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'Archeology' of Hidden Values of Underutilized Historic Industrial Sites in Context of Urban Regeneration and Nature-Based Solutions

Indre Grazuleviciute-Vileniske *  and Diana Zmejauskaite

Faculty of Civil Engineering and Architecture, Kaunas University of Technology, 51367 Kaunas, Lithuania; diana.zmejauskaite@ktu.lt

* Correspondence: indre.grazuleviciute@ktu.lt

Abstract: Today, cities and their heritage function under so-called BANI (Brittle, Anxious, Nonlinear, and Incomprehensible) conditions. Climate change, military conflicts, and the urge to comply with sustainability requirements and to implement green transformation and urban regeneration cause a threat to rapid decision making, which may result in the loss of more subtle, intangible values in the urban environment. Such loss may particularly affect industrial heritage with its contested values and identities. This encourages searching for approaches to capture, analyze, and employ these invisible values for future developments. The methods of research used in this study include qualitative analysis of the literature, the theoretical conceptualization and development of a methodology to capture and record these invisible and intangible values, and the application of the developed methodology to the case study of a historical industrial site in Kaunas (Lithuania). The main findings of this research include a theoretical framework for the analysis of hidden values of historic industrial sites revolving around the concepts of place identity, spirit of place, symbolic potential of place, embedded values, and time depth and its application to the case study of the historic industrial site in Kaunas. This research has demonstrated that historic industrial sites existing in urban settings contain a multiplicity of aspects and meanings, which are not visible at first glance and require thorough qualitative analysis. These invisible aspects constitute important resources for the future development of the site and can contribute to the identity and local character of regeneration efforts and nature-based solutions.

Keywords: embedded values; historic industrial site; nature-based solutions; place identity; spirit of place; symbolic potential of place; time depth; urban regeneration



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1. Introduction

In the evolving landscape of urban development, paradigms are shifting from modernist approaches focused on functionality to postmodernist frameworks that embrace flexibility and multiplicity in urban forms and uses. These new paradigms foster dynamic urban environments where diverse development patterns and mixed-function zones are emerging in response to changes in the global economy, which itself is transitioning from a linear model to one increasingly rooted in circular, sustainable principles. Urban sustainability now serves as the overarching guiding force, promoting practices that not only accommodate growth but seek to balance environmental, social, and economic goals holistically [1]. Amid this transformation, certain urban spaces and development forms are often left behind, abandoned as their purposes fade, only to be revisited and repurposed in response to new societal needs.

Due to rapidly changing urban development paradigms and societal needs in the 20th and 21st centuries, urban regeneration has become a central objective for cities around the world, in both developed and developing countries. The term “urban regeneration” refers to a comprehensive process of revitalizing and redeveloping urban areas that have experienced decline, neglect, or obsolescence, aiming to improve their physical, economic, social, and environmental conditions while preserving cultural and historical heritage. In practice, this concept may encompass a range of meanings, from revitalizing derelict spaces and diversifying economic functions to redefining local development strategies, preserving or adapting cultural heritage, reclaiming public spaces, and expanding essential services [2]. As part of a broader regenerative sustainability framework rooted in ecological principles, urban regeneration often favors nature-based solutions with distinctive ecological identity that align urban growth with ecological resilience in the face of climate change. Nature-based solutions include strategies inspired by natural processes and ecosystems to address current societal challenges by enhancing sustainability, resilience, and biodiversity while providing social and environmental benefits [3]. Thus, nature-based solutions and urban regeneration are viewed and introduced as the context and precondition of this research. Moreover, these transformations of urban environments occur against a backdrop of global environmental and economic crises and a series of related challenges that expose the vulnerabilities of cultural and natural heritage. Events such as military conflicts, climate instability, and natural disasters reveal the fragility of these heritage sites, raising widespread recognition of the need to preserve not only their physical fabric, but also memory value [4]. J. Mahadevan [5] describes the contemporary environment, in which the management of cities and heritage occurs, as BANI—Brittle, Anxious, Nonlinear, and Incomprehensible—a characterization that replaces the previous VUCA paradigm (Volatile, Uncertain, Complex, and Ambiguous). This shift reflects a new urgency in management and leadership approaches, also relevant in the domains of heritage conservation and urban regeneration. Within this unstable environment, efforts to protect, reconstruct, and manage historical sites often encounter tensions between preserving the identity of the site and responding to modern redevelopment needs. Historic industrial sites, for instance, embody values that extend beyond their material structures. According to Coscia et al. [6], “abandoned 19th and 20th century industrial buildings represent a particularly vulnerable form of cultural heritage, and current evidence shows that their preservation is frequently at risk”. As recognized in heritage preservation literature and international documents, these sites symbolize collective memories, social identity, and shared cultural values. Thus, their conservation and adaptation contribute to broader human well-being—psychologically, socially, and economically—by fostering continuity with the past in an ever-shifting present. Moreover, industrial heritage is distinguished by the combination of utilitarian architecture, large-scale infrastructure, and deep connections to socioeconomic and technological transformations, which may raise particular challenges under BANI conditions.

This interplay of memory, identity, and urban redevelopment needs raises complex challenges and reveals the research gap, related to the preservation and continuity of invisible, intangible values of historic industrial sites in the context of rapid urban changes. According to Coscia et al. [6], there is a lack of awareness about the multiple values of industrial heritage. Identifying and protecting the collective memories associated with heritage sites requires interdisciplinary approaches to recognize and safeguard the intangible values connected to place and cultural heritage. Research and efforts are needed to overcome the consideration of such a territory solely as a physical–geometrical reality at the service of economic aspects [7]. Thus, regeneration must transcend mere functional reuse; it becomes an act of safeguarding memory and identity. Achieving this goal requires integrated, interdisciplinary methodologies that bridge traditional disciplinary divides, fostering collaborative research and project imple-

mentation. Additionally, advancements in decision support systems are integral to this vision, particularly as they aid in establishing shared future-oriented plans. Contemporary decision support tools integrate expert knowledge, context analysis, community insights, stakeholder mapping, and collaborative scenario development. These people-centered approaches help democratize heritage discourse, ensuring it becomes inclusive and reflective of diverse perspectives [1]. Several questions can be raised in this context. What methodologies can be developed to assess the feasibility of regenerating historical sites in ways that respect their hidden identity and memory components? How is it possible to capture these often-invisible values and integrate them into site redevelopment in accordance with contemporary sustainable urban development trends? And how might these intangible features be effectively communicated to society and stakeholders?

The aim of this research, guided by the questions raised above, is the investigation of the hidden, intangible values within underutilized historic industrial sites in the context of present-day urban development trends. In order to reach this aim, the research employs a qualitative methodology, combining theoretical analysis with a case study approach. The development of the theoretical framework involves distinguishing key concepts that enable us to capture hidden, intangible values and integrating them with a selected theoretical landscape model. This framework is then applied to the case of a historic industrial site in Kaunas, Lithuania, situated between the Karaliaus Mindaugo embankment and Kauenakiemio Street, through historical analysis, present-state assessment, and mind-mapping of intangible values to derive practical insights for sustainable urban regeneration.

2. Development of Theoretical Framework: Approaches to Hidden Values of Historical Sites

2.1. Selection of Concepts for Analysis

In the analysis of the hidden, intangible values of underutilized historic industrial sites within urban landscapes, this research draws on the foundational concept of place. In this context, understanding place is essential, as it enables a deeper exploration of how values are ascribed beyond mere physical structures. This approach begins by distinguishing place from space, following the foundational work of scholars such as Tuan [8]. In this framework, space refers to the geographical and physical characteristics that define a specific location. In contrast, place is understood as the cultural and personal significance assigned to a space, imbuing it with “personality” and meaning that connect it to individual and collective identity. It is this culturally embedded meaning—a “vibe” or emotional resonance—that transforms a location into a place [9].

For some scholars, place may appear as a measurable phenomenon with clear, tangible attributes. Carmona [10], for example, highlights how specific qualities, such as environmental greenness, mixed land use, low traffic, walkability, bike accessibility, compact development patterns, and convenient public transport connections, positively affect the social, economic, health, and environmental value of a place. These qualities foster well-being and functionality that can be observed and quantified. However, beyond these visible and measurable qualities, there are numerous studies and researchers [11–26] that emphasize the invisible and intangible dimensions of place. According to Tress and Tress [12], a landscape is a complex system involving physical, biological, and mental components. It is not only a spatial but also a mental entity, meaning the landscape is perceived by people through their minds and senses, embedded in their social and cultural context [12].

Various international organizations and documents also recognize these intangible aspects. For example, the former Commission for Architecture and the Built Environment in England identified six types of value inherent to the built environment: exchange value, use value, image value, social value, environmental value, and cultural value [10]. Among

these, image value, cultural value, and social value can be seen as more intangible when compared to exchange or use value. The concept of the historic urban landscape provides a comprehensive perspective on these intangible qualities. This approach emphasizes that urban heritage management must consider not only the physical structure of cities but also the multi-layered interplay of natural and human-made elements, tangible and intangible features, and cultural practices and values. The historic urban landscape approach includes economic processes and intangible heritage dimensions, emphasizing diversity and identity [27]. According to the UNESCO Recommendation on the Historic Urban Landscape [27], managing historic urban areas involves a sustainable development framework that identifies these landscapes' contributions to various aspects of sustainability. They include economic diversity, tourism, balancing urban expansion with quality of life, optimizing public space, fostering social cohesion and diversity, enhancing community identity, supporting creativity, and increasing urban livability and well-being [27]. Thus, the intangible dimension plays a critical role in the sustainable development of urban landscapes, highlighting the significance of hidden values in the revitalization of historic sites, including industrial ones. According to Graham et al. [28], "heritage is inherently a spatial phenomenon. All heritage occurs somewhere". However, not only tangible spatial aspects, but also intangible ones, are relevant for sustainable development. The idea presented by Grant [29]—that only moving from tangible to intangible, from material to less material and more spiritual forms of consumption, would allow humanity to reach sustainability—could matter in this context. According to Dabbene [30], heritage should play the role of inspirer of development processes in tangible and intangible terms. However, in order to employ this catalyst potential of cultural heritage, and especially of such contested heritage categories as industrial heritage, its multidimensional nature, including intangible values, should be analyzed more thoroughly and understood better. Five key concepts integral to understanding the intangible, hidden dimensions of place—place identity [13–16,24,31], spirit of place or *genius loci* [11,21,23,25,26], the symbolic potential of place [22], embedded values, and time depth [18–20]—were distinguished following a comprehensive qualitative review of the literature. The literature for the analysis was obtained from the Web of Science database [32] and other available sources. A general overview of the analyzed literature sources revealed that the existing research on the topics of place identity, spirit of place or *genius loci*, the symbolic potential of place, embedded values, and time depth is relevant for all UN sustainable development goals [33]. Each of these concepts is further analyzed in the sections below and integrated into a theoretical framework to better understand the intangible and often overlooked values within historic industrial sites as they intersect with contemporary urban development trends.

2.1.1. Place Identity, Spirit of Place, and Symbolic Potential of Place

The widest category that can be related to intangible aspects of a place is identity. Place identity is a multifaceted concept and can be analyzed from the perspectives of human psychology, environmental psychology, sociology, etc. Paasi [13–16] has extensively explored the concept of place identity, which he divides into two key dimensions: (1) the inherent identity of a place and (2) the place identity of individuals. The first category relates to the distinctive characteristics of a location, such as natural, cultural, and human elements, that are often highlighted in various discourses, including scientific research, politics, regional branding, cultural initiatives, tourism, governance, and political or religious distinctions, to set one place apart from others. The latter focuses on how individuals personally connect with a place, as the cultural identity of people is strongly associated with the ways in which people interact with their landscapes, as landscapes can be fundamental to personal

identity as well [18,20]. According to Paasi [13–16], place identity encapsulates the unique features of its nature, culture, and community that differentiate it from other places.

Further elaborating on this, Groote and Haartsen [31] describe place identity as an amalgamation of natural and human-driven processes, particular elements and structures, and the meanings attributed to places by those who experience them. Peng et al. [24] suggest that almost any aspect of a place can serve as a marker of place identity. Elements contributing to place identity range from physical structures and architectural styles to language and local customs. However, there is no rigid set of characteristics that constitute place identity [24]. Given this variability, Peng et al. [24] note that many studies adopt an approach that identifies unique characteristics as indicators of a place identity. Yet, they note that this can lead to an overly flexible application of place identity, where nearly any feature may be cited as a marker of identity. Moreover, researchers [24,34] emphasize that place identity comprises both tangible and mental dimensions, highlighting the importance of personal and collective awareness of a place. Therefore, the interconnections between the identity of a place and place identity of individuals deserve to be more thoroughly analyzed. According to Paasi [15], the formation of place identity involves territorial boundaries, symbolism, and institutions. This formation process reveals that identities are often ascribed to a place by various social actors with differing knowledge, interests, or influence. Such ascriptions are shaped by power dynamics, meaning place identities are frequently contested. This resonates with the ideas of Lefebvre [35], who maintained that space is an active component in constructing, maintaining, and challenging the social order.

There is a large body of literature that analyzes and conceptualizes the intangible qualities of places based on the concept of spirit of place or *genius loci*. Norberg-Schulz [11] has identified *genius loci* as the unique presence of a place. *Genius loci* can be defined as “the unity of the tangible and intangible components of the <...> environment, forming the uniqueness of the place” [25]. With the rise of the historic urban landscape approach, the concept has evolved to be seen not only as a heritage conservation concern but also as a vital resource for urban development and sustainability [25]. Vecco [26] explored the interplay of physical and intangible aspects of a place within sustainability, highlighting how this nexus of tangible and intangible elements forms what we know as the spirit of place [22,26]. Ginzarly [36] further supports this view within the framework of the historic urban landscape, which comprises layers of cultural and natural values that contribute to the spirit of place, or *genius loci*. This connection highlights the importance of *genius loci* in sustainable development, though it remains an underappreciated asset in modern urban planning [22]. The subtle nature of *genius loci* means it can easily be eroded, not only through neglect but also through misguided participatory practices. According to Petrusonis [22], a superficial approach to public participation can harm both the *genius loci* and the community by diminishing the deeper connections that people have with a place. An overemphasis on participation without understanding the essence of *genius loci* can sideline other critical research efforts that seek to capture and maintain the subtle manifestations of the spirit of place [26]. Vecco [26] proposes a three-stage approach to sustaining the *genius loci*: rethinking, protecting, and transmitting the place and its essence. This process, however, is not linear. Rather, it must be iterative and accumulative, continuously engaging with the layers of memory and meaning that constitute the *genius loci*.

The category of symbolic potential of place is strongly connected with the above discussed spirit of place or *genius loci*. Petrusonis [22] mentions the symbolic potential and mythical-symbolic essence of a place. Symbols are semiotic entities or signs, which are essential for human communication [37]. According to Fraim [38], symbolism of place is the most important aspect of symbolism. According to him, it is the key to understanding the modern world’s most important methods of communication. It is not surprising that currently, place

branding and advertising practices are on the rise. Our overview of the literature reveals that place symbolism is most often viewed in the context of place branding and marketing. Mueller and Schade [37] note that place branding must be socially responsible and that symbols intended to cover place meanings for local residents cannot be simply declared by place branding authorities, but have to be negotiated by public communication processes. Nevertheless, as was mentioned in the previous subsection, even public participation is not sufficient for a comprehensive understanding of intangible aspects of a place. Thus, superficial place branding and marketing practices can overlook a huge part of the symbolic potential of place, and this issue merits considerable attention. According to Petrusonis [22], knowledge about the symbolic potential of place and the form of presentation of such data is very important for better understanding the cultural memory of a place. The symbolic potential of place in his research can be understood as the inherent cultural, historical, and emotional values embedded in physical locations, which resonate with the community's shared identity and collective memory. This potential emerges through symbols and architectural elements that evoke a complex layering of meanings—these can be immediate and literal or more nuanced, engaging both conscious recognition and subconscious associations. By capturing the symbolic essence of a place, this potential enables urban planners and architects to interpret and design spaces that not only preserve but also amplify a place's unique identity, ensuring its cultural resonance for future generations [22].

The process analysis and representation of the symbolic potential of place may involve such steps as the recognition of symbolic features and cultural connotations of a specific place; performing historical and cultural context analysis examining how certain symbols have evolved over time and their role in societal memory; applying semantic and phenomenological analysis in order to understand the experiential and subconscious impact of a place on its users; the organization of symbols into cultural codes representing recurring cultural themes or societal values; creating a semantic references for stakeholders and presenting the findings explicitly, for example, in a semantic "reference book," detailing each identified symbol and its cultural relevance [22]. This unique approach enables the revealing of hidden layers of meaning by examining the emotional responses the place elicits, which are often connected to shared cultural symbols, mapping the collective symbolic meanings that contribute to the place identity, and facilitates communication among stakeholders. According to Petrusonis [22], such an approach to the symbolic potential of place can contribute to "the development of a culture of poetic thinking, which is now recognized as an important factor in the activities related with reconstruction and renovation of the historically formed cities".

This analysis of the literature has demonstrated that place identity, spirit of place or *genius loci*, and symbolic potential of place are interconnected and complementary. Place identity emerges from the tangible and intangible elements that define the connection of a community to a place, while the spirit of place captures the unique atmosphere and character shaped by the physical and intangible character of locality. Meanwhile, symbolic potential builds on these foundations by highlighting how specific features or narratives embody shared meanings and values, enabling a place to serve as a repository of collective memory and cultural significance. Consequently, the integrated application of these concepts can contribute to a holistic understanding of the place, bridging its physical, emotional, and symbolic dimensions.

2.1.2. Embedded Values and Time Depth

Researchers note that landscapes often contain embedded values alongside surface cultural values [7,18,20]. This distinction offers another approach to uncovering hidden cultural values within landscapes. Stephenson [19] categorizes landscape values based on their origin: surface values emerge from immediate sensory responses to the physical

landscape—such as esthetic or visual appreciation—while embedded values arise from the deeper connections and historical understandings associated with a site, reflecting its temporality through events, cultural practices, and sustained relationships over time. Thus, surface values stem from what is immediately perceptible in the landscape, whereas embedded values rise from the enduring influence of past forms, traditions, and human–environment interactions [19]. This conceptualization of embedded values highlights the importance of time depth in comprehensively understanding the cultural significance of a landscape [19,39,40]. Embedded values can span diverse historical periods, from recent history to ancient or even prehistoric times, which means that archeology plays a crucial role in landscape analysis. Through archeology, researchers can trace long-term processes and address how past land-use patterns, human interventions, and systemic histories have shaped the current form and cultural meaning of landscapes [39,40]. Fairclough [39] notes that archeologists interpret present-day landscapes by drawing on long-term narratives and explanations rooted in historical social, political, and economic transformations. According to him, the primary contribution of archeology to landscape analysis is the recognition of time depth, placing the concept of change at the core of landscape character and history, and viewing the impacts of change as integral to the identity of the site. This perspective also fosters an interest in the sustainable management of future transformations, suggesting that understanding the historical dynamics of a landscape can guide adaptive, heritage-sensitive urban development [39]. In contrast, urban planning often prioritizes abstract spatial configurations and may overlook the time depth and meaning-rich layers significant to those who live in and interact with these spaces [18].

The above-presented analysis of the analyzed concepts has revealed multiple interconnections and shared attributes between them. For example, tangible features and cultural narratives shape both the identity and unique atmosphere of the place, and historical layers and continuity are central to both embedded values and time depth, and they affect community ties, the perception of place identity, etc. Figure 1 summarizes the main features of the analyzed concepts and their interconnections.

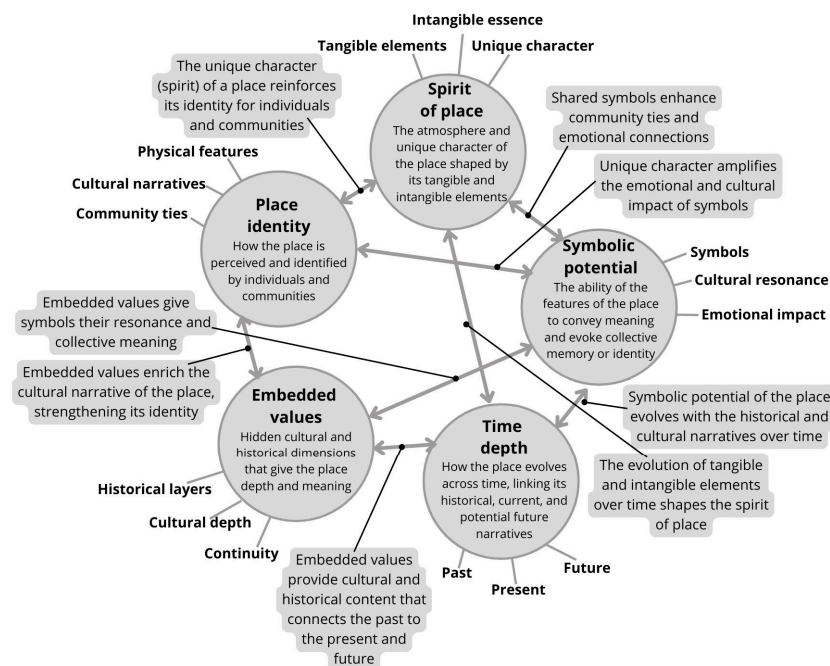


Figure 1. Characteristics and interconnections of the analyzed concepts: place identity [13–16,24,31], spirit of place or genius loci [11,21,23,25,26], symbolic potential of place [22], embedded values, and time depth [18–20].

2.2. The Relevance of the Concepts for the Analysis of Historic Industrial Sites in the Urban Environment in Light of Urban Regeneration and Nature-Based Solutions

Our analysis of the literature has demonstrated that the concepts presented and discussed above are relevant for understanding invisible values in the urban environment, including historic industrial sites.

For example, place identity encompasses both physical characteristics, such as distinctive architectural styles and industrial infrastructure, and the personal and collective connections that communities establish with historical industrial sites. The interplay between the identity of a place and people's place identity [13–16,24] may reveal how industrial sites are perceived not merely as relics of the past but as active participants in shaping local culture and the memory of society.

The concept of spirit of place highlights the unique atmosphere and cultural resonance of industrial heritage sites. It combines their tangible and intangible components, as industrial sites often carry a profound spirit derived from their history of labor, innovation, and economic impact connected with communities that once thrived there.

Historical industrial sites may be rich in particular symbolic potential, embodying, for example, narratives of industrialization, progress, or deindustrialization and related transformations [41]. According to Birkeland [41], place heritage develops through the organization of the narrative of development of the place, where there “is a past and a present and also where particular meanings concerning the role of the future appear”. Physical forms and remnants present in the site, for example, chimneys or relics of machinery, often act as symbols that resonate deeply with local and broader communities. By capturing these symbols through detailed analysis, urban planners and stakeholders can unlock the layered cultural and emotional meanings of these sites, ensuring that redevelopment efforts honor their historical and symbolic significance, actualizing their role as cultural anchors within urban landscapes.

The concept of time depth highlights the historical layering of industrial sites, reflecting changes in their form, function, and societal role over time. Researchers even mention social archeology, which focuses on industrial remains, and industrial archeology, a “field of study concerned with investigating, surveying, recording and in some cases, with preserving industrial monuments” in the context of industrial sites [42]. Historic industrial sites often serve as tangible records of industrialization and urban evolution, where traces of past practices and narratives remain embedded. Analyzing their time depth provides critical insights into their transformation and legacy, guiding urban regeneration and adaptive reuse that respect their historical trajectories and integrate them meaningfully into contemporary urban settings.

Embedded values delve deeper than visually perceived environments, uncovering the intangible and often hidden cultural, social, and historical dimensions that define industrial sites. Recognizing embedded values ensures that redevelopment efforts are not limited to physical preservation but also include the cultural narratives and intangible connections that provide these sites with enduring relevance and meaning. Table 1 summarizes the analysis of the selected concepts—place identity, spirit of place or genius loci, symbolic potential of place, time depth, and embedded values—including the relevance of their analysis to sustainable development goals [33] based on the analysis of the Web of Science [32] database search results to better understand and manage historic industrial sites in the context of the urban regeneration and development of nature-based solutions.

Table 1. A summary of the analyzed concepts and their relevance to sustainable development goals [32,33] and for the historic industrial sites and their potential regeneration [32,33].

Concept	Relevance of Research to SDGs	Methods for Analysis	Relevance to Historical Industrial Sites	Relevance to Urban Regeneration and Nature-Based Solutions
Place identity	Relevant to 16 SDGs (all except 15th)	Discourse analysis, mapping, surveys, interviews, psychological and sociological studies	Reflects the distinctiveness of industrial heritage through architecture, history, and cultural ties	Concept can be applied to local identity and to integrate cultural heritage with green infrastructure and sustainability practices
Spirit of place (genius loci)	Relevant to all 17 SDGs	Phenomenological analysis, historical research, participatory observation	Highlights the intangible character and unique spirit of industrial heritage, shaped by history and culture	Concept can be applied to preserve cultural resonance while enhancing site's ecological esthetics and aligning with sustainable living
Symbolic potential of place	Relevant to all 17 SDGs	Semiotic analysis, cultural context studies, participatory design	Encapsulates cultural and emotional narratives, serving as a symbol of labor, innovation, etc.	Concept can be applied to amplify symbolic elements to engage stakeholders, foster social cohesion, and support sustainable urban development
Time depth and embedded values	Relevant to all 17 SDGs	Archeological and historical studies, archival research, cultural landscape analysis	Reveals historical transformations and embedded narratives within industrial sites	Concept can be applied to embed historical narratives into regeneration, bridging past practices with modern sustainable development goals

2.3. Theoretical Framework for Analysis of Hidden Values of Historic Industrial Sites

After searching for a theoretical framework suitable for the comprehensive analysis of hidden values of historic industrial sites and with potential to integrate place identity, spirit of place or genius loci, symbolic potential of place, embedded values, and time depth, the Cultural Values Model developed by Stephenson [18–20] was utilized. The model originally emerged out of community-based research undertaken in landscapes in New Zealand [20], although it can be applied in various contexts. The Cultural Values Model offers an integrated conceptual framework for understanding the potential range of values that might be present within a landscape, and the potential dynamics between these values, incorporating both natural and human-made features [20]. This model presents the landscape as a “dynamic whole” influenced by time, cultural interactions, and evolving meanings, aiming to bridge fragmented understandings of landscape values. The model consists of three primary components—forms, relationships, and practices. Forms are physical, measurable features of the landscape, both natural and anthropogenic. Relationships are the connections between people and the landscape, including ecological links, spiritual associations, and sense of place. Practices include actions and processes over time, encompassing human activities and natural phenomena that shape the landscape. The model emphasizes that these components are not static but are dynamically interrelated [18–20]. Relationships can amplify the value of forms, and practices may sustain relationships, creating a cross-generative effect. Central to the model is time depth, where landscapes accumulate layers of meaning and association over time, reflecting values derived from historical narratives, family lineages, and past practices that continue to impact present-day landscape interactions [20]. This concept of temporality highlights that landscape identity

is built over time and is continually reshaped by ongoing and past interactions. As was mentioned above, the model introduces the distinction between surface values—directly perceived elements and embedded values—and deep-rooted cultural associations [20]. While some values are visible, such as physical structures or scenic views, others are hidden, residing in stories, spiritual beliefs, or historical connections that might not be immediately apparent [19,20]. Thus, the visually perceived landscape also contains an invisible landscape, which is significant not only for locals who hold cultural or spiritual attachments to these spaces, but also for the future development trajectories of the place.

The analysis of the concepts of place identity, spirit of place or genius loci, symbolic potential of place, embedded values, and time depth allowed us to conclude that the Cultural Values Model by J. Stephenson [18–20] can be applied as a framework for analyzing historical industrial sites that are undergoing urban regeneration, particularly in the context of contemporary urban development trends such as green infrastructure, nature-based solutions, and circular economy solutions, which have their distinctive character and identity. Figure 2 presents the developed theoretical framework, demonstrating interconnections of the Cultural Values Model [18–20] with the analyzed concepts and its potential application for analysis and guiding the transformation of historical industrial sites.

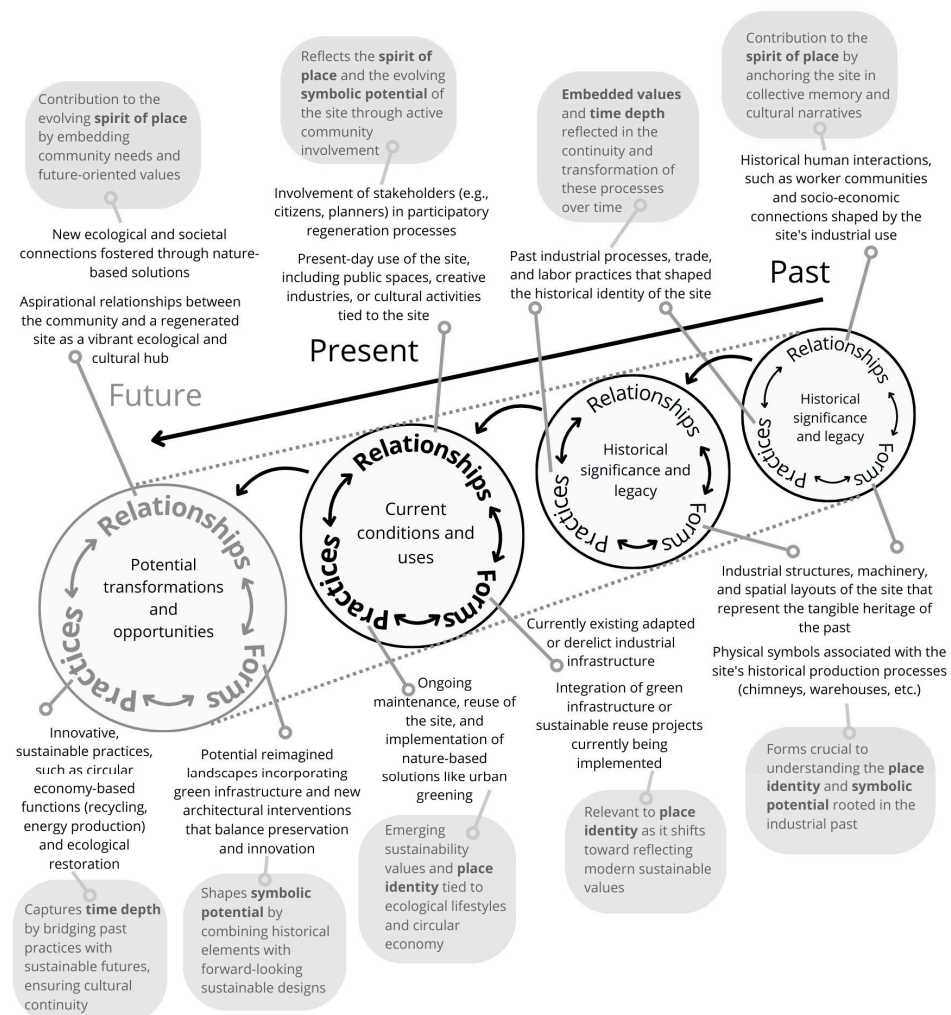


Figure 2. Possible application of Cultural Values Model [18–20] to analysis and guiding regeneration of historic industrial sites integrating concepts of place identity, spirit of place or genius loci, symbolic potential of place, time depth, and embedded values. Scheme developed by authors based on Stephenson [18–20].

By integrating the interdependent components of forms, relationships, and practices, the model highlights the dynamic and evolving nature of industrial sites, allowing for a balanced approach that preserves their historical identity while adapting to contemporary ecological and social priorities. Its emphasis on time depth and embedded values is especially relevant, as these sites often carry deep historical, cultural, and societal narratives that inform their significance. Incorporating green infrastructure or ecological esthetics into regeneration efforts aligns with the model's focus on the continuity of practices, enabling the seamless integration of sustainability principles such as circular economy and ecological lifestyles. Additionally, the model acknowledges shifting societal values, recognizing these sites as opportunities to bridge industrial heritage with modern ecological values and development. The recognition of intangible and invisible values, such as collective memory and symbolic meaning, ensures that redevelopment efforts respect both the tangible and more subtle dimensions of the site. Regeneration projects can use the Cultural Values Model [18–20] to evaluate how physical transformations, for example, green infrastructure development, can impact the embedded cultural narratives of a site. The model can also guide stakeholder discussions, ensuring that redevelopment plans respect historical identities while fostering new ecological and social relationships.

2.4. Steps and Process of Analysis

The application of the theoretical framework based on the Cultural Values Model [18–20] and integrating place identity, spirit of place or *genius loci*, symbolic potential of place, embedded values, and time depth (Figure 2) for the analysis of hidden values of historic industrial sites can be subdivided into six steps: historical contextualization, present-state analysis, the identification of theoretical components and mind-mapping of intangible aspects, the integration of sustainability and urban development trends, and synthesis and recommendations. The steps of the analysis, which can be an iterative process, are presented in Figure 3.

The first step—comprehensive historical contextualization—is intended to uncover the historical layers of the site and its transformation over time by analyzing archival records, historical maps, and other documentation in order to identify key events, structures, and cultural practices that have shaped the role and significance of the site under analysis. A present-state overview including mapping of the architectural features, spatial layout, and remaining industrial structures, while also performing a stakeholder analysis, is conducted in order to assess the current physical, social, and cultural conditions. The theoretical components are then applied based on the findings of historical contextualization and present-state analysis using the Cultural Values Model [18–20], focusing on the forms, relationships, and practices associated with the site. Tangible structures and physical remnants are documented as forms, while historical and contemporary social, economic, and cultural ties are explored as relationships. Practices are analyzed to map historical industrial activities, community interactions, and present-day uses. At this stage, the concepts of place identity, spirit of place, symbolic potential, and embedded values are also applied to interpret how these aspects manifest within tangible and intangible layers of the site. To systematically explore and document intangible aspects, mind-mapping exercises can be conducted to visualize surface values, embedded values, and intangible cultural narratives tied to the site. Such mind-maps may include sensory impressions, historical layers, and symbolic meanings and can be supported by participatory tools such as stakeholder workshops or interviews. Finally, the analysis is contextualized within the contemporary urban regeneration trends by aligning identified forms, relationships, and practices with strategies such as green infrastructure, nature-based solutions, and circular economy approaches. This step identifies opportunities to preserve, adapt, and reinterpret

the values of the place to support sustainable development goals. The findings are then synthesized into a comprehensive narrative that connects the historical significance, present condition, and future potential of the place.

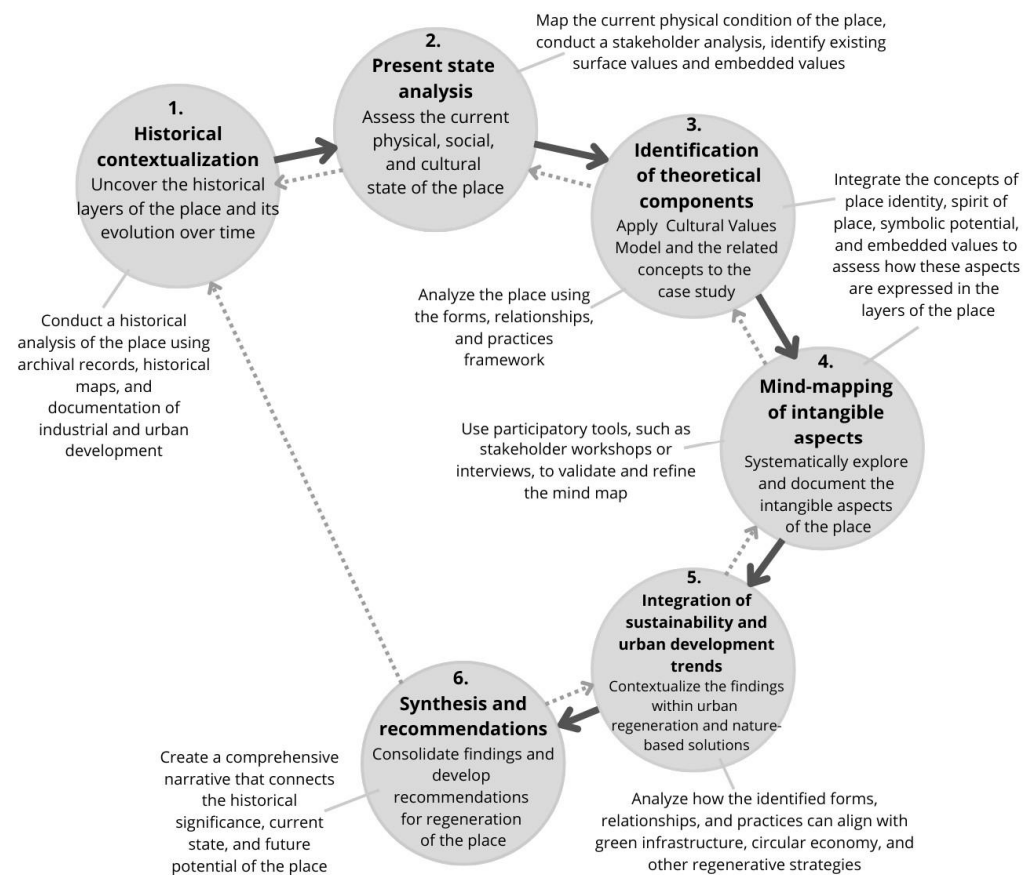


Figure 3. The process of application of the theoretical framework based on the Cultural Values Model [18–20] and integrating place identity, spirit of place or genius loci, symbolic potential of place, embedded values, and time depth for the analysis of the hidden values of historic industrial sites.

3. Case Study: Historic Industrial Site in the Center of Kaunas (Lithuania)

A former industrial quarter with a unique location in Kaunas city between Karalius Mindaugas embankment and Kaunakiemis Street, limited by the Nemunas river and busy city center quarters, part of the historically known Karmelitai district [43], was selected as a case study object. This territory, sometimes referred to as former “Pergale” factory territory, at first glance seems alien to the central part of Kaunas city due to its industrial architecture, functions, scale, and size. Moreover, in 2012, this territory, together with surrounding areas, was annexed to the protected area of the historical part of Kaunas called Naujamiestis [43]; this raises new questions regarding the rehabilitation and actualization of this culturally meaningful site. This currently underused and derelict territory has strong social, cultural, symbolic, and economic potential and provides possibilities for sustainable rehabilitation and the development of nature-based solutions. However, currently, its industrial heritage is undervalued, and this ignorance of the potential of the site may threaten its value in future redevelopment efforts. This territory was previously analyzed by V. Petrusonis [44] and A. Miskinis [45], and more recently by R. Saltonaite [43,46]. Industrial buildings located in the area were analyzed by N. Luksionyte-Tolvaisiene [47] and M. Dremaite [48]. It can be noted that the selected case study site corresponds well to the challenges that historic industrial sites are facing currently in rapidly transforming urban environments under BANI conditions. The application of the developed framework to this territory in Kaunas

began with historical contextualization, which revealed its evolution from its establishment as the Tilmanns factory in the 19th century to its role as a hub of industrial production and community life in inter-war Kaunas and the beginning of the decline in the Soviet years.

3.1. Historical Contextualization

The intensive development of this territory began in the 19th century with the arrival of German engineer and entrepreneur Richard Tilmanns in Kaunas. He founded his family company in a pre-existing nail factory, which he had reconstructed and expanded. Tilmanns arrived in Kaunas in 1878, during a period of significant social and economic transformation. In the second half of the 19th century, Kaunas witnessed the so-called industrial revolution: several large industrial enterprises were established here at the same time [49]. The factory was established near the railway station due to the convenient infrastructure, which made it an ideal location for industrial development and—most importantly—transporting manufactured goods abroad later on. The existence of nearby water bodies—the Nemunas river and its tributary Girstupis flowing through the territory—was also an advantage. The Girstupis stream flowing through the territory to Nemunas was actually one of the reasons why first residents, and later industrial facilities, were established here [46]. The Tilmanns operated their own power plant, providing electricity both to the factory and the surrounding city. By 1906, the factory had expanded significantly, boasting two smelting furnaces and more than 500 machines, making it one of the largest and most technologically advanced facilities in the Russian Empire. Its production was distributed to various cities across the empire, including Moscow, Kharkiv, Saint Petersburg, Kyiv, and Odessa [50].

The factory complex not only consisted of industrial, administrative, and residential buildings, but also included the workers' club, a building that was not impressive from the outside but is often referred as one of the oldest cultural centers in the city. In 1910, the Tilmanns expanded the existing workers' club and transformed it into what was called Tilmanns theater, which became a significant cultural hub for the residents of Kaunas. The venue hosted theatrical performances, concerts, lectures, assemblies, and congresses, playing a vital role in the city's social and cultural life. It is worth noting that the audience was not only local workers—the events even attracted visitors to the city [49]. As in other cities, the industrial architecture of the 19th century is characterized by the fact that Kaunas' early industrial buildings were as if fitted into the shell of the architecture, which was often decorative and ornate. Therefore, the appearance of industrial buildings of that period is closer to that of public and residential buildings [51].

Tilmanns' industrial activities were instrumental in Kaunas's economic development and urban growth during the late 19th and early 20th centuries. Tilmanns established what is now recognized as the Tilmanns family legacy, which significantly influenced Kaunas city life through contributions to culture, science, technology, and philanthropic initiatives. The metal goods factory in this area, founded in 1887, was one of the few social industrial institutions in Lithuania at that time [48,52,53], and was known not only in the Baltic countries, but also in Europe.

Although the market for Tilmanns narrowed after Lithuania becoming independent in the inter-war years, smart entrepreneurs found ways out, even if they could not supply their products to Russia [54]. In the mid-20th century, the Tilmanns company reduced its capacity due to a lack of market. Although the Tilmanns factory continued to produce screws, bolts, plowshares, buckets, nails, chains, and door and window fittings on a large scale, it was forced to lease part of its buildings to other companies [48], and other industries and enterprises, especially the textile industry, started to develop on the site and in its surroundings. By 1927, the wool weaving factory "Liteks" began operations in the former

warehouse buildings of the Tilmanns factory. Two years later, in 1929, “Kauno audiniai” (Kaunas Fabrics), a branch of the Latvian company “Rigas Audums” owned by Robertas Hirsas, was established in rented spaces within the Tilmanns complex. From 1930 to 1933, the spinning factory “Verpalit” operated within the unmodified Tilmanns factory buildings. During the same period, the complex also hosted additional enterprises, including a silk fabric factory, a knitwear factory, a printing house, the tobacco and cigarette factory “Kontinental,” and portions of the still-functioning Tilmanns enterprise. By 1938, the “Kauno audiniai” factory had grown significantly, employing 807 workers and 38 administrative staff members. This growth necessitated a major expansion, for which engineer Nikolajus Maciulskis designed a renovation project of existing red brick buildings. The project included adding a third floor with a mezzanine and extensive facade renovations in a more functionalist style, and constructing a laundry extension. Despite these esthetic updates, the internal structural system of metal beams and columns remained unchanged. This reconstruction demonstrated the increasing importance of the modernist look for industrial facilities, reflecting the evolving priorities of factory owners. [48]. Thus, the inter-war era brought diversification of industrial activities and the emergence of modernist esthetics in the area.

In the 20th century, geopolitical upheavals, including World War I and finally World War II, followed by long-lasting Soviet occupation, disrupted the Tilmanns family’s industrial and cultural activities. Following six decades of successful integration and development, their influence and assets were largely dismantled during the Soviet occupation. While industrial buildings from the previous era remained, many subsequently were either destroyed during World War II or extensively altered, resulting in the loss of their original identity. During World War II, when the Soviets invaded Lithuania, the retreating Germans destroyed some of the buildings, although the Soviets rebuilt the area and continued to use the existing equipment for metal goods production and renamed it the “Pergale” (Victory) factory [52]. A new administration building in the so-called socialist realism style, which remains the landmark of the site until today, was then constructed. Buildings at the site were nationalized, including the former Tilmanns theater, which then became a workers’ club [54]. During the Soviet era, although the production and workers’ social activities continued, the prestige of the site as an industrial–cultural hub began to fade. While Tilmanns theater housed city-scale events, the Soviet era workers’ club activities were focused mainly on workers and locals [55].

The once-renowned factory, which significantly contributed to Kaunas’s reputation and economic development, was ultimately diminished by the passage of time and neglect. The lack of investment in the site’s development led to the erasure of its historical significance, as its legacy was not maintained. Furthermore, the inability to adapt the area to meet the evolving needs of contemporary residents sealed its decline and eventual deterioration [55]. The Soviet period can also be linked with ecological degradation of the site and the erasing of its natural feature—the Nemunas river tributary Girstupis stream. As the traffic through Girstupis increased, bridges were built. Thus, gradually, the whole part of the stream that flowed through the site was sewered. A part of the stream is still visible in the Kaunas city plan of 1967, while Girstupis is no longer marked on the 1986 map [46].

After the restoration of independence of Lithuania in 1990, the closed joint-stock company “Pergales koncernas”, which produced metal goods, was established in the territory based on previously existing Soviet era industry [52], although its production activities gradually declined.

3.2. Present-State Analysis

Today, the underused and chaotically built-up territory can be characterized as “abandoned,” fragmented among multiple shareholders and lacking cohesive urban planning or inner functional integration. In the present-state analysis, the deteriorated physical condition of the site was documented, including partially preserved structures like the theater wall and remnants of industrial equipment (Figure 4). The absence of functional integration with the broader city infrastructure has rendered this area a “blank spot”, a closed quarter in the urban landscape, despite its proximity to Kaunas city center. However, the proximity of the city center with its intensive consumption-oriented activities has gradually influenced the area’s industrial legacy. For example, the administrative building of the Tilmanns company, situated not far from the site under analysis, recently became an interior feature of the large shopping center [52,54] (Figure 5).



Figure 4. Present-state analysis scheme and view of current ruins site and its buildings. The letters on the map identify the objects and spaces recoded in the photographs. Photographs and scheme by D. Zmejauskaitė.



Figure 5. The Tilmanns factory administrative building was integrated inside the “Akropolis” shopping mall. Photograph by I. Grazuleviciute-Vileniske.

Observations on site have demonstrated that proximity to the city center, as well as available affordable spaces for rent of very different sizes and characteristics due to the specifics of former industrial buildings, create very specific viability on site. At first glance, the site appears to be dying or almost dead socially and economically, although upon closer observation, a very different picture appears. Continuous observation has revealed a diversity of economic and cultural activities both in extant administrative and industrial buildings, including metal goods production; offices of various small companies; painters’ and musicians’ studios; kart racing; a barber shop; bicycle repair; music classes for children; car repair; an indoor sports arena; shops selling leather, tires, ceramic goods, spare car parts, concrete products, and jewelry; various small catering institutions; a laser entertainment space; an event space; a car care service; event organizers; and more. A techno music festival was even organized there. The site emerges as some kind of unorganized bottom-up small business incubator. Unusually diverse economic activities enrich the economic landscape of the city center, and their existence would not be possible without these former industrial buildings (Figures 4 and 5) with quite poor amenities but very affordable rent fees. Heritage preservationist Rypkema mentions that heritage buildings can become small business incubators, providing affordable spaces for small businesses and creative industries [56], and the situation at the site between the Karaliaus Mindaugo embankment and Kaunakiemio Street reflects this statement.

However, it is necessary to mention that the industrial heritage and symbolism of the site, as well as the history of the Tilmanns family, currently are not the driving forces of these economic activities, and deeper narratives of the site are waiting to be discovered and meaningfully employed in the future. The visual quality and ecological situation at the site also need improvement (Figure 5). While architecturally and functionally linked to the Tilmanns legacy, many of the structures at the site have lost their value due to modifications and neglect. An analysis on site [55] identified 24 buildings, assessing their physical condition, adaptability for reuse, and accessibility. Most buildings are in good structural condition but feature altered historical facades, such as boarded-up windows, repainted walls, and added lightweight structures. The industrial buildings have lost significant heritage features, as the original red brick facades have been replaced or degraded over time. Two notable structures remain. The first is the “Pergale” factory administrative building built in the socialist realism style. Although its interior has been altered, the exterior is well-preserved and visible and accessible from the street, suggesting potential for continued use with diversified functions. The second significant element is the remains of the former Tilmanns theater, now reduced to a single wall, which was recently registered as a cultural heritage object. Efforts to stabilize the structure aim to integrate it into future development, though its original function as a theater is deemed unsuitable. The territory is now predominantly covered with asphalt, prioritizing transportation over other uses.

Consequently, it suffers from a lack of greenery. Most of the existing trees and shrubs are in poor condition, with some even dead due to prolonged neglect.

3.3. Identification of Theoretical Components and Mind-Mapping

Key extant historical features, such as the Tilmanns theater wall, reinforced concrete cranes, and administrative building, were identified as significant elements representing the industrial and social legacy of the place (Figure 4). The historical contextualization and present-state analysis stages highlighted the transformation of the territory during various periods, including founding, growth, flourishing in the 19th century and inter-war years, further industrial use in the Soviet period, and post-independence decline. The surface values, such as the potential esthetic appeal of the concrete cranes and historical facades, were distinguished from embedded values linked to the deeper cultural and historical significance of the place.

Through the Cultural Values Model [18–20], this analysis further focused on forms, such as the remaining industrial architecture; relationships; including the historical ties between workers, the factory, and the surrounding community; and practices, such as industrial production, cultural activities in the theater, and worker traditions. Figure 6 demonstrates the mind-map constructed as a summary of the case study results using the Cultural Values Model [18–20]. The case study confirmed that this model allows for the analysis and visualization of the continuous transformation of the analyzed site—from an emerging industrial and cultural hub to a Soviet era industrial complex to gradual decline after Lithuania regained its independence and started transformation towards a market economy—and the currently emerging multiplicity of economic and cultural activities on the site.

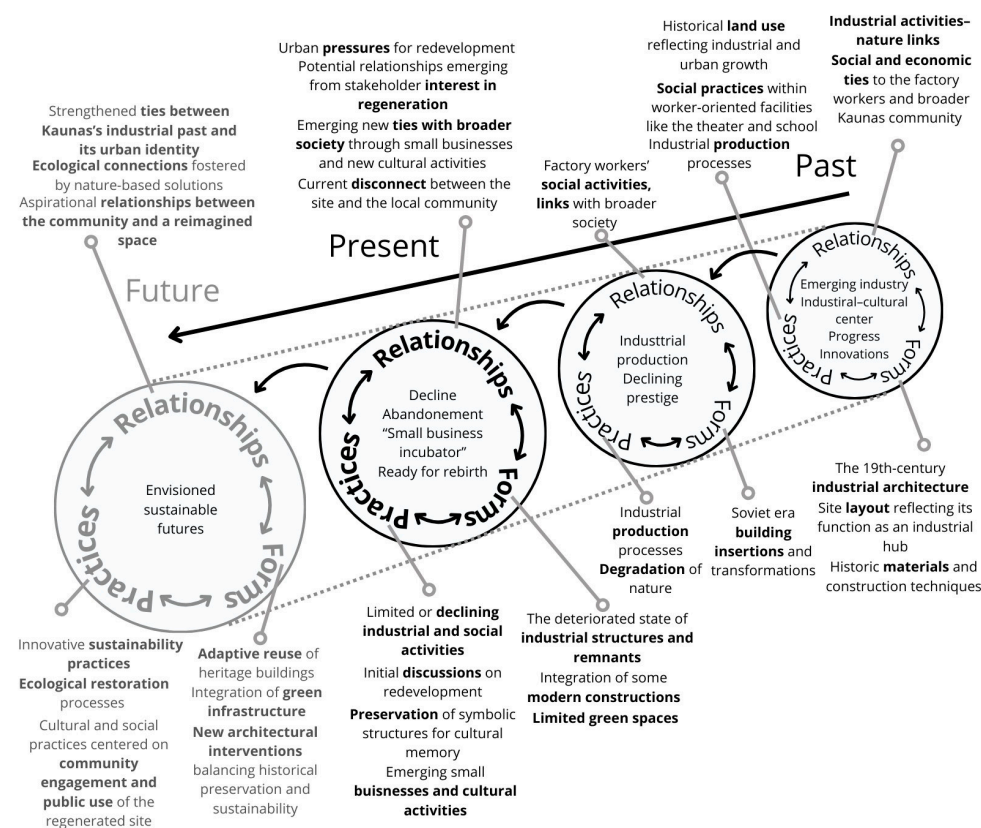


Figure 6. Application of Cultural Values Model [18–20] to general overview of historic industrial site in Kaunas, demonstrating the possibilities of analyzing and visualizing embedded values, time depth, continuous transformations, and potential sustainable futures. Scheme developed by authors based on Stephenson [18–20].

The concepts of place identity, spirit of place or *genius loci*, symbolic potential of place, embedded values, and time depth were further applied based on the historical contextualization, present-state analysis, and mind-mapping results. The summary of the analysis presented in Table 2 reveals, for example, that the place identity is tied to its historical importance in Kaunas industrial and cultural development, while its spirit of place was identified in its unique blend of industrial heritage and proximity to the Nemunas river.

Table 2. Summary of case study results: application of concepts of place identity, spirit of place or *genius loci*, symbolic potential of place, embedded values, and time depth for general overview of historic industrial site in Kaunas.

Framework/Concept	Past	Present	Envisioned Future
Place identity	Defined by the historical role of the Tilmanns factory, theater, and related worker facilities, which integrated the working class into Kaunas society	The identity of the place eroded due to neglect and lack of preservation, but some key features like the theater wall remain	Adaptive reuse to strengthen local identity by preserving key structures and integrating them with green public spaces
Spirit of place (<i>genius loci</i>)	Embodied in the industrial and social character of the site, combining architectural forms with the adjacent Nemunas river	The current state reflects the fragmented character of the site, where spirit of place is weakened by disuse and dangerous conditions	Reinforcing the spirit of place by combining preserved structures, ecological restoration, and new cultural and social uses
Symbolic potential of place	Symbols of industrial innovation (e.g., furnaces, factory) and cultural significance (theater) reflect resilience and progress	Remaining symbols, such as the theater wall and “Pergale” administration building, are underutilized but have potential as cultural anchors	Transform symbolic features into focal points of regeneration, highlighting themes of heritage, sustainability, and innovation
Embedded values and time depth	Historic layering of architectural styles (19th-century historicism, socialist realism, modernism,) and industrial practices	Current underuse and decay obscure the embedded values but leave opportunities to reconnect past narratives with the site	Integrate embedded values into the redevelopment, creating a narrative that connects the site’s industrial heritage to modern sustainable practices

3.4. Synthesis and Recommendations

As poetic and symbolic thinking [22] are as relevant to successful urban regeneration as thorough analysis, systemic thinking, contextualization, participatory practices, and other aspects, after the general overview of the historical industrial site in Kaunas using the developed theoretical framework, the present situation of the territory can be symbolically compared to an ancient tree which, although it seems to be dying, actually houses and ensures the existence of a multiplicity of life forms [57]. The currently underused, eroded, and dilapidating historical industrial complex houses numerous small businesses and diverse economic and cultural activities, which range from metal goods production to art studios, a techno music festival, kart racing, catering, and a barbershop. This situation has emerged mainly due to the peculiar combination of affordable rents, diversity of spaces, and proximity to the city center. However, the industrial heritage character was not the main driver for these emerging businesses and activities. As in ecosystem management, ancient trees should be preserved as long as possible as hubs of biodiversity; similarly, this historical complex should be preserved as a generator of economic and cultural activities that complement the activities of the city center in a way that would not be possible in other

circumstances. Bearing in mind this symbolic comparison, the future regeneration and transformation of the site will face three major challenges: (1) to recover and actualize the industrial heritage potential of the site; (2) to preserve and boost the emerging economic and cultural vibrance of the site and the above-mentioned diversity of activities; and (3) to regenerate and improve the ecology of the site.

The analysis highlighted opportunities to preserve and reinterpret distinguished valuable aspects within regeneration efforts. Finally, the findings were aligned with the urban regeneration trends, proposing the adaptive reuse of structures for cultural or ecological purposes, such as incorporating green public spaces and nature-based solutions to connect the site with the Nemunas river. The recommendations emphasized preserving the site's symbolic and historical values while ensuring its transformation into a sustainable and accessible space for the community. The envisioned future scenarios are integrally represented and described in Figure 6 and Table 2.

4. Discussion and Conclusions

This study established the hypothesis that under contemporary rapid urban developments, BANI conditions, and the focus in the sustainable transformation of cities, subtle intangible values of historic urban environments may be overlooked, damaged, and even lost. Historical industrial sites are especially vulnerable in this situation. Our theoretical analysis and conceptualization have demonstrated the applicability and benefits of such concepts as place identity, spirit of place, symbolic potential of place, embedded values, and time depth and the Cultural Values Model [18–20] as an integrating framework for better understanding the complexity and invisible aspects of historic industrial sites in the urban context. The case study of the historic industrial quarter in Kaunas, situated between the Karaliaus Mindaugo embankment and Kaunakiemio Street, has further proved the applicability of these approaches to specific contexts and objects. The pilot application of the Cultural Values Model [18–20] integrated with the concepts of place identity, spirit of place, symbolic potential of place, embedded values, and time depth to the case study site in Kunas demonstrated the possibility of envisioning practical approaches to the urban regeneration and heritage protection of historic industrial sites, including adaptive reuse for cultural or mixed-use purposes, the integration of green infrastructure, participatory planning, embedding nature-based solutions, etc., based on the systematic consideration of intangible values such as collective memory, cultural narratives, and symbolic significance.

This research is significant for its contribution to bridging heritage preservation and sustainable urban regeneration by highlighting the importance of intangible aspects in shaping adaptive reuse strategies for historic industrial sites and related decision-making processes. The theoretical and practical significance of the research is discussed below.

The theoretical significance and novelty of our findings include the following: (1) the further analysis of possible applications of the Cultural Values Model [18–20] in very different contexts compared to where it was developed; (2) the analysis of possible interconnections and complementarity with the Cultural Values Model [18–20] of the concepts of place identity, spirit of place, and symbolic potential of place; (3) demonstration of the potential of the concepts of place identity, spirit of place, symbolic potential of place, embedded values, and time depth for the analysis of intangible values of historic industrial sites; and (4) the consideration of subtle dimensions of industrial heritage in the context of the green transformation of urban areas. This approach offers a methodological contribution to heritage studies, enriching participatory planning and decision-making processes in urban regeneration contexts. This research is also relevant in the context of BANI conditions, as it provides a framework for understanding and valuing the hidden, intangible dimensions of historic industrial sites amidst rapid and unpredictable urban transformations. By inte-

grating cultural and historical values with contemporary urban regeneration trends such as nature-based solutions, this study offers a resilient and adaptive approach to heritage preservation and sustainable urban development. Such an approach is grounded in the recognition that heritage preservation and urban regeneration are interconnected processes requiring multidimensional frameworks that address cultural, environmental, and social sustainability. By considering invisible, intangible values, the integration of nature-based solutions may not only improve ecological resilience but also reinforce the role of cultural heritage in adaptive and inclusive urban development strategies. Thus, the proposed theoretical framework can support decision-making processes that are more inclusive, context-sensitive, and capable of addressing the complexities and uncertainties inherent in the BANI framework.

The practical significance of this research is that the developed theoretical framework may offer a basis for the development of participatory planning tools and for analysis, design, and decision-making. The modified Cultural Values Model [18–20] (Figure 2) can be applied in discussions and brainstorming activities and in participatory planning workshops and as a guiding framework and a tool both to organize the activities and to process data. It is worth bearing in mind that previous research on participatory workshop design and implementation has demonstrated that the application of urban theories in such workshop design is beneficial in the design, implementation, and analysis of results stages [58].

Several limitations of this research can be pointed out as well. While this research offers a comprehensive framework for analyzing hidden values at historic industrial sites, its application was limited to a single case study in Kaunas, Lithuania. This application can be considered a pilot study. Such a localized focus may restrict the generalizability of our findings to other contexts with differing historical, cultural, and urban dynamics. It is necessary to mention the subjective nature of the proposed qualitative methodologies as well, including mind-mapping and narrative interpretation, which may introduce biases or variability depending on the perspectives and expertise of the researchers and participants. Thus, the application of the proposed theoretical framework requires significant involvement from experts and competent facilitators, which may not always be available in all contexts. Consequently, the reliance on theoretical frameworks and qualitative analysis could benefit from further validation through quantitative methods. A potential future research direction could be validation of our research findings through quantitative methods: interdisciplinary approaches integrating methods such as GIS-based spatial analysis or participatory digital tools could contribute to the robustness of the framework and facilitate the integration of intangible values into urban planning and decision-making processes. Future research directions may also include the application of the developed conceptual framework in different contexts and its in-depth application to case studies of various industrial sites, in comparative studies, and for the design and application of participatory approaches.

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