

TRANSFORMATIVE URBAN LANDSCAPE AND ITS HERITAGE: A LESSON FROM THE BICOCCA AREA IN MILAN

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Abstract

Urbanisation is causing changes in the scale of the urban landscape and interfering with its heritage dimension. Due to cultural differences and site-specific characteristics, formal recommendations in this area often do not offer an operational approach. We propose a values-based approach to heritage management that delves into the essence of heritage by individually and cross-cuttingly extracting a place's tangible and intangible attributes linked to its values and identifying lost heritage. The representation of heritage and its values can be manifested through spatial symbolism, historiographical activities and social ties. We test the application of such an approach and tool using the example of the transformation of the Bicocca post-industrial area in Milan. In this case, we discovered that the historical memory of a place can be preserved despite spatial transformation. Transformation can catalyse a new identity, which gradually becomes established over time. This research contributes to a better understanding of addressing sensitive landscapes susceptible to urban development pressures.

Keywords: *Heritage; Heritage values; Landscape heritage; Urban landscape; Urban transformation*

Introduction

The city and its physiognomic countenance reflect the state of civilisation and culture. It is often likened to a palimpsest, preserving traces of past content, notwithstanding its continual overwriting [1, 2]. In the past, its formation encompassed the lifespan of many generations, solidifying the belief that the authenticity of place entails direct reference to the object and its interpretation in historical terms. Narratives about the past of cities closely alluded to their material dimension, spatial symbols and representations of the landscape. Recent decades have shown that the possibilities of human action have increased to such an extent that changes can be made in quite a short time on the scale of landscapes that are fragile and subject to loss of identity before they can become consolidated. Such actions constitute a rupture of time in the continuity of urban heritage formation [3]. In order to maintain its continuity, the discourse was directed towards its essence – values, seeing this as an opportunity for development and a way of managing resources. Some documents directly address these issues – for instance, the Narra Charter [4] or the Burra Charter [5]. The need to consider various cultural and developmental contexts has prompted a compromise – treating urban transformation itself as a process of establishing place authenticity [6-8] and taking into consideration the authenticity of experience [9].

Landscape has a crucial cognitive dimension, actively creating images, spatial representations and knowledge [10]. Its visual nature influences the creation of imagery and

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experience [11]. How a cultural image is constructed and represented is essential for cultural communication on a personal, social and political level. Attributes of the landscape are a tool for creating narratives – they are vehicles for meanings and associated values, including those derived from the past of place [12]. Cosgrove recognised this capacity by analysing the contextualisation of the landscape. In addition to the dominant narratives, he drew attention to the side narratives that sometimes clash, affecting the coherence of the landscape and thus recognised its relational nature [13, 14].

The expansion of interest in heritage issues in the twentieth century led to a shift of attention from the limited circle of architectural objects of artistic-historical value to the broad field of heritage encompassing the context of historic buildings, as already emphasised in the Venice Charter [15]. Over time, the contextual approach, additionally supported by associative values, has been translated into the protection of new spatial forms - urban complexes (like, e.g., city centres or settlements, industrial complexes), landscapes, as well as non-material elements, functionally relevant resources, other cultural subjects [16, 17] and the protection of heritage representing different values [18] or emotions [19].

In the face of dynamic developmental changes in cities, the physical representation of industrial complexes has begun to disappear en masse, being treated as a replaceable element. At the same time, the potential of these sites and their value for transforming urban areas and the public interest caused a turnaround in their treatment, elevating them to the status of heritage assets [20]. The consideration of contemporary architecture in the creation of cultural landscapes has broadened the research perspective and gained legitimacy in international documents – e.g. the Vienna Memorandum, which draws attention to „physical, functional and visual, material and associative, with the historic typologies and morphologies” [21]. In this context, a valuable resource for urban heritage has emerged which, in the process of Identification, protection and management, requires not only the participation of experts but also public engagement [22-25].

The 2011 Recommendations on Historic Urban Landscapes aimed (HUL Recommendations) to holistically address and integrate different approaches to historic urban landscapes. The document defines the concept as „the result of the accumulation of cultural and natural values and the occurrence of attributes throughout history, beyond the concept of <<historic centre>> or <<ensemble>>, viewed in the broader context of the city and taking into account its geographical location” [26]. Practice in the progressive transformation of urban areas prompts a review of the relevance and topicality of these provisions. Transition is natural for the continuity of cities and implies continuity and, therefore, the perpetuation of values. Transformation is oriented towards change but is also a formative stage for cities – the change process can have developmental value. The document does not explicitly refer to the pushing out of their physical representation or the presence of a contrasting landscape regarding values.

Intense and rapid urbanisation processes favour the emergence of transformative, short-lived landscapes formed from random juxtapositions of forms whose meanings are not consistent. The metaphor of Breccia, taken from Sigmund Freud [27], has emerged in urban heritage studies. It is appropriate for places that result from material, spatial and temporal juxtapositions of elements with different identities. Elements from the past can hinge on new narratives and the possibility of reshaping spaces [28]. This approach does not guarantee a coherent narrative, so ways are sought to preserve the memory of a place. Considering landscape not only as a physical construct but also as a socio-cultural one, a representation of the social environment, involves its capacity to transform individual, collective and societal understandings, experiences and interactions [29, 30]. On this basis, it is possible to distinguish heritage that has lost continuity due to the loss of social impact [31]. The transformative nature of the landscape is associated with an increasingly relational approach to territoriality. Territorial changes include pace, rhythm, meaning, time and scale. The process deprives the meaning of physical representation and cultural significance in favour of creating heritage

potential, animating it by organising related events. This development trend contributes to the creation of temporary territorial production and the construction of development strategies with little potential for long-term consolidation [32].

To maintain heritage in sensitive and transformative places, it is necessary to ensure narrative coherence based on values represented by its new landscape attributes and to enable understanding, experiencing, feeling and interaction with heritage. The search for effective strategies in this area is a current task because heritage resources also include only recently recognised valuable elements, which have no chance of establishing their identity over time and are susceptible to hasty elimination. On the other hand, the protection of too many resources makes it difficult to effectively use urban areas for development purposes, so the protection strategy must be balanced and based on qualitative research and individual analyses, adapted to the places and their values – embedded in the structure of land development and connections with the surrounding areas and the system cities.

In the empirical part, we discuss an area in the north of Milan, Bicocca, which has transformed, changing its identity in the landscape dimension. In this case, the place identity was mainly defined by the agricultural, industrial and now mainly service functions. The place, which was treated purely functionally, has, over time, acquired its value, which, from a heritage point of view, is now attractive. By presenting the spatial development chronology and showing the key aspects of place identity in dynamically developing areas, it is possible to analyse the representation of value – both material and non-material – and thus understand the essence of heritage.

The research aims to understand and evaluate urban heritage practices in an environment prone to transformation. The issue is relevant to the preservation of the cultural character of cities.

Methods

The theoretical framework includes the issue of urban heritage and its relationship to landscape and values. The literature review on the historical urban landscape analysed nearly 350 papers from the Scopus database from 2008-2024. We mapped co-occurring issues using the VOSviewer tool based on abstracts and keywords. The result was six clusters of topics, from which we selected the most pertinent in the context of theoretical research and the Bicocca case in question: redevelopment and heritage values (Fig. 1), which guided a further detailed literature review.

We discussed the research problem presented in the case of the development of the Bicocca area in Milan. A chronological analysis of the urban transformation of the place allowed us to identify the correspondence and specificity of the successive stages with general trends.

It covers the time from the appearance of the place in historical sources, i.e. the 16th century to the present day. The research included an analysis of written sources, archival maps, photographic material and planning documents. The existing condition, development, landscape values and heritage elements were analysed through in situ surveys in 2022 and 2023.

We studied urban-architectural transformation based on an archival search at the CASVA Archive (Centro di Alti Studi sulle Arti Visive Castello Sforzesco, Milan) in August 2022. It included four large volumes from the archive of the professional achievements of the principal author of the plan and buildings, Vittorio Gregotti. We used a logical deduction path in data mining the archive's inventory. The choice of relevant materials was dictated by an investigation into how the original concept evolved through the detailed designs to completion. The search focused on the conceptual materials. The materials were structured collections (folders and binders) containing drawings, photographs, slides and descriptions. Some were developed in a compact, selected libretto form (the name given in Gregotti's studio). Analysis of

these collections has made it possible to show the consistency and departures of the projects from their previous concepts.

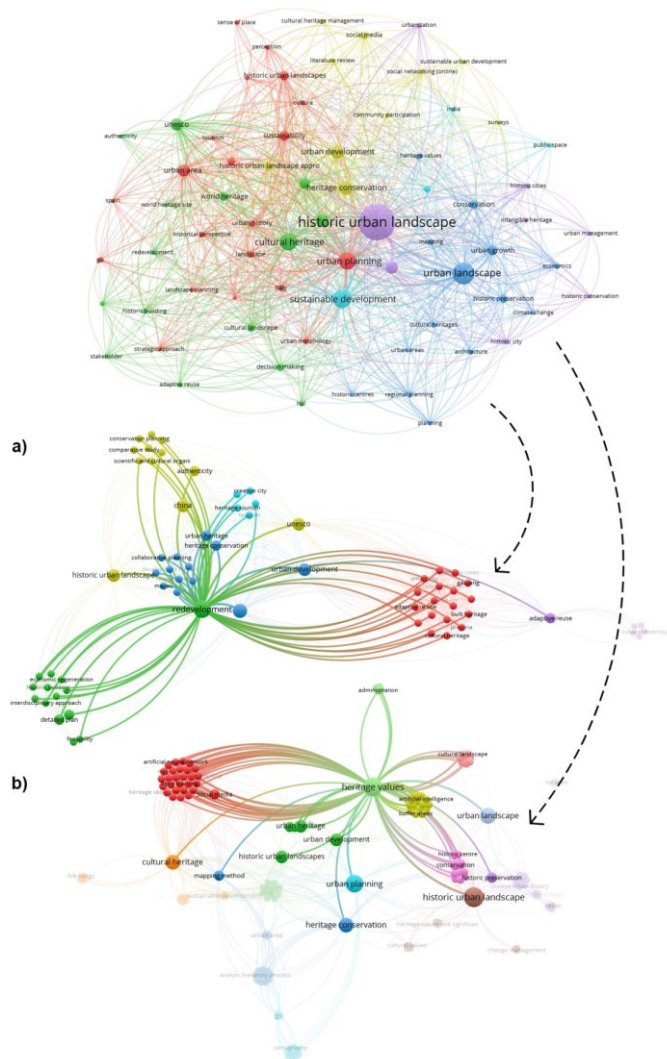


Fig. 1. Mapping the Historic Urban Landscape issue using the VOSVIEWER tool. Extracting the threads: redevelopment (a) and heritage values (b).

The primary scope of the research in the case study section covers the Bicocca area within the boundaries of the former Pirelli rubber products factory (about 70ha) and the immediate surroundings. Our research focused on the issue of landscape and its transformation in the context of heritage development.

We based the study of heritage conservation during the area's transformation on recognising attributes (material and non-material) and their associated values. We established the set of values based on the literature review [7, 33], while we established the selection of attributes based on urban planning practice and general standards for conducting urban analysis, as well as the characteristics of the place itself (Table 1). The presented attributes refer to those aspects that can be translated into the landscape and its values.

Identifying attributes and values in the Bicocca area is our own contribution based on cognition of the site, its historical development, literature, planning and design research and field research using a non-participatory observation method.

Table 1. Potential tangible and intangible attributes of urban landscape heritage and the establishment of values.

| Tangible attributes/elements of urban landscape heritage | Intangible attributes/elements of urban landscape heritage | Urban landscape values |
|---|---|-------------------------------|
| Details, elements of buildings or fixed structures; | The architectural idea, artistic concept; | Aesthetic; |
| Development, buildings; | Relationship to surroundings/place; | Age-old; |
| Urban elements, infrastructure; | Character; | Historical; |
| Natural resources; | Function, programme, utilitarian significance; | Scientific/research; |
| Complexes; | Knowledge/tradition/practice; | Social; |
| Context, layout, composition; | Semantic meaning; | Organisational; |
| Area; | Relationship to important figures/people; | Natural; |
| Result of subdivisions/grid; | Organisational significance. | Political; |
| Landscape/environmental imagery. | Developmental role/significance; | Economic; |
| | socio-cultural practices. | Other cultural. |

In conceptualising the research, we relied on the following structuring of different forms of heritage representation, which helps to situate particular constructs related to the new development of the area and landscape [34, 35]:

(1) Symbolism of place – a reference to material resources that allow imagery to be created, having cognitive significance, representing and referring to specific cultural elements relating to the viewer-place relationship.

(2) Historiographies of space – transferring narratives of place to other elements and representations, e.g. to an archive, to an exhibition, to an event; the possibility of achieving a multithreaded narrative.

(3) Social ties and community networks – create a collective identity that enables people to organise and act around a community heritage element.

The structure of the study of the Bicocca area involves dividing into development periods and identifying individual elements of the tangible and intangible landscape heritage and associated values. The analysis also singles out those elements that have no representation in the landscape and are, therefore, not reflected in material form. It allows the full range of heritage and its different forms of representation to be captured, aiming to preserve and perpetuate values.

In the discussion, we referred to the general discourse on historic urban landscape design more than a decade after establishing the HUL Recommendation [26]. We presented different approaches to urban heritage. The empirical part contributes knowledge about urban landscapes and their management – especially those from not-so-distant historical periods, which have not been recognised until now but are now a resource [36].

Literature review

Urban redevelopment and the historic urban landscape

Broadly defined, historic urban landscapes contribute to personal and collective memory. Urban development that touches the landscape means interfering with heritage and this often provokes public opposition because it interferes with a sense of place and personal identity [37].

The approach to the historic townscape depends on the cultural context. Italy, for example, tends to be conservative in practice concerning recognised resources and secondary ones. It has the effect of undermining socio-economic potential when it concerns sites that represent development potential. Urban development should consider long-term impacts and respect historical and cultural values. Historic zones are formally designated in Italian plans but do not include resources such as industrial areas. Protection stems from the practice of dealing with landscape design - all new interventions are analysed in terms of consistency with the original buildings, the layout and relationship of blocks and voids, the orientation of roofs, the colour scheme of the site and the spatial contexts that provide a buffer. A historic area does not lose its heritage if its new development evolves with the city and territory, addresses historical and cultural values, is consistent with typological and morphological features and respects socio-economic conditions [38]. To compensate for possible losses resulting from a restrictive approach to heritage preservation, a specific planning tool is considered, i.e. building compensation, allowing investment in alternative locations [39].

In the HUL Recommendations, authenticity is not unambiguously defined [26]. The need to reconcile heritage preservation with the development of tourism and creative cities has contributed to a conceptual stratification into object/place authenticity and experiential authenticity, which decision-makers use when transforming urban areas. The conservation approach is displaced by a transformational approach (Fig. 2) [39]. The result is often the adaptation of heritage potential to the needs of development through the creation of attractive authenticity [7].

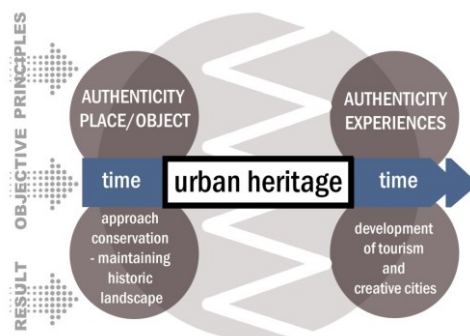


Fig. 2. A change of reference point in the treatment of heritage from the object authenticity to the authenticity of the experience. Own elaboration, 2023

Development decisions that involve places with historic landscapes can support city branding precisely through heritage elements and the use of so-called iconic architecture, thus working towards the image of the place. Too little importance is given to an adaptive approach and respect for the local specificities of places, resulting in a loss of authenticity in favour of a superficial attitude towards the history of places [7, 40]. A sustainable approach to urban development requires maintaining cultural diversity and the chrono-diversity of the urban fabric [41]. However, it carries the risk of too much contrast, for example, resulting from using high-rise buildings [42].

Assuming that the selected representative industrial areas pretend to be included in urban heritage areas, the above strategies become legitimate for further consideration as historical landscapes.

Heritage values and historic urban landscape

The departure from an object or place-centred authenticity, seen in the HUL Recommendations, has developed a new understanding of protecting heritage through values. They are defined by the impact of heritage on people and the potential to create experiences [7].

For this reason, the additional reliance on non-expert knowledge makes it possible to acquire experiential knowledge, learn about associative attributes, understand symbolism and consider collective memories and associated attachments. These aspects are important for heritage [43] and, consequently, for keeping the memory of a place alive. Applying the valorisation of heritage through the lens of values provides a greater chance for its vitality, as the longevity of values must be continuously activated.

The HUL Recommendations operationalisation should include tools corresponding to a value-based approach. A rigid regulatory or facility-focused approach is replaced by redirecting attention to the process, representing a qualitative change and incorporating intangible assets [44]. A flexible and process-oriented approach is in line with the idea of sustainable development. The methodology for studying urban heritage should include documentation assessment, site assessment, significance and value assessment [44].

The landscape, representing different values, encourages the formation and expression of views and has many perspectives for development thanks to interpretive qualities. They can carry the danger of distorting the essence of heritage, so subjective approaches to creating tourism programs or promoting heritage must be balanced [7, 45].

The very search for a new spatial expression of places can also be an expression of authenticity, as it often stems from the developmental conditions of a place [7]. Development is an important yet underestimated element in heritage valuation [46]. The values of a newly developed place should be differentiated on a spatial scale to balance different needs and interests. However, such a mechanism is insufficient to achieve the goals in the HUL Recommendations. Activities touching heritage should be additionally set in a broad context to capture its essence and coherence.

The HUL Recommendations encourage efforts to co-create heritage [26]. Its broad, holistic approach causes many complications due to ambiguities about basic definitions and different local contexts [47]. One way to improve the flow of information is by using modern technologies that enable innovative forms of heritage management – gathering information and interacting with audiences. Through the mapping method, it is possible to estimate the level and direction of interest in cultural heritage and then use this information to strengthen poorly performing areas [48].

Historical outline of the development of the Bicocca area (Milan)

In the context of the transformation of urban heritage areas, the Bicocca area is an example illustrating the consequences of different approaches to preserving the memory of a place in a situation of need for further development. Its formation can be divided into phases in which there were elements with distinct identities: from the initial settlement, through moments of radical functional, spatial and social change, to the present, which includes contemporary modernisations and prospects for potential change in climate change.

Area forming process

The first mention of the place has to do with the settlement of the Arcimboldi family in a suburban villa in the mid-15th century. The property was about 6km from Milan and was used seasonally. The word „bicocca” roughly meant a small castle on a hill. The villa, oriented according to the cardinal directions, dominated the open landscape. The building was erected on a rectangular plan measuring 40 x 13m. The highest, third floor was an open loggia – a kind of terrace under the roof. The interiors were decorated with frescoes depicting genre scenes – entertainments of the court ladies and patterns around the window and door frames.

The earliest picture of the surroundings is provided by descriptions related to the great battle of Bicocca in 1522, which occurred as part of the Fourth Italian War, in which more than 50,000 people participated. One description spoke of a fortified court park between a swampy

area and a road with a ditch connecting Milan and Monza [49]. Another description described a walled vegetable garden crisscrossed by drainage ditches [50].

The estate changed owners in the 18th century after the Arcimboldi family became extinct. Its significance was limited to functioning as a rustic suburban farmhouse, which declined until conservation efforts were undertaken in the first decade of the 20th century [51]. It is now privately owned – the archive of the Pirelli company (Fig. 3).

A significant event was the railroad routing in 1840 as the second in Italy under the Imperial-Regal Privileged Railway from Milan to Monza (original Imperial-Regia Privilegiata Strada da Milano a Monza). It was 12.8 kilometres long and contributed to the area's significant development.

The Bicocca landscape in the early 20th century was described in the account of the coachman Antonio de Vecchi during the reconnaissance of Alberto Pirelli before the purchase of land for the factory. At the time, he saw the property, simple sheds for storing agricultural tools, fields and sodden roads. Rows of mulberry trees appeared in the landscape, testifying to a previous function related to light industry – the production of silk, which became the source of many fortunes in Milan [52, 53]. The rows of trees and directions of parcelling are shown on a map from the second half of the 19th century.



Fig. 3. Villa Bicocca degli Arcimboldi. View from Viale Sarca Street

Industrial period of the Bicocca area

The land needed to relocate the Pirelli industrial plant from the centre of Milan was purchased in batches starting in 1906. Due to the convenient transport and location conditions, an industrial district of over 500 hectares was planned in the Bicocca area, concentrating several large factories together. The land purchase was led by the Società Quartiere Industriale Nord Milano fund, founded by representatives of Pirelli and Breda and financial institutions [54].

In 1912, due to the demographic growth of the city and the territorial expansion of Milan, the city authorities entrusted the development of an urban plan to the city engineers Angelo Pavia and Giovanni Masera. The street grid proposed in the plan was a continuation of the ideas of Beruto's 1884 plan. Thus, the Viale Zara and Viale Monza streets, which are critical to the area, were extended [55, 56]. In 1914, the Milano Greco railway station was created (Fig. 4). After the incorporation of the adjacent municipalities into Milano in 1923 (including Niguarda and Greco Milanese), these areas were covered by the regulatory plan of 1934

completed under the direction of Cesare Albertini. Then, the basic layout of the Bicocca Street network was shaped.



Fig. 4. Creation of the Milano Greco station in 1914: Current state (a),
The station is at the end of the viewing axis via Luigi Emanuelli and Piazza della Scienza (b)

Ettore Broggi drew up the plan for the factory. Its basic layout was created in the 1920s when zones of the central corpus, Segnanino, Albania, the sports complex and the Piero Pirelli Institute were formed. The division into factory blocks completely obliterated the original parcelling out of agricultural plots. Social facilities were built within the factory: the Pirelli workers village (1920-1923) (Fig. 5), sports centre (1919), orthopaedic trauma centre (1929), workers canteen (1955) and educational institute (1957). How the factory operates and treats workers is sometimes called “industrial paternalism” [57, 58].

The extent of the industrial plant provided a continuity of street frontages and a uniformity of the urban landscape. The buildings within the factory were subject to change associated with the organisation and operation of the factory, but this did not imply a change in the character of the place (Figs. 6 and 7). The areas were accessible to the working population. At its peak (early 1950s), the factory employed around 20,000 people [59]. The factory played a social role throughout the period – as a centre of resistance against fascism during the Second World War and the labour movement fighting for employee rights in the 1960s [60].



Fig. 5. Aerial view of the village of Pirelli. Workers houses were built in 1923.
Source: (a) Google Earth 2023; (b) Photo by author 2022.



Fig. 6. The character of the in-factory landscape at the start of operations, circa 1922.
Source: public domain



Fig. 7. Bicocca and surroundings. Aerial map showing land use in 1975 obtained from photointerpretation of flight “ALIFOTO1975”). Source: Regione Lombardia, 2024

A post-industrial district – a new technology pole

From the 1970s, it became unprofitable to maintain industry in cities. Factory sites gradually became urban wastelands. Additionally, in the case of this factory, unfavourable rubber prices and misguided investments contributed to the crisis [58]. The factory authorities took steps to restructure the area while production was still ongoing, which was tricky in organisational and social terms. Such significant changes require agreements with different communities, the establishment of public-private partnerships and changes within urban planning. The development perspective of creating a metropolitan centre with a technological and scientific function was a strong argument for such a transformation. The transformation of the area was a financial strategy to establish the land as a financial asset for the continued operation of the company in a crisis [58].

Studies on the functioning of similar areas, the appointment of experts and the formula of an architectural and urban planning competition also sanctioned the difficult decision to transform the area. The initiator of the transformation, Leopold Pirelli, stressed that he wanted the sites to be integrated into the existing urban fabric. The initial agreement – i.e. the division

of the site (in Italian: *lottizzazione convenzionata*) – between the company authorities and city representatives took place in 1983 and concerned three sub-areas: Albania, the sports campus and the central zone. It was implemented in the 1983-86 multi-year implementation plan (II Piano Pluriennale di Attuazione del PRG per il 1983/86) [60]. It was decided to leave the production function in the areas following the railway. There was to be a strip of special functions between Viale Fulvi Testi and Viale Sarca streets. The buildings in the central zone were to remain for ten years and those representing architectural value remained for longer. The buildings in the Albania section were to be replaced by research functions and those related to modern technology [61].

In 1985, an agreement was reached between the municipal, provincial and regional authorities and the Pirelli company authorities. In the same year, a proposal was presented for developing a part of the site called Albania, which envisaged the construction of buildings with administrative functions and research laboratories, with a total area of 96,000 m². The existing sports complex became the city property [62].

The first transformation project (Elementi per una proposta di reinserimento delle aree Pirelli di Viale Sarca – F. Testi) was developed within the municipal office. It concerned the strip of buildings between the main streets Viale Fulvio Testi and Viale Sarca [63, 64]. The official agreement on the Integrated Multifunctional Technological Centre outlined the future shape and significance of the new metropolitan centre [65].

In the same year, a two-phase international competition was launched for a „scheme to develop the future urban and architectural layout of the Pirelli-Bicocca area” [66]. The competition assumptions were quite general and open to proposals. Given the high probability of failure of a complex transformation, the implementation aspect was crucial, so an orderly, adaptive approach was suggested [67]. In the first instance, the competition task involved establishing an urban pattern (broad context) for the Pirelli-Breda-Falk area and linking it to the urban spatial structure. According to the concept, the area was to fulfil research and development and high-tech production functions.

After the first stage, three works were selected (Gabetti and Isola, Gregotti Associati International and Gino Valle) and finally, the first prize was awarded to the work carried out by the Gregotti Associati International office. The jury assessment included the size of the area of the proposed buildings, the demarcation of the different areas, the typology of the development, the possibility of adapting existing buildings and incorporating new ones within the already established communication (infrastructural) grid, the creation of social space, the layout of green areas, the connection of the area with surrounding areas, the possibility of linkage with other planned investments beyond the Bicocca area [68]. According to the jury justification, the awarded work provided the possibility of multiple spatial configurations within the proposed layout and quite a lot of freedom in the programmatic proposal, which was advantageous in case of change. The design removed spatial barriers and linked the new layout, based on former subdivisions, to the surrounding network of public spaces. The new ensemble was characterised by the prioritisation of selected spaces, the preservation of large quarters, the proposal of a differentiated character of public spaces, a conscious articulation oriented towards compositional, spatial elements and the preservation of selected elements of former development.

Leaving a matrix of forms, thus a form of inheritance of space, while achieving a rational and efficient solution was one of the most significant qualities of the award-winning work. The increasing recognition of industrial heritage at the time meant that many disused buildings could be adapted to new functions [69]. Some of the newly built public buildings have taken over the organisation of former industrial facilities, which is a common occurrence [70]. In the case of the Bicocca area, these facilities have become part of the new university campus.

The new urban unit was based on the former subdivisions of the factory area, while a coherent spatial quality was produced and the conditions for a new programme were created.

Gregotti, in his own words, designed neutral architecture to adapt to the new social conditions. He described the project as „a historical centre in the periphery, a place where historical social and physical characteristics blend seamlessly with high culture functions” [58].

The University of Milan-Bicocca, established in 1998, gave the place a new identity. The first actions were taken as early as 1991, in the Segnanino section, with the establishment of a new department of environmental sciences operating under the affiliation of the University of Milan (Università degli Studi di Milano). Some of the factory buildings were modernised for use by the University (Fig. 8). The second object of identity significance for the site and the city is the Teatro Arcimboldi Milano (TAM) theatre, built in 2002 and designed by architect Vittorio Gregotti (Fig. 9). Residential developments have also been created in the post-factory area (Fig. 10).



Fig. 8. Piazza dell' Ateneo Nuovo and University building - Aula Magna U6 (modernised post-factory building) (a); Piazzetta Difesa delle Donne between University building U7 and the dormitory (b).



Fig. 9. Teatro Arcimboldi Milano (a). The small square in front of the entrance to the theatre (b).



Fig. 10. Housing quarters

Most of the completed buildings were designed by Vittorio Gregotti, the author of the urban layout and architect associated with Milan. Thanks to this, the place is characterised by a stylistic coherence and a specific typological reference to Lombard architecture (e.g. buildings in a quarter system with a central courtyard; spatial emphasis on the axuality of the layout through symmetry). In some places in the modernised buildings, reference has been made to the former factory buildings – e.g. connecting links between the buildings (Fig. 11).



Fig. 11. References to old industrial architecture in the modernised university buildings – link between buildings (a); façade of modernised buildings (b).

New directions for the transformation

Architectural developments in the Bicocca area and those in the immediate vicinity indicate the development of cultural-related functions (e.g. Hangar Bicocca). Further facilities are also being built as part of the university campus. The transformation of the area has enabled the activation and development of many cultural institutions, the circulation of knowledge, social integration and the giving of a new identity to a post-industrial area [71]. An ecological housing development is planned on the eastern side of the railway tracks (Innesto project). The campus facilities are being upgraded in terms of pro-environmental solutions. It is a return to the environmental values relevant to the site before the industrial phase.

Results

Identifying tangible and intangible heritage attributes in the different development phases made it possible to assign values to them (Table 2) and then verify which heritage elements are not reflected in the Bicocca landscape (Table 3).

An analysis of the buildings between 1972, 2012 and 2022 has made it possible to show the scale of transformation changes (Fig. 12).

Identifying heritage in the different periods shows the cross-section of values associated with urban heritage. As a result of the transformation, the material part of the heritage has been replaced by other new elements of development, of landscape, which do not lose the essence of the memory of the place. Several elements of the buildings have survived the old industrial structure and earlier stages of development: the Villa Bicocca degli Arcimboldi, the Pirelli worker's village, the Greco Pirelli railway station, the cooling chimney, the modernised industrial buildings, repurposed for university purposes, the industrial hall in via Sesto San Giovanni.

Table 2. The Identification of tangible and intangible heritage elements and state values in the Bicocca area during the different periods.

| Period | Existing, tangible attributes/elements of the urban landscape heritage | Intangible attributes/elements of urban landscape heritage | Urban landscape values |
|--------------------------------------|---|---|--|
| Formation of the area | Building – 15th century villa; course of the road towards Balsamo (fragment); Milan-Monza road; Milan-Monza railway line. | The „bicocca” name; Testimony to the functioning of the illustrious Arcimboldi family; The site of a battle; The importance of the railway in developing this part of the town. | Ageing value; Historical value; Aesthetic value (villa). |
| Industrialisation phase | Urban layout of the factory surroundings – a grid of public spaces defined by a plan; Factory complex with internal communication system, entrance gates, communication hubs, public facilities (a small part of the buildings remains, the buildings have been modernised); Accompanying facilities – workers village; Infrastructure facilities – cooling tower, water tower (Torre Breda). | Testimony to the existence of the factory, an essential contribution to the industry of Lombardy; The work of the Pirelli family; A place of work for many generations and a large community; The coherent character of an industrial district embedded in the surroundings of northern Milan; Testimony to the manufacturing, technical thought; Testimony to economic development; Testimony to the organisation. | Social value; Organisational value; Economic value. |
| Post-transition period | Spatial matrix – divisions into blocks; Clear spatial structure based on urban composition and interiors; link to the surrounding area; Metropolitan importance of the sites: university (campus), theatre; A site commemorating the factory's activities–Pirelli Foundation's headquarters. | Creative realisation of the ensemble by the world-renowned Milanese architect Vittorio Gregotti; Innovative organisational approach - public-private partnership; Scientific and research centre; Academic identity; Naming of the university; The creation of a community living in the area; Urban policy effect. | Aesthetic value; Scientific/research value; Organisational value; Economic value; Social value; Political value. |
| Present period and future projection | University campus development; neighbourhood impact – Pirelli HangarBicocca (culture); l'Innesto zero-emission housing estate (environment). | Realisation of the idea of a pro-environmental city; Realisation the idea of a city based on culture and science; Realisation the idea of preserving the identity of a place. | Natural/environmental value; Cultural value – initiating; Economic value; Social value. |

Table 3. The Heritage that is not reflected or is ambiguous/unclear due to transformation.

| Period | Not reflected heritage |
|-------------------------|--|
| Formation of the area | Disappearance of the original parcelling out; The disappearance of the agricultural landscape; disappearance of the mulberry tree landscape, which was associated with the textile tradition of the region; Lack of Identification of the battle site; |
| Industrialisation phase | Disappearance of the factory as an ensemble; Demolition of some buildings which presented cultural values (e.g. the mensa building); Change in accessibility – opening up the area and integrating it into the urban fabric; |
| Post-transition period | Minor changes to the design of public spaces - the addition of green elements that change the character of urban interiors. |

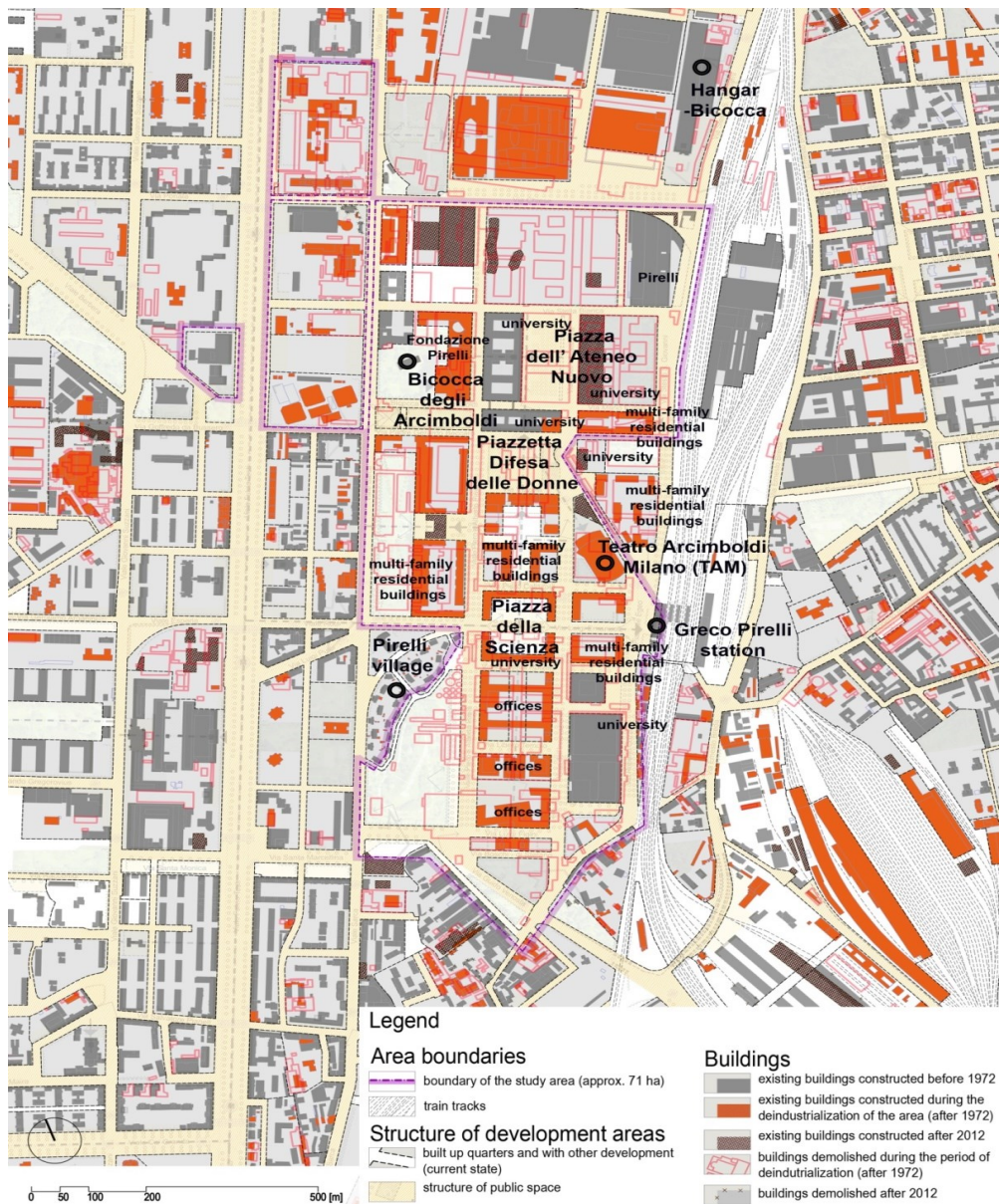


Fig. 12. Chronology of development formation. Significant replacement of buildings in the post-factory area is evident.

These buildings have been incorporated into the new landscape and convey the values of the place. Material evidence of 20th-century industrial architecture was not considered during modernisation for memorialisation reasons, but it was recommended to remain for implementation. The factories dating from the 20th century generally did not have a valuable architectural representation, which is the problem of the contemporary revitalisation of post-industrial areas. Contemporary transformations are moving towards functions of innovation, science and culture, while forms are adapting to environmental needs [72].

Knowledge about the place's past can be conveyed by transferring it into a symbol, through a directed narrative (as part of the historiography of space), or by social ties and functions in the community. The memory of the form and functioning of the Pirelli industrial

plant is documented through the resources of the Pirelli Foundation archive located at Viale Sarca, which collects documents, photographs and plans and maintains a rich digital archive. Although the assumption is maintained that the memory of a place can be reconstructed based on memories, Bartolini et al. claim that this is not entirely possible, as memory is based on a dependence on the physical form of the place [73].

The essence of heritage is its experience and its capacity for social engagement. The memory of Bicocca heritage is cultivated through the activities of different social and institutional groups: the local community living in Bicocca, the academic community and the community interested in particular aspects of the city, such as industry. The forms of commemoration are realised in organisational activities and different types of events (e.g. walks in the area, the commemoration of the Vittorio Gregotti work – architectural heritage in the CASVA archive). Cultural heritage is fundamental. Its diversity means that different communities can perceive it. Digitisation and techniques for collecting historical material, the possibility of activating and creating narratives and spreading local knowledge represent both an opportunity and a threat in reflecting this value [74].

With the benefit of hindsight, the replacement of the factory area in large part by a new form of urban cluster was justified. With time, the new place acquires its own identity, which does not place it in a category devalued by the transformation. Further transformation, however, will require community animation measures to maintain the memory of a heritage with no apparent physical representation and pro-environmental measures to improve the conditions of the place.

Discussion

The renewal of post-industrial cities consists in adopting policies that generate mechanisms to prevent social decay. To this end, creative city concepts are emerging, mainly oriented towards culture and innovation [35]. Value-based heritage also provides a supportive strategy for building development policies [75].

Research on the transformation of the Bicocca area revealed a rupture between the local social system and the spatial image. On the other hand, the transformation involved a class clash between the industrial elite and the working class. This aspect is integral to the intangible heritage encompassing the transformation process. Therefore, despite the non-participatory nature of the transformation, public participation in the change occurred [58, 76]. The current functional and spatial programme of the area consolidates its place in the public consciousness, in line with the HUL Recommendations, which seek actions to prevent social and spatial fragmentation by „taking into account the role of social, economic and cultural processes in preserving the values associated with the city” [26].

Past urban landscape protection patterns have not always been fully adequate for new situations [77]. When responding to the global situation the current approach to transformation processes is much more liberal [78]. New forms of urban heritage preservation are also being sought. This depends on the scale of the value and uniqueness of the landscape. According to the provisions of the HUL Recommendations, in the face of urbanisation and urban transformation pressures, values from different approaches need to be balanced, but there is still no established operational procedure [7, 26]. Case studies indicate that applying the values and attributes framework requires considering the local specificity of heritage and its context to fully and purposefully assess heritage [7, 79]. A contextual approach can translate into a different criteria selection in forming a set of values. Nouch has identified ten categories of values [44] that are coherent with those revealed in the case study of Bicocca.

In the geographical approach, the spatial aspect, the morphological layout, influences the landscape's character. The classical division proposed for analysis by *M.R.G. Conzen* [80] assumes an analysis of three layers: the city plan, the layout of the development (terrain, streets, quarters, subdivisions), the spatial form (third dimension) and the land use (function). In doing so, he draws attention to the distinct character of whole complexes and areas, achieved through differences in scale, different types of subdivisions and plot sizes. Morphologically, in the

Bicocca area, the divisions into quarters – the size of them (approximately 140m x 140m) – have been preserved; some buildings have been modernised and refer to the former development. It forms part of the landscape heritage. However, the morphological approach does not take into account the semantic aspect. Meaning requires a carrier, which in the case of landscape transformation is impermanent or forms the breccia mentioned at the beginning. Similarly, an approach oriented towards visual perception does not capture the entire spectrum of values, although Gao and Liu mention the following aspects in the process of forming aesthetic experiences and building experiences: the natural environment, the built environment, the process of activity and meaning in building associations [81]. This last factor is significant in creating narratives based on the past landscape.

The specific location of the Bicocca area in the city and the metropolitan area provides opportunities to create further development based on these two spatial perspectives. Creating a polycentric structure with distinct but distant nodes is appropriate for urban structures subject to uncontrolled diffusion, as in the case of Milan [82]. Forming a node is possible by producing a new expressive urban form and architecture integrated with new functional needs. The realisation in the Bicocca district is unique because of the coherence of the urban layout and architecture, which were the work of a single author. The exhibition on Gregotti's work, organised at the end of 2017 and the beginning of 2018, gave rise to the realisation of heritage practices, the theme of which became the entire new post-industrial district, with a development in the form of heritage promotion events with active public participation [83].

Public engagement in landscape conservation is supported by IT technology, e.g. through the creation of social networks focused on the subject [84]. The dissemination of audiovisual material and memories broadens knowledge and popularises it. Storytelling creates diverse narratives through which various values can be presented. This fits in with the demands of the HUL Recommendations [26], which concern the use of modern technology. Thanks to modern IT technology, simulations of landscapes are also created, which are thus recreated or re-created. Using a technologically mediated environment is not a substitute for personal experience but contributes to a significant spread of this type of exploration [85].

Referring to the notion of cultural injustice [86], which is caused by cultural domination that excludes different social groups, the city, through its landscape and contemporary techniques of representing different points of view, has the opportunity to be culturally „democratized” without getting rid of its heritage. This approach, however, carries the threat of control and manipulation in forming a collective idea of it.

Conclusion

Post-industrial sites in urban areas aspire to be urban heritage as a witness to urban development. Further development of these areas is possible, but some valuable resources should be considered. There are currently no formalised rules on how to do this in the face of such diversity. The approach should depend on the context of the site. As a result, all heritage values should be reflected and represented in new development.

The analysis of the Bicocca area, which has undergone at least two landscape transformations, has made it possible to identify which elements have been preserved in material form and which have been perpetuated in other ways. We have also identified disappeared elements that could represent a place memory. Identifying existing and lost resources is vital in heritage valorisation. It helps to prioritise landscape conservation and to create narratives based on lost heritage.

Heritage values are important strategic resources in building spatial and cultural policies. In a situation where it is impossible to maintain the existing form of the urban landscape, a framework is created to preserve the memory of the place and its spirit by transferring the values and the semantic meaning to other carriers, attributes than those derived from the physical structure. Such a form can play a complementary role, not just a substitute. The development of heritage practices should consider preserving heritage values by ensuring the coherence of narratives and values, thus enabling people to understand, experience, feel and

interact with heritage. Direct experience, drawn from the landscape, which is the carrier of heritage, is the most powerful experience of the history of a place.

Landscapes with strong identities are more resistant to transformations that blur their previous character. The extinction of meaning, functional, spatial, economic, social and therefore a deficit of value, can prompt transformative actions to restore the ability to function productively, actively and permanently. Inserting a place into a broader urban context establishes consistency and continuity of perception.

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