate change extend beyond residential functions to impact the physical environment of buildings. Melting polar ice contributes to rising sea levels, causing potential damage to coastal buildings and infrastructure. Heavy rain can cause river flooding and flash floods. In addition, there is also a risk of mass movements associated with hillside locations, which can cause significant damage or destruction to buildings (adelphi / PRC / EURAC, 2015).

Another consequence of climate change is the increase in solid winds. Heavy storms primarily damage the roofs and windows of buildings, but residential functions are also affected by the destruction of infrastructure, such as, overhead lines (adelphi / PRC / EURAC, 2015).

Increased temperatures lead to the warming of urban environments. The waste heat from buildings significantly impacts: the urban climate and air quality in cities; pollutant emissions; the building materials used; and the high proportion of sealed surfaces (adelphi / PRC / EURAC, 2015). Especially in densely populated areas, there is an interaction between buildings and the temperature change (more heat waves), which leads to a risk of overheating (Reicher and Söfker-Rieniets, 2022).

Among the identified consequences are changes in thermal behavior within urban areas, limited air exchange caused by surface properties, and the emergence of heat islands. This constellation endangers the health of the urban population (Reicher and Söfker-Rieniets, 2022). It is, therefore, crucial to mitigate the impact of climate change in urban areas.

The investigations into previous damage events in the Dresden region have made it clear that the consequences of climate extremes are already leading to considerable and hardly quantifiable damage to buildings. Irrespective of the changes to be expected due to climate change in the two impacts considered, flooding and heavy rain, it can be stated that the affected buildings are often not prepared for these impacts. Cases of damage, but also amounts of damage, are constantly increasing and, thus, confirm the hypothesis of a building structure that is susceptible to the impacts described (Nikolowski, 2014).

STRATEGIC RESPONSES TO CLIMATE CHALLENGES IN HOUSING

Housing is increasingly confronted with the complex and far-reaching consequences of climate change. From extreme weather events and heavy rainfall to rising sea levels and prolonged heatwaves, the environmental pressures on residential spaces are growing rapidly. These developments pose serious risks not only to buildings themselves, but also to the health, comfort, and safety of their occupants.

To ensure that housing remains functional, livable, and sustainable under changing climatic conditions, a strategic and integrated approach is essential. This chapter introduces a four-dimensional response framework based on adaptation, mitigation, prevention, and compensation. Together, these strategies form a holistic foundation for climate-resilient housing development and renovation.

Rather than treating buildings as isolated technical objects, this framework understands them as embedded in wider socio-ecological systems. It takes into account not only structural and material aspects, but also spatial, behavioral, and institutional factors.

Adaptation

Adaptation entails adapting to the expected or actual consequences of climate change, in order to mitigate damage or capitalize on advantageous opportunities.

Adaptation in dwelling functions

In order to be able to cope with the dangers of climate change, residential construction needs resilience. A crucial aspect of climate-resilient housing is the functional adaptation of dwellings to the previously mentioned challenges of climate change. One consideration could be to reinforce different areas within homes with climate-resilient materials and designate them as safe (Riegel *et al*., 2013). Smart home technologies can be used to monitor and adapt the indoor climate to ensure comfort and energy efficiency (Das Haus Online, 2018).

In this regard, multi-purpose rooms with appropriate ventilation and insulation can serve as emergency shelters. Attention must be paid to accessibility so as not to neglect residents with mobility problems (Gupta *et al*., 2021).

To achieve this, homeowners and builders need to redesign their housing structure. Resistant building materials that improve insulation must be used. Energy-efficient appliances must also be used, for example by using renewable energy sources. Promoting decentralized renewable systems, like solar panels, can empower homeowners to adapt independently.

Adaptation in the physical environment

To adapt residential buildings to the challenges of climate change, the built environment must be conceived as a flexible, energy-conscious, and ecologically integrated system. Climate-resilient architecture considers not only the operational performance of buildings, but also the environmental impact of construction materials and design choices over the entire lifecycle.

Passive design strategies tailored to local climatic and geographical conditions offer effective ways to regulate indoor temperatures without excessive energy use (Flores-Larsen *et al*., 2019). Planning processes should promote modularity and adaptability, enabling future renovations and functional adjustments (Vogt, 2021).

A fundamental goal is the reduction of fossil fuel dependence through the use of renewable, low-impact, and recyclable materials. At the urban scale, strategies such as unsealing surfaces, increasing vegetation, and implementing rainwater retention systems support natural cooling processes and biodiversity (Rahla *et al*., 2021; Reicher and Söfker-Rieniets, 2022).

Building-integrated photovoltaics (BIPV) can contribute to decentralized energy production while complementing architectural design. Green facades, rooftop vegetation, and shading elements like trees improve evaporation and provide thermal protection, making buildings more robust against heat stress.

Mitigation

Mitigation involves endeavors directed at lessening or averting the release of greenhouse gases, thereby reducing the scope and repercussions of climate change. It encompasses initiatives that tackle the fundamental causes of climate change.

Mitigation in dwelling functions

To mitigate some of the climate change, housing can play its part by reducing the carbon emissions emitted from the construction and ongoing operation of residential buildings. A few approaches can be used to do this, including the following:

Smart home automation can reduce energy consumption while maintaining comfort by optimizing heating, cooling and lighting (Das Haus Online, 2018). Composting and recycling can reduce a household's CO_2 footprint by maintaining sustainable practices (BDE e. V., 2020).

Strong regulatory frameworks and incentive-based funding for energy-efficient retrofits are essential to drive wide adoption. Government intervention in the form of policies and regulations can spur positive change by pointing to the construction of environmentally friendly houses and the promotion of public transport. Importantly, public awareness and sensitization to the impacts of climate change on housing can help individuals take action to mitigate them. Educational initiatives should also target tradespeople and builders to embed sustainability early in the construction process.

Mitigation in the physical environment

Minimizing the consumption of fossil fuels or renouncing fossil fuels entirely will make a decisive contribution to climate protection. Solar thermal and geothermal energy for heat generation and photovoltaic technologies for electricity generation are currently available as direct methods used in building. Other energy-saving methods, such as heat recovery from wastewater and room air, are also available (Reicher and Söfker-Rieniets, 2022).

However, construction activity also leads to an increase in greenhouse gas emissions of 20-25% for buildings renovated according to the current efficiency regulations and up to 50% for buildings considered particularly energy efficient. Another measure to save energy is the insulation of building envelopes (Reicher and Söfker-Rieniets, 2022).

Ivanova *et al.* (2020) examined changes in consumer behavior towards low-carbon alternatives. Regarding residential construction, the authors found that containment was most effective when renewable electricity was purchased or produced. Such behavior resulted in an average of 1.5 and 1.3 tCO2eq/capita (Ivanova *et al.,* 2020).

However, the ability to mitigate the effects of climate change depends on the energy source. Multiple contextual factors need to be considered, such as the type of electricity used to produce renewable technologies, the location, as it affects the amount of energy produced in the usage phase, and the use and maintenance of the new technologies.

There are other options related to space heating and infrastructure. These options include refurbishment and renovation, the installation of heat pumps and renewable heating systems. These options have an average reduction potential of 0.9, 0.8, or 0.7 tCO2eq/capita. Converting buildings to passive house standards also offers a scalable path to mitigation, though it requires significant investment and planning.

Prevention/Avoidance

Prevention or avoidance concerning climate change encompasses actions taken to prevent or alleviate the incidence of unfavorable climate-related effects. This involves proactive practices and strategies to minimize the risk of harm related to climate impacts.

Prevention in dwelling functions

Preventing climate impacts on the functional aspects of housing can only be achieved if sustainability and resource efficiency are at the forefront. Practices and technologies must be used to reduce the carbon footprint in daily life within a dwelling. Residents need to make sustainable lifestyle choices so that they can contribute to a climate resilient living environment. This includes, among other things, reducing energy consumption in the home by being more conscious of it. Lights and appliances should be turned off when not in use. Heating and cooling systems should also be optimized (Schöner Wohnen, 2011).

Climate-conscious living also involves using water sparingly. Care should be taken to ensure that leaks are repaired quickly or that water-saving taps are used. These things can lead to a significant overall reduction in water consumption and thus counteract the water scarcity that comes with the effects of climate change (Das Haus Online, 2019).

Waste reduction can also lead to prevention of climate impacts. Residents should adopt practices such as reducing, reusing, recycling and composting waste. In this way, households can minimize waste and contribute to a better environment (BDE e. V., 2020).

Prevention in the physical environment

Sustainable building materials play a key role in climate protection. Alongside CO_2 storage, avoiding waste and promoting recyclability help reduce environmental harm (Reicher and Söfker-Rieniets, 2022).

Bell (2019) critiques "green" buildings that still consume large amounts of energy and space. Instead of building new homes, existing structures should be preserved and improved – by avoiding demolitions, reusing vacant stock, and maximizing renovation potential.

To mitigate heat stress, passive strategies like reducing sun-exposed window areas, using light-colored surfaces, and installing shading (e.g. trees or overhangs) are essential (Häupl, 2017). Building orientation and compactness also influence heat gain, with east-west alignment and high-density offering advantages (Hausladen *et al*., 2012).

Circular economy principles – such as recycling materials and designing for disassembly – help conserve resources (Rahla *et al*., 2021). Urban mining and reused concrete reduce emissions and minimize the need for new raw materials (Vogt, 2021).

Reducing embedded energy requires locally sourced, renewable, and low-impact materials. Prefabricated, modular construction can also lower waste and energy use. Wood is particularly valuable as a carbon sink when used responsibly (Hafner, 2022). Green building also means avoiding harmful chemicals to protect biodiversity (Reicher and Söfker-Rieniets, 2022).

Compensation

Compensation entails measures or strategies to counteract, balance, or rectify environmental or societal impacts arising from climate change or associated activities.

Compensation in dwelling functions

Compensation measures in the context of housing construction aim to give something back to the environment and communities that are affected by it. This is more than just protecting residents from climate-related risks. Housing here becomes an agent of positive change by taking a proactive stance towards environmental protection (Stiftung WWF Deutschland, 2022).

Within a property, one can adopt several environmentally friendly practices that can promote nature and species conservation. For example, one can make one's garden or balcony very nature-friendly by planting native flowers or even a tree to attract insects and birds to promote biodiversity. Birdhouses and feeders can also be installed by residents to feed birds, especially in the winter months (Tagesschau, 2023). Rainwater collection systems and greywater reuse are effective compensation strategies, especially in regions facing water stress.

Compensation in the physical environment

Compensation strategies applied to the physical environment of housing seek to preserve and restore ecosystems that may be damaged during a construction phase.

Renewable energy in particular plays a very important role in compensating for environmental impacts by minimizing the use of fossil fuels and harmful emissions. These energy sources produce clean energy by using natural processes that do not release greenhouse gases or harmful waste. Renewable energy refers to the use of solar energy, wind energy and hydropower. This can make an important contribution to offsetting the effects of climate change, and can create a more sustainable energy future (BMZ, 2022).

Another factor for environmental protection and urban planning is the ratio of built-up to unbuilt area (Umweltbundesamt, 2022). To give more land back to the environment, paved areas must be unsealed and converted into green spaces. This can be achieved by building gardens, parks, roof gardens and vertical gardens. People thus have the opportunity to feel a little closer to nature (Verbraucherzentrale NRW, 2023).

Reusing vacant buildings and materials not only saves resources, but also compensates for past environmental degradation.

Innovative approaches to sustainable living environments

When it comes to sustainable and climate-resilient housing, especially in the context of single-family homes, new ideas are emerging that go beyond technical upgrades and energy-saving checklists. These approaches look at the home as a whole – Its structure, materials, environment and the way people actually live in it. They aim to create adaptable, regenerative spaces that respond to both climate and lifestyle changes.

One promising starting point is the use of building typologies. By grouping homes based on their shape, age, usage and climate zone, planners and researchers can develop solutions that match the specific needs of different housing types. This allows for practical and scalable improvements across regions. The TABULA project, for example, showed how this typology approach can be used to guide targeted renovation and energy strategies across Europe (Loga *et al*., 2012).

Another area of innovation lies in combining passive design strategies with smart technologies. Instead of relying entirely on high-tech systems, many sustainable homes use simple, proven principles like orientation for daylight, cross-ventilation and thermal mass to improve comfort and reduce energy needs. These are increasingly supported by responsive systems that adapt to weather and user behavior – helping buildings stay efficient without being overcomplicated (Pomponi and Moncaster, 2016).

Smart home systems themselves are also becoming more human-friendly. Rather than creating fully automated environments that can feel impersonal or even frustrating, designers are working on hybrid models. These systems learn from how people use their homes, but still allow manual control. The goal is to help residents understand and influence their energy use, without overwhelming them with technology (Wilson *et al*., 2014).

Material cycles and resource use are also being rethought. Circular building principles are gaining momentum, especially in housing. These include modular design, reused and recyclable materials, and buildings that can be adapted

or even disassembled over time. Such practices reduce environmental impact over the building's life span and encourage long-term thinking (Geissdoerfer *et al*., 2017; Pomponi and Moncaster, 2017).

Sustainability in housing now increasingly includes nature itself. Green roofs, rain gardens, and native planting are being integrated into the design from the start – not as extras, but as essential parts of how homes interact with their surroundings. This brings ecological value directly onto residential plots, creating small but meaningful habitats and helping to manage water and heat locally.

Finally, housing needs to adapt to people's lives just as much as to climate conditions. Flexible layouts, movable walls and rooms that can serve multiple purposes allow a home to evolve with its occupants. Whether it is working from home, caring for family members or aging in place, these spaces are designed to stay functional over time. Adaptability like this is increasingly seen as a marker of long-term building quality (Pinder *et al*., 2017; Gann *et al*., 2003).

Altogether, these approaches reflect a growing awareness that sustainable housing is not just about saving energy – it is about making homes more responsive, more inclusive and more deeply connected to the environment and the people who live in them.

CLIMATE-FRIENDLY LIVING AS PART OF SUSTAINABLE LIVING DESIGN

Ivanova *et al.* (2020) agree that the size of the building is the most important factor in determining the energy consumption of a house. Therefore, reducing the size of buildings will also significantly reduce housing-related emissions and energy use. However, the authors warn that "there are significant structural (e.g., lack of adequate alternatives), psychological (e.g., attachment), and security (e.g., loss of property) barriers associated with downsizing" (Ivanova *et al.* 2020, p. 10).

The results for less living space and co-housing (including reducing living space with less heating and construction, living with others, and renting out guest rooms to other people) can lead to CO_2 reductions of up to 1.0 tCO2eq/capita. The average is 0.3 tCO_2 eq/cap (Ivanova *et al.* 2020). Moreover, the link between the physical structure of buildings and the quality of life of the occupants is clear. Climate-resilient housing therefore seeks not only to provide protection from extreme weather events, but also to improve the overall living experience, comfort and health (Ruíz and Mack-Vergara, 2023).

According to Satterthwaite *et al.* (2020), even informal settlements require extensive modernization since only basic modernization does little to build resilience, but extensive modernization that significantly improves resilience can be expensive. Bültmann-Hinz (2021) also warns that renovations are associated with considerable investments and, thus, costs that are not always offset by corresponding energy savings. In the absence of this adaptation, the response to heat stress, such as air conditioning, accelerates climate change, leading to a vicious cycle of higher energy consumption and greenhouse gas emissions (Matthies *et al.,* 2008).

Since the advantage of achieving climate protection goals in the building sector benefits society, society should also bear part of the costs. To solve the tenant-landlord dilemma in a targeted manner, state subsidies, whether tax-related or otherwise, could be an opportunity to increase the incentives and acceptance for energy-related refurbishments and, thus, advance the energy transition (Bültmann-Hinz, 2020).

In addition, there are limits to the adjustments. A building can only be operated passively as long as sufficient indoor conditions can be guaranteed both in summer and winter (Kovats *et al*., 2014). The climate inside a building is an essential aspect of well-being and health. This observation means that energy consumption can only be reduced to the extent that human well-being and health allow (Kovats *et al.,* 2014). The indoor climate can also be influenced by natural surfaces that regulate humidity and temperature (Reicher and Söfker-Rieniets, 2022).

In a situation where renewable energy sources cannot completely replace fossil fuels, even strategies to promote energy-efficient and environmentally friendly technologies have a significant disadvantage, the so-called rebound effect. As demand from the public continues to increase, reliance on traditional energy sources is becoming increasingly unsustainable, especially as indoor comfort becomes more important in people's daily lives. Therefore, in the short to medium term, only smart technologies can effectively meet the challenge of maintaining a quality indoor microclimate through home automation and control systems at a reasonable cost (Ryzhov *et al*. 2019). If we recognize these principles and the link between climate resilience and quality of life, we can build a future where homes can offer more than mere shelters.

DISCUSSION

The growing urgency of climate change requires a shift in how we understand and design single-family homes, particularly in suburban and peri-urban areas where these housing types dominate. While cities have become the focus of climate innovation, it is precisely in these lower-density zones – where energy consumption, land use, and individual ownership converge – that untapped potential for climate action lies. This paper proposes an integrative framework for climate-resilient housing based on four pillars: adaptation, mitigation, prevention, and compensation. The following discussion explores both the strengths and limitations of this approach, offering a balanced view of its practical relevance.

One of the framework's key advantages is its holistic nature. Rather than focusing solely on energy or materials, it combines technical design strategies with ecological thinking, behavioral insights, and attention to everyday living needs. By connecting building performance to human comfort, social inclusion, and long-term environmental responsibility, the model offers a broader vision of what sustainable housing can be. It not only asks how homes are built, but also how they are used, shared, and maintained.

Another strength lies in its adaptability. Drawing on building typologies – defined by characteristics such as construction period, climate zone, and usage – the framework enables context-specific strategies. This is especially valuable

in retrofitting older housing stock, where standardized solutions often fall short. A typological approach makes it possible to plan interventions that are both technically effective and socially appropriate.

At the same time, several challenges must be acknowledged. First, many of the proposed strategies require financial resources that are not available to all households. Technologies such as smart home systems, solar panels, or high-performance insulation can offer long-term savings but remain costly in the short term. This raises questions of equity: who can afford climate resilience, and who is left behind?

Second, there are cultural and spatial tensions. Compact, modular designs may be environmentally sound but run counter to widespread preferences for large, individualized homes. Likewise, strategies such as green roofs, shared gardens, or water reuse systems require more than design – they demand ongoing care, cooperation, and sometimes a shift in values. In privately owned, self-managed housing, such collective approaches may not be easily adopted.

Third, even well-intentioned technical solutions can create unintended consequences if not properly integrated. Over-insulation, for example, can lead to poor indoor air quality without adequate ventilation. Smart systems might reduce energy use but increase dependency or alienate users unfamiliar with digital interfaces. Climate resilience, therefore, is not just about design quality – it is about usability, education, and support structures.

To evaluate the real-world applicability of the framework, three exemplary case studies will serve as the next research phase: Vauban in Freiburg, BedZED in London, and Aspern Die Seestadt in Vienna. These three developments illustrate different approaches to sustainable housing. Vauban shows how community-driven planning and passive house standards can transform urban life. BedZED provides early lessons on ecological building, particularly around the interaction between technology and user behavior. Aspern demonstrates how sustainability can be embedded at scale through state-led urban expansion and integrated infrastructure.

Together, these case studies provide a valuable testing ground for the framework. They allow us to examine how climate strategies function in practice – under different climatic, cultural, and political conditions – and where adjustments are needed to make them more effective and inclusive.

Finally, this discussion draws attention to a structural imbalance in current climate policy: while most funding and attention is directed toward inner-city transformation, a large share of emissions and resource use comes from low-density residential areas. If we are serious about a just and effective transition, we must place the single-family home at the center of our thinking – not as an obstacle, but as an opportunity for change.

CONCLUSION

Single family homes are often left out of the spotlight when it comes to climate policy. Yet they make up a large part of how people actually live, especially in suburban and rural areas, and their environmental impact is anything but small. This paper has shown that these homes deserve a more central place in the conversation about sustainable living.

The framework presented here is built around four key ideas: adaptation, mitigation, prevention and compensation. It offers a way to rethink how single-family homes can respond to the challenges of climate change. The approach brings together technical strategies and human needs, showing that good design can and should work with local conditions, everyday life and long-term sustainability in mind.

Of course, real change is not just about having good ideas. It also depends on whether those ideas can be implemented in practice, whether they are affordable, and whether they are supported by the right policies. That is why the next step will focus on three real-world examples: Vauban in Freiburg, BedZED in London and Aspern Die Seestadt in Vienna. Each of these places takes a different approach, and together they offer valuable insights into what works, what does not, and where more learning is needed.

In the end, this research invites a shift in how we think about the home. Not just as a private space or a place to live, but as something more – a setting that can support a more sustainable, fair and resilient future, starting from where people already are.

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REFERENCES

adelphi / PRC / EURAC (2015). *Vulnerabilität Deutschlands gegenüber dem Klimawandel.* Umweltbundesamt, *Climate Change*, 24/2015, Dessau-Roßlau.

ARD alpha (2023). *Extremwetter durch Klimawandel; Mehr Hitzewellen, Starkregen und Stürme*. ARD alpha [online]. https://www.ardalpha.de/wissen/umwelt/klima/wetter-meteorologie-hitze-starkregen-extremwetter-klimawandel-100.html [Accessed: 21 Sep 2023].

Bell, H. G. (2019). *Zukunft Wohnen*. Power Point presentation, SoFoR-Theoriekreis, Köln, Germany [online]. https://sf-rheinland.de/wp-content/uploads/2018/12/vortrag-zukunft-wohnen-gek%C3%BCrzt.pdf [Accessed: 18 Sep 2023].

Bültmann-Hinz, B. (2021). *Wohnangebot und -eigentum zwischen Regulierung und Klimaschutz*, *Argumente zu Marktwirtschaft und Politik*, Stiftung Marktwirtschaft [online]. https://www.stiftung-marktwirtschaft.de/wp-content/uploads/2024/08/Argument_157_Wohnen_2021_09_06_WEB.pdf?utm_source=chatgpt.com [Accessed: 11 Jun 2025].

Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ) (2022). *Klimawandel und Entwicklung: Energie und Klima*, BMZ [online]. https://www.bmz.de/de/themen/klimawandel-und-entwicklung/energie-und-klima [Accessed: 22 Sep 2023].

Bundesverband der Deutschen Entsorgungs-, Wasser- und Rohstoffwirtschaft e. V. Wirtschafts- und Arbeitgeberverband (BDE) (2020). *Recycling stoppt Treibhausgase – Der Beitrag der Kreislauf- und Wasserwirtschaft zum Klimaschutz*, BDE e. V. [online]. https://www.umweltbundesamt.de/sites/default/files/medien/publikation/long/3893.pdf [Accessed: 19 Sep 2023].

Das Haus Online (2019). *Wasser sparen: Die effektivsten Tipps.* Das Haus Online [online]. https://www.haus.de/leben/wasser-sparen-die-effektivsten-tipps-26979 [Accessed: 18 Sep 2023].

Das Haus Online (2018). *Raumklima verbessern: Die besten Tipps.* Das Haus Online [online]. https://www.haus.de/leben/tipps-fuer-ein-gutes-raumklima-22796 [Accessed: 21 Sep 2023].

Flores-Larsen, S., Filippín, C., Barea, G. (2019). Impact of climate change on energy use and bioclimatic design of residential buildings in the 21st century in Argentina, *Energy and Buildings*, Vol. 184, pp. 216–229. https://doi.org/10.1016/j.enbuild.2018.12.015

Gann, D. M., Salter, A. J., Whyte, J. (2003). Design Quality Indicator as a tool for thinking*, Building Research & Information*, Vol. 31, No. 5, pp. 318–333. https://doi.org/10.1080/0961321032000107564

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm?, *Journal of Cleaner Production*, Vol. 143, pp. 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

Graeber, D., Wengrow, D. (2021). *The dawn of everything: A new history of humanity*. London: Penguin UK.

Gupta, R., Vahanvati, M., Häggström, J., Halcomb, J. S. (2021). *A Practical Guide to Climate-resilient Buildings & Communities,* United Nations Environment Programme (UNEP) [online]. https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/36405/Adapbuild.pdf [Accessed: 23 Sep 2023].

Hafner, A. (2022). Vertiefte Betrachtung: Die ökologische Mustersiedlung Prinz Eugen-Park in München*.* In C. Reicher, A. Söfker-Rieniets (Eds.), *Stadtbaustein Wohnen: Lehr-und Grundlagenbuch*. Springer Vieweg, pp. 221–242.

Hausladen, G., Liedl, P., Saldanha, M. (2011). Climatic Design: International Klimagerechtes und Zukunftsfähiges Planen und Bauen. In M. Bauer, M. Hegger, H. D. Hegner, T. Lützgendorf, F. J. Radermacher, K. Sedlbauer, W. Sobek (Eds.), *Nachhaltiges Bauen: Zukunftsfähige Konzepte für Planer und Entscheider.* Beuth Verlag, pp. 65–94.

Häupl, P. (2017). Klimagerechtes Bauen. In W. M. Willems, A. Maas, M. Homann, G. Höfker, C. Nocke, C. Kölzow, R. Olaf (Eds.), *Lehrbuch der Bauphysik*. Springer Vieweg Wiesbaden, pp. 411–425.

Intergovernmental Panel on Climate Change (IPCC) (2014). *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge: Cambridge University Press [online]. http://www.ipcc.ch/report/ar5/wg3/ [Accessed: 9 Jun 2025].

Intergovernmental Panel on Climate Change (IPCC) (2012). *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. Cambridge: Cambridge University Press.

Ivanova, D., Barrett, J., Wiedenhofer, D., Macura, B., Callaghan, M., Creutzig, F. (2020). Quantifying the potential for climate change mitigation of consumption options, *Environmental Research Letters*, Vol. 15, 093001. https://doi.org/10.1088/1748-9326/ab8589

Jovanović Popović, M., Ignjatović, D. (2013). *National Typology of Residential Buildings in Serbia.* Belgrade: Faculty of Architecture, University of Belgrade and GIZ.

Kovats, R. S., Valentini, R., Bouwer, L. M., Georgopoulou, E., Jacob, D., Martin, E., Soussana, J. (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, Vol. 1267, pp. 1267-1326. https://doi.org/10.1017/CBO9781107415386

Läpple, D. (2022). Wohnen, Arbeit und Klimawandel, *WSI-Mitteilungen*, Vol. 75, No. 3, pp. 235–242. https://doi.org/10.5771/0342-300X-2022-3-235

Loga, T., Diefenbach, N., Stein, B., Dascalaki, E., Balaras, C., Droutsa, K., Kontoyiannidis, S., Šijanec Zavrl, M., Rakušček, A., Corrado, V., Corgnati, S. P., Ballarini, I., Roarty, C., Hanratty, M., Sheldrick, B., Van Holm, M., Renders, N., Popiołek, M., Kwiatkowski, J., Amtmann, M., Wittchen, K. B., Kragh, J., Despretz, H., Georgiev, Z., Spets, K., Ortega Begoña, L., Serrano Lanzarote, B., Jovanovic Popovic, M. (2012). *Typology Approach for Building Stock Energy Assessment. Main Results of the TABULA Project,* Germany: Institut Wohnen und Umwelt GmbH [online]. https://doi.org/10.13140/RG.2.2.22343.57767

Matthies, F., Bickler, G., Marin, N., Hales, S. (2008). Heat–health action plans. *WHO Europe* [online]. https://ghhin.org/wp-content/uploads/E91347.pdf [Accessed: 24 Sep 2023].

Nikolowski, J. N. (2014). *Wohngebäude im Klimawandel: Verletzbarkeit und Anpassung am Beispiel von Überflutung und Starkregen* (Doctoral dissertation, Technische Universität Dresden, Dresden, Germany). https://nbn-resolving.org/urn:nbn:de:bsz:14-qucosa-150202 [Accessed: 11 Jun 2025]

Novikova, A., Csoknyai, T., Szalay, Z., Jovanović Popović, M., Stanković, B., Živković, B., Ignjatović, D., Sretenović, A. (2015). *The Typology of the Residential Building Stock in Serbia and Modelling its Low-Carbon Transformation.* Szentendre, Hungary: The Regional Environmental Center (REC).

Pinder, J. A., Schmidt, R., Austin, S., Gibb, S., Saker, J. (2017). *What is meant by adaptability in buildings?, Facilities*, Vol. 35, No. 1/2, pp. 2–20. https://doi.org/10.1108/F-07-2015-0053

Poerschke, U. (2014*). Funktionen und Formen: Architekturtheorie der Moderne*. Transcript Verlag.

Pomponi, F., Moncaster, A. (2017). Circular economy for the built environment: A research framework*, Journal of Cleaner Production*, No. 143, pp. 710–718. https://doi.org/10.1016/j.jclepro.2016.12.055

Pomponi, F., Moncaster, A. (2016). Embodied carbon mitigation and reduction in the built environment: What does the evidence say?*, Journal of Environmental Management*, No. 181, pp. 687–700. https://doi.org/10.1016/j.jenvman.2016.08.036

Rahla, K. M., Mateus, R., Bragança, L. (2021). Implementing circular economy strategies in buildings—from theory to practice, *Applied System Innovation*, Vol. 4, No. 2, 26. https://doi.org/10.3390/asi4020026

Reicher, C., Söfker-Rieniets, A. (2022). *Stadtbaustein Wohnen: Lehr- und Grundlagenbuch.* Springer Vieweg.

Riegel, C., Trum, A., Maximini, C., Vallée, D. (2013).

Klimaschutzteilkonzept „Anpassung an den Klimawandel für die Städte Solingen und Remscheid". Aachen [online]. https://www.remscheid.de/umwelt-mobilitaet/klimaschutz/download-pool/Anpassung_Konzept_Anpassungsstrategie_RS_SG.pdf [Accessed: 21 Sep 2023].

Ruíz, M. A., Mack-Vergara, Y. L. (2023). Resilient and Sustainable Housing Models against Climate Change: A Review, *Sustainability*, Vol. 15, No. 18, 13544. https://doi.org/10.3390/su151813544

Ryzhov, A., Ouerdane, H., Gryazina, E., Bischi, A., Turitsyn, K. (2019). Model predictive control of indoor microclimate: existing building stock comfort improvement, *Energy Conversion and Management*, Vol. 179, pp. 219–228. https://doi.org/10.1016/j.enconman.2018.10.046

Satterthwaite, D., Archer, D., Colenbrander, S., Dodman, D., Hardoy, J., Mitlin, D., Patel, S. (2020). Building resilience to climate change in informal settlements, *One Earth*, Vol. 2, No. 2, pp. 143–156. https://doi.org/10.1016/j.oneear.2020.02.002

Schneider, H. (2019). *Struktur*. Der Architekt [online]. http://derarchitektbda.de/struktur-grundlage/ [Accessed: 9 Jun 2025].

Schöner Wohnen (2011). *Nachhaltig und ökologisch wohnen*. Schöner Wohnen [online]. https://www.schoener-wohnen.de/einrichten/30752-rtkl-nachhaltig-wohnen-und-leben [Accessed: 21 Sep 2023].

Stiftung WWF Deutschland (2022). *Kompensation und CO2-Ausgleich: So geht es richtig.* WWF Deutschland [online]. https://www.wwf.de/aktiv-werden/tipps-fuer-den-alltag/energie-sparen-und-ressourcen-schonen/kompensation-und-co2-ausgleich-so-geht-es-richtig [Accessed: 18 Sep 2023].

Tagesschau (2023). *Artenschutz im eigenen Garten*. Tagesschau [online]. https://www.tagesschau.de/wissen/klima/artenvielfalt-heimischer-garten-100.html [Accessed: 22 Sep 2023].

Umweltbundesamt (2025). *Struktur der Flächennutzung.* Umweltbundesamt [online]. https://www.umweltbundesamt.de/daten/flaeche-boden-land-oekosysteme/flaeche/struktur-der-flaechennutzung#die-wichtigsten-flachennutzungen [Accessed: 23 Jun 2025].

UN-Habitat (2016). *The State of the World's Cities Report 2016: Urbanization and Development – Emerging Futures.* Nairobi: United Nations Human Settlements Programme (UN-Habitat).

UN-Habitat (2011). *Cities and Climate Change: Global Report on Human Settlements 2011.* London: Earthscan.

UN-Habitat (2009). *Global Report on Human Settlements 2009: Planning Sustainable Cities.* London: Earthscan.

United Nations Framework Convention on Climate Change (UNFCCC) (2009). *Copenhagen Accord.* United Nations Climate Change Conference COP15, Copenhagen, Denmark, UNFCCC [online]. https://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf [Accessed: 23 Jun 2025].

United Nations Framework Convention on Climate Change (UNFCCC) (1998). *KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE*, UNFCCC [online]. https://unfccc.int/resource/docs/convkp/kpeng.pdf [Accessed: 23 Jun 2025].

Verbraucherzentrale NRW (2024). *Von der Versiegelung zur Entsiegelung*. Verbraucherzentrale NRW [online]. https://www.klimakoffer.nrw/klimaanpassung-entsiegelung [Accessed: 23 Jun 2025].

Vogt, M. (2021). Nachhaltiges Bauen und Wohnen, *Jahrbuch für Christliche Sozialwissenschaften*, Vol. 62, pp. 221–242. https://doi.org/10.5771/9783748923581-221

Wilson, C., Hargreaves, T., Hauxwell-Baldwin, R. (2014). Smart homes and their users: A systematic analysis and key challenges, *Personal and Ubiquitous Computing*, Vol. 19, No. 2, pp. 463–476. https://doi.org/10.1007/s00779-014-0813-0

Winklmayr, C., an der Heiden, M. (2022). Hitzebedingte Mortalität in Deutschland 2022, *Epid Bull*, Vol. 42, pp. 3-9. https://doi.org/10.25646/10695.2

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UNPACKING COMMUNITY-BASED ARCHITECTURAL PEDAGOGY: A SYSTEMATIC REVIEW OF CURRENT SCHOLARSHIP

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Community-based architectural pedagogy encompasses a diverse range of practices – such as live projects, design-build studios, participatory design, and service-learning – yet the fragmented terminology and varying theoretical underpinnings pose challenges to understanding its broader educational impact. This systematic review examines ninety-five peer-reviewed and Scopus-indexed publications from 2014–2024 to explore how various approaches address student learning and community participation. Using a mixed-method approach, we combine a systematic quantitative literature review (SQLR) with qualitative thematic analysis to identify five pedagogical orientations: Community-Driven & Participatory Approaches, Experiential & Design-Build Pedagogy, Sustainability & Resilience, Digital & Interdisciplinary Innovation, and Culture, Heritage & Pedagogical Frameworks. While some papers prioritize student learning or community impact, the majority pursue a balanced synergy between both. Furthermore, the review also identifies six recurring pedagogical strategies employed in community-based design education: hands-on fabrication, collaborative design, place-based learning, digital engagement, sustainable and regenerative design, and community-driven engagement. However, limitations such as tokenism, scalability, and digital access persist. Findings reveal a Western-dominated field, characterized by a concentration of projects and scholarship in the U.S. and European regions with limited representation from non-English contexts, although there is growing global interest. Future models should be able to prioritize longitudinal impact, equitable power-sharing, and scalable hybrid models. This study advances discourse on balancing educational goals with meaningful community engagement.

Key words: **community-based pedagogy, architectural education, participatory design, design-build, service-learning.**

INTRODUCTION

Community-based design and planning have been extensively discussed, researched, and implemented across various disciplines, including architecture and the built environment. This approach offers positive attributes such as promoting transparency of the process, user involvement, agency, contextuality, collaboration, knowledge exchange, and power distribution (Awan *et al*., 2013; Jones, 2005; Till, 2016). Particularly in diverse geographical contexts, community-based design has been linked to efforts in serving vulnerable and underprivileged communities, highlighting the idea of architecture of empowerment (Serageldin, 1997; Smith, 2008).

However, despite its advantages, community-based architectural pedagogy is not without critique. Scholars have raised concerns regarding the methodologies employed in participatory design, pointing to issues such as power imbalances, tokenism, and the challenge of achieving genuine consensus (Arnstein, 1969; Carpentier, 2016). Some critics argue that participatory design, when not carefully managed, can devolve into a performative exercise rather than a truly inclusive process. The participatory nature of community-based design can lead to unintended

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challenges, including power struggles and coercion, which some scholars describe as a form of 'tyranny' or even a 'nightmare' (Cooke and Kothari, 2001; Miessen, 2011). These concerns underscore the complexities of balancing stakeholder engagement with the realities of decision-making and implementation in architectural practice and education.

Understanding community-based scholarship is challenging, as the pedagogical terms vary widely, overlap, and are often interchangeable due to factors including political context, traditions, and theoretical underpinnings (Boyle, 2021; Pak and De Smet, 2022; Salama, 2016). However, it is important to know the trend of this pedagogy by considering its wider terms, as previous reviews have tended to focus on specific terms such as design build (Canizaro, 2012), live project (Smith *et al*., 2023) and participatory (Lee *et al*., 2024).

This paper aims to conduct a systematic review of community-based design in architectural education, focusing on its application and approaches. By examining established terminology commonly used in the discourse – such as live project in the British tradition and design-build in the American tradition (Pak and De Smet, 2022) – alongside broader terms like participatory design, service learning, and the emerging concept of urban labs (see Table 1), this study seeks to provide a comprehensive overview of current research, key trends, and critical insights in community-based architectural pedagogy.

This systematic review aims to provide a transparent, unbiased synthesis of existing scholarship addressing our research questions. To ensure methodological rigor, this paper followed the systematic quantitative literature review (SQLR) (Pickering and Byrne, 2014) as a method to quantitatively collect the papers, and qualitatively code the papers in order to systematically categorize and interpret the textual data, themes, and patterns (Creswell, 2012; Saldana, 2009). Considering the evolving trend of community-based architectural pedagogy globally, this study addresses two main research questions:

- How do the objectives of community-based architectural pedagogy address student learning and community goals?
- What practical approaches are commonly implemented in community-based architectural pedagogy?

By investigating these questions, this study aims to contribute to a deeper understanding of how community-based architectural pedagogy is taught and implemented – while also critically examining how community participation is conceptualized and addressed in current architectural scholarship.

RESEARCH METHODS

The paper adopts a mixed-method approach, integrating a systematic quantitative review of existing scholarly literature on community-based architectural pedagogy (Pickering and Byrne, 2014) with qualitative coding techniques to analyse textual data. This coding process involves three key stages – initial coding, focused coding, and theme development – to identify recurring patterns and themes (Creswell, 2012; Saldana, 2009). The study aimed to identify the last ten years of peer-reviewed publications between 2014 and 2024 that focused on architecture students' involvement in community-based architectural projects and design led by university pedagogy. This review focuses on Scopus-indexed, English-language publications due to their accessibility, tools to refine and filter the results, and established academic rigor. However, we acknowledge that excluding non-English sources may overlook important perspectives, particularly from regions where community-based architecture thrives but is documented in local languages. Future research should mitigate this limitation by integrating multilingual sources.

The first quantitative step was identifying and carefully defining a specific topic within the overall type of research (Pickering and Byrne, 2014). Considering the wider variety of the community-based terms that are interchangeable (Salama, 2016) and overlapping (Anderson, 2017; Boyle, 2021; Canizaro, 2012; Forsyth *et al*., 2000; Harriss and Widder, 2014), we decided to include several terminologies associated with community-based architectural pedagogy including live project, design build, service learning, practice-based, community-based, urban lab, and participation. Additionally, some of the terms also have variations such as the use of hyphens, extended noun phrases or related terms like practice-oriented, urban living, and participatory (see Step 1 - Table 1). The specific term 'architecture' was added to the keyword search to keep its relevance to the architectural context, as the community-based terms are widely used in another field of research. By using the Boolean searching technique, the first initial search yielded 2,780 articles.

These initial results were refined using several inclusionary and exclusionary steps that span from step two to step four. Starting from step two, all the screening and reviewing were done manually to make sure that the selected papers were relevant to the research topic. Step two was done by reading the title, abstract and its keywords as we are aware that the research topic has layered meaning and various fields of study. For example, the term 'architecture' was sometimes used to refer to information technology or organizational systems, which did not align with the main research objective. Additionally, the term like 'participatory' was sometimes used to refer to students' involvement as users in architectural projects, rather than as the facilitator or main actor in the design, or architectural process like designing school together. Other conflicting terminologies were also related to student collaboration in architectural projects that involved multi-discipline to create a design build project rather than making a collaborative program with the community in a specific place.

After excluding irrelevant papers, 132 articles were thoroughly reviewed for relevance to our research questions. Finally, the last stage of the review focused on examining how each article related to actual community engagement. Papers that discussed community pedagogy in isolation – without addressing its impact on the community – were excluded as irrelevant. Additionally, any articles by the same authors were reviewed, and duplicates containing identical content were excluded. This resulted in a final 95 documents to be explored more, which can be accessed through the appendix. These were analysed using categorization and metadata in line with the research questions.

Table 1. The systematic document selection process

INCLUSION and or Exclusion	STEP 1	STEP 2	STEP 3	STEP 4
("architect*") AND ("student*") AND ("live project")	75	31	19	10
("architect*") AND ("student*") AND ("design build" OR "design-build")	161	43	28	21
("architect*") AND ("student*") AND ("service learning" OR "service-learning")	113	33	19	16
("architect*") AND ("student*") AND ("practice oriented" OR "practice-oriented")	32	4	0	0
("architect*") AND ("student*") AND ("practice based" OR "practice-based")	173	9	4	2
("architect*") AND ("student*") AND ("community based" OR "community-based")	270	17	15	16
("architect*") AND ("student*") AND ("urban lab*" OR "urban living lab*")	16	2	2	2
("architect*") AND ("student*") AND ("participation" OR "participatory")	1940	78	45	30
Total number of articles	**2780**	**217**	**132**	**95**

RESULTS

Prevalence and trend of research

Analysis of the metadata obtained from the documents can be illustrated to present an overview of the publications on community-based architectural pedagogy research. It is also worth noting that this review does not capture all community-based literature and publications. The results presented in this research only capture published peer-reviewed publication in English. Outside language limitation, it also became clear that many outputs of community-based pedagogy are not published in a written journal format.

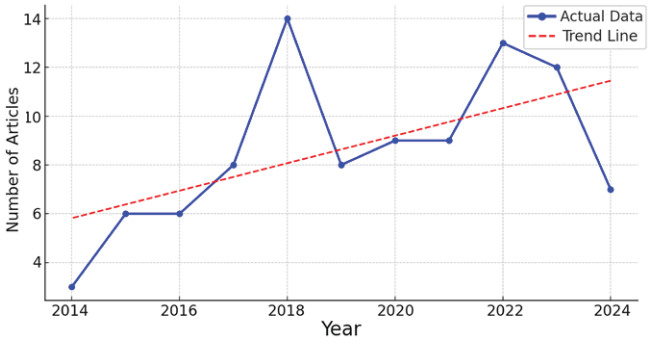

Figure 1. Trend analysis of community-based pedagogy in architecture (Source: Authors, 2025)

The trend of publications on community-based architecture pedagogy from 2014 to 2024 shows fluctuations with an overall increasing interest in recent years (Figure 1). The number of articles published annually varied, with notable peaks in 2018 (14 articles) and 2022 (13 articles). After a slight dip in 2019 and 2021, publication numbers began rising again, reaching 12 articles in 2023. Notably, 2019 marked the onset of the Covid-19 Pandemic, affecting teaching methods in universities including in architecture, which were forced into online interaction (Grover and Wright, 2023; Metinal and Gumusburun Ayalp, 2024). While 2024 shows a slight decline (7 articles), this may be due to the incomplete dataset for the year. The general upward trend suggests growing academic engagement with the topic, particularly in the last five years, indicating an increasing recognition of community-based approaches in architectural education and practice.

Analysing geographical distribution, the comparison between project locations and author institutions in community-based architecture highlights significant geographical disparities (see Figure 2). American and European regions dominate the field, with 32 and 29 projects respectively, supported by a strong institutional presence (30 and 33 institutions). This suggests that these regions have well-established research networks and academic interest in community-based architecture. American institutions are known for their design build pedagogy, with the most popular example from Rural Studio, in Auburn (Canizaro, 2012; Mockbee, 2010). In the European context, especially in the UK, live projects pedagogy are dominating the discourse to date (Anderson, 2017; Harriss and Widder, 2014; Smith *et al.*, 2023). Asia follows with 16 projects and 14 institutions, indicating moderate engagement. Australia, despite having only 7 projects, has 9 contributing institutions, suggesting active research efforts that may not always lead to direct implementation. In contrast, Africa has the lowest representation, with only 2 projects and 2 institutions, reflecting limited academic and practical engagement in the field. Multi-region studies account for 9 projects and 7 institutions, highlighting cross-regional collaborations but on a smaller scale.

It is interesting that publications from the multi-regional locations or institutions usually give an in-depth and evaluative analysis of previous projects, such as an analysis of social quality of design-build project at the University of Stuttgart, Germany (Schreiber *et al.*, 2022), the iterative aspect of design build program at Tulane School of Architecture, New Orleans (Passarelli and Mouton, 2021), and an evaluation on how design education can walk the talk outside the theoretical agenda (Charlesworth, 2018).

Overall, the trend indicates that while community-based architecture is a global topic, research and implementation remain concentrated in developed regions. Therefore, study and publication about community-based pedagogy in other contexts is necessary, in order to have more understanding of its current scholarship.

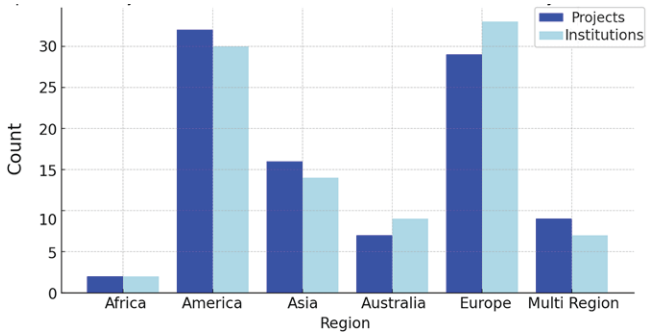

Figure 2. Comparison of project locations and Authors' Institution (Source: Authors, 2025)

Regarding the use of the term in the community-based architectural pedagogy, the metadata analysis indicated a broad, evolving landscape of the pedagogy, moving away from conventional toward collaborative, interdisciplinary, research-driven, and socially engaged models (Figure 3). The analysis of 95 pedagogical papers shows a strong concentration on Participatory Design (16 papers) and Design-Build (15 papers), making them the dominant themes in contemporary community-based architectural education. This indicates a pedagogical shift whereby students and community stakeholders could collaborate during the design process (Salama, 2021; Sara, 2011). Examples include Public Space Participatory Design (Haupt and Kazanecka-Olejnik, 2023) and Participatory Urban Design Education (Racoń-Leja, 2020), which highlight urban-focused, community-driven design approaches. Similarly, Material Reuse in Design-Build Education (Cohen *et al.*, 2019) and Design-Build Education in Post-Disaster Contexts (Owen, 2017) emphasize real-world, construction-based learning experiences that help students translate theory into practice. The prevalence of these themes suggests that modern architecture and design pedagogy prioritizes practical engagement, social impact, and sustainability over purely theoretical instruction. It is resonance (Harriss, 2014) that highlights the potential of an architecture live project in developing practice-ready skills for the student.

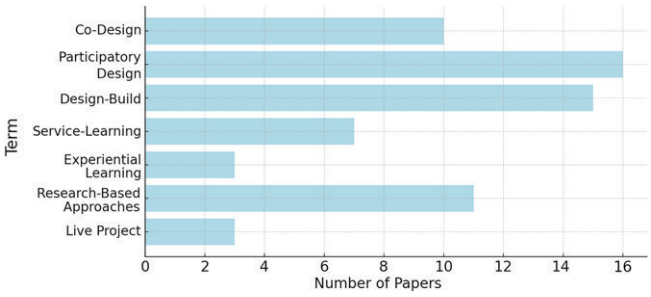

Figure 3. Pedagogical terminologies in community-based architecture (Source: Authors, 2025)

Additionally, Co-Design (10 papers) and Service-Learning (7 papers) further reinforce the idea that collaboration and community involvement are essential components of architectural education today. Papers like Inclusive Co-Design (Cifter *et al.*, 2023) and Games-Based Co-Design (Peng *et al.*, 2024) introduce innovative community-based architectural methods, demonstrating how interdisciplinary and interactive approaches enhance the learning process. Meanwhile, Service-Learning in Urban Design (Kelsch *et al.*, 2017) and Service-Learning in Territorial Planning (Ņitavska *et al.*, 2016) showcase how students actively contribute to real-world projects while acquiring practical experience. The relatively smaller number of Experiential Learning (Antonini *et al.*, 2021; Rodriguez, 2018) and Live Project papers (Abrahams *et al.*, 2021; Anderson, 2017; Denicke-Polcher, 2022) suggests that while these approaches are present, they may not yet be as widely implemented or known as participatory, service-learning, and design-build models. These findings not only indicate a strong shift towards socially responsible, participatory, and applied education, but also state that community-based architectural pedagogy can be applied and understood in diverse pedagogical terms. This is especially evident in the remaining 30% of less frequently mentioned pedagogical terms, which include concepts such as citizen science (de Paula *et al.*, 2024), radical co-creation (Ortiz, 2022), urban mentoring (Goledzinowska and Kostrzewska, 2019), collaborative experimentation (Belova and Schofield, 2022), and co-production (Udall *et al.*, 2015), all of which highlight alternative approaches to community-based learning.

Thematic insights on balancing learning goals and community objectives

The thematic findings related to the objective of the pedagogy can be organized into five overarching categories – Community-Driven & Participatory Approaches, Experiential & Design-Build Pedagogy, Sustainability & Resilience, Digital & Interdisciplinary Innovation, and Culture, Heritage & Pedagogical Frameworks – each of which strikes a unique balance between enhancing student learning and ensuring meaningful community participation. These themes answer the implicit research question: How do the objectives of community-based architectural pedagogy address student learning and community goals?

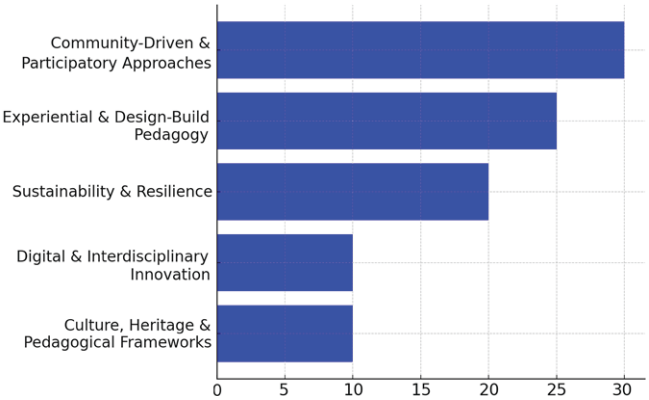

Figure 4. Focus areas on community-based architectural pedagogy scholarship (Source: Authors, 2025)

When the result is projected in a bar chart (Figure 4), these five themes reveal a distribution whereby most studies highlight either community engagement or experiential, hands-on teaching models as central to architectural education, with a substantial number also addressing environmental imperatives, technological innovation, or cultural and heritage dimensions. Although the exact numerical breakdown may vary depending on one's coding and grouping decisions, the aggregated evidence from these 95 sources provides a broad picture of how authors formulate their pedagogical objectives in relation to student learning agenda, societal needs and local stakeholder involvement. A closer inspection of individual papers shows how each theme manifests, as well as which side – student skill development or community-focused outcomes – tends to predominate in different contexts.

Numerous studies classified under Community-Driven & Participatory Approaches, typically intertwine student learning with community empowerment, with objectives that emphasize co-creation, stakeholder workshops, and service-learning. An example of this is a speculative design studio in post-mining regions (Spurr and Carrasco, 2024); while it highlights the ability of students to develop empathetic and future-focused design proposals, it also discusses how local residents are actively involved in imagining new post-extraction scenarios, gaining a voice in what such transitions could look like. Haupt and Kazanecka-Olejnik (2023) focus on whether architecture students are adequately prepared to design public spaces through both top-down and bottom-up approaches, underscoring the role of end-users in shaping urban design. In a similar spirit, Murphy and Brisotto (2022) examine how working with migrant communities can foster a deeper sense of social justice among students, stressing that such engagement becomes a powerful mechanism for students to grasp spatial inequalities and challenge them through co-design processes. Although most of these participatory papers seek a balanced outcome – students gain knowledge and real-world collaboration skills as communities receive more tailored solutions – some studies caution against superficial or short-lived engagement. Charlesworth warns that "walking the talk" can be compromised if universities parachute into neighbourhoods without building lasting relationships, effectively benefiting students more than local constituents (Charlesworth, 2018). Still, most objectives in this category propose iterative, inclusive processes that enhance learning outcomes and simultaneously empower stakeholders.

Many authors grouped under Experiential & Design-Build Pedagogy frame construction-based teaching as an avenue for both practical skill development and community uplift. A paper by Passarelli and Mutton (Passarelli and Mouton, 2021), for example, outlines iterative design-build processes that focus on affordable housing, reporting that students gain competencies in project management, hands-on assembly, and the negotiation of real-world constraints such as budgets, materials, and municipal codes. In parallel, the families or groups involved in that housing project receive direct benefits – new dwellings or amenities that reflect user input throughout the construction process. An example from Lebanon shows how a design-build approach addresses social and environmental challenges simultaneously, indicating that design-build tasks can bring students face-to-face with the complexities of real construction sites, local regulations, and community expectations, thereby improving both practical knowledge and empathy (Mohareb and Maassarani, 2018). In the interior architecture context, Zingoni (2018) highlights student-led design-build as a form of social agency, and draws attention to how physically constructed outcomes can help marginalized communities see immediate improvements, from small-scale public furniture to more ambitious structures like pavilions or resource centres. On the other hand, some authors, such as those in the post-occupancy testing (Hardin, 2018) explored certain design-build initiatives that inadvertently prioritize the final product – and student portfolios – over sustained community engagement, thereby risking a lopsided scenario in which the university collects accolades for "impactful" designs without ensuring robust community ownership. Nonetheless, the broad consensus remains that experiential pedagogy of this type can marry both practice-readiness for students and real-world relevance for communities, particularly when the latter are invited to shape the design-build process from inception to completion.

The Sustainability & Resilience theme unites another group of authors who emphasize ecologically and socially responsible design as integral to architectural education. With the rise of global crises such as rising temperature, flooding, or social inequalities, it is important to have a pedagogy that can foreground climate change and act as living laboratories (de Paula *et al*., 2024; Kiers *et al*., 2020; Solis *et al*., 2022). The objectives in these papers often emphasize the importance of embedding environmental issues into real-world studio projects, occasionally incorporating aspects such as occupant behaviour. For example, Hardin (2018) shows the influence of occupant behaviour on energy efficiency in hot climates or local biodiversity – students exit the program with advanced ecological literacy, and communities acquire tangible pathways for future-proofing their neighbourhoods. This approach also fosters co-learning: communities contribute their contextual knowledge about local ecological patterns, while students apply theoretical frameworks that can refine everyday sustainable practices.

With fewer total papers but still a clear presence, Digital & Interdisciplinary Innovation underscores the emerging use of augmented reality, virtual reality, digital fabrication, and interdisciplinary collaborations in community-based work. Collaborative projects that incorporate digital mapping or online platforms can foster wider collaboration with different backgrounds and disciplines also with external collaborators like municipalities (Paragliola *et al*., 2024; Racoń-Leja, 2020). Interactive digital platforms could also potentially replace traditional critiques with public feedback mechanisms, suggesting that real-time user input fosters more iterative and inclusive design cycles, though it may also be limited by local digital literacy levels or technology access (Guaralda *et al*., 2015). Hence, digital innovation often amplifies design possibilities, but it can also amplify inequalities if hardware or digital literacy is scarce. Across these papers, the impetus for interdisciplinary work is to

deepen students' problem-solving abilities and to anchor design proposals in a broad knowledge base, though in practice, some projects remain more "tech demonstration" than genuine user-led transformation.

Finally, Culture, Heritage and Pedagogical Frameworks speaks to the subset of objectives that emphasize cultural identity, vernacular traditions, or theoretical scaffolding in teaching. Gajendran *et al*. (2022) discuss merging Indigenous and Western pedagogies for work-integrated learning, explaining how architecture students learn to appreciate different epistemologies, while Indigenous communities can guide the design to reflect intangible heritage or local cultural practices. It can be done by addressing non-morphological factors such as social and historical contexts (Qiu *et al*., 2023) and integrating methods like semantic ethnography (Cranz *et al*., 2014); to heighten cultural sensitivity, educators can prepare students for deeper, more empathetic site analyses that go beyond superficial morphological standards. Authors in this category typically assert that architectural pedagogy is at its best when it recognizes the built environment as a nexus of culture, history, power, and community identity. This leads to projects that respect local knowledge and cultivate a sense of shared purpose.

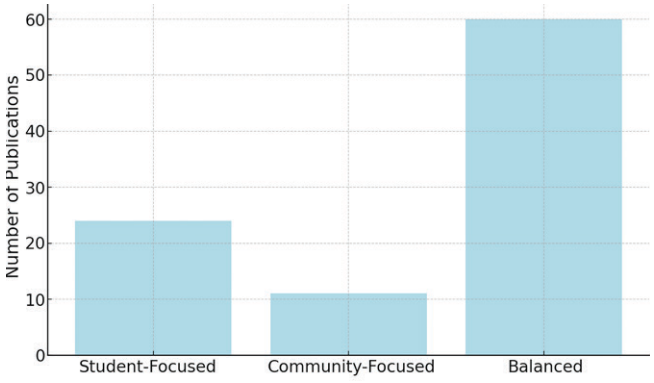

Figure 5. Focus objective on community-based architectural pedagogy scholarship
(Source: Authors, 2025)

Across all five themes, the question of whether the objectives weigh more toward student learning or community benefit does not have a single uniform answer. However, after looking back to the coding mechanism across the 95 papers, the research found that 24 primarily emphasize student-focused objectives, 11 are largely community-focused, and the remaining 60 aim for a balanced synergy between both (See Figure 5). The student-focused category (Brown and Camilli, 2023; Dragutinovic *et al*., 2023; Qiu *et al*., 2023) typically underscores how immersive workshops, design-build activities, or digital innovations sharpen students' technical and reflective abilities without giving equal weight to stakeholder leadership in the process. Meanwhile, the community-focused group (Belčič and Eloy, 2023; Denicke-Polcher, 2022; Lawanyawatna and Schoch, 2023)S centres on tackling local challenges – such as prison architecture or rural depopulation – where students' educational gain is a byproduct of meeting urgent or deeply rooted community needs.

The largest segment, however, is balanced – some 60 papers articulate objectives that explicitly entwine student learning with genuine community participation. In these, authors detail how students develop professional competencies only through real co-creation, user feedback, or participatory research. de Paula, Paragliola and Magnussen (de Paula *et al*., 2024; Magnussen and Hod, 2023; Paragliola *et al*., 2024), for instance, describe resilience planning, inclusive construction, and green-space renovation where local stakeholders shape the process alongside students, thereby ensuring that the educational benefits go hand-in-hand with tangible outcomes for residents. This distribution suggests that while many educators still concentrate on enhancing students' skill sets, a substantial portion of the literature recognizes that robust academic growth and meaningful local impact can – indeed, should – occur in tandem. Overall, most papers do treat the synergy of learning and serving as essential to community-based pedagogy: authors typically highlight that the best educational outcomes arise from working with genuine community partners who can articulate local realities, critique naive assumptions, and ensure that projects have a functional afterlife.

Unveiling practical strategies in community-engaged architectural education

Community-based architectural education bridges classroom learning with real-world application, cultivating practical skills and social responsibility in students through direct interaction with communities (Harriss and Widder, 2014; Pak and De Smet, 2022). This thematic analysis of 95 papers uncovers six commonly implemented strategies – collaborative design practices, community-driven engagement, hands-on innovation and fabrication, technology-enhanced analysis, sustainable and regenerative design, and place-based learning with cultural context – that define how students are trained to address community needs outside conventional studio settings (See Figure 6). By exploring specific examples this critical narrative examines these strategies' prevalence, effectiveness, and limitations, while proposing future methodological enhancements to answer the second research question: What practical approaches are commonly implemented in community-based architectural pedagogy?

A standout strategy is collaborative design practices, where co-creation serves as a dynamic teaching tool. Studios like co-design workshops for inclusive decision-making and co-Design with NGO representatives (Cifter *et al*., 2023; Paragliola *et al*., 2024) immerse students in partnerships with NGOs, residents, or policymakers, fostering immediate, hands-on collaboration. Targeting diverse groups also hones students' ability to navigate varied perspectives (Murphy and Brisotto, 2022; Scott *et al*., 2018), while innovative methods like game-based co-design (Peng *et al*., 2024) make participation engaging and accessible. Frequently applied outside conventional architectural pedagogy studios (Jabeen *et al*., 2021; Schreiber *et al*., 2022), this approach delivers real-time feedback, yet its educational depth falters without scrutiny of power dynamics. The lack of insight into how student-led efforts (Belčič and Eloy, 2023) balance academic and community goals suggests a risk of superficiality, urging a need for critical reflection to teach negotiation and empathy beyond process.

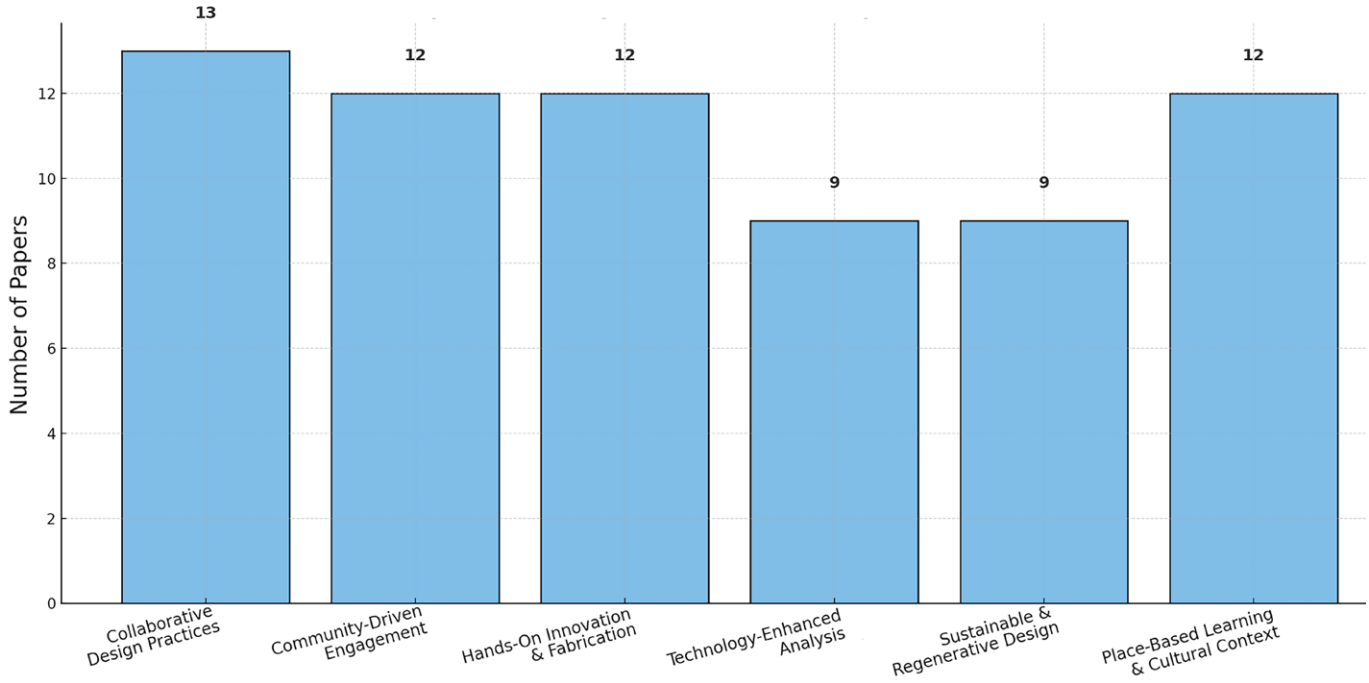

Figure 6. Thematic findings from methods and approaches in community-based architectural pedagogy (Source: Authors, 2025)

Closely aligned, community-driven engagement positions students as facilitators of community voices, embedding real-world interaction into learning. Examples like citizen science and participatory quantifiable frameworks (de Paula *et al*., 2024; Kuo and Lee, 2024) train students in grassroots techniques – surveys, exhibitions – to capture community needs, while formal consultations such as stakeholder interviews (Shanthi Priya *et al*., 2020) and public workshops (Racoń-Leja, 2020) deepen participatory skills. Widespread across papers this strategy aligns with service-learning ideals, teaching adaptability and listening. However, its practical edge dulls with top-down tendencies, where students refine rather than redefine designs, limiting their agency. Repetitive consultation can turn formulaic, raising doubts about whether students gain critical insight or just procedural know-how, especially without longitudinal evidence of impact. Hands-on innovation and fabrication offer a tangible alternative, integrating design-build into the curriculum for experiential learning. However, its resource intensity – time, materials, expertise (Salazar Ferro *et al*., 2020; Schreiber *et al*., 2022) – limits its scalability within academic constraints. While effective in small-scale contexts and products like tiny homes (Johnson, 2018), it risks prioritizing product over reflective process, a critical pedagogical gap despite its popularity.

Technology-enhanced analysis brings digital tools into the mix, blending innovation with community engagement. The use of remote sensing and GIS Mapping means to help better understanding of the context while also proposing data driven approach (de Paula *et al*., 2024; Mehan and Dominguez, 2024), while participatory digital mapping foster student and community involvement during the process (Alba *et al*., 2023; Ortiz, 2022). This dual focus on technical skill and collaboration shines in tech-forward settings, but reliance on advanced tools could raise accessibility barriers, potentially sidelining students or communities without technological resources or knowledge. Sustainable and regenerative design infuses ecological responsibility into pedagogy, preparing students for community-relevant challenges.

Place-based learning and cultural context anchor education in local realities, fostering community connection. Ethnographic fieldwork and place based research (Daneshyar and Keynoush, 2023; Dragutinovic *et al*., 2023) trains students in immersive research, while cultural narratives by embedding indigenous and local perspectives, enriched by storytelling create a fundamental process and understanding on where the knowledge is practiced and explored (Ortiz, 2022; Rodgers *et al*., 2020; Spurr and Carrasco, 2024). Prevalent in context-focused studios, this authentic approach builds cultural sensitivity, but its intensity and specificity could also limit scalability, risking a narrative focus over practical skills unless balanced.

These strategies – collaborative co-design, community engagement, hands-on fabrication, digital analysis, sustainable design, and place-based learning – form a practical toolkit, widely implemented across 95 papers, signalling a shift toward experiential, community-engaged education. However, several challenges remain: collaborative and engagement methods risk becoming tokenistic without clear power dynamics; hands-on and technological tools often struggle with issues of scalability and equity; and sustainability or place-based approaches require significant resources and contextual specificity, which can hinder their broader applicability.

Critically analysing the themes, future development of this pedagogy must address these gaps. Longitudinal assessment,

which involves tracking outcomes over time beyond individual projects, is essential and can be strengthened through mixed-method or multi-method evaluation approaches to more effectively validate the impact on both students and communities. Power-sharing frameworks, inspired by participatory action research, could deepen co-design and engagement, and teach students to negotiate authority and counter tokenism. Scalable hybrid models – merging digital tools with low-resource fabrication and outputs – could give a more iterative aspect of the pedagogy that could not be seen in a short period of time. The absence or limited use of these methods in the findings analysis highlights a missed opportunity to enhance practicality and equity, which are crucial for fostering community-engaged education that truly empowers both learners and communities.

CONCLUSION AND BEYOND

This systematic review of 95 Scopus-indexed studies from 2014–2024 illuminates the evolving landscape of community-based architectural pedagogy, revealing its ambitions, achievements, and shortcomings in addressing student learning and community participation. In response to our first research question – how objectives balance these dual goals – our analysis identifies five pedagogical orientations: Community-Driven & Participatory Approaches, Experiential & Design-Build Pedagogy, Sustainability & Resilience, Digital & Interdisciplinary Innovation, and Culture, Heritage & Pedagogical Frameworks. Of these, 60 studies aim for synergy, integrating student skill development with community benefits, as seen in projects blending co-creation with real-world outcomes (e.g., Passarelli and Mutton, 2021). Meanwhile, 24 papers prioritize student learning, focusing on technical or reflective gains (Qiu *et al*., 2023), whereas 11 focus more explicitly on community impact, addressing local challenges like rural depopulation (Denicke-Polcher, 2022). This uneven distribution exposes a central tension: despite the rhetoric of mutual benefit, pedagogical design often prioritizes academic objectives, risking superficial engagement or "parachute" interventions that fade post-project realities (Charlesworth, 2018).

For the second question – what practical approaches are implemented – six strategies dominate: collaborative design, community-driven engagement, hands-on fabrication, technology-enhanced analysis, sustainable design, and place-based learning. These methods are exemplified by co-design workshops (Cifter *et al*., 2023) and GIS mapping (de Paula *et al*., 2024), and other pedagogical shifting approaches toward experiential and socially engaged practice. However, their effectiveness is curtailed by persistent challenges: tokenism in participatory efforts, resource-intensive fabrication limiting scalability (Schreiber *et al*., 2022), and also digital divides that exclude less-resourced communities (Guaralda *et al*., 2015). The field's Western dominance – 32 US and 29 European projects versus 2 in Africa – further skews the narrative, sidelining non-Western contexts where community-based design may thrive outside English-language scholarship (Salama, 2016). Publication trends show growing interest, peaking at 14 articles in 2018, yet disruptions like Covid-19 (Metinal and Gumusburun Ayalp, 2024) suggest fragility in research momentum.

Critically, the minimal amount of longitudinal evidence weakens claims regarding lasting impact. Many studies offer snapshots – semester-long projects – rather than tracking how skills translate to practice or how communities sustain benefits (Harriss, 2014). This gap, paired with a reliance on peer-reviewed journals, overlooks grey literature or local documentation, particularly from underrepresented regions. The field's promise – to educate practice-ready architects while empowering communities – remains aspirational without rigorous validation and broader inclusivity.

Looking beyond, transformative steps are essential. It is important to recognize that community-based architectural pedagogy is one of several new pedagogical approaches emerging in architectural education as a response to complex contemporary challenges. Other fields such as sustainable development, resilience, and climate change research are actively developing transformative learning models to address these global issues. Future research in community-based architectural pedagogy could significantly benefit from integrating insights and methodologies from these related domains, thereby broadening its scope and impact. Longitudinal assessments, spanning years rather than terms, should employ mixed methods to measure student competencies (e.g., empathy, collaboration) and community outcomes (e.g., social cohesion, built assets), building on calls for evidence-based pedagogy. Equitable power-sharing frameworks, rooted in participatory action research, must replace tokenistic consultation, positioning communities as co-designers and teaching students to negotiate power dynamics critically. Finally, multilingual reviews, incorporating non-English sources from Asia, Africa, or Latin America, would decolonize the discourse, aligning with global calls for inclusive and pluriversality scholarship (Escobar, 2018). By embracing these shifts, including learning from adjacent fields tackling sustainability and resilience, community-based pedagogy can move beyond fragmented promises to deliver architects equipped for practice and communities empowered through co-creation, fulfilling its dual mission with rigor and equity.

Appendix

All reviewed articles can be access through this link https://s.id/ninetyfiveslr

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REFERENCES

Abrahams, C., Delport, H., Perold, R., Weber, A. M., Brown, J. B. (2021). Being-in-context through live projects in architectural education: Including situated knowledge in community engagement projects, *Critical Studies in Teaching and Learning*, Vol. 9, pp. 99-125. https://doi.org/10.14426/cristal.v9iSI.1813

Alba, S., Baldo, M., De Benedetti, L., Deimichei, S., Mazzino, F., Margagliotti, A., Polin, V., Quaglia, D., Tardivo, S., Tocco Tussardi, I. (2023). A Participatory Inventory Project to Kick-Start the Creation of a Hospital Park: The Experience of the University of Verona (North-Eastern Italy), *Sustainability*, Vol. 15, No. 5. https://doi.org/10.3390/su15053905

Anderson, J. (2017). Devising an inclusive and flexible taxonomy of international live projects, *ARENA Journal of Architectural Research*, Vol. 2, No. 1. https://doi.org/10.5334/ajar.5

Antonini, E., Gaspari, J., Visconti, C. (2021). Collaborative learning experiences in a changing environment: Innovative educational approaches in architecture, *Sustainability*, Vol. 13, No. 16. https://doi.org/10.3390/su13168895

Arnstein, S. R. (1969). A ladder of citizen participation, *Journal of the American Institute of Planners*, Vol. 35, No. 4, pp. 216-224. https://doi.org/10.1080/01944366908977225

Awan, N., Schneider, T., Till, J. (2013). *Spatial agency: Other ways of doing architecture*. London: Routledge. https://doi.org/10.4324/9781315881249

Belčič, A., Eloy, S. (2023). Architecture for Community-Based Ageing - A Shape Grammar for Transforming Typical Single-Family Houses into Older People's Cohousing in Slovenia, *Buildings*, Vol. 13, No. 2. https://doi.org/10.3390/buildings13020453

Belova, D., Schofield, J. (2022). Collaborative experimentation in the urban process: activism and everyday heritage in Krasnoyarsk (Siberia, Russia), *International Journal of Heritage Studies*, Vol. 28, No. 4, pp. 538-558. https://doi.org/10.1080/13527258.2021.2020878

Boyle, D. (2021). *A history of community development.* Local Trust Long Reads [online]. https://longreads.localtrust.org.uk/2021/05/01/a-history-of-community-development/ [Accessed: 14 May 2024].

Brown, J. B., Camilli, F. (2023). Students in the Forest: The Role of Design-Build Pedagogies in Repairing Material Disconnections in Architecture Education, *International Journal of Art & Design Education*, Vol. 42, No. 2, pp. 230-245. https://doi.org/10.1111/jade.12457

Canizaro, V. B. (2012). Design-build in architectural education: Motivations, practices, challenges, successes and failures, *International Journal of Architectural Research: Archnet-IJAR*, Vol. 6, No. 3, pp. 20-36.

Carpentier, N. (2016). Beyond the ladder of participation: An analytical toolkit for the critical analysis of participatory media processes, *Javnost - The Public*, Vol. 23, No. 1, pp. 70-88. https://doi.org/10.1080/13183222.2016.1149760

Charlesworth, E. (2018). Walking The Talk: from theory to practice in delivering community based design education, *International Journal of Art & Design Education*, Vol. 37, No. 2, pp. 253-264. https://doi.org/10.1111/jade.12049

Cifter, A. S., Dong, H., Cook, S., Ayna, A. (2023). Using normative inquiry and co-design to embed inclusive design in social design education, *The Design Journal*, Vol. 26, No. 2, pp. 229-251. https://doi.org/10.1080/14606925.2022.2152986

Cohen, D., Osseo-Asare, D. K., Hailey, C. (2019). Making with Repurpose: Finding Architectural Value between Waste and Landfill, *European Journal of Creative Practices in Cities and Landscapes*, Vol. 2, No. 2, pp. 105-120. https://doi.org/10.6092/issn.2612-0496/9554

Cooke, B., Kothari, U. (2001). *Participation: The new tyranny?.* London, New York: Zed Books.

Cranz, G., Lindsay, G., Morhayim, L., Sagan, H. (2014). Teaching semantic ethnography to architecture students, *Archnet-IJAR: International Journal of Architectural Research*, Vol. 8, No. 3, pp. 6-19. https://figshare.utas.edu.au/articles/journal_contribution/Teaching_Semantic_Ethnography_to_Architecture_Students/22982705?file=40728677 [Accessed: 18 Jun 2025]

Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). London: SAGE Publications.

Daneshyar, E., Keynoush, S. (2023). Developing Adaptive Curriculum for Slum Upgrade Projects: The Fourth Year Undergraduate Program Experience, *Sustainability*, Vol. 15, No. 6. https://doi.org/10.3390/su15064877

de Paula, A. L., Marchezini, V., Mendes, T. S. G. (2024). Participatory analysis of disaster risk creation in Brazilian coastal cities: bridging remote sensing and citizen generated data, *International Journal of Disaster Resilience in the Built Environment*, Vol. 16, No. 3, pp. 378-401. https://doi.org/10.1108/IJDRBE-02-2023-0013

Denicke-Polcher, S. (2022). Reactivating underpopulated areas through participatory architecture in southern Italy by creating a home for newcomers, *Architecture_MPS*, Vol. 21, No. 1. https://doi.org/10.14324/111.444.amps.2022v21i1.003

Dragutinovic, A., Milovanovic, A., Stojanovski, M., Damjanovska, T., Đorđevic, A., Nikezic, A., Pottgiesser, U., Ivanovska Deskova, A., Ivanovski, J. (2023). Approaching Extracurricular Activities for Teaching and Learning on Sustainable Rehabilitation of Mass Housing: Reporting from the Arena of Architectural Higher Education, *Sustainability*, Vol. 15, No. 3., 2476. https://doi.org/10.3390/su15032476

Escobar, A. (2018). *Designs for the pluriverse: Radical interdependence, autonomy, and the making of worlds*. Durham: Duke University Press.

Forsyth, A., Lu, H., McGirr, P. (2000). Service learning in an urban context: Implications for planning and design education, *Journal of Architectural and Planning Research*, Vol. 17, No. 3, pp. 236-259.

Gajendran, T., Tucker, C., Ware, S., Tose, H. S. (2022). Integrating Indigenous, Western and inclusive pedagogies for work-integrated learning partnerships in architecture and design disciplines, *International Journal of Work-Integrated Learning*, Vol. 23, No. 2, pp. 259-277. https://files.eric.ed.gov/fulltext/EJ1346569.pdf [Accessed: 18 Jun 2025]

Goledzinowska, A., Kostrzewska, M. (2019). Co-operation with local stakeholders: A crucial element of urban design, *World Transactions on Engineering and Technology Education*, Vol. 17, No. 4, pp. 490-494.

Grover, R., Wright, A. (2023). Shutting the studio: the impact of the Covid-19 pandemic on architectural education in the United Kingdom, *International Journal of Technology and Design Education*, Vol. 33, No. 3, pp. 1173-1197. https://doi.org/10.1007/s10798-022-09765-y

Guaralda, M., Caldwell, G. A., Rittenbruch, M. (2015). Enriching

architectural design education through interactive displays and local community engagement, *Design and Culture*, Vol. 7, No. 3, pp. 433-439. https://doi.org/10.1080/17547075.2015.1104900

Hardin, M. (2018). Post-Occupancy Testing of Thermal Dynamics of Design-Build Residences in Tucson, Arizona, *Technology Architecture and Design*, Vol. 2, No. 2, pp. 147-159. https://doi.org/10.1080/24751448.2018.1497361

Harriss, H. (2014). *Architecture Live Projects acquiring and applying missing practice-ready skills*. RADAR [online]. https://radar.brookes.ac.uk/radar/file/7504258d-d3e9-4ee5-8350-ff0028035e3a/1/harriss2014architecture.pdf [Accessed: 14 May 2024].

Harriss, H., Widder, L. (2014). *Architecture live projects: Pedagogy into practice*. London: Routledge.

Haupt, P., Kazanecka-Olejnik, L. (2023). Public space activation in architectural and urban design education, *World Transactions on Engineering and Technology Education*, Vol. 21, No. 4, pp. 217-222. http://www.wiete.com.au/journals/WTE&TE/Pages/Vol.%2021,%20No.4%20(2023)/01-Haupt-P.pdf [Accessed: 18 Jun 2025]

Jabeen, H., Kabir, K. H., Aziz, T. (2021). Balancing rationalism with creativity: an architectural studio's experience of responsive design solutions, *Environment and Urbanization*, Vol. 33, No. 1, pp. 63-82. https://doi.org/10.1177/0956247820981873

Johnson, R. D. (2018). Homelessness: A critical approach to architecture and planning, *WIT Transactions on Ecology and the Environment*, Vol. 217, pp. 675-686. https://doi.org/10.2495/SDP180571

Jones, P. B. (2005). *Architecture and Participation*. London: Routledge.

Kelsch, P., Krider, J. K., La Coe, J. (2017). Reimagining riverfront access along the George Washington Memorial Parkway: Student proposals for Rosslyn, Virginia, *Transportation Research Record*, Vol. 2614, pp. 18-26. https://doi.org/10.3141/2614-03

Kiers, A. H., de la Peña, D., Napawan, N. C. (2020). Future Directions - Engaged Scholarship and the Climate Crisis, *Land*, Vol. 9, No. 9, 304. https://doi.org/10.3390/land9090304

Kuo, C. G., Lee, L. C. (2024). Research of the design-factor framework for sustainable community-based public building in Taiwan, *International Journal of Applied Science and Engineering*, Vol. 21, No. 5, pp. 1-12. https://ir.lib.cyut.edu.tw/bitstream/310901800/44048/1/IJASE-202412-21-5-002.pdf [Accessed: 18 Jun 2025]

Lawanyawatna, S., Schoch, M. (2023). Collaborative approach for socially oriented design in architecture education, *Humanities, Arts and Social Sciences Studies*, Vol. 23, No. 1, pp. 66-79. https://doi.org/10.14456/hasss.2023.7

Lee, J. Y., Clark, J. K., Schmiesing, R., Kaiser, M. L., Reece, J., Park, S. (2024). Perspectives of community members on community-based participatory research: A systematic literature review, *Journal of Urban Affairs*, pp. 1-20. https://doi.org/10.1080/07352166.2024.2305132

Magnussen, R., Hod, Y. (2023). Bridging communities and schools in Urban development: community and citizen science, *Instructional Science*, Vol. 51, No. 5, pp. 887-911. https://doi.org/10.1007/s11251-023-09641-9

Mehan, A., Dominguez, N. (2024). Interdisciplinary Urban Interventions: Fostering Social Justice Through Collaborative Research-Led Design in Architectural Education, *Architecture*, Vol. 4, No. 4, pp. 1136-1156. https://doi.org/10.3390/architecture4040059

Metinal, Y. B., Gumusburun Ayalp, G. (2024). Modeling the critical factors affecting the success of online architectural education to enhance educational sustainability, *Sustainability*, Vol. 16, No. 9, 3803. https://doi.org/10.3390/su16093803

Miessen, M. (2011). *Markus Miessen - The Nightmare of Participation (Crossbench Praxis as a Mode of Criticality)*. London: Sternberg Press.

Mockbee, S. (2010). The Rural Studio. In K. Sykes (Ed.), *Constructing a new agenda: architectural theory 1993–2009* (1st ed.). Princeton: Princeton Architectural Press.

Mohareb, N., Maassarani, S. (2018). Design-build: An effective approach for architecture studio education, *Archnet-IJAR: International Journal of Architectural Research*, Vol. 12, No. 2, pp. 146-161. https://doi.org/10.26687/archnet-ijar.v12i2.1570

Murphy, C., Brisotto, C. (2022). Education as Acceptance: Including Differences in Studio Pedagogy to Achieve Spatial Justice, *Studies in Social Justice*, Vol. 16, No. 3, pp. 628-636. https://doi.org/10.26522/ssj.v16i3.3960

Ņitavska, N., Zigmunde, D., Markova, M., Īle, U. (2016). Bridging the gap between planning process in municipalities and landscape architecture studies and research in Latvia, *Journal of Architecture and Urbanism*, Vol. 40, No. 4, pp. 262-271. https://doi.org/10.3846/20297955.2016.1246984

Ortiz, C. (2022). Cultivating urban storytellers: A radical co-creation to enact cognitive justice for/in self-built neighbourhoods, *Urban Planning*, Vol. 7, No. 3, pp. 405-417. https://doi.org/10.17645/up.v7i3.5430

Owen, G. (2017). The shotgun of selective belonging: Localised housebuilding initiatives and the transformation of New Orleans, *City*, Vol. 21, No. 6, pp. 800-812. https://doi.org/10.1080/13604813.2017.1412202

Pak, B., De Smet, A. (2022). *Experiential learning in architectural education: Design-build and live projects*. London: Routledge.

Paragliola, F., Esposito De Vita, G., Deal, B., Rigillo, M., De Paola, P., Bevilacqua, C. (2024). Do It Yourself! Collaborative Processes for Inclusive Design and Capacity Building in Louisiana (USA), *Urban Science*, Vol. 8, No. 2. https://doi.org/10.3390/urbansci8020032

Passarelli, R. N., Mouton, B. J. (2021). The URBANbuild Program: Bridging Design, Construction, and Research, *Journal of Architectural Education*, Vol. 75, No. 1, pp. 102-107. https://doi.org/10.1080/10464883.2021.1859892

Peng, X., Li, J., Tang, H., Luo, Q. (2024). Gamified interaction and urban regeneration: an analysis of serious game participation in rural architectural transformation and its influential factors, *Journal of Asian Architecture and Building Engineering*, pp. 1-15. https://doi.org/10.1080/13467581.2024.2373825

Pickering, C., Byrne, J. (2014). The benefits of publishing systematic quantitative literature reviews for PhD candidates and other early-career researchers, *Higher Education Research & Development*, Vol. 33, No. 3, pp. 534-548. https://doi.org/10.1080/07294360.2013.841651

Qiu, Z., Wang, S., Chen, X., Xiang, X., Chen, Q., Kong, J. (2023). Research on the Influence of Nonmorphological Elements' Cognition on Architectural Design Education in Universities: Third Year Architecture Core Studio in Special Topics "Urban Village Renovation Design", *Buildings*, Vol. 13, No. 9. https://doi.org/10.3390/buildings13092255

Racoń-Leja, K. (2020). Modelling the process of teaching engineers, architects and spatial planners in the field of urban design in co-operation with small municipalities, *Global Journal of Engineering Education*, Vol. 22, No. 2, pp. 85-90. http://www.wiete.com.au/journals/GJEE/Publish/vol22no2/02-Racon-Leja-K.pdf [Accessed: 18 Jun 2025]

Rodgers, M., Marques, B., McIntosh, J. (2020). Connecting Māori Youth and Landscape Architecture Students through Participatory Design, *Architecture and Culture*, Vol. 8, No. 2, pp. 309-327. https://doi.org/10.1080/20507828.2020.1768349

Rodriguez, C. M. (2018). A method for experiential learning and significant learning in architectural education via live projects, *Arts and Humanities in Higher Education*, Vol. 17, No. 3, pp. 279-304. https://doi.org/10.1177/1474022217711878

Salama, A. M. (2021). *Transformative Pedagogy in Architecture and Urbanism*. London: Routledge.

Salama, A. M. (2016). Interchangeable design pedagogies: Community design, design-build, and live project studios. In A. Salama (Ed.), *Spatial Design Education*, London: Routledge, pp. 245-290.

Salazar Ferro, C., Artega Arredondo, I., Rodriguez, C. M., Nadal, D. H. (2020). Active Learning in Architectural Education: A Participatory Design Experience (PDE) in Colombia, *International Journal of Art & Design Education*, Vol. 39, No. 2, pp. 346-366. https://doi.org/10.1111/jade.12280

Saldana, J. (2009). *The coding manual for qualitative researchers*. London: SAGE Publications.

Sara, R. (2011). Learning from life - exploring the potential of live projects in higher education, *Journal for Education in the Built Environment*, Vol. 6, No. 2, pp. 8-25. https://doi.org/10.11120/jebe.2011.06020008

Schreiber, F., Nöldeke, J., Setzen, Š., Kropp, C., Ley, A. (2022). The Social Quality of Design-Build: Lessons Learnt from Higher Education, *Sustainability*, Vol. 14, No. 17. https://doi.org/10.3390/su141710816

Scott, I., Mclachlan, F., Brookfield, K. (2018). Inclusive design and pedagogy: An outline of three innovations, *Built Environment*, Vol. 44, No. 1, pp. 9-22. https://doi.org/10.2148/benv.44.1.9

Serageldin, I. (1997). *The architecture of empowerment: People, shelter and liveable cities.* London: Academy Editions.

Shanthi Priya, R., Shabitha, P., Radhakrishnan, S. (2020). Collaborative and participatory design approach in architectural design studios, *Social Sciences & Humanities Open*, Vol. 2, No. 1, 100033. https://doi.org/10.1016/j.ssaho.2020.100033

Smith, C. (2008). *Design for the other 90 per cent*. New York: Cooper-Hewitt Museum.

Smith, S. G., Dupre, K., Crough, J. (2023). Live projects: a mixed-methods exploration of existing scholarship, *International Journal of Architectural Research Archnet-IJAR*, Vol. 17, No. 4, pp. 793-811. https://doi.org/10.1108/ARCH-03-2022-0067

Solis, M., Davies, W., Randall, A. (2022). Climate justice pedagogies in green building curriculum, *Curriculum Inquiry*, Vol. 52, No. 2, pp. 235-249. https://doi.org/10.1080/03626784.2022.2041981

Spurr, S., Carrasco, S. (2024). Architecture for Complexity: Speculative Design as Enabler of Engagement in Co-Designing Post-Mining Futures in the Hunter Valley, *Sustainability*, Vol. 16, No. 16, 6842. https://doi.org/10.3390/su16166842

Till, J. (2016). *Distributing Power: Jeremy Till on the Complex Necessity of Participatory Urbanism*. Arch Daily [online]. https://www.archdaily.com/782319/distributing-power-jeremy-till-on-the-complex-necessity-of-participatory-urbanism [Accessed: 14 May 2024].

Udall, J., Forrest, D., Stewart, K. (2015). Locating and building knowledges outside of the academy: approaches to engaged teaching at the University of Sheffield, *Teaching in Higher Education*, Vol. 20, No. 2, pp. 158-170. https://doi.org/10.1080/13562517.2014.966237

Zingoni, M. (2018). Prototyping process: interior architecture as a social agency, *Interiors: Design, Architecture, Culture*, Vol. 9, No. 3, pp. 306-323. https://doi.org/10.1080/20419112.2019.1622234

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