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What are the Limits? The Role of Designers on Preserving the Identity in Adaptive Reuse of Urban Industrial Areas

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Abstract

Cities are organisms that expand and transform. This expansion can include industrial sites into the city's organism and create abandoned areas. Adaptive reusing them plays a significant role in the sustainable urbanization goal. However, the interventions in the processes may cause the loss of the regional identity. This study examines the role and interference limit of designers in the adaptive reuse of industrial areas with the focus of creating mixed-functional sustainable structures without loss of the spirit of place. The study uses the case study model as a qualitative methodology. Firstly, the concepts of industrial heritage, adaptive reuse, and sustainable urbanization have been examined as background studies with a literature review. Later on, the paper discusses the role of designers and the intervention limits in adaptive reuse of urban-industrial areas. In the light of the findings, this issue is classified under three subtitles: preserving the spirit of place, the participatory design process, and creating a new urban focus with cultural development. Lx Factory is examined with a field trip as the case study in the context of becoming a new urban focus and creating a new, creative identity by preserving the existing industrial identity. It is a significant example both in terms of sustainable material use and its relationship with the region. As a result, the study concludes that designers should adopt a participatory design process and an inclusive approach to maintaining the regional identity in the adaptive reuse projects.

1. INTRODUCTION

A city is a product perceived by millions of people with various identities and characteristics. It is constantly changing as the product of many users who change its structure according to their own reasons [1]. The definitions that limit the parts of the cities as 'living area' or 'industrial area' have become indistinct and intermingled. In recent years it is clear to see that the cities do not fit in these rigid and limited definitions. Cities and their dwellers expand these limits in an axis of new urban focuses. These new areas can be social facilities where citizens gather, as well as cultural spaces for daily activities. In this context, industrial areas also have gone into a similar cycle.

Industrial structures lose their functions with changing technological possibilities and economic developments. These areas remain abandoned in the changing and expanding city organism. With the emergence of industrial heritage, these areas have been reused within the frame of regional needs. Adaptive reuse practices preserve and save them from ineffability they create in the city pattern. It is critical to adaptively reuse these structures for the preservation of the cultural identity [2].

Definition of the identity of places depends on the factors such as their meaning, function, and historical process [1]. Abandoned structures either continue to carry their context in the historical process or detach. Interventions may cause radical changes in the context of the function, demographic structure, and regional

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identity. Today, citizens come across many adaptive reuse industrial building examples as mixed-functional buildings. Industrial regions gain a new urban identity with these new mixed-function building blocks. These areas usually become popular for the young population. At this point, to what extent the identity of the structure is preserved plays a key role. The extinguishment and reproduction of this identity may cause not only the loss of architectural values but also the social, economic, and vital story of the building [3]. Preservation of cultural values in the urban organism depends on the new function of the region and the citizens' needs [4].

This study examines the role and interference limit of designers in the adaptive reuse of industrial areas with the focus of creating mixed-functional sustainable structures without loss of the spirit of place. The study uses the case study model as a qualitative methodology. First of all, the concepts of industrial heritage, adaptive reuse, and sustainable urbanization have been examined as background studies with a literature review. Later on, the paper discusses the role of designers and the intervention limits in adaptive reuse of urban-industrial areas. In the light of the findings, this issue is classified under three subheadings: preserving the spirit of place, the participatory design process, and creating a new urban focus with cultural development. As the case study, Lx Factory is examined in the context of becoming a new urban focus and creating a new, creative identity by preserving the existing industrial identity. It is a significant example both in terms of sustainable material use and its relationship with the region. The following research questions asked to examine the project: What is the main factor that ensures Lx Factory's active role in regional transformation? What is the relationship between the industrial heritage and its' new function? What are the intervention limits? How do these inputs affect the spatial atmosphere? What are the effects of the material choices on protecting this atmosphere? Within the scope of the study, it is aimed to discuss and answer these questions.

2. BACKGROUND

In his book *Le Droit à la Ville*, Henry Lefebvre mentions a phenomenon of cities in industrialized countries, which he calls "implosions-explosions of the city" where the old city core degrades or explodes outward. [5]. For Lefebvre, these explosions do not destroy the urban core but transform and incorporate the invading texture into its urban pattern. According to him, the biggest factor in the survival of these ancient cores is their "aesthetics". Industrialized cities contain industrial zones attached to their cores. However, when an industrial zone loses its economic function, it becomes uncanny, disused, and idle in the urban organism.
According to the 2018 Revision of World Urbanization Prospects produced by the Population Division of the United Nations Department of Economic and Social Affairs (UN DESA) the urban population of the world has grown rapidly from 751 million in 1950 to 4.2 billion in 2018. The global rural population is now close to 3.4 billion and is expected to rise slightly and then decline to 3.1 billion by 2050. According to the UN, 68% of the world population is projected to live in urban areas by 2050 [6].

By extension of the increasing population rates in cities, accommodation costs become much higher in the centers. Thus, this creates a dilemma especially for students, immigrants, and people with low income. At this point, the idea of meeting the urban needs by functionalizing the idle areas in the city arises. Sustainable urbanism and adaptive reuse concepts come into play here. Producing sustainable solutions in cities is a necessity with this increasing population density.

Historic industrial buildings are crucial factors not only for the financial strengthening of cities but also for preserving and maintaining cultural identity, local collective memory through preservation and reuse [7]. The role of culture in sustainable urbanism is critical.

UNESCO started the Culture for Sustainable Urban Development Initiative in 2015. As part of the 2030 Agenda for Sustainable Development, that set out a 15-year plan to achieve the 17 Sustainable Development Goals (SDG) [8]. The United Nations Sustainable Development Program's (UNDP) Goal 11 is about cities. The motto of Goal 11 is "make cities and human settlements inclusive, safe, resilient and sustainable." Addressing the issues of "affordable housing, accessible and sustainable transport systems, clean energy use, sustainable and resilient buildings constructed with local materials and protecting and safeguarding the world's cultural and natural heritage." [9].

Short-term solutions arise along with the long-term problems pointed out by UNDP. Such as the concept of tactical urbanism, which targets immediate change by focusing on providing high impact at low cost, has emerged. Besides, there are urban strategies for the reclamation of urban alleys for pedestrian use, such as the 'park(ing) day' project that aims to raise awareness on public spaces for a lively, creative, and social city [10].

Adaptive reuse is associated with sustainability, sustainable urbanization, and industrial heritage. It is not actually a new concept. According to the Urban Redevelopment Authority of Pittsburgh, as an industrial city, Pittsburgh's post-industrial strategies date back to 1945 [11]. The concept of industrial heritage first appeared in the 1950s using the term industrial archeology. In 1959, the Council for British Archeology (CBA) in England organized a national conference on industrial archeology. Interest in industrial archeology has increased considerably by the late 1960s and 1970s. In 1971, The North American-based Society for Industrial Archeology and the British-based Association for Industrial Archeology (1973) organizations were established [12]. Founded in 1978, The International Committee for the Conservation of the Industrial Heritage (TICCIH) defines industrial heritage as follows:

"Industrial heritage consists of the remains of industrial culture which are of historical, technological, social, architectural, or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activities related to the industry such as housing, religious worship or education." [13].

The re-functionalization of industrial heritage with the aforecited features creates the concept of adaptive reuse. Since adaptive reuse is the reproduction of an existing building with a new function, it builds concrete bridges between the old and the new. It becomes the expression of economic, environmental, social, and cultural values [7]. Interventions that cause the loss of cultural values and industrial identity demolish these concrete bridges. In this context, it is necessary to intervene by taking into account the historical, socio-cultural, architectural, and scientific value of industrial heritage.

Most of the buildings that will get reused in the future are in cities. This is critical for sustainable urban development [14]. The importance of efficient use of urban areas in sustainable urban development supported by concepts such as zero-carbon city, renewable energy, and the use of raw materials. Research show that energy consumption, carbon dioxide, and other greenhouse gas emissions, fossil fuel consumption, and material use significantly reduce with adaptive reuse buildings. It is an environmentally friendly approach compared to constructing a building from scratch [14]. At this point, a responsibility arises for everyone who develops a discourse, designs, and produces in cities. Efficient use and sustainability of resources begin with the planning phase. Together with local administrators, designers come into play as the connecting factor between the user and the product.

3. THE ROLE OF DESIGNERS: INTERVENTION LIMITS IN ADAPTIVE REUSE OF URBAN INDUSTRIAL AREAS WITH A CULTURAL APPROACH

3.1. Preserving the Spirit of Place

Industrial heritage has its own spatial identity as much as other places worth protecting. This quality, which can also be called identity/spirit of place, is defined in the literature with the term 'genius loci' in Latin. Genius loci is the intangible value of physical space. It is both physically and spiritually perceived [15]. Although the value is intangible, it's created with a combination of tangible and intangible features of space. Along with the physical properties such as materials, light, colors, and textures, its function, environmental character, in short, the spatial 'atmosphere' makes up the 'spirit' of a place.

Spaces change and transform like the cities we live in. They exist with their social relationships and the bond established with its users. When spaces become idle, they either continue to carry their identity or decontextualize. The unique identity and spatial atmosphere of industrial buildings generate emotions that

can only be perceived there. Industrial buildings need interventions that preserve their genius loci to links between the past and the present. In this process, it is crucial to create the 'new' by stratification.

3.2. The Participatory Design Process

The Global Taskforce of Local and Regional Governments (facilitated by UCLG) states that stronger citizen participation and adequate collaborative governance by local administrators is the key in urban development [16]. Contrary to a top-down attitude, a participatory and inclusive approach that involves the inhabitants in the process and includes the region in all aspects enables this transformation to be permanent. Each area of expertise provides a different contribution while ensuring urban integrity. Although most of the industrial areas are not historical monuments, they are included in the memories of the city dwellers and bear the architectural identity of the period. An abandoned industrial site or building has its own qualities. It is critical to understand its positive and negative characteristics and how they can affect the reuse process [11]. What these qualities can give to the designer through the process of creating the "new" differs each time. The building already exists, and it contains many design factors. There should be an inclusive approach to the design process. Participation should be a design parameter considering the harmony of the new identity with the existing environment.

A place is not independent of its surroundings, but a part of the city and time. It exists as an element of a greater whole. Any intervention that will make it become a new urban focus in its environment is the responsibility of the designer. Balancing this boundary is a task the designer has to do. At this point, the main issue is to separate the distinguishing features of the building. Define the elements that make up its identity and include it as a design parameter.

Designers should be able to identify which items in a building are valuable and which are not. They should know how to preserve critical qualities to inspire new design [17]. They should distinguish and embroider the elements of each industrial building from its period. Through the adaptive reuse process, designers should take into account all these elements and create a new identity without erasing the old features and preserve the existence of both.

Participatory design is a comprehensive process. The designer has to define the new function while preserving the spirit of the existing place. Within the context of its relationship with the environment, a holistic approach should be adopted. At this point, the designer's task is to be a bridge between the environment, the new and the old, industrial identity, and the current function. With such a holistic approach, in harmony with the existing area, the new design can meet the needs of the city. Thus, it becomes a new focal point that urbanites can embrace.

The new functions of the reused buildings are critical for regional identity, economic development, transportation conditions, and urban sustainability. From this point forth, a collaborative design process should take place. There are alternative ways of collaboration. Architectural competition projects or surveys organized by local governments are some of them. These practices are crucial for understanding the needs of the city. They create a democratic atmosphere for making necessary interventions with environmental awareness and sustainability.

In line with the new functions, the material selection also affects the preservation of the identity. In the adaptive reuse process, alternative scenarios can come into play. Although the main change in the structure is functional, space circulation, spatial orientation, interspace communication are the elements that create the building itself [18]. Some of these parameters are cultural identity, environmental aspects, urban texture, demography, etc. In the urban fabric, nothing is experienced independently of their environment. They can be perceived by the memory of the events and past experiences [1]. In this context, it is ethical to use sustainable, local materials against the loss of the identity of space. The harmony of the reinforcements and recycled materials with new functions supports this theory.

Designers' intervention limit is critical in terms of urban sustainability. A considerable amount of literature supports that the greenest building is the one already built [10]. During a reuse process, it is often not

possible to use the existing structure as it is. Adaptive reuse is the reinterpretation of spaces with a new function, with the ability to keep traces of their relationships with past periods [19].

Instead of creating a sterilized environment by demolishing the existing elements, it is critical to utilize them with a sustainable approach. Interior architecture/design becomes the preferred discipline at this point. It takes into account the idea of reusing and reinterpreting existing elements, as well as the importance of the existing heritage. Interior designers should be able to see and solve the tangible and intangible layers of architecture and reveal them [19]. The equipment and reused materials produced within the framework of what the area offers will also support the existing identity of the space. Thus, it will contribute to both sustainability and spatial identity.

Access to the area is also a critical element for both the experience of the space and for sustainability. Easy transportation, bicycle paths, greening the region are crucial in increasing the interest of the citizens in the area.

3.3. Creating a New Urban Focus with Cultural Development

Cultural development is particularly critical for sustainability. The Global Taskforce of Local and Regional Governments (facilitated by UCLG) expresses the importance of culture in the context of urban sustainability as follows:

“Culture will be key in the success of sustainable development policies, as driver and enabler of development and people-centered societies. A holistic and integrated approach to development needs to take creativity, heritage, knowledge and diversity into account. Poverty is not just a question of material conditions and income, but also of lack of capabilities and opportunities, including in cultural terms.” [20]. Additionally, The Global Report on Culture for Sustainable Urban Development, facilitated by UNESCO's Culture and Sustainable Urban Development Initiative explains the importance of culture in creating sustainable, creative, innovative, people-oriented, and inclusive cities and proposes solutions for these purposes [21]. Cities are centers of innovation in economic, cultural, and social fields. It is necessary to support cities with culture-oriented urban strategies. Culturally supported urban development inspires the participatory process. Because culture provides information about our existence as urban dwellers and citizens of the world [22]. City dwellers who know about their city and culture are beneficial in making meaningful, utilitarian, and sustainable decisions. In this context, while determining a new function for abandoned industrial areas, cultural aspects should be taken into consideration.

To conclude, the literature identifies that industrial area transformation projects need transdisciplinary thinking. It requires collaboration between urban planners, architects, interior designers, landscape architects, restorers, civil engineers, and graphic designers. This collaboration is a process that takes all critical aspects of the region into account. In adaptive reuse projects, the design is a process with the existing and layered new identities. And all inputs involved in this process should work together to create the 'new.'

4. EXPLORING ADAPTIVE REUSE OF INDUSTRIAL AREAS THROUGH THE EXAMPLE OF LX FACTORY

Lx Factory is an adaptive reuse project of abandoned factories in the Alcântara region of Lisbon, Portugal. As a fabric production factory, the establishment of Lx Factory dates back to 1846. Workers' residences were built around the factory by the owners of the factory in 1873. Thus, the factory had an essential role in Lisbon's production history. The area fell into disuse after the production was interrupted majorly in the 1990s. In 2007, it was transformed into its current function and became a multi-functional "creative island" under the name of Lx Factory [23]. It is a significant example in terms of the organic process of its adaptive reuse, its transformative quality that involves the area, spatial approach in the transformation process, and material usage. Also, nearby museums (Museum of Art, Architecture and Technology - MAAT, Museum of Contemporary Art, etc.) support the creative and cultural identity of the area (Figure 1).

Figure 1. *Lx Factory and its surroundings.*

After its transformation into Lx Factory, this industrial area became a focal point for tourists as well as natives. It has had a remarkable impact on the region. Not only Lx Factory but also the number of cafes, pubs, restaurants, and art studios has increased significantly all over the area [24]. Analyzing the factors that make this organic transformation and new urban focus is essential for reference to future studies. At this point, the primary issue is the inputs that make Lx Factory a successful example among the other adaptive reuse industrial areas. Creating a new memory by layering with the existing industrial identity makes the difference. When the integrity and consistency of the spatial approach are examined, it has been seen that there is a totalitarian approach from spatial organization to the material choices. Instead of a "sterile new" production that removes the traces of the industrial heritage, a multilayered design approach is dominant.

The eleven different building blocks that constitute the Lx factory involve various functions such as shops, art workshops, cafes, bars, hairdressers, gym, design offices, and a bookshop. When different businesses come together, their multiple identities can get in conflict (Figure 2). However, in the Lx Factory's context, this is not the case. Each shop in Lx Factory has their own identity, yet they come together in the frame of a totalitarian mutual language. In an area where the interference limit is perceived clearly, industrial identity is still observable. Preserving industrial identity is also essential to keep the characteristics of societies that live there [25]. The use of building elements such as facades, doors, and windows from the past supports this situation. Not being ‘sterile new’ also gives reference to the abandoned state of the area.

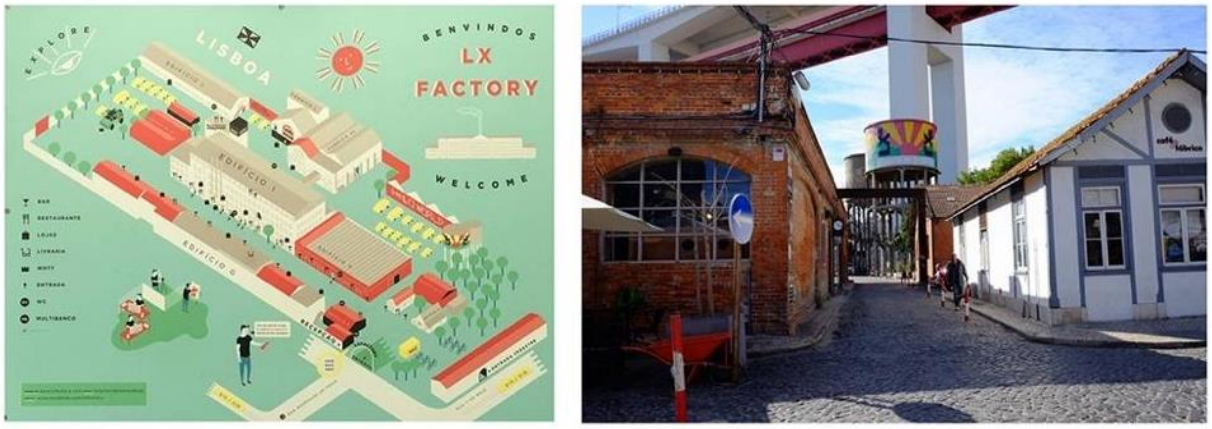

Figure 2. *Lx Factory map and general spatial atmosphere (2018).*

The spatial atmosphere is in harmony with this feeling of an abandoned state. It strengthens the memory of the industrial area once it was in the minds of the citizens. (Figure 2). With the principle of providing minimum living conditions and the use of reclaimed materials, the function stands out in equipment-wise. The industrial identity and materials created an atmosphere as a whole throughout the place. Most of the buildings even don't have a stable heating system. It is also substantial in terms of the sustainability of construction. This sustainable approach continues with passive climate control throughout the space.

Lx Factory has two entrances in total. Surrounded by industrial buildings within the boundaries of the area, it is located around the street line that forms the two main bases. When users enter from the main entrance, they face shops created with temporary structures as well as industrial buildings. These pop-up shops were designed with reused container units to correspond to the general identity of the area. Street furniture was designed by reusing found materials in common areas (e.g., an outdoor bar unit designed with found material) (Figure 3).

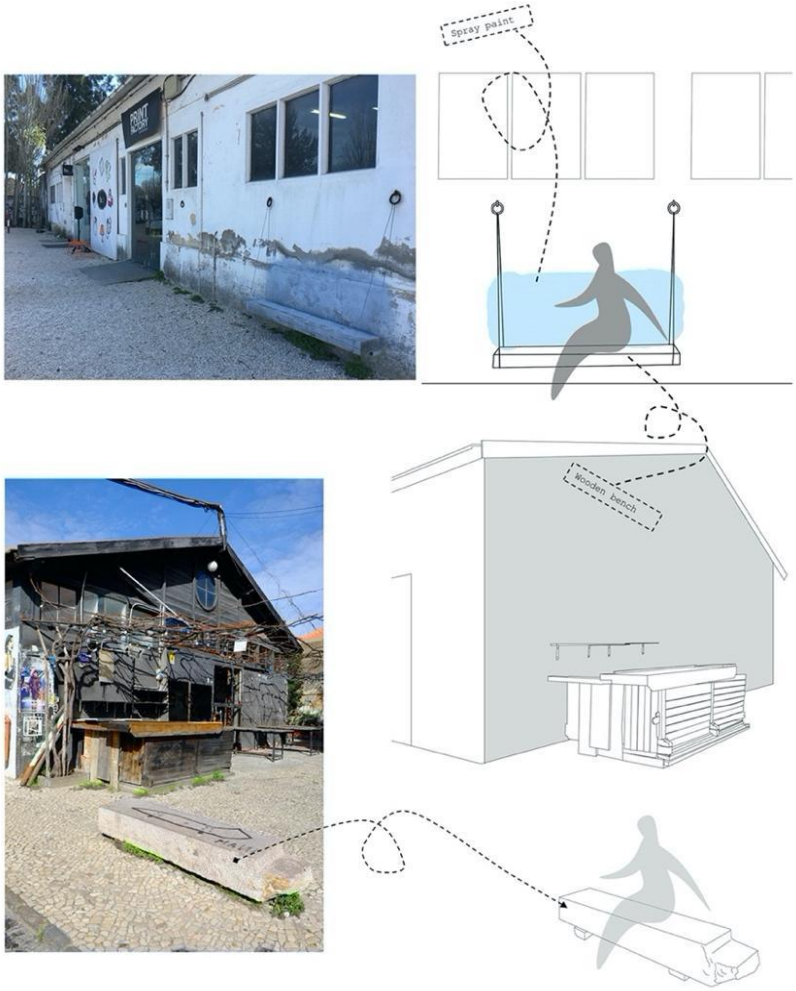

Figure 3. *Furniture production with the reusing of waste material (2018).*

This 'scratchy' appearance fits into the general identity of the place. Rather than a strained design perspective, these fittings, which are used as they are, create a free perception. The facades of constructions preserve the present identity of the industrial area. There are graffiti art installations on facades. This artistic and industrial approach also continues in the interior design of the building blocks. In the interior spaces, many elements from the industrial time are preserved. Instead of covering former marks, there is an interior design approach that especially shows them. This principle has also been maintained in the interiors where the identity and material stratification are observed.

There is a strong bond between the material and spatial atmosphere. The complete perception of the architectural place depends on the material and details of the tactile area [26]. This bond has become even more essential in terms of the formation of the spatial atmosphere in Lx Factory. The design principle adopted here is function centered with the use of raw material and far away from an ornamental attitude [27]. It has been observed that there is the use of wooden, metal, and gross concrete in urban furniture. These materials correspond to industrial identity within the framework of their utility and visual qualities. The building facades are mostly used in their current form. The damages in facades are left as they are in some areas. Roof coverings are left for interior use as long as they do not pose a vital problem. Roof coverings that cannot provide comfort conditions at the minimum level are also supported with raw materials such as plywood. The old windows and doors of the buildings are still in use without a major change. In the interior spaces, the same materials are used for different functions. Wooden and metal usage is dominant throughout the area.

Ler Devagar (meaning "read slowly" in Portuguese) is a bookshop in Lx Factory. The bookshop is one of the places of intense interest in the region. As a former printing house, the building transformed into a

bookshop, a coffee shop and a temporary art gallery. Lithography machines are still at the center of the open space and they serve as a kitchen space for the cafe inside (Figure 4).

Figure 4. *Interiors of Ler Devagar (2018).*

Finally, in addition to preserving the regional identity with a sustainable approach, it is seen that the presence of creative industries also contributes to the identity of the area. The design studios, creative offices, and innovative concepts also play a critical role in the desired identity of Lx Factory as a new urban focus.

5. RESULTS AND DISCUSSION

The study obtains findings on urban identity, place perception, and materials used in Lx Factory. The project has a significant position due to its totalitarian approach that involves the region and adaptive reuse of abandoned industrial buildings. The project is notable in terms of creating a new urban focus. Making 'de-identification' with 'top-down' design decisions that ignore the regional identity causes the loss of qualification of the industrial heritage value.

Lx Factory preserves the areas' industrial identity. It has been recovered from an uncanny and undefined state. The project involves the spatial organization and the presence of waste materials of the former industrial site. The design principle in the project is simple. It aims to preserve a valuable industrial identity. In the new version, the building blocks have a new function, but the industrial identity holds its presence. This approach creates a multilayered design. It does not demolish the valuable industrial identity but creates harmony. The new urban focus has been created by re-incorporating the region into the pattern of urban life.

The spatial atmosphere is also an essential factor for Lx Factory to be a new urban focus. The most efficient input in preserving place identity in Lx Factory is material usage. The materials from the former site carry the memory of the factory in itself support the created atmosphere. The supportive condition between the material and identity provides a totalitarian atmosphere throughout the construction. In these places, users come across a structure that reveals its own identity and atmosphere, not within the framework of the same 'new current' design concept. The design of the place exists by layering. The advantages of being an industrial structure and the layers of the past are there. And citizens can read it from the design of the building. Every element of the place is taken as the best assessment of existing. In this way, the design of the Lx Factory is unique for itself. The location of Lx Factory is a former workman neighborhood away from the old town and touristic areas. It would be correct to say that shops with different functions such as art studios, restaurants, cafes, and gyms add a functional quality to the region. The example of Lx Factory shows that it is possible to create new urban focuses without losing industrial identity. It gains a new identity with minimum interference to constructions in an abandoned state which carry industrial heritage value. The usage of recycled material, flexible spatial organization, and design with maximum efficiency from the existing place play a pivotal role in this design process.

Table 1. *Design inputs for adaptive reuse of Lx Factory within the context of sustainable urban development.*

	Lx Factory
Design Process	Designed as a collaborative development project with a multi-disciplinary, participatory design process.
Design Focus	Economic and cultural development is the main design focus.
Material Use	Designed with mostly reused materials. Additional buildings are constructed out of recycled material such as freight-containers. Street furniture such as benches, chairs, tables, a street bar and pots, etc. designed out of scrap materials from the former industrial site.
Cultural Development	Art and culture is the key factor in the development of the area. The area rapidly grows with new cultural venues and activities around Lx Factory.
Economic Development	Includes accommodation, shops, restaurants, bars, offices, etc.
Transportation	Transportation to the area is well established. There are bus, metro and tram connections to the area.

According to Table 1, instead of refined products and perfect materials, the design should be sustainable. It should be in line with the needs of the city and the wishes of the citizens. The final project should be open to constant change.

With the case study and the literature review, it is seen that culture and cultural activities are used as the fundamental source in the organization of the region. Preserving the industrial identity and highlighting the region's cultural identity are the main focuses. Sustainability and the use of local and recycled materials are highlighted in the design. Instead of building new structures in the region, the existing ones are preserved and reused adaptively with minor interventions. The newly articulated structures are temporary. The new function of the area is created with a multidisciplinary approach and participatory design processes.

Ultimately, this study shows that using an environmentally friendly design process reduces construction-induced pollution. Using passive ventilation, natural lighting, and sustainable materials helps reduce energy consumption. Adaptively reused constructions carry this responsibility from the very beginning. They are the outcome of a sustainable approach in line with the nature of this concept. The transformation of industrial areas and structures should be by considering both the sustainable urbanization and the historical identity of these regions. This process should include the local community, local government, and an interdisciplinary partnership. Adaptive reuse projects should be designed as a collaborative development project with a multi-disciplinary, participatory design process. The decisions should support the inclusive idea-sharing environment to create sustainable urban transformation. The awareness of designers has a vital role in preserving industrial heritage, cultural identity (Figure 5). The design process should offer environmental and innovative solutions. A multidisciplinary approach is significant to achieve those solutions.

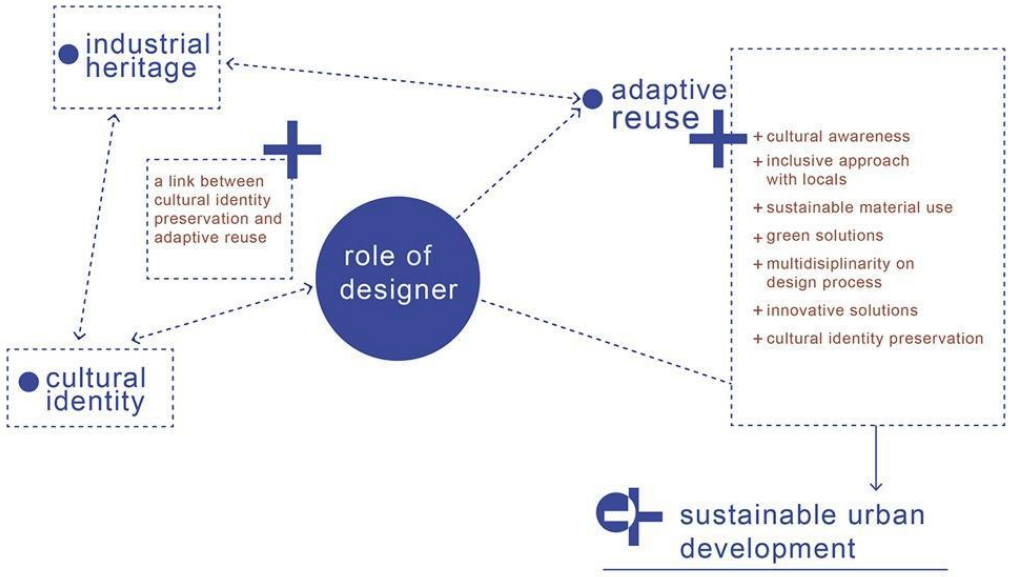

Figure 5. *The role of designer as a link between cultural identity, industrial heritage, and adaptive reuse for sustainable urban development.*

In summary, this paper argues that aforementioned methods can prevent gentrification on the adaptive reuse process of industrial areas. Examination of such examples guides designers in the adaptive reuse process. For further studies, researchers can examine alternative adaptive reuse processes using diverse methods. These studies are critical for the cities and the urbanites and can be stimulating for designers with alternative approaches.

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