

# The Preservation of Industrial Heritage as a Form of Urban Resilience.

## The Case Studies of Ile-de-Nantes and Docks-de-Seine

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The paper questions the meaning of preservation of industrial remnants in former industrial cities which are characterized, especially after their deindustrialization, by urban regeneration programs. Isolated buildings as factories and abandoned infrastructure and equipment dated on the industrial era are often demolished in favor of contemporary buildings which seem to better correspond to users' needs and contemporary aesthetics. The two French case studies reported in the paper are considered as exemplary models of architectural and urban design forms in former industrial cities as they allow the dialogue between buildings, equipment, and infrastructure of different eras (industrial, contemporary). On the one hand we have the reconversion project Ile-de-Nantes, a brownfield within the former industrial city of Nantes, a city with a significant industrial heritage. On the other hand, we have the reconversion project Docks-de-Seine, a brownfield located in the city of Saint-Ouen in the outskirts of Paris. The study and comparison of the two case studies revealed the risk of gentrification in former industrial cities as their working-class identity changes due to the design of buildings by star architects, resulting in the arrival of executives and the rejection towards the cities' periphery of the modest socio-professional categories.

231

## Introduction

After deindustrialization, former industrial cities are characterised by the presence on their urban fabric, remnants of their industrial past such as buildings, infrastructure and equipment reflecting industrial activities of previous decades. The question of reintegration of these elements to the urban fabric and the social-economic and environmental reactivation of the deindustrialized sites is primarily based on urban regeneration programs (D'Arienzo 2017). These programs usually involve the conservation of industrial buildings as a measure of preservation of local history and collective memory of the living and working conditions of former industrial workers (Corboz 2011). At the same time, in several cases of urban regeneration programs in deindustrialized cities, we observe conflicts of interest between the procedures of heritage making and neoliberal urban development practices in architecture and urban design, which lead to the demolition of infrastructure and equipment dated on the industrial era and the consequent construction of contemporary buildings by “starchitects”, likely to better correspond to users’ needs and contemporary aesthetics (Luxembourg 2014).  
© The decision to preserve or not the places of industrial production is not neutral, according to French researcher Vincent Veschambre (2008) and it depends on the decisions, made by municipalities of deindustrialized cities and project managers of urban regeneration projects, about how architectural and urban design is supposed to face the consequences of deindustrialization, its social and economic decline (Cowie & Heathcott 2003).

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I wouldn't say that the neoliberal development is, tout court, opposite to the refurbishment of older buildings: there are plenty of cases in which the two things go together. I would say that the difference is the eventual occurrence of gentrification processes (see Guironnet & Halbert 2023).

### VARVARA TOURA

There are many different perceptions related to the preservation of the industrial past. Even in cases of gentrification of former industrial areas we can see that many industrial buildings were preserved and restored. It is true that gentrification is the result of different factors (economic, political, urban planning) as well as the decision of different actors and it has primarily to do with urban development policies. But we should underline that the demolition of buildings dated on the industrial era (factories and social housing) increases the possibility of gentrification as groups of people as the industrial workers have to move to other areas where the housing prices are lower. At the same time the construction of office buildings in former industrial areas leads inevitably to the displacement of people with high incomes (CEOs for example) and makes the processes of gentrification even faster.

The question of preservation of industrial heritage and its reintegration to the urban fabric is based on the principle of conservation of historical urban forms as well as a reminiscence of the social character of the architectural design of the buildings of these areas, especially of the industrial workers' houses (Choay 2010). In France, Reichen & Robert Associés proposes new forms and uses for old industrial buildings, such as industrial museums and houses, based on the principles of circular economy (recycle of buildings) and preservation of urban heritage (Reichen & Robert 1989). In Great Britain, the urban fabric of former industrial cities that were highly urbanized such as Liverpool and Manchester retained its centralities from the industrial era as a result of the strategic relay points of trade routes (Bergeron 2012). Even though the media highlight the clash between different values and meanings (on one hand, the conservation of no longer existing cities' past and, on the other, the cities' future, based on new forms of architecture and economic activities), we must underline that there are different approaches in the content of urban regeneration/renewal programs: in fact, decision-makers (local elected officials, developers, urban planners, architects) choose either to restore and reuse old industrial buildings or to demolish them in order to transform the urban landscape (Fache 2006).

The concept of industrial heritage is changing with the emergence of Critical Heritage Studies, which consider the conservation of industrial heritage as an evolutionary process that responds to the needs of contemporary societies in terms of sustainable development, economy, or culture (Morisset 2018). This means that the appearance, since the 1980s, of preoccupations at international level about social, economic, and environmental sustainability of cities created new challenges for the preservation of industrial heritage, as industrial buildings can be restored and reused in order to have a second life, for example as housing units and cultural spaces (Guérard, S, 2004). We must also underline the fact that many reconversion projects of industrial brownfields contributed to boost social actions and environmental responsibility in architecture and urban design (Blanc 2015) such as the urban project Ile-de-Nantes, presented later in the article.

In this context, the principal hypothesis of the article is to consider that the preservation of architectural and urban design forms in former industrial areas can contribute to their urban resilience and to the conservation of essential meanings in architecture and urban design. Through a critical examination of the procedures of preservation of industrial heritage in programs of urban regeneration in deindustrialized cities, which are often characterized by neoliberal practices, the objective of the article is to question the policies and tools which seem to lead to urban resilience of deindustrialized territories. At the same time the article will investigate the ways in which a balance in city planning could be achieved between the construction of new contemporary buildings and the conservation and reuse of industrial buildings. In order to respond to the main hypothesis of the article we will use data (interviews, socio-economic elements) collected from two programs of industrial reconversion in France which highlight the context of preservation of industrial heritage and the risks of gentrification.

## Two case studies

The two case studies of the paper are considered as exemplary models of architectural and urban design forms in former industrial cities, as they allow the dialogue between buildings, equipment, and infrastructure of different eras (industrial, contemporary). On the one hand we have the reconversion project Ile-de-Nantes, a brownfield within the former industrial city of Nantes at the west of France, a city with a significant industrial heritage [FIG. 1]. The project functions as a vector for the development of new architectural forms in public buildings (e.g. the local courthouse) [FIG. 2]. On the other hand, we have the reconversion project Docks-de-Seine, a brownfield located in the city of Saint-Ouen in the north suburbs of Paris, a city characterized in the last 20 years by its urban transformations (spatial, economic, social), in which industrial activities have never ceased to exist [FIG. 3]. The project functions (as the first case study in Nantes) as a vector for the development of new architectural forms in office buildings (e.g., the buildings of Alstom) [FIG. 4].

The study and comparison of the two case studies reveal the risk of gentrification in former industrial cities and the swift to different values and meanings in architecture, now closer to a more productive dimension due to the design of public and commercial buildings by starchitects, the limited number of social housing units and the uses of the former industrial buildings. The results of this trend are the arrival of executives in de-industrialized areas and the rejection towards the cities' periphery of the modest socio-professional categories [TAB. 1, 2].

234

Categories	2009	2014
TOTAL	165.840	178.471
Craftsmen, tradesmen, businessmen	6.778	8.208
Senior managers and professional occupations	39.726	46.379
Intermediate professions	49.798	54.931
Employees	48.162	47.849
Industrial workers	21.376	20.457

[TAB. 1] Number of working positions in Nantes, INSEE and City of Nantes (2018). It is interesting to compare the numbers of senior managers and intermediate professions to the number of industrial workers, in order to understand the shift to a different economic model.

Categories	2009	2014
TOTAL	34.466	36.060
Craftsmen, tradesmen, businessmen	1.912	1.969
Senior managers and professional occupations	11.353	13.489
Intermediate professions	8.829	8.623
Employees	6.801	6.807
Industrial workers	5.571	5.115

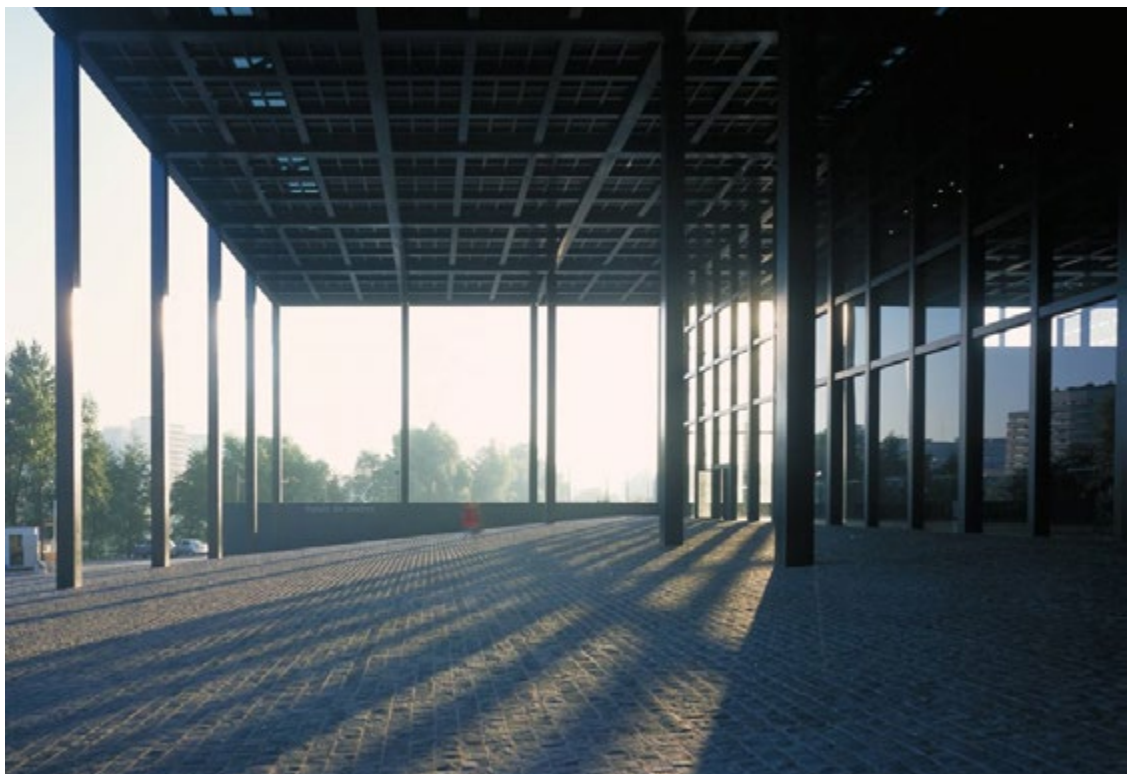
[TAB. 2] Number of working positions in Saint-Ouen, INSEE and City of Saint-Ouen (2018). It is interesting to compare the numbers of senior managers and intermediate professions to the number of industrial workers, in order to understand the swift to a different economic model.



[FIG. 1] *The industrial museum of Nantes*, ©Varvara Toura, 2023. Buildings of the former industrial site of naval construction Dubigeon, located in the site of Ile-de-Nantes, are preserved, and transformed in exhibition spaces and located close to contemporary buildings.

235

[FIG. 2] *The local courthouse of Nantes*, ©atelier Jean Nouvel. The courthouse is designed by French star architect Jean Nouvel and it is located in the site of Ile-de-Nantes near classified urban monuments as is the Embassy of Turkey.





[FIG. 3] *The factory CPCU in Saint-Ouen*, ©Varvara Toura, 2023. The factory CPCU of the Parisian company of urban heating is located in the site of Docks-de-Seine near new residential buildings and shows the continuous presence of industrial activities in the area.

236



[FIG. 4] *The Alstom building in Saint-Ouen*, ©Pocelingo, [https://upload.wikimedia.org/wikipedia/commons/e/e6/Alstom\\_siege\\_social.jpg](https://upload.wikimedia.org/wikipedia/commons/e/e6/Alstom_siege_social.jpg). The workplace of the French enterprise Alstom, located in the site of Docks-de-Seine near residential buildings and a pedestrian passageway, marks the new identity of the area as a business cluster.

## — The Ile-de-Nantes project: reactivate and reintegrate to the urban fabric the former industrial site

In 1987, the Bougainville was the last ship constructed in the shipyards located at the west of the industrial site of Ile-de-Nantes. After a prosperous industrial era, only brownfields remain on this site. The future of the territory was part of the debates during the municipal elections in Nantes in 1989. In his speech in March 1989, after his election, the newly city mayor and member of the French Socialist Party Jean-Marc Ayrault declared that he will give a radiant image to the 7th city of France and that the city will find its role as a big European Metropolis of tomorrow [1].

During the 1990s, the team led by Jean-Marc Ayrault launched a period of reflections on the future of the site which embodies both the preservation of its industrial past and the solving of social problems linked to the closure of shipyards, as well as the possibility of reactivation and regeneration of the site. The idea of transformation of the entire territory, uniting its three parts in a dynamic way, emerges. The desire of the municipal team for an extension of the historic center of Nantes towards the site of Ile-de-Nantes is shown by the proposal of the city to the French government in 1996 to construct on the site the new City Courthouse. To formulate the project the Municipality launched a competition in 1998.

The Atelier de l'Ile-de-Nantes, a team of architects, urban planners and landscape architects led by the architectural studio of Alexandre Chemetoff, was the first to be selected in order to implement the strategy and political ambitions of the municipal team. The first phase of studies, which lasted ten years (2000-2010), resulted in the desire to reconsider the island as a whole and to define an urban regeneration project adapted to the new economic, environmental, and social challenges without denying the local urban history that has shaped its territory [2]. In this context several industrial buildings were preserved especially on the site of the former shipyards and were reused as museums and exposition spaces [FIG. 5].

In 2003, Nantes Métropole entrusted SAMOA (Society of Planning of the West Atlantic Metropolitan Area) to manage the project. It is within the framework of a public development agreement, that its mission as a project manager is established for a period of 30 years. The project of Ile-de-Nantes is based on three axes: a) to build a new metropolitan center at the heart of the historical part of the city of Nantes, b) to restore its urban heritage and to create new public spaces and c) to build a mixed-use city for all its inhabitants despite their ethnic origin [3].

During the first operational phase of the project, we can see that the vision of the municipal team and the team of Atelier de l'Ile-de-Nantes was to propose an urban regeneration project whose principles would be in line with the goals of sustainable development (economic, environmental, and social challenges). However, this notion was not used in the speeches of project managers and local elected officials. The Guide Plan (Plan Guide), a design method proposed by the team of Alexandre Chemetoff for the urban regeneration

[1] French National Audiovisual Archives (INA). Accessed in November 2023 (Jean-Marc Ayrault maire de Nantes - Auran Nantes (ina.fr)).

[2] Interview in May 2019 with members of the architectural studio of Alexandre Chemetoff.

[3] Interview in May 2020 with members of Nantes Métropole, urban planning department.

project of Ile-de-Nantes, makes possible – at least according to the designers – to study the historical eras in the architectural forms and make a projection of their evolution in the future. The method of the team of Alexander Chemetoff is based on a reconfiguration of the site's public spaces, which are seen as fundamental elements of the landscape and contribute to the reintegration to the urban fabric of the former industrial buildings. The Guide Plan expresses the desire of the project management team to restore the link between the past and the future of the territory in order to offer an attractive living environment.

During the ten years of project management by the team of Alexander Chemetoff we can see his vision for the regeneration of the site through small-scale urban projects concerning the site's public spaces and buildings. These include: the Schoelcher footbridge built in 2001, a pedestrian bridge that connects the historical center of Nantes to the site, the Boulevard De Gaulle built in 2007 that connects the north and south part of the site and the Quai des Antilles built in 2007 which echoes the industrial and port memory of Ile-de-Nantes [FIG. 6]. We should note the will of the Municipality of Nantes and the team of project management to create an urban project whose design is linked to territorial experiments. In fact, the Guide Plan provides broad guidelines for the development of the urban regeneration project which allow the preservation of the industrial heritage in the redevelopment of the different site sectors.

The turning point towards more neoliberal practices in architectural and urban design forms is the construction on the site of Ile-de-Nantes in 2008 of the Beaulieu Commercial Center and Nantes School of Architecture in 2009, which will give a new vision for the resilience of the site based on cultural and commercial activities [FIG. 7, 8]. The later construction of the University hospital center of Nantes on the site of Ile-de-Nantes is based on the same principle, which underlines the importance of big infrastructure and equipment in order to achieve urban resilience. Besides this vision towards a productive dimension in architectural and urban design we must underline the risk of gentrification as we have seen previously in the Table 1 which shows a swift towards tertiary activities.

In July 2010, a new phase began for the Ile-de-Nantes project. For a period of 7 years (2010-2017), the project management will be led by the team of architects and urban planners Marcel Smets and Anne-Mie Depuydt. The liberation of the industrial spaces in the south-west of the site and the creation of the Nantes/Saint Nazaire ecocity, determine the new approach to the development of the project. The Transformations Plan (*Plan des transformations*), a new design method developed by the team Smets and Depuydt, is based on the study of the landscape relief as a strategy for the regeneration of the site. It is a transformative design process for the development of the site until 2030, which analyses the territory like a set of plaques whose architectural and urban structure is intimately linked to their geological structure and landscape [4].

The restoration of the connection between the territory and its industrial past through the redevelopment of the quays and banks, which was part of the strategy of the Chemetoff team, is pursued during the project management of Smets and Depuydt. During this phase of the project the banks of the Loire River are

[4] Interview in June 2021 with members of the architectural studio of Smets and Depuydt.





[FIG. 5] *Reconversion of industrial buildings into exhibition spaces*, ©Varvara Toura, 2023. Former office buildings and warehouses of the industrial era located in the Ile-de-Nantes site are restored and reused as museums and exhibition spaces.

[FIG. 6] *The Quai des Antilles in Nantes*, ©Varvara Toura, 2023. The redesign of the west part of the site of Ile-de-Nantes led to the creation of a cultural and tourist zone on the former shipyards which includes the reuse of elements of the industrial past.





[FIG. 7] *The School of Architecture of Nantes*, ©Lacation and Vassal.

240

[FIG. 8] *The surrounding public space of the School of Architecture of Nantes*, ©Varvara Toura, 2023. The construction of the city's School of Architecture on the site of Ile-de-Nantes is part of the strategy of the municipal team to attract students and thus lead to the economic development of the deindustrialized territory.



transformed into places for walking and leisure. The study of site's landscape relief is also based on other founding elements of the site's urban history, such as the railway infrastructure, which is integrated into the site's regeneration project in order to play a new role.

In this second operational period of the project, we can see the will of the management team and the Municipality of Nantes to continue the redevelopment processes begun by the previous management team. On the other hand, it should be noted the different policies for the preservation of industrial heritage during this phase of the project, which are now not based on the rehabilitation of the industrial buildings of the site but on the inscription of traces of the industrial past in a system of parks that unite the various neighbourhoods of the site. In addition, it can be noted that the Transformations Plan is an operational document that provides broad guidelines for the development of the project, as was done previously by the Guide Plan of the team Chemetoff. We can therefore see a local urban planning approach (*urbanisme à la nantaise*) that highlights territorial experiments in architectural and urban design which allows a balance in city planning through the construction of new contemporary buildings and the conservation and reuse of industrial buildings. However, it should be mentioned that the construction of big infrastructure and equipment on the site such as the University Hospital and the City Courthouse, as well as the creation of neighbourhoods that promote commercial and cultural activities, have modified the social character of the project. The swift to different values and meanings in architecture closer to a more productive dimension is evident and has as results the arrival of executives and entrepreneurs and the increase of rentals and property sale prices.

— The Docks-de-Seine project: reshape and connect to the city an industrial site near Paris

The willing of a group of industrialists to create an outer harbour downstream in Saint-Ouen near the Paris Metropolis has contributed to the economic attractiveness of the city and its surroundings with the arrival of internationally renowned companies and many state-owned enterprises [5]. The departure of the industries gradually changed the face of the district of the Docks-de-Seine. At the beginning of 2000 (departure of Total in 2003 and Alstom in 2004), discussions began at municipal level in order to give new functions to the Docks site while preserving its industrial heritage.

The major challenge for the City of Saint-Ouen as well as for the present industries on the site like SYCTOM (Metropolitan Household Waste Agency), is to give this territory back to the city's citizens through an urban regeneration project of the former industrial areas [6].

This objective was interpreted by the Municipality of Saint-Ouen and the project management team as the need to link the city center of Saint-Ouen to the industrial remnants of the site in order to offer to the Docks new development perspectives. The goal of the Municipality of Saint-Ouen and the developers is to transform the industrial site into a mixed-use

[5] Interview in February 2018 with members of the direction of cultural heritage of the department of Seine-Saint-Denis.

[6] Interview in June 2021 with the Deputy Delegate for General Administration, City Policy, Citizenship, Participatory Democracy and Associative Life of Saint-Ouen.

sustainable neighbourhood, with the reuse of former industrial buildings and the maintenance and development of important metropolitan facilities on the site (energy pole of Saint-Ouen). In 2007, the City of Saint-Ouen commissioned to Séquano Aménagement the management of the urban regeneration project, as part of a concession for the development of the Docks until 2025. The project management team selected is led by Makan Rafatdjou (architect) and is consisted by urban planning and landscape agencies (Agence Reichen & Robert Associés, Olga Tarraso, Hélène Saudecerre, Peria & Pena, Coup d'Eclat, Beri, Ter Agency). The development of the urban regeneration project of the Docks-de-Seine began in 2007 with the creation of the ZAC of the Docks (Urban Development Zone).

The realization of the development project is the result of two factors. On the one hand, the creation of the ZAC, result of a reflection carried out by the Municipality of Saint-Ouen for the transformation of its territory. On the other hand, the announcement of Total in March 2003 of the closure of its factory at the east part of the site of the Docks, resulted in the lifting of the Seveso perimeter (industrial sector with a risk of major accidents) and in the first urban planning projects for the site's redevelopment in 2004 as part of the local PADD (Planning and Sustainable Development Framework). According to the PADD the site of the Docks will be part of an urban regeneration program that includes all city's brownfields while at the same time its urban regeneration program is in line with the Municipality's strategy to preserve and demonstrate its industrial fabric through the rehabilitation and reuse of former industrial buildings [7].

The purchase of 18.8 ha of the site of the Docks by the French real estate group Nexity in March 2004 (initially they belonged to the French enterprise Alstom) shows the differentiation of the project from other sustainable neighbourhoods in France, because in this case we can find a private company among the team of developers of the urban regeneration project. This vision to include private companies in the development of the site is described in the 2008 PLU (Local Urban Planning Plan) as a strategy that aims to attract private investors who in turn will contribute to new forms of architectural and urban design as well as to economic resilience.

The strategy of the Municipality to attract private companies for the funding of the project of the Docks-de-Seine led to a swift from industrial activities to tertiary ones, to the demolition of industrial buildings in order to construct new buildings in the perimeter that belongs to Nexity as well as to a change of the socio-professional status of the city's inhabitants as we have seen in previous part of the paper. The construction of office buildings on the site of the Docks [FIG. 9] is also linked to the previous construction of office buildings to the nearby Victor Hugo neighbourhood in which former industrial buildings were demolished. In the Dhalenne sector, three office buildings developed by Nexity (one of the developers of the urban regeneration project) were acquired by private investors: in July 2007 (Hines), in November 2008 (Generali & Nexity REIM) and in June 2011 (Gecina). The construction of the first two buildings, Kappa and Sigma, was launched with an already present tenant, Alstom. These buildings were built before the creation of the ZAC of the Docks in 2007.

[7] Interview in April 2020 with members of Séquano Aménagement (project management team).

The Dhalenne sector has a special status in the development of the urban regeneration project of the Docks, especially after Nexity acquired 18.8 hectares from the Alstom group. We must mention that the industrial zone has been located since 1917 on the grounds of a former racecourse. The real estate developer Nexity is looking to develop a policy of co-creation of the territory and collaboration in the processes of urban regeneration. Through its role as a contracting authority, it seizes to guarantee opportunities for the group's real estate development subsidiaries and companies [8].

What we should note from Nexity's speech is its ambition to be directly involved in urban regeneration projects, as is the case of the Docks-de-Seine. In this context, Nexity tries to assume the financing of the whole urban regeneration project (buildings, equipment, infrastructure) and become a contracting authority through the purchase of the industrial land. We should also mention the swift to the values and meanings in the architectural design of social housing in an industrial area as the prices of Nexity's housing are

[8] Interview in June 2020 with members of the French real estate developer Nexity.

[FIG. 9] *The building of the Region of Ile-de-France in Saint-Ouen, ©Teachix, [https://upload.wikimedia.org/wikipedia/commons/a/af/Consail\\_R%C3%A9gional\\_d%27%C3%8Ele-de-France%2C\\_%C3%A0\\_Saint-Ouen-sur-Seine\\_1.jpg](https://upload.wikimedia.org/wikipedia/commons/a/af/Consail_R%C3%A9gional_d%27%C3%8Ele-de-France%2C_%C3%A0_Saint-Ouen-sur-Seine_1.jpg). The central building of the Region has relocated on the site of Docks-de-Seine close to the sector of the local Municipal house in order to be near the office buildings of private companies and metro stations.*





[FIG. 10] *The commercial and office building La Halle Alstom in Saint-Ouen, ©Reichen-Robert. The former industrial building of Alstom (warehouse) on the site of Docks-de-Seine is transformed to a commercial and office building in which there is the office of Saguez and Partners, an international interior design studio.*

higher compared to the ones of other companies. A tripartite agreement between the Municipality of Saint-Ouen, Séquano Aménagement and Nexity was concluded in 2009, before being revised in 2012, in order to guarantee the project management of the ZAC of the Docks.

The agreement signed between the Municipality of Saint-Ouen, Séquano Aménagement and Nexity seems to have slowed down the ambitions of Nexity to develop and commercialize the Dhalenne sector and thus profoundly change its working-class character in architectural and urban design forms. However, its involvement in the urban regeneration project of the Docks, following the purchase of land by the Alstom group, attracted several investors interested in tertiary activities and led to the demolition of industrial buildings even though certain buildings such as the Hall Alstom were preserved and restored [FIG. 10]. These activities change the meaning of urban resilience in industrial areas as the social character of the Docks project (a project for all, especially low-income families, and immigrants) is confronted with a productive dimension in architectural design and with the gentrification processes already observed in Saint-Ouen and in other municipalities of the Ile-de-France region.

### Conclusions

The issue of preserving urban heritage, which is often cited by stakeholders as a good practice regarding the subject of urban regeneration of industrial brownfields, has also its contradictions according to the two parameters of preservation of industrial heritage (preservation of the built

heritage, preservation of the social fabric). It is evident from the previous analysis of the context of the two regeneration programs that the working-class character of former industrial districts no longer exists with the arrival of executives in these territories. Despite the replacement of industrial activities by tertiary ones, traces of the industrial past are still present on both sites (we can note the rehabilitation of old industrial buildings in the Ile-de-Nantes project and the continuous presence of industrial activities on the site of Docks-de-Seine). ©

Associations of former industrial workers, researchers and scholars who work on the local industrial heritage, as well as the services of cultural heritage of the two cities studied in the article, manifested against local municipalities and the teams of project management in cases of decisions to demolish industrial buildings and equipment, as they wanted to safeguard the urban fabric around factories. Furthermore, they have succeeded in integrating into the new plans of the districts' traces of their industrial past as is the case of the *Fonderies* district on the site of Ile-de-Nantes. The preservation of industrial heritage of the two sites goes beyond the rehabilitation of certain industrial buildings and also includes the creation of industrial museums, publications, and exhibitions regarding the places of industrial production and the living conditions of former industrial workers, as well as guided tours of industrial monuments. Therefore, it can be seen that the industrial heritage contributes to the urban resilience of the two cities with the preservation of architectural and urban design forms while at the same time it offers the possibility of a collaborative economy with the direct participation of local communities in the planning processes of their living environments.

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As a side note, I find it strange that, too often, architects seem to be great at renovating industrial sites, thus enhancing their architectural characters; however, they are not as smart in designing new industrial sites. This is particularly revealing of the meaning of the "past" we're speaking of; a romanticised meaning related to the intentionality of memory and its poetic fallacy.

VARVARA TOURA

I think that it has to do with the fact that many architects, especially those who work in the domain of conservation and restoration of historical buildings, are primarily interested in the preservation of the architectural past. They approach architecture in a romanticized way. On the other hand, the specialization that characterises modern societies lead to the perception that the design of industrial sites is more related to the work of urban planners than to those of architects. It is a pity though as the design of these type of places could potentially lead to innovations in the architectural conception as it has already happened in the past at the beginning of industrial revolution.

CARLO DEREGIBUS

So true.

## Discussion

To go further on the subject of urban regeneration of industrial brownfields and their development in a resilient way, we should underline the link between the location of brownfields (inside or on the outskirts of cities), the architectural and urban design forms of the industrial era (factories, small industrial units, social housing, administration offices) and the policies and obstacles for their reconversion. Brownfield sites on the outskirts of large cities are part of urban expansion dynamics in order to respond to the need for new housing that is less expensive to the real estate prices in central districts. Real estate prices in peripheral neighbourhoods have increased over time and have led to a change in the identity of these neighbourhoods, which are no longer working-class neighbourhoods but rather gentrified places. Brownfield sites inside cities centers are part of urban regeneration programs which include the reuse and reconversion of industrial infrastructure and the creation of public spaces on these sites.

These urban regeneration programs often include the construction of new residential buildings whose real estate prices are the same to those in other central city neighbourhoods. The socio-economic identity of central city districts has changed, as has done that of the peripheral districts, with the arrival of executives, which in turn led to the gentrification of working-class neighbourhoods and the rejection of modest socio-professional categories to the periphery of cities. At the same time many industrial buildings were demolished in order to construct new commercial and office buildings. Can we continue to talk about industrial identity and urban resilience in the context of the gentrified city? Policies such as the reuse of industrial buildings as social housing, property prices' controls and equal access to housing could reverse this trend. However, we must ask ourselves under what conditions are such policies possible while maintaining the industrial and popular character of these sites?

The local political and social context plays a major role in making decisions about the content of brownfield conversion programs. All cities do not have the means to take such operations, either because they lack funding or because they are in economic decline. Voluntarism and political stability at local level (we should mention that the reconversion programs last for several years and the continuity of local policies is a strong point for their implementation), the active associative network (both architectural associations and inhabitants and activists) and the favourable financing conditions (public-private partnership, public funds, European Union funds in the case of member countries) make these policies possible and at the same time differentiate them according to the challenges and orientations determined by the different actors. In addition, we should note that a certain number of cities, especially at European level, find the opportunity to finance such operations through the organisation of sport events (for example the Olympic Games in London in 2012 where the Olympic Village was built on an industrial brownfield on the outskirts of the city) or cultural events (such is the case of the European Capital of Culture in which the host city is often a deindustrialized one and industrial buildings are reconverted and reused for cultural activities). We could, therefore, underline the exceptional conditions and means (financing, media coverage) that lead to the realization of this type of operations.



We should also note the confrontation between the concepts and meanings of resilience in architectural and urban design which are usually based on low-cost practices such as the reuse of existing buildings and the cost of large-scale urban regeneration operations which is high as it usually involves the demolition of existing buildings and the construction of new ones. The financing of such projects requires large amounts of capital, at the risk of disadvantaging other municipal policies (health, education, housing). We can see therefore that urban resilience in former industrial cities could be achieved through a balance in city planning that involves the construction of small-scale contemporary buildings and the conservation and reuse of industrial buildings.

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