**Landscape Architecture and Regional Planning**
2021; 6(4): 64-72
http://www.sciencepublishinggroup.com/j/larp
doi: 10.11648/j.larp.20210604.11
ISSN: 2637-4358 (Print); ISSN: 2637-4374 (Online)

# The Strategies for the Reuse of Old Industrial Buildings into Third Places

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**To cite this article:**
Liu Xin, Panashe Whisper Matarutse. The Strategies for the Reuse of Old Industrial Buildings into Third Places. *Landscape Architecture and Regional Planning*. Vol. 6, No. 4, 2021, pp. 64-72. doi: 10.11648/j.larp.20210604.11

**Received**: September 10, 2021; **Accepted**: October 5, 2021; **Published**: October 12, 2021

**Abstract:** A third place is any form of shared space for multifunctional use that promotes innovation, interaction, and cooperation with surrounding residents or users. Third places have become necessary in today's society due to the close integration between daily human life, work, and technology. The characteristics of third places are the diversification to meet different functional requirements, easily accessible and act as a middle ground for users from different backgrounds. Besides promoting social interaction, third places are also of great value in promoting healthier lifestyles, increasing the real estate value of the surrounding areas, and promoting community resilience during disaster times. This paper shows the transformation of old industrial buildings into third places to fill the gap for different functional needs for third places, promoting sustainable urban development and saving the old industrial buildings which otherwise face the threat of demolition due to continuous deterioration. Industrial buildings possess exceptional structural and architectural characteristics that can support many new third place functions. By searching through related literature related to the reuse of old industrial buildings and third places, different influencing factors are extracted and summarised to classify different space modes of third places into site space, ecological space, activity space, service space, and transitional space. The paper further summarises different strategies for transforming the old industrial buildings` structure, façade, and the different spatial modes of the third places.

**Keywords:** Industrial Reuse, Industrial Transformation, Third Place

## 1. Introduction

Society has developed a need for social interaction spaces during the COVID-19 pandemic [1]. According to Mimoun and Gruen, third places have become critical players in the communities today due to organisations shifting to having remote workers and increasing the number of business start-ups [2]. A study done by Jeffres et al revealed that the availability of third places in a community contributes to people's satisfaction with life quality [3]. Third places can meet a variety of needs that involve interaction, innovation and production.

To attend to different needs for third places, this paper supports the concept of reusing industrial buildings into third places. The adaptive reuse of industrial buildings into third places has gained mainstream media attention as a more sustainable method [4] of development than demolishing and building anew. Besides the transformation of obsolete industrial buildings being more environmentally friendly than demolishing the buildings [5], the process has other benefits, including reduced project time since the main structure of the building is already in place.

The transformation of industrial buildings is possible due to shared characteristics between the old industrial buildings and third places. According to Binder, old industrial buildings have a spatial structure that can support any future function and gives character to urban development in a way that may not be available with new buildings [6].

The paper aims to analyse and summarise the different design strategies for reusing industrial buildings into the different spatial modes of third places.

# 2. The Concept of Third Place

## *2.1. Definition and Importance of Third Places*

The sociologist Ray Oldenburg pioneered the concept of "Third Place," in which he defined third places as unique, informal gathering spaces in the community that do not fall under the category of work nor under the category of workplaces, and have the aim at promoting social interaction for people from different backgrounds [7]. Crick has contested this definition, arguing that the definition of third places as defined by Ray Oldenburg was from a North American perspective [8]. According to Mimoun and Gruen, third places have evolved to cater to flexible working and freelancing [2]. To take note of the definition and arguments previously mentioned, and to keep up with recent trends in the development of the third-place concept, in this study, we define third places as shared spaces (Figure 1) that are of multifunctional use and have the aim of promoting innovation, interaction and cooperation in the community.

According to Moore [10], third places play a crucial role in communities as spaces for promoting social interaction, promoting health, have economic benefits and encourage resilience, as explained in Table 1;

***Figure 1.*** *Third place as a shared workspace (source: [9]).*

***Table 1.*** *Importance of Third Places (source: [10]).*

| Importance | Description |
|---|---|
| Social | Third places promote social interaction in a community |
| Health | Provide relaxing environments that can have psychological benefits. Third places such as gymnasiums can meet the physical health needs of a community. |
| Economic | Well-designed third places can have a positive impact on urban renewal. An excellent functional third place can increase the real-estate value of the surrounding residential area. |
| Resilience | Third places are well-known in the community and are reliable places for accessing information. They can provide a sense of 'place' during disasters or post disasters periods. |

## *2.2. Characteristics of Third Places*

According to Ray Oldenburg, the characteristics of third places are: acting as a middle ground, diversified and easily accessible [7]. He described that accessibility is an essential characteristic in third places and outlined that third places must be within a walkable distance with the aid of a reliable public transport system [7]. He also elaborated how third places are numerous in today's society and are diversified to meet different functional needs. Jeffress listed third places to include coffee shops, coworking spaces, leisure centres and parks [11]. Concerning the diversified characteristics of third places, Crick described the uses of third places in developed countries to be different from those in developing countries [8]. Therefore, there are cultural and economic differences about the use of third places around the world. In China, numerous formally designated third places promote mixed uses of social interaction and remote working while offering affordable and convenient internet access. This is in contrast to Zimbabwe, a developing country with fewer formally designated third places that promote multifunctionality. Many third places in Zimbabwe are either business orientated or orientated for social interaction, therefore lacking the character of multifunctional use.

Regarding Oldenburg, third places also act as a middle ground designed with informal aesthetics to allow different users from different backgrounds to experience a sense of 'home away from home' [7].

However, Mehta and Bosson were the first to give the physical characteristics of third places [12]. They classified the physical characteristics of third places under personalisation, permeability, seating and shelter [12]. The characteristic of personalisation allows users to change their surrounding environment in relation to the users` activity patterns. Permeability is the ability to see the inside of a building when passing from the outside. Permeability stimulates users` senses to enter the third place and promotes users' connection with the external environment. In a third place, it is essential to provide shading for the users while also balancing the amount of natural light allowed into the building [12]. Figure 2 shows LocHal as an example of an old industrial building transformed into a third place. The translucent roof of LocHal provides adequate illumination for users during the daytime.

***Figure 2.*** *LocHal, Netherlands. A multifunctional shared space building from a building previously used for railway locomotive servicing (source: Archidaily-LocHal).*

### *2.3. The Connotation of Third Places*

The location of third places conveys a sense of belonging to users [3]. According to Rosenbaum, third place users can patronise third places to satisfy needs beyond consumption, such as companionship and emotional support [13]. The UN-Habitat of May 2020 states how shared spaces are crucial in the fight against the COVID-19 pandemic as these shared spaces can help individuals from feeling isolated, which can, in turn, promote resilience [1].

This study takes the typical industrial buildings that are not part of industrial heritage as the research object, analyses and summarises strategies for their spatial design and transformation into third places. Such buildings exist in the city's central area and have a high land regeneration value in a geographical context. From the perspective of buildings structure, the main structure is well preserved and has the primary conditions for transformation and reuse. Concerning the current building use, most of the old industrial buildings are abandoned or underdeveloped, which does not meet the living needs of urban residents.

### *2.4. The Functional Space Modes of Third Places*

Third places are of different modes [8] [7] and therefore, to classify the common functional spaces in third places, influencing factors related to the topic are analysed and summarised according to the technical route shown in figure 3. The technical route shows (in figure 3) the process of first formulating the object, screening the sample results using selection principles, and finally determining and summarising the influencing factors.

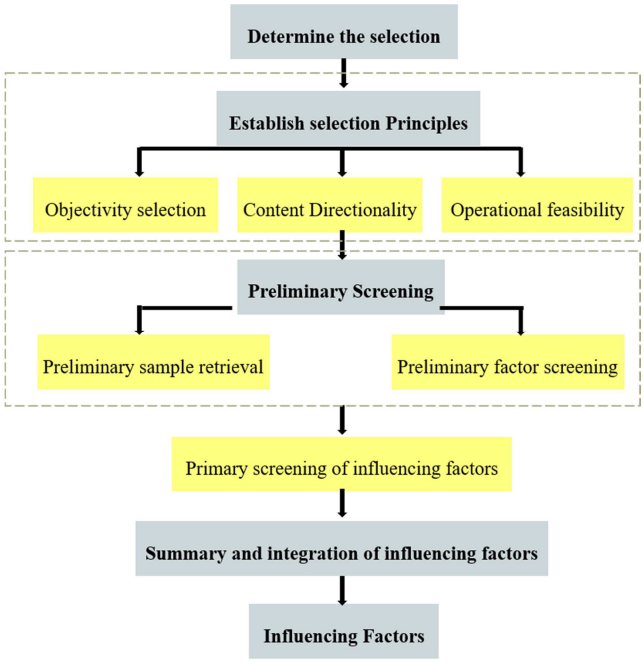



***Figure 3.*** *A technical route for screening of influencing factors (Source: Authors).*

#### *2.4.1. Preliminary Retrieval of Influencing Factors*

Selecting Google scholar as the search engine for retrieving results, the keywords used for the search are; "reuse of industrial buildings", "Reuse of industrial heritage", "Architectural Third places," and "Open public spaces" for papers ranging from 2000 until now. The results from the search are sorted, with a total of 314 related papers obtained for further screening.

#### *2.4.2. Preliminary Screening of Literature*

After screening the literature obtained from the search, 25 papers related to the reuse of industrial buildings and third places, 231 influencing factors are analysed and summarised from the related work. The classifications of related literature are design principles (comfort/safety), design contents (site planning, green landscape design), space environment (entrance, vehicle parking space) and behavioural activities (viewing, walking, leisure, shopping).

#### *2.4.3. Integrated Summary of Influencing Factors*

The concepts of reuse of industrial buildings and third places, combined with the preliminary screening factors, were further improved and summarised. The factors that were repeated or ambiguous in expression were merged or discarded. Finally, as shown in Table 2, a total of 19 influencing factors were obtained.

***Table 2.*** *Classification of third-place functional space modes and influencing factors (Source: Authors).*

| Classification | Influencing Factors |
|---|---|
| Site | 1. Site Accessibility<br>2. Spatial function<br>3. Site traffic organisation |
| Ecological Space | 1. Green area<br>2. Plant orientation<br>3. Plant functions |
| Activity Space | 1. Private space<br>2. Open space<br>3. Seating layout<br>4. Multifunctional space |
| Service Space | 1. Facilities<br>2. Toilets<br>3. Catering<br>4. Storage |
| Traffic Space | 1. Vertical/horizontal movement<br>2. Disabled access |
| Transitional Space | 1. Outdoor seating<br>2. Grey Space<br>3. Entrance/exit |

### *2.5. The Relationship Between Industrial Buildings and Third Places*

Industrial buildings can be transformed into third places due to similarities in spatial form, social needs for third places, and sustainable urban development.

#### *2.5.1. Similarities in Spatial Form*

Industrial buildings and third places have a mutual spatial relationship with one another. Old industrial buildings were initially constructed to cater to the mass production of goods and their storage. In addition, industrial buildings have large open spaces supported by robust structures [14]. Concealed works such as electrical lines, water supply, and drainage were

also designed according to industrial operational standards. The regular and orderly spatial structure and concise architectural design leave room for innovative transformation into third places of unique form, with changeable space full of interest. The old industrial buildings can meet the needs of third places since the two agree in spatial form.

#### *2.5.2. Social Needs for Third Places*

The COVID-19 pandemic has increased the need for shared spaces open to the public [1]. The study done by Cabras and Mount showed that in Ireland, there is a need for third places to help promote community cohesion and contribute to the social and economic wellbeing of the society [15]. A transformation project of an industrial building into a third-place can significantly benefit the surrounding residential areas with an alternative space for pursuing social interaction and other third-place uses.

#### *2.5.3. Sustainable Urban Development*

Environmental conservation has become a significant concern globally, and more attention is being paid to developing cities using eco-friendly methods. The transformation of industrial buildings should be considered as a sustainable method of developing cities [16]. This method of transforming industrial buildings to meet different functional needs conserves the buildings` embodied energy and reduces waste compared to demolishing and building anew [17].

## 3. Transformation Strategies for the Reuse of Industrial Buildings into Third Places

### *3.1. Transformation of Site Space*

The industrial buildings' site area needs attention to be transformed into space that supports a more humane or casual experience [18]. Much attention should be given to site transformation since industrial sites have a large and plain scale. In transforming industrial buildings into third places, the site space must be redesigned into a more human-oriented and intimate scale. The transformation of site space can be achieved by reorganising the traffic space and reusing the industrial equipment on the site.

#### *3.1.1. Reorganisation of Traffic Space*

The traffic around the industrial buildings is essential in connecting the industrial building to the city and helps manage the smooth flow of vehicles and pedestrians. Increasing the separation of pedestrian traffic and vehicle traffic can reduce the severity of accidents between pedestrians and vehicles. This can be achieved by using blocks to prevent vehicle access into spaces designated as human activity spaces. Adequate parking spaces are essential as they can reduce congestion and make visiting the space more convenient. In Beijing, an old factory building was converted into the Beijing Fashion factory. The factory was converted into shared spaces that promote innovation and are also used as coworking spaces. Figure 4 shows a pedestrian pavement on the Beijing Fashion Factory site. The site space consists of separated pedestrian and vehicle traffic spaces. Designated parking spaces are also provided to on the site.


***Figure 4.*** *Pedestrian pavement on the Beijing Fashion factory (Source: www.archdaily.com/949265/).*

#### *3.1.2. Reuse of Industrial Equipment*

The abandoned mechanical equipment from the old industrial function can be reused as architectural sketches. The old industrial equipment can be left untouched or combined with outdoor seats or other site facilities. Using the left-over industrial equipment can help give character to the site. New architectural decorations such as sculptors can also be installed on the site to promote coherence. Figure 5 shows old industrial equipment that acts to decorate the new function with industrial characteristics.

***Figure 5.*** *Industrial equipment used from and an abandoned Railway (source: Local culture on the reuse of old industrial buildings in an industrial area).*

### *3.2. Transformation of Ecological Space*

Pollution in the previous ecological spaces of old industrial buildings is inevitable, and the pollutants vary depending on the previous industrial use. Decontamination solutions depend on the site contaminants present in the soil and surrounding vegetation. Two transformation strategies can be used during

the reuse of the ecological space of an old industrial building:

#### *3.2.1. Using Vegetation and Water Bodies*

The use of vegetation and water bodies around the building alleviates the negative feelings of the space. Attention should be paid to the planting location and combinations with other vegetation [19]. Trees can be used to provide shade to the users. When reusing the ecological spaces of old industrial buildings, providing a seat under a tree will act as a rest space with shade.

#### *3.2.2. Installation of Interactive Technology*

The ecological space can be transformed to be more interactive through the installation of interactive behaviour technology such as delay fountains and exercise equipment.

### *3.3. Transformation of Spatial Form*

The spatial form of industrial buildings is generally large and requires space division and merging strategies to suit different functional spaces. The division of spaces is categorised into horizontal and vertical directions.

#### *3.3.1. Horizontal Direction*

#### *(i). Division of Space*

Horizontal division of space is a process of horizontally dividing the internal space by introducing vertical partition elements such as glass, plants, flexible partition, and traffic space to meet the new third place function (Figure 6). The ample open space of an industrial building can is divisible into different smaller spaces that can serve different functions or spaces that can complement the primary function.

***Figure 6.*** *The Horizontal division of space (source: authors).*

#### *(ii). Merging of Horizontal Space*

This strategy is when independent spaces are combined to create a larger space that can accommodate a joint function. As shown in Figure 7, the non-load bearing walls can be removed to form a more extensive functional space. This strategy employs the destruction of non -load-bearing walls in order to create a larger interior space.

***Figure 7.*** *Merging of horizontal Space (source: authors).*

#### *(iii). Embedding Independent Spaces*

Embedding independent spaces refers to installing new independent spaces into the interior of the old industrial building (Figure 8 and Figure 11). The installation of spaces maintains the characteristics of the original industrial building and bring a new experience into the building. The newly embedded block can be of a different structural and architectural form compared to the old industrial building but should be of sufficient installation size in the horizontal direction.

***Figure 8.*** *Embedding independent spaces (Source: Authors).*

#### *3.3.2. Vertical Direction*

#### *(i). Vertical Division*

Vertical division of space introduces horizontal elements to vertically separate an ample space into different floors that can be used for space functions, as illustrated in Figure 9. In third places, the introduction of vertical elements creates activity stage spaces and balconies for traffic and viewing and increases the user carrying capacity.

***Figure 9.*** *Vertical division of building space (Source: Authors).*

#### *(ii). Merging of Vertical Spaces*

Merging vertical spaces refers to the removal of upper floors in order to create a wider vertical height (Figure 10). This method is usually used in a multi-storey industrial building to create a more comprehensive view range and, in some cases, for third place to allow terraced seating space for viewers.

***Figure 10.*** *Merging vertical space (Source: Authors).*

### *3.4. Strategies for Activity Space*

In the design of activity spaces, special attention should be paid to the lighting and colour of the activity space. According to Yu, black and white and high chroma colours give a sense of tension; on the other hand, grey and low chroma colours give comfort [20]. Natural lighting in an activity space is an advantage, and artificial lighting can be a good supplement. Activity spaces can be divided into open activity space and private activity space:

#### *3.4.1. Private Spaces*

In the design of private spaces, they should be independent of other functions and supported by good noise insulation to discourage interference.

In the design of private spaces, one or a combination of transparent partitioning, semi-partitioning, or foldable partitioning can be used to meet different user activities and groups. However, these types of partitioning have reduced noise insulation, increasing the chances of disturbance. In open spaces, partial portioning can be used to create more personal/ study areas. Figure 11 shows the Tingtai Teahouse, a transformation project that used the strategy of embedding independent spaces into an old factory building to create private spaces for users.

***Figure 11.*** *Private spaces in the Tingtai teahouse (Source: www.marcobeolchi.com/2019/02/03/).*

#### *3.4.2. Open Spaces*

The design of open activity spaces should be in a manner that is easily accessible and encourages interaction between users. The seating arrangement is not designed to be fixed to allow multifunctional use [12]. Seating layout for third places can be divided into 'dot', 'linear' and 'plane';

(i) 'Dot' layout covers a small area and is suitable for temporary activities. The type of space layout can be used in spaces with high traffic accessibility and can sometimes activate dead spaces, improving space utilisation.

(ii) 'Linear' layout is arranged in the form of a line. This type of layout can be combined with internal traffic. It is highly accessible and is adaptable for different user activities. This layout can, however, be disturbed by the flow of people.

(iii) 'Plane' layout is a seating space that is surrounded by other functional spaces. This space usually covers a larger area and has a clear direction of space. The 'plane' layout is more suitable for a relaxed and comfortable collaboration environment than the aforementioned seating layouts.

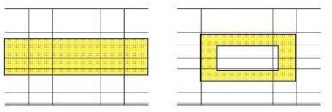
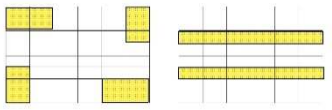
### *3.5. Service Space Design*

Service spaces are areas that have a clear functional orientation. These spaces focus on the functionality of the internal environment with examples such as storage, toilets, catering space, retail and exhibition space. In the design of service spaces, it is essential to pay attention to the space environment to stimulate productivity, encourage users to stay longer, and promote communication activities. The service areas such as toilets should be provided separately for men, women and disabled people. Storage spaces should be designed with generosity for any main use activity such as seating and sports. Particular attention should be paid to the lighting type in exhibition spaces as natural lighting destroys some exhibits. Artificial lighting must be used with caution to avoid sudden changes in brightness or extreme brightness in the field of view.

### *3.6. Traffic Space Design*

The traffic design spaces should be clear of obstruction, be wide enough to avoid congestion, and effectively direct people to a gathering place or dispersing them. The use of signs in traffic spaces can help with directions and access information for evacuation purposes. In general, after the spatial form of the building is determined, next is the traffic space, as it is an important part that works together with the spatial function. The design of staircases and corridors is done in strict stipulation by the evacuation regulations and building codes. Internal traffic spaces are categorised into centralised and scattered traffic layouts, as illustrated in Table 3.

***Table 3.*** *Classification of Internal traffic space (Source: Authors).*

| Traffic layout | Characteristics | Illustration |
|---|---|---|
| Centralised | Traffic Space is centrally arranged to save space and facilitates the formation of communication space |  |
| Scattered | Used when the building plane is too large, and the use of a centralised layout is not effective and may waste space |  |

#### *3.6.1. Centralised Layout*

The centralised layout is characterised by internal traffic organised in the central core of the building's functional spaces. This method saves space and promotes gathering and communication. In small industrial buildings, this can be arranged to one side to form a corridor.

#### *3.6.2. Scattered Layout*

The scattered layout is characterised by randomly organised traffic space to meet the evacuation requirements of large-scale industrial buildings. In some cases, having centralised traffic can occupy more space and therefore favouring scattered traffic space.

### *3.7. Transitional Space Design*

Transitional space is the space that acts as the connection between the interior and exterior of the building. The transitional space is also widely known as grey space. This space integrates the exterior and interior by introducing the exterior into the interior. The design of transitional space should combine the physical components of the space with the behavioural consciousness, extending the interior space outward and finding a balance between the interior and the exterior. In the design process, remarkable attention should be paid to detail, the selection of materials, the selection of colours, and the shaping of the space.

A series of physical facilities can be set up at the entrance so that users can feel safe and encourage social interaction while maintaining a certain degree of privacy. In small-scale projects, transitional spaces can be developed through the porch, terrace, green plants, or seating in the front of the building. Shown in figure 12 is Ghirardelli square plaza, a transformation project from a chocolate factory into a multifunctional space with transitional space being used as seating space.


***Figure 12.*** *Transitional space used as seating space, Ghirardelli square plaza (Source: /www.hok.com/projects/view/ghirardelli-square-plaza/).*

### *3.8. Structural Space Design*

Due to obsolescence, industrial building buildings may build up complex structural problems. Therefore, it is necessary to comprehensively analyse and evaluate the structural system for an old building being considered for reuse to find a strategy that best fits the transformation. Strategies for the structural transformation can be classified into the retention of structural system, reinforcement of structural system and implantation of a new structure.

#### *3.8.1. Retention of Structural System*

Industrial buildings have a long lifespan, and in some cases, the building can still support the new function without any alterations to the original structure. Retaining the old industrial building's structure can save resources and also maintain the industrial characteristics of the building to a higher degree.

#### *3.8.2. Reinforcement of Structural System*

After evaluating the building's structure and the structural system as degraded, there is a need to intervene and meet safety requirements for the new third place function. This intervention can be done through reinforcement of the weak structural members. There are various methods of reinforcing different structural members, including cement grouting, polymer jacketing, increasing the cross-sectional dimension of members and plate bonding. All these have different advantages and disadvantages of implementation for designers to choose from.

#### *3.8.3. Implantation of a New Structure*

When the structure of the industrial building has been under significant wear and tear, and the structural stability cannot be determined, the only option would be to implant a new structural system to aid the existing structure. The new structure installations can be of the same materials or different from the original building. The materials commonly used to build a new structure are wood and brick, reinforced concrete, and steel. In Figure 13 below, in Zhejiang village, Jinxi, an old industrial brick kiln was transformed to cater to the surrounding community's social needs. The old building was originally made of brick, and to strengthen the overall structure, a steel structure was installed in the interior and steel stairs were installed on the exterior.

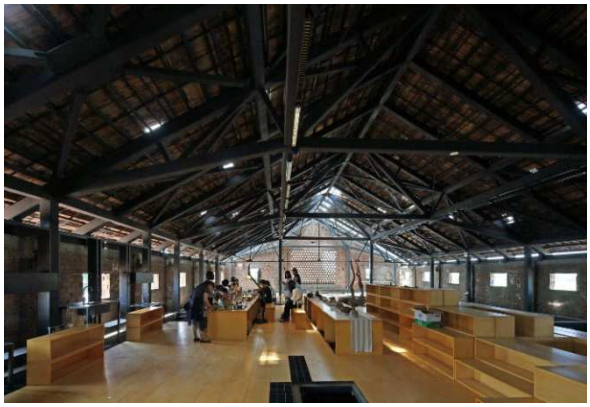


***Figure 13.*** *Implantation of a new structure in a reuse project, Jinxi (source: www.archdaily.com/886538/zhujiadian-brick-kiln-museum).*

### *3.9. Transformation of Building Façade*

As previously discussed, the industrial buildings mentioned in this paper do not have prominent historical, cultural and aesthetic characteristics, allowing architects freedom of creativity to transform the original façade. The transformation of the external image of such industrial buildings is divided into two;

#### *3.9.1. Original Facade Features Are Maintained*

The external image of the building ultimately retains the original features or part of the original features. This method of transformation adopts modern methods, which form a sharp contrast with the original external image. Figure 14 below shows a reuse project of an old industrial building in the 798 Beijing 798 Zone. The history of the building cannot be traced back, and part of the façade was demolished to make way for new, more extensive glazing that improves permeability.

***Figure 14.*** *An old industrial building with part of the façade was demolished to install more extensive windows (Source: www.archdaily.com/921532/voyage-coffee-798).*

#### *3.9.2. Altered Original Façade Features*

This method applies to reconstruction without considering industrial buildings' historical and cultural value rather than the economic benefits. Figure 13 shows an old industrial building located in the 798 zone in Beijing. The original façade of the factory building was demolished to install more extensive-sized windows that promote permeability. The external image of the building completely abandons the building's original characteristics, giving maximum use and redesign of the building to the designers.

## 4. Conclusion

The adaptive reuse of industrial buildings into third places is a method that conserves industrial buildings from the threat of demolition. This paper investigated the reuse of industrial buildings interior, exterior and site space into functions that suit the new uses of third place. This research is essential in the sustainable urban development of spaces that promote social interaction in communities surrounding vacant industrial buildings.

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