

Towards a Framework for Sustainable Monotowns: Identity, Transformation, and Heritage in Post-Socialist Cities

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Abstract

The article develops a methodological framework for analysing trajectories of identity reframing and for examining the post-socialist development of monotowns in Eastern and Central Europe. The methodology employs an interdisciplinary comparative case study approach, used as a meta-method and encompassing a multi-level research structure, aimed at providing a foundation for developing recommendations for rethinking Piatykhatky's (Kharkiv, Ukraine). The methodology can subsequently be applied to other monotowns in Ukraine.

Introduction

The legacy of Soviet and socialist-era architecture and urban planning presents major challenges for countries across the post-socialist space, including former Soviet territories. Monotowns (or single-industry towns) are part of this legacy, which needs to be reassessed in order to foster the development of these territories. The phenomenon of post-socialist and post-Soviet monotowns in Central and Eastern Europe represents a unique and timely challenge for regional development and socio-economic revitalisation. Many monotowns faced significant economic and social challenges following the collapse of the socialist bloc and the Soviet Union. Their development trajectories vary: some have overcome the crisis, reconfiguring their identity and fostering growth, whereas for others, the state of crisis and transition persists.

In European countries that were under the Soviet Union's influence or were part of it for a long time, studies have been conducted on monotowns, addressing various aspects, including the processes of post-socialist identity reframing in these monotowns and their subsequent development. However, such studies have not been conducted in Ukraine, highlighting the relevance of addressing this gap. Ukrainian monotowns have primarily been examined by sociologists and historians, rather than by scholars in the fields of architecture and urban planning.

Given the large number of monotowns in Ukraine, the ongoing transitional period, and the current war, there is an urgent need to study this topic and to draw lessons from the development experiences of post-socialist monotowns in other European countries. Studying the experiences of countries that have already undergone processes of identity reframing in such urban settlements is important for the further development of Ukrainian monotowns.

This study aims to develop a methodological framework for analysing the development trajectories of monotowns in Eastern and Central Europe (post-Soviet and post-socialist contexts), to subsequently formulate recommendations for Piatykhatky (Kharkiv), Ukraine. In this article, we intend to test the methodology using the example of a European monotown that is successfully undergoing identity reframing – Visaginas in Lithuania. The methodological framework for analysing development trajectories is intended to be applied in future studies to other monotowns, in order to develop a more comprehensive set of recommendations aimed at fostering the development of Piatykhatky.

The methodology is built as an interdisciplinary comparative case study approach, conceived as a meta-method that integrates various research tools, including interviews, document analysis, and observation. It is grounded in a systematic review of the academic literature, examining the reciprocal influence between the material

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environment and identity. It also examines the instruments and practices employed by active actors, as well as both tangible and intangible elements of urban space. This foundation allows for the construction of a theoretical framework to study identity trajectories and urban transformations in monotowns. The approach employs a multi-level research structure, examining interactions across institutional, professional, and grassroots. The methodology is conceived as universal and can be applied to other monotowns in Ukraine. Such a process of reframing is crucial to prevent sites of cultural memory from becoming sites of cultural oblivion. Erasing the colonial past without learning from it leads to the loss of invaluable experience and opportunities for reflection.

I. Theoretical Basis and Development of The Methodological Framework

A. Theoretical Background

The question of the interrelationship between the material environment and identity occupies a central place in urban studies and cultural geography. As H. Lefebvre [1] noted, space is not a neutral container for social processes; it is socially produced and both shapes and expresses relations of power, ideology, and culture. The material environment – buildings, infrastructure, and urban layout – embeds specific narratives and symbolic meanings that influence the formation of collective identity. The volume *Sanctioning Modernism* [2] shows how postwar modernist architecture shaped collective identities, with urban materiality actively producing social meanings and self-perception.

However, this process is reciprocal. Identity – both individual and collective – shapes how the environment is perceived, used, and transformed. As D. Massey [3] argues, place, constituted through spatial practices, historical memory, and political interests, is actively constructed by identity via appropriation, adaptation, and reinterpretation. D. A. Bell and A. de-Shalit [4] examine how a city's material environment, architectural forms, and urban morphology embody its "spirit," shaping collective identity and moral-cultural reference points amid globalisation. A. Cheshmehzangi [5] analyses how urban spaces, infrastructure, and the built environment shape multilayered urban identity, producing shared meanings and urban distinctiveness through material, social, and narrative interactions. S. Berger [6] examines how industrial heritage, material traces, and architectural sites reinterpret regional identity, showing that material memory fosters new cultural narratives and reinforces collective self-identification amid economic restructuring.

The material environment and identity are mutually constitutive. Architectural forms and spatial structures

provide a framework for everyday practices, collective memories, and social roles, while identity guides preservation, adaptation, or demolition, turning the environment into a resource or constraining legacy [7], [8].

Understanding the mutual influence of environment and identity is crucial for analysing post-socialist and post-Soviet monotowns, where heritage and collective identity are constantly reshaped. Collective identity is shaped through social practices, institutions, and discourses, and can be deliberately transformed by an *Actor* capable of reflecting on their individual or collective position and consciously engaging in identity work. This is supported by research on place identity and organisational *identity work* [9]. An *Actor* in superposition is an agent (an individual, organisation, or coalition) who recognises the need for transformation and possesses the tools to advance it. In monotowns, such actors include municipal representatives, managers, non-profit leaders, and project curators, whose reflective actions are studied in identity entrepreneurship and management literature [10]. Based on the studies, three levels at which an Actor operates or interacts can be distinguished: (1) municipality/state – establishing institutional frameworks and policies; (2) professional communities/institutions – shaping practices, the economy, and narratives; (3) local initiatives/bottom-up – generating everyday practices and symbolic meanings. For monotowns, this distribution is particularly relevant due to the dominant role of single-industry structures [11]. Moreover, research on urban coding demonstrates that place identity is embedded and transmitted through stable spatial "codes" – morphological patterns, regulations, and planning practices [12] – meaning that actors who intervene in these codes also shape identity. Interstitial actors – project managers, NGOs, and intermediaries – serve as mediators between top-down and bottom-up processes, enhancing the potential for deliberate change and the scaling of innovations [13]. This is supported by research on urban mediation [14].

Based on the analysis, key tools for managing urban identity include discursive practices (narratives, PR), institutional mechanisms and policies (programs, infrastructure, redevelopment), cultural and symbolic programs (festivals, branding), community networks (local actions, partnerships), economic practices (subsidies, business support), and educational-media tools (museums, social platforms), among others. Depending on the level of interaction, an *Actor* operates either tactically (T) – local, short-term changes or strategically (S) – institutional reforms, long-term transformations. Tactical interventions are often aimed at rapidly shifting perceptions and are more frequently initiated by local and interstitial actors. Strategic changes demand greater resources and time, typically involving policy reform, economic diversification, educational transformation, and long-term cultural programs (Matrix 1).

MATRIX 1

Governing Actors' levels and instruments (by the author)

	Narratives and communication strategies (S)	Institutional mechanisms/policies (S)	Economic incentives and development (S)	Spatial and urban-planning transformations (S, occasionally T)	Media and digital tools (S)	Urban-planning/design practices (S)	Cultural and symbolic programs (S-T)	Educational, research, and public-outreach practices (S)	Media platforms and digital tools (T-S)	Community practices and local activation (T, occasionally S when sustained)	Small-scale cultural events and temporary interventions (T)	Cross-sector networks and coalitions (T-S)
Municipality/state	●	●	●	●	●	●			●			
Professional communities/institutions	●	●			●	●	●	●	●			●
Local initiatives – grassroots	●				●		●	●	●	●	●	●

In examining the processes of identity formation – particularly in monotowns – it is essential to distinguish between two types of actors. *Governing Actors (GAs)* deliberately shape and manage the city's identity through conscious and strategic actions. *Social Actors (SAs)*, by contrast, may not always be aware of their role; nevertheless, their everyday practices and material interventions also exert a significant influence on urban identity. It is important to note that *GAs* may belong to any of the three levels (municipality/state, professional communities/institutions, local initiatives) or operate as an inter-level coalition.

This distinction draws on the classic differentiation between *strategies* and *tactics* in everyday practices [15], where strategies are associated with institutionalised subjects, while tactics are embodied in the everyday activities of residents. In the context of monotowns, *GAs* seek to create a territorial brand or to exercise control over symbolic resources [16]. At the same time, *SAs* – residents, informal groups, street artists – affect urban space through practices that materialise in the form of graffiti, inscriptions, unauthorised constructions, or even damaged objects. Such practices often manifest as “signs of appropriation” and simultaneously function as instruments for articulating local identity [17]. Actor-network theory views material traces as active network participants influencing social meaning; even unintentional material actions by social actors significantly shape ongoing processes of placemaking and local identity [18]. In monotowns, these processes are particularly pronounced. While city-forming enterprises – historically the state under socialism – once defined local identity, their decline has shifted this role to municipal authorities, regional initiatives, and new institutional actors. Meanwhile, social actors' everyday

practices and material interventions continue to produce layered, coexisting identities at the local level [19].

B. Constructing a Methodological Framework (I). Urban Environment Components: Tangible and Intangible

In research on urban identity, it is important to distinguish between material (tangible) and immaterial (intangible) dimensions. As noted in a range of studies, identity emerges from the interaction of morphology, architecture, spatial symbols, and social representations [20], [21]. However, existing approaches typically analyse isolated elements of the environment or pit material and non material factors against each other, without systematically differentiating them according to their levels of transformability.

The proposed framework refines this distinction by identifying six tangible dimensions that constitute the foundational layers of urban identity.

Dimension I: Structural urban framework (SUF)

- *Urban structure* (street grid, blocks, squares) – the most stable and enduring layer of the urban environment [22].
- *Urban voids* (lost spaces) – dynamic territories that are frequently subject to reinterpretation and redevelopment [22].

Dimension II: Architectural form and surface (AFS)

- *Architectural volumes* – relatively inert, yet fundamental in shaping a city's scale and silhouette [23].
- *Façades* – the “surface layer” of architecture, more flexible and transformable, shaping stylistic perception [20].

- *Monumental art* – symbolic yet physically stable elements of identity [24].
- *Toponymy and other spatial signifiers* – unlike monuments, place names and signifying elements are highly dynamic and often function as instruments for rearticulating identity [25].

Regarding toponymy, it should be noted that, as a symbolic urban code, it embodies meaning, memory, and ideology, critically shaping collective memory and political power [26]. It also belongs to the tangible level, materialising in signs, plaques, maps, registries, and digital layers, physically embedded and alterable. Toponyms function as legal, navigational, and visual markers, operating symbolically and materially; some studies highlight their political economy, commercialisation, renaming, sponsorship, and inclusion in digital infrastructure [27], [28], [29]. Toponymy is a hybrid tangible level, combining material inscription and symbolic meaning, highly transformable, with rapid replacement of signs or digital records, enhancing urban identity analysis.

In addition to the tangible dimensions discussed above, it is important to highlight the *intangible* dimension.

- the field of meanings and representations held by actors (both GAs and SAs).

For our study, these are treated as intangible because they constitute cognitive, narrative, and symbolic structures that can subsequently shape the material environment (tangible). We conceptualise actors as carriers of intangible representations capable of materialising identity through inscriptions, drawing on place identity theory, social representations, and the concept of inscription/materialisation in actor–network theory (ANT). *GAs* and *SAs* operate at the meta-level, forming identity through values, social meanings, and mental representations. Governing actors not only deliberately shape the environment but also influence the semantic field of social actors. These intangible structures – including cognitive maps, narratives, and cultural symbols – may materialise through physical inscriptions. This approach acknowledges the dual nature of urban inscriptions, bridging symbolic meaning and material presence, which allows for a nuanced analysis of identity dynamics [18], [30], [31]. Thus, the novelty of the proposed framework lies in the systematic integration of:

- three *tangible* dimensions, with an explicit hierarchy (levels) defined by their degree of transformability;
- *intangible* dimension (Actors' mental field), where mechanisms are formed that shape identity's material dimensions (Fig. 1).

This structure makes it possible not only to document the constituent elements of identity, but also to analyse the potential dynamics of its transformation across the identified dimensions. It enables the examination of which

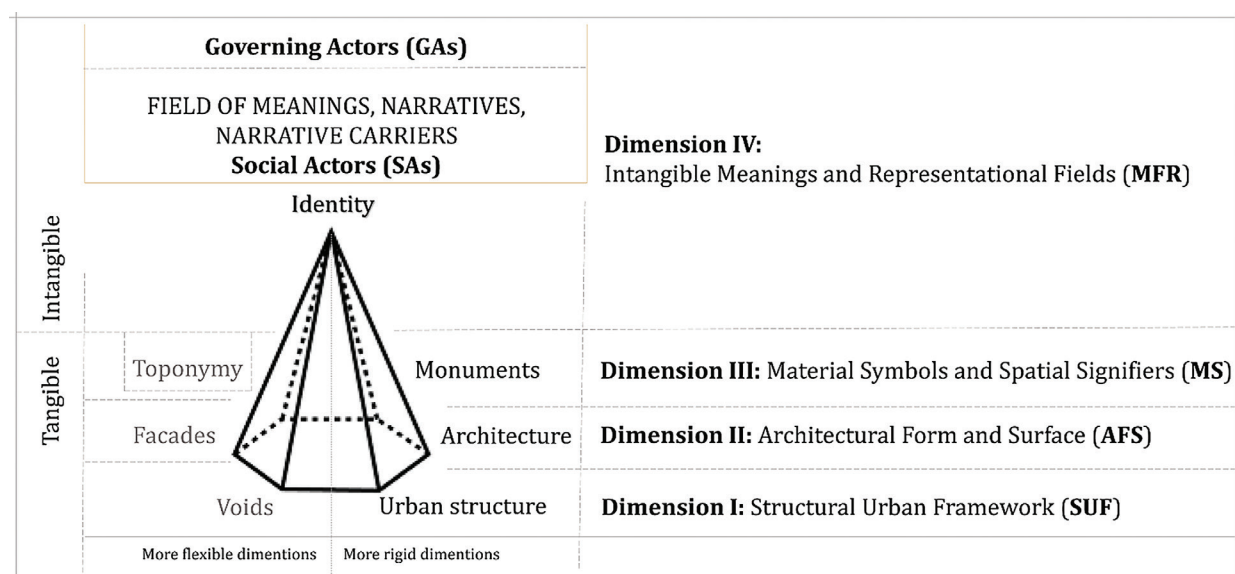


Fig. 1. The Actors and the levels of identity reproduction (by the author).

environmental elements are, or may become, potential drivers of identity transformation in a particular city. Moreover, it allows the identification of the intangible component – “living” carriers of identity – who can simultaneously perceive, transmit, and moderate (i.e., transform) identities and the narratives embedded in the actors’ consciousness.

C. Constructing a Methodological Framework (II): Identification of Development Trajectories and the Transferability of Experience

Having established the structure described above, it is essential to define the research tasks, which will guide the subsequent investigation, aimed at:

- identifying the development trajectories in monotowns that have already undertaken steps to reinterpret their identity (*reference monotowns*), and the dimensions in which these transformations are reflected;
- determining which methods can assess the transferability of transformation trajectories from reference monotowns to Piatykhatty (*recipient town*).

To reconstruct and analyse the trajectories of identity transformation in monotowns, it is necessary to address the following research questions regarding the *reference monotown*:

- WHO? At what level is the GA situated?
- WHAT/WHERE? How has the situation evolved over recent decades across all levels of transformation, specifying what changed and where, including all the tangible and intangible dimensions?
- HOW? Which instruments or interventions were employed to influence the dimensions that underwent change?

Based on this, a framework can be proposed that presents the instruments (Fig. 1) and, following the methodological framework (I), categorises actors along with the tangible and intangible identity dimensions they influence.

To identify an appropriate method for calculating applicability coefficients, the research tasks are as follows:

- *Context and potential*: Assess the key background conditions, challenges, strengths, and growth opportunities of reference monotowns and Piatyhatky.
- *Comparison and correspondence*: Identify which aspects of reference monotowns most closely correspond to Piatyhatky, and determine shared points, common weaknesses, and potential growth areas.

- *Applicable practices*: Determine which practices aimed at strengthening tangible and intangible dimensions are most transferable.

To determine the *transferability* of development trajectories, we propose employing a SWOT analysis reinforced by multi-criteria evaluation (MCA). The SWOT analysis for the *reference monotowns* will cover the periods of crisis preceding their transition to transformation, whereas for the *recipient monotown* – Piatykhatty – it will encompass the past three decades, marked by post-Soviet structural decline and the ongoing war.

The SWOT framework will be applied across all tangible and intangible dimensions to identify each town’s strengths, weaknesses, opportunities, and threats during its crisis stage, revealing comparable markers between *reference and recipient cases*. These markers form the basis for assessing the transferability of urban development experience.

The subsequent assessment of transferability relies on comparative analysis and MCA, widely used in studies of policy transfer and urban transformation. The literature stresses that evaluating transferability requires not only comparing formal instruments but also examining structural affinity, institutional logics, and crisis conditions shaping development trajectories [32], [33]. The proposed evaluation table follows the logic of weighted criteria comparison: each parameter is assigned a weight proportional to its relevance for urban identity transformation. Core structural and functional characteristics (monotown structure, enterprise profile, challenges, development potential) receive higher weights; secondary factors (e.g., size, compactness) lower ones; heritage – moderate. The methodology draws on approaches used in interurban policy learning and structural affinity analysis [34]. The relevance score is calculated by multiplying each criterion’s weight by an expert similarity rating (0–5), producing an integrated conformity score. This procedure helps ensure a more systematic, transparent, and reproducible assessment of the potential for interurban transfer (Matrix 2).

Since the primary aim of developing this methodology is to apply it for formulating recommendations for the *recipient town*, introducing quantitative indicators can significantly reduce inaccuracies and strengthen the robustness of the analysis. Based on identified commonalities and the resulting transferability scores –

MATRIX 2

Framework for the assessment of relevance and transferability (by the author)

Criterion	Urban characteristics				Architecture/typology		SWOT: post-transition challenges & potential		Relevance
Reference town score (0–5)	Size (weight 0.05)	Compactness (weight 0.05)	Isolation/ green buffer (weight 0.15)	Monotown structure (weight 0.20)	Type of city-forming enterprise (weight 0.15)	Modernist heritage (weight 0.10)	Post-transition challenges (weight 0.15)	Potential/ opportunities (weight 0.15)	Total ly (0–5)

and drawing on the outcomes of methodological framework (I) – we will be able to propose development trajectories for the *recipient monotown* aligned with analogous reference points observed previously.

Accordingly, a three-stage methodology will be employed. The first stage analyses mechanisms of identity governance; the second examines and conceptualises the experience of the *reference towns*; and the third develops and evaluates potential development strategies and tactics, determining the extent to which they can be transferred to the *recipient town*.

II. Results

A. Application of the Methodological Framework

The proposed theoretical-methodological framework is based on the classification of urban identity governance. It presents the instruments employed (Matrix 1) and, following the methodological framework (I), categorises actor levels alongside the tangible and intangible layers of urban identity they influence.

Following the methodological framework (II) and based on the experiences of *reference towns* with SWOT analyses conducted during crisis periods, we identify, for each actor level, combinations of instruments that can effectively manage the four layers of identity. Using a similar SWOT analysis for Piatykhatty, we determine the most suitable development trajectories, accounting for unique conditions, including those arising from wartime. Quantitative indicators, such as the transferability coefficient, allow us to compare *reference towns* and the

recipient town systematically, highlighting both shared challenges and context-specific solutions in urban, social, and cultural development.

Visaginas is considered in crisis from 2004 to 2015 due to the gradual closure of the Ignalina Nuclear Power Plant, which caused massive unemployment, social destabilisation, youth outmigration, population decline, and a crisis of institutional identity. Piatykhatty has experienced a prolonged crisis from 1991 to 2025, following Ukraine's independence and the loss of centralised Soviet funding, resulting in halted development, social fragmentation, and gradual erosion of its scientific and urban identity. While some recovery has occurred, structural, social, and infrastructural challenges persist.

B. SWOT Analysis of Piatykhatty

Piatykhatty, built in the 1950s–1980s as a planned settlement for the Kharkiv Institute of Physics and Technology, long functioned as a Soviet monotown, dependent on a single scientific institution. After 1991, it entered a prolonged crisis marked by shrinking resources, social fragmentation, and erosion of its scientific identity – a condition that persists today. Recent positive shifts have begun to emerge thanks to the UIPT Museum, established in 2019, which has initiated revitalisation of research, memory work, and community engagement, reflecting the continued strength of an institutional-level GA [35]. These initiatives have started to revitalise research, memory work, and community engagement, and continue despite the ongoing war in Ukraine.

Among the town's current strengths are the preserved modernist urban structure, the distinctive architectural

MATRIX 3

SWOT analysis of Piatykhatty (by the author)

Strengths	Weaknesses
SUF – compact modernist layout remains largely intact, offering a stable historic urban structure, integration into landscape, infrastructure, and ecotourism potential. AFS – documenting buildings strengthens the architectural layer. MS – digitised archives and oral histories form a new symbolic memory layer, the identity of physics. MFR – physics professional identity, involving the local community in surveys on Piatykhatty's life; a sense of the city as a unique urban phenomenon	SUF – limited ability to influence the larger urban structure during the ongoing crisis, abandoned urban voids, and lack of shared spaces. AFS – degraded architectural surfaces and lack of restoration funding. Disregard for modernism's value. MS – fragmented symbolic identity. MFR – dependence on external partners and weak institutional autonomy. Social actors are not engaged due to a lack of cultural infrastructure. Limited public visibility of the digital archives
Opportunities	Threats
SUF – compactness as an opportunity to rethink urban voids via workshops and projects; and to present Piatykhatty as a modernist research-city case study. AFS – potential to document and restore key buildings and to create a unique city brand code; projects as narrative tools to activate façades and surfaces. MS – digital archive + oral histories can evolve into a public memory platform, creating a new layer of urban memory through new narratives, museumification. MFR – strengthening partnerships with institutions, receiving international funding, activation of social actors. Heritage shift: technocratic to cultural	SUF – war damage and redevelopment threaten urban stability and historical layers, further decay of urban voids AFS – loss of architectural substance due to neglect, damage, or budget cuts. Façades are vulnerable to uncontrolled alterations. MS – risk of symbolic displacement – loss of monuments, renaming, ideological reinterpretation. Memory conflicts Potential loss of archives before full digitisation. MFR – war disperses social and professional actors; identity loss from new residents unfamiliar with Piatykhatty's history reduces community participation.

volumes of the research campus, and the expanding digital archives containing oral histories of local life. Partnerships with universities, DOCOMOMO Ukraine, artists, and residents reinforce emerging cultural and research activity. Weaknesses stem from limited institutional resources, incomplete museum infrastructure, deteriorating architectural surfaces, and limited public access to digital heritage. Opportunities arise from reinterpreting urban voids, activating architectural surfaces through educational and artistic programs, and expanding the digital memory platform with international support. Threats include war-related risks to buildings, archives, and community cohesion, as well as the long-term structural decline inherited from the post-1991 crisis (Matrix 3). The town's history, urban and architectural features, and contemporary challenges are summarised here for relevance, with full details available in existing studies [36], [37].

C. SWOT Analysis of Visaginas

The town's history, urban and architectural features, and encountered challenges are detailed in prior studies [38], [39]. As such detailed accounts fall outside the scope of the present study, we proceed to the SWOT analysis (Matrix 4). In Dimension I (SUF), the street grid and microdistricts remained stable, but public spaces and urban voids deteriorated. Strengths such as compactness and integration with the natural landscape provided opportunities for urban redevelopment and the creation of recreational routes. Weaknesses included degraded public areas, incomplete districts, and weak regional connections. Threats emerged as urban voids risked further decay, potentially turning into lifeless, mono-functional dormitory zones. In Dimension II (AFS), original volumes and façades reflected the city's modernist identity. However, during the

crisis, prefabricated building façades degraded, and some residents rejected modernist aesthetics. Opportunities existed in reviving modernist architecture and adapting buildings for new functions, while threats included the mass loss of heritage and destructive renovations that erased original features. Dimension III (MS) showed the city's symbolic links to nuclear energy and Lithuanian identity through monuments and toponymy. Weaknesses were the lack of memory-preserving policies and dependence on the decommissioned plant, while opportunities included museumification of post-industrial heritage and fostering multi-ethnic identity. Threats included conflicts over Soviet versus Lithuanian narratives and the erosion of identity markers. In Dimension IV (MFR), there was a struggle with institutional collapse, unemployment, and youth outflow, weakening community participation. Opportunities existed in reinterpreting heritage and creating a pluralistic identity, while threats were growing detachment from the past and municipal undervaluation of urban space. This SWOT analysis illustrates how the crisis 2004–2015 affected Visaginas' physical, symbolic, and social fabric, highlighting both vulnerabilities and potential avenues for recovery.

D. Transferability Assessment

To advance the analysis according to the developed methodological framework, the relevance coefficient must be calculated. The table presents the transferability assessment of post-crisis identity transformation experience from Visaginas to Piatykhvatky. It was constructed to systematically evaluate which development trajectories and institutional practices could be adapted to the *recipient town*. Values were determined through a weighted comparison of key urban, architectural, and institutional criteria, reflecting structural, spatial,

MATRIX 4

SWOT analysis of Visaginas (by the author)

Strengths	Weaknesses
SUF – compactness, integration into the natural landscape, infrastructure, potential for ecotourism and recreational routes AFS – presence of objects made according to original designs. Unique decorative elements, brick inserts, and individual details. MS – symbolism of nuclear energy, renaming of the city in 1990 (adding Lithuanian identity), foundation stone in the shape of Lithuania. MFR – strong professional community, sense of the city as a unique urban phenomenon.	SUF – limited ability to influence the larger urban structure during the ongoing crisis, abandoned urban voids, and lack of shared spaces. AFS – degraded architectural surfaces and lack of restoration funding. Disregard for modernism's value. MS – fragmented symbolic identity. MFR – dependence on external partners and weak institutional autonomy. Social actors are not engaged due to a lack of cultural infrastructure. Limited public visibility of the digital archives
Opportunities	Threats
SUF – compactness for restarting urban scenarios, transforming empty spaces, and potential of the recreational network around the lake and forest. AFS – the revival of modernism – the formation of a unique brand code for the city; adaptative reuse. MS – creating a new layer of urban memory through the museumification of post-industrial heritage. MFR – reinterpreting heritage: from technocratic to cultural; creating a pluralistic identity; growing interest in post-Soviet modernism in Europe; external resource for symbolic development.	SUF – further decay of urban voids; risk of lifeless monofunctional dormitory zones. AFS – mass loss of modernist sites; destructive renovations erasing original features. MS – memory conflicts (Soviet heritage vs. Lithuanian narrative); loss of Soviet modernist traces, risk of identity void. MFR – growing isolation and detachment from the past; the city is seen as "depressive"; the municipality undervalues urban space and heritage.

MATRIX 5

Assessment of the relevance and transferability of Visaginas' experience to Piatykhatty (by the author)

Criterion	Urban characteristics				Architecture/typology		SWOT: post-transition challenges & potential		Relevance
Reference town score (0–5)	Size (weight 0.05)	Compactness (weight 0.05)	Isolation/ green buffer (weight 0.15)	Monotown structure (weight 0.20)	Type of city-forming enterprise (weight 0.15)	Modernist heritage (weight 0.10)	Post-transition challenges (weight 0.15)	Potential/ opportunities (weight 0.15)	Totally (0–5)
Visaginas	3	4	4	5	4	4	4	3	4
	0.15	0.20	0.60	1	0.6	0.4	0.6	0.45	

and mono-industrial characteristics. Expert similarity ratings (0–5) were assigned based on historical, social, and economic data, considering both towns' post-Soviet crises and ongoing institutional shifts. Higher weights were given to core factors – monotown structure, post-transition challenges, spatial isolation, and type of anchor institution – resulting in a combined relevance score of 4, indicating significant potential for adapting Visaginas' experience to Piatykhatty (Matrix 5).

E. Analysis of Development Trajectories of Visaginas

The reinterpretation of Visaginas since 2015 reflects a gradual transformation of the city's identity through the interplay of actors and instruments. Beginning in 2015, institutions and professional communities – including institutions and NGOs – implemented educational and research-based practices, such as the international *Mapping Visaginas* workshop, the *NuSPACES* program, and the publication of *Visaginas. People. Part 1*. These initiatives generated new scenarios for urban use, enhanced the status of modernist buildings, consolidated the cultural significance of the atomic heritage, and positioned Visaginas as a laboratory for a post-nuclear future. Urban planning and project-based practices contributed to long-term urban scenarios, proposed public space revitalisation,

and supported preservation of modernist structures. At the same time, new local mobilisations and mediator networks emerged, illustrated by Visaginas's integration into the European platform *New Towns | New Narratives*. This initiated jointly developed urban scenarios, strengthened recognition of modernist heritage, reassigned meanings to material and symbolic dimensions, and integrated the city into international modernism debates.

Grassroots initiatives, led by *Urban Stories*, local artists, and activists, actively employed tactical instruments, including community activation, small-scale cultural events, and digital media. These practices fostered new spatial attachments, strengthened the perceived modernist buildings' value, generated micro-toponyms, and shaped an alternative map of urban memory. Temporary artistic interventions animated urban space and added aesthetic value to the environment. Digital tools such as *Visaginas. guide* and audio tours catalogued modernism, generated online monuments, and disseminated multilayered, resident-co-produced narratives [39].

As a result, over these years, Visaginas has transitioned from a post-nuclear mono-image to a layered identity, where modernism, cultural memory, and active community participation are integrated into the urban narrative, combining local experience with international perspectives (Matrix 6).

MATRIX 6

Assessment of the relevance and transferability of Visaginas' experience to Piatykhatty (by the author)

Actor level	Instruments	Examples	Effect on urban identity	
Institutions/ professional communities	Educational, research, and outreach practices (T+S)	Workshop <i>Mapping Visaginas</i> ; NuSPACES (2021–2024); DOCOMOMO Int./LT involvement; educational expeditions, courses, interprofessional exchanges	Creation of new urban usage scenarios	SUF
			Elevation of the status of modernist buildings; heritage cataloguing	AFS
			Redefinition of <i>atomic heritage</i> from technical to cultural	MS
			Institutional reframing – city positioned as a laboratory of modernism and post-nuclear futures	MRF
	Urban planning/ design practices (S)	Mapping Visaginas (interdisciplinary workshops); participation of international experts; strategic recommendations from NuSPACES	Long-term urban scenarios post-nuclear plant; void revitalisation proposals	SUF
			Professional justifications for preserving modernist buildings	AFS
			Post-nuclear narratives, rethinking and new symbols adding	MS
			Reinterpreting the city's history through professional expertise	MRF

CONTINUATION OF MATRIX 6

Assessment of the relevance and transferability of Visaginas' experience to Piatykhatty (by the author)



Actor level	Instruments	Examples	Effect on urban identity	
Complex forms of local mobilization/mediators	Cross-sector networks (T-S)	New Towns New Narratives	Sharing practices for using public spaces	SUF
			Advancing modernist preservation	AFS
			Consolidating new meanings through shared participation	MS
			Shift from a technocratic city image to a culturally-research-oriented one	MRF
Grassroots initiatives	Community practices and local activation (T, sometimes S if sustained)	<i>History at First Sight</i> ; residents' audio tours; <i>Visaginas. people</i> ; micro-activations in courtyards and informal public spaces; participatory workshops (urban, photographic, research)	Formation of new <i>attachment points</i> and routes; activation of neglected or invisible spaces	SUF
			Enhancement of the local value of modernist buildings; <i>returning visibility</i> to ordinary dwellings	AFS
			Creation of grassroots micro-toponyms	MS
			Formation of new collective narratives, mental map; strengthening local identity and intergenerational dialogue; rethinking the city through lived experience	MRF
	Small cultural events and temporary interventions (T)	Festivals, lectures, public readings in open spaces; site-specific artistic actions	Temporary <i>activation</i> of city spots; creation of new accents, formation of event-driven focal points	SUF
			Artistic interventions re-signify facades, enhancing buildings' emotional and aesthetic value	AFS
			Creation of <i>soft monuments</i> ; emergence of new local visual markers	MS
			Transforming city perception, reducing alienation, and creating an alternative cultural image of Visaginas	MRF
	Local media and digital channels (T)	<i>Visaginas.guide</i> — digital city guide; residents' audio tours; social media of local cultural groups; publications and digital micro-narratives by activists	---	SUF
			Digital <i>visibility</i> of modernism (buildings receive histories)	AFS
			Emergence of digital monuments	MS
			New interpretations of the past; decentralised narratives; emergence of a cultural city image shaped by residents themselves; increased significance for residents	MRF

F. Identifying Transferable Development Models from the *Reference Town* to the *Recipient Town*

The comparison of Visaginas and Piatykhatty was based on an analysis of the structural characteristics of both towns and a retrospective examination of their crisis stages. Despite differences in scale and origin, the two territories share several fundamentally common reference points. First, both towns developed as planned, functionally specialised spaces, which over time created vulnerabilities in their urban identity: dependence on a single dominant industry resulted in a specific economy and a relatively *rigid* city image. Second, the gradual weakening of the core urban function generated a series of spatial consequences, most notably the emergence of underused areas and zones with diminished functional or symbolic meaning. Third, both monotowns exhibit a weakened sense of shared urban perspective: residents face uncertainty, which generates fragmentation and diminishes local self-identification.

Based on these points of intersection and the developmental trajectory of Visaginas (*reference town*), a prioritised matrix of potential crisis-exit trajectories was constructed for Piatykhatty (*recipient town*). The logic of defining trajectories proceeds from core to derivative

factors: first targeting the symbolic layer of the city, then the spatial, followed by the institutional, and finally the economic-cultural dimensions. Such sequencing is not accidental: without restoring meanings and community agency, spatial or economic changes remain superficial and unsustainable. The SWOT analysis also indicated that Piatykhatty's potentially strongest actor level is the institutional one, with the capacity to form coalitions.

The prioritisation followed the sequence foundation, framework, infrastructure, specialisation: first reshaping urban perception and reinforcing internal value through symbolic reprogramming. Next, spatial changes materialise new meanings and urban scenarios, followed by institutional consolidation and coalition-building to secure their durability. Only at the final stage is economic and cultural diversification introduced, transforming the renewed identity into a foundation for development. When developing the list of practices and trajectories for Piatykhatty, a significant adjustment was made to account for the context of martial law in Ukraine and the ongoing security threats affecting Kharkiv.

Unlike Visaginas, where identity transformation could rely on material interventions, Piatykhatty operates under conditions in which transformations of the physical

urban environment are systematically constrained. This necessitates shifting the focus toward *intangible, symbolic, and social instruments*, capable of functioning even with minimal access to spatial resources. Developing a stable *mental infrastructure* – narratives, communities, symbolic codes, and mutual-support practices – is essential to lay the foundation for future spatial reconstruction, as prior symbolic recovery accelerates post-crisis material rebuilding [40], [41].

Therefore, the proposed trajectories for Piatykhatsky serve as “identity preparation” for post-war material redevelopment. The current stage focuses on reshaping

collective meanings, strengthening social capital, and establishing a renewed territorial framework, rather than transforming the physical environment. This approach treats identity as a strategic resource, reducing community fragmentation, enhancing residents’ resilience, and enabling a long-term future vision.

In the next phase, this *mental foundation* will enable both restoration and meaningful reinterpretation of spaces, ensuring sustainable, coherent post-conflict development. Given Visaginas’ extensive practices in transforming the mental and symbolic field, its experience is highly valuable for our study (Matrix 7).

MATRIX 7

Proposed Trajectories for Piatykhatsky’s Identity Reframing and Development (by the author)

Trajectory No. 1 – Foundational (sense-making and work on residents' self-perception) Main goal: To restore residents' sense of confidence, dignity, and future prospects.			
Actors level	Instruments (T + S)	Expected effect on identity layers	
Institutions/ professional communities + cross-sector coalitions	Discursive practices: new urban narratives and repositioning. Cultural-symbolic practices: festivals, media projects, "stories of residents." Educational and outreach formats: public lectures, archival projects, and local history initiatives. Networked and coalition mechanisms: alliances of NGOs, universities, and community activists.	Emergence of a "places of meaning" logic – gathering points, routes, network of public spaces, symbolic axes.	SUF
		Pilot refurbishments; buildings embody the new narrative	AFS
		New symbols appear, including temporary and permanent art interventions and thematic routes.	MS
		Radical shift: heightened pride, sense of a "unique community," and emergence of new micro-identities.	MRF
Trajectory No. 2 – Material (tactical and localised reimagining of urban space) Main goal: To physically transform patterns of city use.			
Actors level	Instruments (T + semiS)	Expected effect on identity layers	
Grassroots/ community initiatives	Temporary spatial prototypes: pop-up installations, art platforms, public interventions. Creative micro-clusters: local studios, cultural and educational hubs in vacant buildings. Community courtyard redevelopment. Local economic incentives: micro-grants for initiatives, coworking formats, support for creative startups.	Revitalisation of vacant areas, creation of new attachment points, formation of local routes and networks.	SUF
		Increased local value of modernist and representative buildings through active use.	AFS
		Micro-symbols and temporary "beacons" (artworks, clusters).	MS
		"City as a space of opportunities", enhanced sense of participation.	MRF
Trajectory No. 3 – Institutional (strengthening intersectoral networks and civic platforms) Main goal: To ensure greater coordination through horizontal coalitions.			
Actors level	Instruments (T + semiS)	Expected effect on identity layers	
Intersectoral/ mediators (NGOs, universities, cultural centres)	Intersectoral coalitions: joint workshops, public projects, exchange of practices with other cities (e.g., <i>New Towns New Narratives</i>). Digital participation platforms: online learning, virtual tours, shared maps and archives.	Coordinated spatial planning scenarios, managed use of public spaces.	SUF
		Evidence-based support for modernist heritage, enhanced visibility of valuable buildings.	AFS
		Consolidation of memory through community participation.	MS
		Sense of co-participation, culturally research-oriented city image, collective awareness of change.	MRF
Trajectory No. 4 – Socio-economic and cultural activation Main goal: To create symbolic and economic landmarks without large-scale state intervention.			
Actors level	Instruments (T+semiS)	Expected effect on identity layers	
Grassroots/ community initiatives	Small creative and cultural clusters: art studios, temporary cultural spaces, local festivals. Local cultural branding: events, publications, city promotion via media and social networks. Temporary economic activities: coworking spaces, local business projects, support for craft initiatives. Tourist and educational scenarios: thematic routes, integration of local history and heritage into cultural events.	Small active hubs, revitalisation of areas with event potential.	SUF
		Enhancement of local building value and aesthetics through cultural accents.	AFS
		Thematic markers, and cultural objects.	MS
		Increased pride, perception of the city as a vibrant and creative environment.	MRF

CONCLUSION

The study establishes a theoretical framework for examining identity trajectories and urban transformations in monotowns. A three-stage methodology was developed, moving from identity governance analysis to conceptualisation of *reference-town* experiences, and finally to a systematic and transparent comparative assessment of transferability to the *recipient town*.

The framework's practical feasibility was demonstrated through the transfer of experience from Visaginas to Piatykhatty, and it was designed as a universal tool applicable to other Ukrainian monotowns. Based on this methodology, a prioritised set of practices and trajectories for Piatykhatty was developed. Each trajectory specifies the relevant actor level, types of instruments, and specific practices from the reference towns, along with their anticipated effects on urban identity layers. Organised in a prioritised sequence, the trajectories provide a foundation for guiding the city's identity reframing. Notably, the institutional trajectory can play a reinforcing role in all subsequent stages, as coalitions and municipal interactions consolidate spatial, socioeconomic, and cultural changes over time. By linking actor levels and instruments to tangible and intangible identity layers with different degrees of transformability, the framework clarifies where rapid, low-resource changes (e.g., symbolic recoding, toponymy, façade interventions, and the reuse of urban voids) are feasible even when the structural urban framework remains relatively stable.

Beyond the specific case of Piatykhatty, the proposed framework suggests conceptualising monotown transformation as a multi-stage process in which symbolic reinterpretation and institutional reconfiguration can precede and enable spatial adaptation and subsequent economic diversification. In this sense, urban identity emerges not as a secondary characteristic, but as a strategic resource for long-term development.

The study also suggests that, in conditions of prolonged crisis, war, or limited material capacity, urban transformation may begin not with large-scale physical intervention, but with the formation of an intangible infrastructure: narratives, memory work, local coalitions, and symbolic recoding. Such processes can prepare the ground for future spatial and socioeconomic reconstruction and can stabilise community agency and institutional cooperation when material interventions are constrained. Accordingly, the framework is applicable not only to other monotowns but also to a broader range of functionally specialised urban formations – whether standalone towns or specialised districts/campuses and industrial districts within larger cities, among others, – where mono-functional or institutionally dominant development paths have produced durable inherited spatial frameworks and a need for identity reframing under structural crisis,

functional change, or post-socialist transition. More broadly, the article contributes to urban studies by offering a transferable analytical model for examining how identity, heritage, and crisis can be mobilised as drivers of context-sensitive and sustainable urban development.

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