From abandonment to critical conception: post-growth policies for the resilience of deindustrialised areas. The case-studies of Ile-de-Nantes and Docks-de-Seine in France

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Abstract
The appearance of the notion of sustainable development in the 1980's constituted an important step in the procedures of urban planning as its structuring elements referred to questions like growth and its limits. Considering the inequal development of urban areas in the Global North and Global South, especially places that were left neglected for several years such as deindustrialised areas, the paper tries to explore the ways through which deindustrialised areas could be developed in order to sustain both ecological balance and social equity. The choice of the case studies, the projects Ile-de-Nantes and Docks-de-Seine in France, was based on the necessity to critically think existing growth theories and concepts for the development of deindustrialised areas based on the reduction of their environmental footprint.

Key words: post-growth policies; social and environmental balance; deindustrialised areas; socio-economic inequalities, France

Introduction

The appearance of the notion of sustainable development in the 1980's and the publication of the Brundtland report constituted an important step in the procedures of urban planning of the late 20th century, especially for deindustrialised cities (Devillers, 2010). Its multifaceted nature, result of the diversity of intellectual filiations that preceded it (humanist, economist, ecologist), shows, according to some researchers like Passet, a reconciliation between limitless growth and environmental and social barriers (Passet, 1978). We can distinguish from the origins of this notion its structuring elements such as growth and its limits, conservation and preservation, as well as the place and role of natural and artificial capital in economic development procedures (UN, 1987).

A historical analysis of the issue of sustainable development carried out by Bertrand Zuindeau and Franck-Dominique Vivien in 2001 allows us to reflect on the spatial dimension of sustainable development and its role in transforming urban areas beyond modern policies of urban growth. The two authors distinguish in the intellectual framework of the concept two approaches:

- a global approach that focuses on the interactions between the environment and the economy on a global scale and
- a local approach which insists on the local characteristics (environmental, economic, cultural) for the spatial implementation of sustainable development at the local level (Vivien and Zuindeau, 2001).

It can be underlined, therefore, that even if previous works, particularly from the 1960s and 1970s, such as the Green Paper of European Commission, present a global approach to the concept of sustainable development (EU, 1990), linked to international concerns on the protection of the environment, there is also a local approach addressed particularly in reports on sustainable cities and sustainable neighbourhoods (Aalborg Charter) (EU, 1994).

The question of application of sustainable development policies at territorial level brings out the different apprehensions of space related to urban development (particularly economic). The space can take the form either of a support space, for example a space that facilitates the installation of production activities in a given territory (for example low taxes), or of a space - resource, that is to say a space that attracts the installation of production activities thanks to its natural and artificial resources (Bastié and Dézert, 1980).

It should be emphasised that there are no general rules that can function as key formulas for the implementation of sustainable development at territorial level. On the contrary, in studies of the application of sustainable development policies at territorial level, several researchers note that there are difficulties and limits in generalising local approaches and results issued from local experiences (Godard,1996). In addition, we can note that the local dimension of sustainable development, especially in small scale projects at neighbourhood level,

consists rather of a tool mobilised by local actors in order to promote mutual learning, with the collaboration of inhabitants, technicians and local elected officials for the planning of sustainable neighbourhoods.

The principles of sustainable development policies are often quite vague, particularly with regard to the simultaneous implementation of the global issues set out at the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro, as these principles do not articulate with the reality of the territories (Theys, 2000). Today there are very few approaches that allow the operational implementation of the goals of sustainable development as they appeared in Agenda 21. The one that can be noted is that of the environmental footprint. This concept makes it possible to show the capacities of ecosystems to resist the pressures of human activities (Matuštík, Kočí, 2021). It mostly refers to the environmental dimension of sustainable development. However, it can be an important tool for analysing the limits of modern modes of urban growth as cities expand towards their surrounding areas and exploit their natural resources (Valderrama and al, 2024).

The difficulty of defining priorities by local authorities on the implementation of sustainable development policies both at territorial level and in public action shows the dual nature of the concept which refers, as we have already seen, at two scales: global and local (Vivien and Zuindeau, 2001). Cyria Emelianoff and Jacques Theys underline in their analysis for the sustainable city, that a sustainable city must first contribute to the solution of major global problems. This is not only a question of conflict of priorities, but of the profound difficulty in articulating several obviously different representations of territory and political action (Emelianoff and Theys, 2001). We can see that there is a dissociation between the two scales of the concept (global and local) which underlines the importance of the management of the interfaces between the two.

In regard to the subject of the scale of implementation of sustainable development policies, it is important to refer to the work of the French Institute for the Environment which highlights two aspects of the concept:

- What is sustainable on one scale may not be at another
- In problem solving there is no optimal scale in itself, there are only scales that are more useful than others for answering very specific questions (IFEN, 1999).

It is therefore obvious that there is no optimal scale of intervention. On the contrary, we can observe that there are several scales which articulate, and which must be studied in relation to their specificities and their complementarities (Eames and Abedowale, 2002). However, it should be noted that even if the implementation of sustainable development policies at different territorial scales does not allow us to talk about global sustainable development objectives, there are elements in sustainable urban development projects that reinforce the hope of a territorial implementation of sustainable development on a global scale in the future (the exemplarity of sustainable development projects at territorial level, the cooperation between the actors involved in sustainable development urban projects, the awareness of local actors around the notion of sustainable development) (Emelianoff, 2007).

By considering the inequal development of urban areas, especially those that were left neglected for several years such as deindustrialised areas which are characterised by high levels of air, water and soil pollution, the paper tries to answer the question of which ways lead to the sustainable development of deindustrialised areas in order to sustain both ecological balance and social equity. Issues related to the implementation of sustainable development policies at territorial level, the actors involved in these procedures, the different levels of decision making as well as the complementarity of these policies (at regional, municipal and neighbourhood level) are among the key points for the development of urban areas that were left neglected for several years. The purpose of the research is to critically question the appearance of new planning policies for deindustrialised areas which are considered innovative and inscribed in the sustainable development framework, such as the creation of sustainable neighbourhoods and participatory design, based on their capacity to foster regenerative relationships between society and the environment. Sustainable neighbourhoods (écoquartiers in the French context) are a form of urban design projects that try to implement environmental policies at territorial level while proposing social housing for the low-income inhabitants and participatory design actions for the involvement of inhabitants in decisions related to the form and functions of their living environments (Hamdan and al, 2021, Ministère de l'aménagement du territoire et de la décentralisation, 2024). However this type of projects seem to be rather ambitious as they are trying to respond to environmental questions that cannot be handled at local

level (for example air and water pollution) (Dessouky and al, 2023) while citizen engagement and participatory design usually refer to experimentations at neighbourhood level and not to the elaboration of concrete solutions that could be applied at different governance levels (regional, municipal) (Allen, Queen, 2018).

Methodology

The research method used was the descriptive-analytic. The descriptive method was used in order to define post-growth policies and tools for the development of deindustrialised areas and relate them to previous studies in areas facing significant socio-economic inequalities. Our main hypothesis is that the development of deindustrialised areas in a sustainable way that focuses on their particular characteristics, internal dynamics and external opportunities should be the basis for the development of such areas which struggle with the effects of deindustrialisation (socio-economic and environmental difficulties) and gentrification due to the interest for their planning by private and public investors. In several cases the former industrial cities have a significant urban past reflected on the architecture of industrial buildings such as factories and houses of industrial workers and the organisation of spaces around industrial units. At the same time, there is still present on these areas their social structure, which dates back to their industrial era, through the form of associations gathering former industrial workers and local inhabitants. These associations are interested in preserving the local character of their areas, both its tangible form (buildings and neighbourhoods) and intangible (inhabitants' relationships, areas for the low- and middle-class households), thus creating the conditions for social sustainability (Katapidi, 2023).

Deindustrialised areas, inside or outside of cities limits, face significant economic and social difficulties due to deindustrialisation, or to the closure of local enterprises, and seem to bear the effects of this negative context as they do not have sufficient funds for their environmental protection and economic development (Schindler and al, 2023). The former industrial lands are heavily polluted and struggle with economic recession. In certain cases, we observe waste in these areas either domestic or resulting from industrial activities whose presence in these areas deteriorates the existing environmental degradation, while contractors, investors and local authorities show a particular interest to build them in order to boost their local economy and those of neighbouring cities who also face social and economic difficulties. In this context the development of deindustrialised areas in a sustainable way that takes into consideration the needs of the local population and proposes economic activities in accordance with the restauration of the natural environment, offers a second life to places that were underdeveloped and neglected for several years due to socio-economic problems. Our hypothesis is that the development of neglected deindustrialised areas in a sustainable way and their subsequent integration into the regional and municipal economic channels fabric is not only a measure towards environmental and economic sustainability and resilience, but it can also serve as a measure to solve social conflicts as underdeveloped deindustrialised areas are places that gather activities of regional and municipal interest such as research hubs, tourism and cultural facilities.

Another point to underline in contemporary practices for the development of deindustrialised areas, related to technological innovations and to the need to reduce cities' environmental footprint, is the planning of these areas according to specific standards (international and national) that seems to give answers to the global dimension of sustainable development such as the reduction of carbon emissions and energy demands for cooling and heating housing units (Power, 2018). Policies such as the design of passive houses, the collection and reuse of grey water in domestic activities and the re-design of polluted former industrial lands as parks are presented as strategies for the creation of sustainable neighbourhoods (Ministère de l'aménagement du territoire et de la décentralisation, 2024). However, it is important to see whether these high-cost policies in areas historically gathering low and middle-class households are acceptable by the local population. Taking this into consideration, our third hypothesis is that the development of deindustrialised areas through the creation of sustainable neighbourhoods could act as a measure for sustainability and resilience, when these areas are developed for all (both for the local population and for new inhabitants), take into consideration the local socio-economic context (thus do not propose high-cost policies) and restore the polluted natural environment in order to bring environmental sustainability.

The analytic method was used in order to identify first the particular socio-economic characteristics of the two case studies, the relationship between the built and the natural environment as well as technical innovations which seem to foster social and environmental balance. At the same time, we took interviews with local actors (inhabitants' associations, former industrial workers associations, environmental associations, researchers, teams of architects and urban planners working on the two sustainable neighbourhood projects, local elected officials) in order to study the implementation of inclusive and equitable territorial policies which aim to foster a circular economy model than a one that exploits ecosystems. In second place based on the findings of the field research we tried to verify our initial hypotheses in order to see which policies lead to the sustainable transformation of deindustrialised areas and take into consideration the local social, economic, environmental and cultural characteristics. The research proposes an experimental approach in order to investigate the policies and tools which potentially could tackle socio-economic inequalities and reshape planning policies in deindustrialised areas. A critical point is to underline policies that seem to align with community needs, especially at neighbourhood level and which could be generalised at the level of the city. This approach (bottom-up) helps to better identify and understand cities' future in a resilient and inclusive way, as it is possible to study whether the goal of growth concerns all inhabitants, including marginalised groups, or is targeted at a limited number of people.

The analysis of the findings of the field research focuses on policies at municipal and regional level such as: 1) the revalorisation and reuse of significant buildings and neighbourhoods dating on the industrial era as a form of reminiscence of the tangible heritage, 2) the creation of community ties through the preservation of intangible heritage and the presence of active inhabitants' associations in the areas, 3) the restauration of the natural resources polluted during the industrial era of the two cities and environmental policies for reducing environmental footprint as well as 4) the development of economic activities in accordance with the local needs in order to boost municipal and regional economy as a means to reduce local unemployment rate and to lead to economic resilience and sustainability.

In our analysis of the policies that lead to the sustainable development of the two former industrial areas we took into consideration existing power dynamics of the two cities (Nantes and Saint-Ouen), their surrounding areas as well as of the regions of Loire-Atlantique and Ile-de-France in which administratively are part the cities of Nantes and Saint-Ouen. It is important to mention that both of the two regions are characterised by their industrial past with industrial activities related to energy production and shipbuilding while their deindustrialisation seems to had a different impact on the two cities as Ile-de-France, where Saint-Ouen is located, is the most developed region at national level (French) and its economy is also based on other activities such as tourism, culture, research and national administration. At the same time the funding of the two redevelopment projects in Nantes and Saint-Ouen (EU funds, public-private partnership) poses challenges regarding their growth urban planning policies as private investors (we can see it in the case study of Saint-Ouen) are more interested in economically profitable activities (office and administration buildings) and avoid taking measures for the good living conditions of the local low-income households such as the construction of social housing. A final point of our analysis is based on the political decisions taken at municipal and regional level on environmental, social and economic issues which are usually related to the political party that is affiliated the majority. While socialist and ecological parties are more interested in questions related to social cohesion and environmental protection, right and liberal parties are interested in the economic development of their areas leading in several cases in the gentrification of these spaces.

The case studies: the sustainable neighbourhood Docks-de-Seine in the city of Saint-Ouen and the industrial reconversion project Ile-de-Nantes in the city of Nantes

The choice of the case studies was based on the necessity to critically think and reshape existing growth theories and concepts for the development of deindustrialised areas based on the reduction of their environmental footprint. On one hand we have the case study of the Docks-de-Seine in Saint-Ouen, a sustainable neighbourhood project located at the north part of the Ile-de-France region not far from Paris (Figure 1). The neighbourhood was constructed on a deindustrialised brownfield by focusing on bringing eco-social balance. The project covers an area of about 100 hectares. Saint-Ouen's population in 2017 was approximately 90,000 inhabitants (INSEE a, 2018). Saint-Ouen, which is known for its industrial activities since the nineteenth century, faced a significant population decline in the late 1980s due to the departure of local industries in the periphery of the city.

Figure 1. Saint-Ouen's location on the map of France. The city is located in the Seine-Saint-Denis department in the north suburbs of Paris. The city and the Docks-de-Seine district are connected by bus and metro to Paris, thus attracting new inhabitants and enterprises who search for lower rents outside the French capital. Source: Varvara Toura

Saint-Ouen's industrial history is linked to the Docks-de-Seine district, where the city's railway station was built in 1856. The two main sectors were those of energy production and waste treatment (Figure 2). Saint-Ouen became an industrial city as a result of the infrastructure and equipment installed in the Docks-de-Seine district, where a water station was established in 1830 and a railway network in 1856. The two infrastructures created the conditions for the city's industrial development due to the good access of the site (APUR, 2006). However, this concentration of infrastructures will prevent the city from developing towards the Seine River. Only two streets of the city crossed the area of the Docks and had access to the river quay, rue Ardouin and rue des Bateliers. In the northern part of the site, a plot of 26 hectares was purchased in 1917 by the Thomson-Houston company. On the strip of land directly along the Seine, a facility was created in 1862 (Département de la Seine, Direction des affaires départementales, 1902). The departure of Total (2003) and Alstom (2004) industries from the Docks district marked the beginning of a city's renewal program for central districts, as large zones alongside the Seine River were left inactive.

Figure 2. The Docks-de-Seine district during its industrial era in 1964. The industrial activities never ceased to exist in Saint-Ouen. There are still present on the site of Docks industries related to the production of electricity and waste treatment posing restrictions to sustainable development projects in the city such as the sustainable neighbourhood project of Docks-de-Seine. Source: Historical archives of the city of Saint-Ouen

Saint-Ouen's policies towards the city's development after its industrial era focused on the sustainable reconversion of the city's urban voids and the preservation of local industrial heritage. They were established in 2000 as a measure inscribed within the regional policies of Ile-de-France region for the redevelopment of its peripheral areas. A representative project for the reconversion of industrial urban suburbs in a sustainable way is the sustainable neighbourhood project of the former industrial site Docks-de-Seine initiated in 2005. The

Docks-de-Seine project contributed to reverse Saint-Ouen's population decline that followed the closure of local industries in the late 1990s. The design team selected for the development of the project of Docks-de-Seine was the team lead by the architect Makan Rafatdjou (2005-present) while the project was planned since its beginning as a sustainable neighbourhood (écoquartier in French) focusing on the environmental dimension of the project. In the French context the écoquartiers projects receive a label from the French Ministry of Environment as projects inscribed in the field of sustainable development. We should mention that this label does not include public funds for the project but is rather an honorary title increasing the competition between architects and urban planners working on these projects.

On the other hand, we have the case study of Ile-de-Nantes, a reconversion project located in the city of Nantes at the west of France which is constructed in a deindustrialised zone (Figure 3). Compared to the first case study, in the case of Ile-de-Nantes we have a big, deindustrialised area, where an important role plays the planning and development of sustainable neighbourhoods during the third phase of the project (2017-present). The main purpose of the project was the transformation of a deindustrialised area in a sustainable way which reconciles the natural environment while revitalising the local economic and social tissue. The project covers an area of about 337 hectares. Nantes' population in 2017 was approximately 300,000 inhabitants (INSEE b, 2018).

Figure 3. Nantes' location on the map of France. The city is located in the Loire-Atlantique region at the west of France. Despite deindustrialisation Nantes' population increased after 1990 due to the development of activities based on culture, tourism and research. The city is connected by intercity buses and train to the main French cities including Paris. Source: Varvara Toura

At the beginning of the nineteenth century, industrial activities became the driving force of Nantes economy, succeeding the early manufactories of the eighteenth century. Shipowners and merchants invested in the industrial sector, particularly benefiting from European maritime trade (Guépin and Bonamy, 1835). The two areas for factory establishments were the banks of the Loire and the Erdre River. By the end of the nineteenth century, other productions emerged alongside metallurgy: sugar refineries, chemicals, and fertilizers. Companies like Amieux and Saupiquet thrived between the two wars, relying on vegetable and horticultural products or the processing of fish from the entire Brittany region. During the period of the World War I, the growing industry was that of military production as well as the construction or reconstruction of the military and civilian fleet (Bois, 1977). Till World War I, factories from all branches in the city employed over 27,000 workers. In the 1950s, reconstruction allowed a revival of the main sectors: shipbuilding (Figure 4), metallurgy, and agri-food. In the seventies, the concentration of businesses accelerated. The largest factories established themselves on the outskirts in new activity zones.

Figure 4. The Dubigeon shipbuilding industry in Nantes during its industrial era. Nantes' industrial era ended in the 1980s when shipbuilding industries located inside the city's limits moved to the neighbouring city of Saint-Nazaire. The significant industrial heritage of the city and especially shipbuilding infrastructure and equipment was part of the reconversion policies of the site of Ile-de-Nantes as they were restored and reconverted into museums and cultural spaces. Source: Musée des hommes et des techniques de Nantes

Nantes's policies towards city's development and preservation of local industrial heritage within the context of sustainable development were developed in the 1990s as part of a municipal plan for the revitalisation of urban voids. A representative project of these policies is the reconversion project of the former industrial site Ile-de-Nantes. The project is developed in three different phases since 2000 with three different design teams focusing on the sustainable development of the area by combining modern economic and environmental policies alongside citizen engagement in the urban design process as measures to preserve the local industrial heritage and to transform the deindustrialised site. These policies' primary objective was to reverse the significant population decline that the city faced after the closure of local industries in the late 1980s. The first selected design team was the team lead by the architect Alexandre Chemetoff (2000-2010) focusing on the inscription of industrial heritage in the new urban planning of Ile-de-Nantes. The next two teams started to reflect on the issue of sustainable development of the deindustrialised site through its connection with Nantes' city centre (team Marcel Smets and Anne Mie Depuyt, 2010-2017) and the creation of green-blue corridors in the site of Ile-de-Nantes alongside the planning of sustainable neighbourhoods (team Shorter and Osty, 2017-present).

Outcomes-Results

The study of the regions of Ile-de-France and Loire-Atlantique, of the cities of Saint-Ouen and Nantes and the projects of transformation of deindustrialised spaces in these cities especially the Docks-de-Seine and Ile-de-Nantes projects revealed different strategies and policies for the post-growth development of the above areas. In the case study of Docks-de-Seine the project is inscribed within the perimeter of Grand Paris, a project of transformations of former industrial cities of the Ile-de-France region based on environmental, economic and social policies, while at the same time the former industrial cities (les banlieues) are connected to Paris with a new urban railway network (Grand-Paris Express). The close proximity of the Docks-de-Seine site to the Olympic Village of 2024 Olympic Games (Seine-Denis) and the active industrial units within its perimeter make both the project of the sustainable neighbourhood Docks-de-Seine and the urban transformations inside the city of Saint-Ouen important for the development of the region of Ile-de-France as the area is considered as an energy pole providing activities of regional interest. Even though the project of Docks-de-Seine is labelled by the French Ministry of Environment as an écoquartier the planning and construction of the project are not funded by national funds, but from a public-private partnership between the Region of Ile-de-France, the Municipality of Saint-Ouen and private investors such as Nextcity, an urban development company, posing challenges regarding the social dimension of the project as the private investor is interested in profitable economic activities like office buildings and not on the preservation of the local industrial heritage and the construction of social housing for the low-income households.

At regional level the Regional Counsil is in favour of the project since its beginning, while the construction of the main building of the Ile-de-France region on the site of the Docks underline the importance of the site for the regional development. On the contrary at municipal level since the beginning of the project, the Municipal Counsil was led by three different political parties (communists, liberals, socialists) showing a different interest for the main axes of the project (environmental and social for communists and socialists, environmental and economic for the liberals).

In the case study of Ile-de-Nantes the project is located inside the city limits in proximity with Nantes historical and economic centre. Due to Nantes former socialist Mayor Jean-Marc Ayrault (who later became Prime Minister of France under the presidency of François Hollande) and his ambition to make Nantes an attractive destination for new inhabitants, tourists and public and private investors the deindustrialised area of Ile-de-Nantes, an island in the Loire River, was developed in the 1990s as part of a bigger project of urban transformations inside the city. The project was developed in three phases led by different design teams focusing since the beginning on issues related to post-growth development theories such as the social parameter of the project (a project for all), the environmental justice in a polluted industrial land and the boost of the local economy based on the internal strengths of the city of Nantes (local industrial heritage). Even though industrial activities have moved to areas outside the city of Nantes, especially the thriving shipbuilding activity who has moved in the city of Saint-Nazaire, the strategy for the development of Nantes reached to reduce the local unemployment rate through economic activities such as research labs and universities built on the site of Ile-de-Nantes, industrial museums and monuments found particularly on the Ile-de-Nantes site, as well as office and commercial activities. Inside the region of Loire-Atlantique the city of Nantes is developed as a large French city of the west side of the country while the political continuity at municipal level since the 1990s (Nantes Municipal Counsil is led by the socialist party) creates the conditions for the development of the city according to the same economic, environmental and social policies. Unlike the project of Docks-de-Seine, the Ile-de-Nantes project was funded by European Union Funds from 2000 to 2010 while the rest of the second development phase of the project and the third phase are funded by public-private funds deriving from the Region of Loire-Atlantique, the Municipality of Nantes and private investors. It is important to mention that despite the fact that the sustainable development dimension was discussed as a pillar of the project since 2000 (restauration of the natural environment of the Ile-de-Nantes and connection to the city centre of the city), this dimension of the project is more evident in the current third phase of the project with the planning and construction of sustainable neighbourhoods inside the perimeter of the project, which are also labelled écoquartier by the French Ministry of Environment.

Concerning policies for the revalorisation and reuse of significant buildings and neighbourhoods dating on the industrial era in order to inscribe the local tangible heritage within the post-growth development model (development based on local resources) the two cities followed a different strategy. In Saint-Ouen and the Docks-de-Seine site there are still active industrial units dating from the industrial era as industrial activities never ceased to exist. Due to the abandonment of several districts of the city after the closure of a certain number of local factories and to the focus on the economic regeneration of Saint-Ouen, important industrial buildings such as le garage à bennes (a space for stocking merchandise) were demolished in favour of the construction of office and commercial buildings. After 2005 and the beginning of the sustainable neighbourhood project of Docks-de-Seine we note policies for the preservation of the local industrial heritage in correspondence with the national (French) and regional framework for the conservation and restauration of historical buildings. We can note the reuse and transformation of the Halle Alstom into a recreation and office space (Figure 5) and the inscription of the gardens of the formal industrial workers on the plan of the main park of the Docks.

Figure 5. La Halle Alstom on the site of the Docks-de-Seine. A former office building of the industrial complex of Alstom, the building was transformed into an office and recreation space. Source: Varvara Toura

In Nantes and the Ile-de-Nantes site there aren't active industrial units. Even though the abandonment of several districts of the island led to the demolition of buildings dated on the industrial era such as houses of the industrial workers, the activism at city level from scholars like Jean-Louis Kerouanton and associations working on the urban and industrial heritage of Nantes created the conditions, despite oppositions at the Municipal Counsil, for the preservation and reuse of industrial heritage. These policies in favour of the preservation of the local heritage are in correspondence with the national (French) and regional framework for the conservation and restauration of historical buildings. In the shipbuilding sector at the west of the island buildings and equipment from the industrial era are still present on the site and are transformed into industrial museums, city's landmarks and recreation spaces (Figure 6).

Figure 6. Industrial building from the Dubigeon complex. The Dubigeon complex included a space for shipbuilding activities as well as office buildings and warehouses that are nowadays transformed into recreation spaces. Source: Varvara Toura

As we have previously mentioned, an important dimension of post-growth policies in the processes of transformations of former industrial cities into sustainable cities concerns the social dimension of these processes and particularly the creation of community ties between the citizens and the presence of active inhabitants' associations in the areas (development based on co-planning and co-decision). In the analysis of interviews with local elected officials and local inhabitants' associations we noted differences in the two case studies resulting from the local political and associative context. In the case study of Saint-Ouen and the Docks-de-Seine project after the deindustrialisation era many former industrial workers left the city as gentrification

processes appeared (rents' increase, construction of office and administrative buildings). The new inhabitants who were installed in the city and on the site of the Docks were young people trying to benefit from the presence of social housing in the Docks-de-Seine project and the lower housing rents compared to the Parisian housing rents. Both the region of Ile-de-France and the municipality of Saint-Ouen were favorable in the creation of inhabitants' associations working on issues like environmental protection and preservation of the local heritage. The association Mon Voisin les Docks is among the first in Saint-Ouen working with the local authorities on issues related to the quality of life on the Docks and the maintenance of the local natural resources such as the River Seine and the main park of the Docks (Figure 7).

Figure 7. Public meeting between local elected officials and inhabitants' associations in Saint-Ouen. The meeting was held in order to discuss changes in the planning of the sustainable neighbourhood Docks-de-Seine. Source: Municipality of Saint-Ouen

In the case study of Nantes and the Ile-de-Nantes project, despite the appearance of gentrification processes after the deindustrialisation era (rents' increase, construction of office buildings) the local inhabitants did not leave the city of Nantes and the Ile-de-Nantes site. With the support of the municipality of Nantes and the region of Loire-Atlantique many associations were created by local scholars and former industrial workers who were interested in the preservation and promotion of the local urban and industrial heritage. A local way of city planning focusing on the principles of co-decision and co-design was developed inside the city (l'urbanisme à la nantaise) and was used in all phases of the project of Ile-de-Nantes with the participation of local elected officials, inhabitants' associations, scholars and the teams of architects and urban planners working on the project. Public meetings, workshops and seminars were used as a means to boost citizens involvement in the processes of decision making on issues such as environmental protection, preservation and reuse of industrial heritage and design of houses and public spaces (Figure 8).

Figure 8. Workshop on the second phase of the project of Ile-de-Nantes. Local elected officials, inhabitants' associations and the team of architects and urban planners that led the project during this phase participated in the workshop. Source: Municipality of Nantes

An important parameter in the development policies of deindustrialised areas is the restauration of the natural resources polluted during the industrial era and environmental policies for reducing environmental footprint as a measure for bringing ecological and social justice to areas facing serious environmental and social difficulties

(development based on eco-social integrity). In the case study of Saint-Ouen and the Docks-de-Seine project environmental policies are inscribed in the regional environmental plan for the preservation of local natural resources such as the Seine River while inside the city are created blue and green corridors for the protection of important green spaces such as public spaces and small forests (Figure 9). The polluted industrial area inside the site of the Docks was re-designed and transformed into the main park of the neighbourhood, where vegetation acts as a natural filter in order to clean the water inside the park. Even though the project of Docks-de-Seine as an écoquartier is based on ecological and energy criteria there are doubts about its eco-social dimension as the maintenance of green public spaces of the neighbourhood and the use of smart buildings are expensive measures that do not fit with the industrial character of the city.

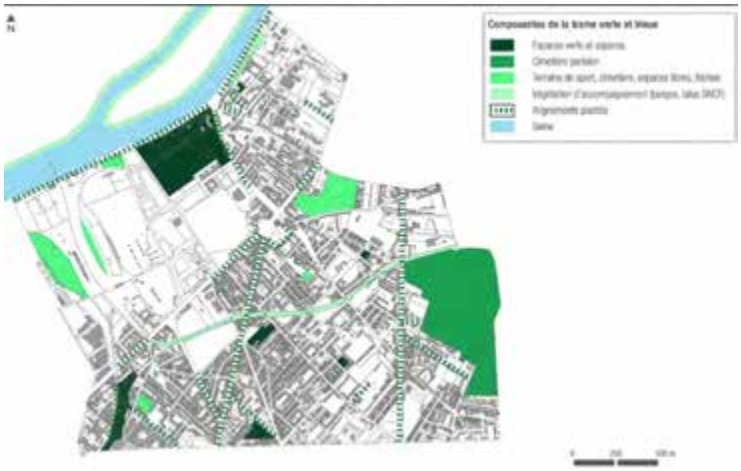

Figure 9. Blue and green corridors inside the city of Saint-Ouen. The development of blue and green infrastructures helps to restore the polluted former industrial lands. Source: Municipality of Saint-Ouen

In the case study of Nantes and the Ile-de-Nantes project environmental policies are inscribed both in the regional environmental plan for the preservation of local natural resources such as the Loire and Erdre River while the city of Nantes developed a plan for the revitalisation of the city based on green public spaces and mobility by bicycle and foot. The polluted industrial spaces inside the Ile-de-Nantes are re-designed and transformed into public spaces (parks) using vegetation as a filter for the polluted water while in the current third phase of the project the leading design team (Shorter and Osty) proposed the creation of green and blue corridors inside the island that will connect it with the public spaces of the city centre (Figure 10). As in the previous case study we should note that the planning and construction of écoquartiers on the site of Ile-de-Nantes focus on ecological and energy criteria but there are doubts about the high cost of such measures that do not fit with eco-social integrity.

Figure 10. Blue and green corridors inside the Ile-de-Nantes project. The development of blue and green infrastructures helps to restore the polluted former industrial lands and connect them to the public spaces of the city centre of Nantes. Source: Varvara Toura

Another point for the growth of deindustrialised areas in post-growth theories is related to the development of economic activities in accordance with the local needs in order to boost the municipal and regional economy as a means to reduce local unemployment rate and to lead to economic resilience and sustainability (economic development based on the local and social characteristics). In the case study of Saint-Ouen and the Docks-de-Seine project at regional level the local economy is based on existing industrial activities together with the construction of office and administrative buildings. At municipal level Saint-Ouen tries to develop its local economy based on activities related to culture and tourism using the former industrial buildings as places to host cultural and educational events (Figure 11). Even though industrial activities play a key role in the economic development strategies for the project of Docks-de-Seine, they are harmonised with the other economic activities while maintaining the industrial character of the city which seems to be gentrified as a result of the installation of office and administrative buildings.

Figure 11. Industrial, cultural and tourism activities on the site of the Docks-de-Seine. While industrial activities continue to exist in Saint-Ouen the city focuses on its industrial past as a source of development of economic activities based on local needs. Source: Varvara Toura

In the case study of Nantes and the Ile-de-Nantes project at regional level the local economy is based on industrial activities in neighbouring cities of Nantes such as Saint-Nazaire while the city of Nantes is developed as the big urban centre of the region where office and administrative buildings are found together with commercial, educational and cultural activities. At municipal level Nantes tries to develop its local economy based on activities related to culture and tourism using the former industrial buildings as places to host cultural and educational events (Figure 12). Even though the restauration and reuse of industrial buildings brings tourists to the area and together with office and administrative buildings creates gentrification conditions inside the former industrial city, they play a key role in the economic development strategies for the project of Ile-de-Nantes and maintain the industrial character of the city as they are also used by local associations of scholars, citizens and former industrial workers.

Figure 12. Educational, cultural and recreation activities in the site of Ile-de-Nantes. Even though industrial activities do not exist inside Nantes the city focuses on its industrial past as a source of development of economic activities based on local needs. Source: Varvara Toura

Discussion

The study of two real-world cases revealed the necessity to consider planning in deindustrialised areas in an interdisciplinary way that brings together members of academia, industry and local actors in order to reshape cities through bottom-up strategies while promoting eco-social integrity. The development of deindustrialised areas in the context of post-growth theories should be based on their particular characteristics, especially their tangible and intangible industrial heritage. Traces of the industrial past such as buildings, neighbourhoods, infrastructure and equipment could be restored and reused as museums, cultural spaces, research hubs and universities in order to promote the local history and boost the local economy through activities related to culture, education and tourism. Local associations of citizens and former industrial workers work on the issue of preservation of industrial heritage and in several cases reverse regional and municipal policies to demolish industrial buildings in order to built contemporary office buildings. The intangible industrial heritage relies on these social ties and on the preservation of the social character of these areas where mainly live low- and middle-class households. The funding of the projects of transformation of deindustrialised areas and especially the planning of sustainable neighbourhoods seems to attract the interest of private investors who are more interested in the development of tertiary activities that in several cases lead to the gentrification of these areas. For this reason, it is important to be developed at national, regional and municipal level policies to reverse gentrification such as a minimum number of social housing in the sustainable neighbourhoods.

Another point to consider from the above analysis for the development of sustainable conditions in former industrial areas are the policies for the environmental protection of these areas alongside the restauration of the polluted natural resources. These policies should be inscribed at a larger context (national, regional, municipal) referring to the global dimension of sustainable development in order to respond to issues such as cities' environmental footprint and reduction of gas emissions. At the same time environmental policies at neighbourhood level that are part of the development program of sustainable neighbourhoods (for example the creation of small and big public spaces such as parks) should be in accordance with the regional and municipal strategic plan for environmental protection in order to propose solutions that would not only benefit certain cities' districts but rather the entire city and region. These environmental policies should be combined with economic activities in accordance with the local communities needs (for example the creation of schools, hospitals and small shops) in order to bring ecological and social justice to areas that suffer from high unemployment rates and pollution due to being neglected for several years after their deindustrialisation. These economic activities could serve as a means to solve social conflicts as underdeveloped deindustrialised areas are places that gather activities of regional and municipal interest such as research hubs, tourism and cultural facilities.

Finally, the last point to consider are the technological innovations of the sustainable neighbourhoods' programs that are presented by politicians (in the French context by the French Ministry of Environment) and contractors as measures that bring social, economic and environmental sustainability and resilience in underdeveloped deindustrialised areas. The development of écoquartiers in France is based on certain policies and measures (Charte Ecoquartier) common for all projects of this category which mainly focus on the reduction of carbon emissions and energy demands for cooling and heating housing units. In certain cases, the cost of this policies is really high thus preventing cities to develop other local policies such as education and health care which are particularly important in areas historically gathering low and middle-class households. Technological innovations of the sustainable neighbourhoods' projects in underdeveloped urban areas such as the design of passive houses, the collection and reuse of grey water in domestic activities and the re-design and transformation of polluted lands into parks should receive national and international funding as they are part of global policies against global warming and climate change. At the same time these innovative policies should be developed for all cities' inhabitants, take into consideration the local socio-economic context (especially the difficulties related to unemployment) and restore the polluted natural environment in order to bring environmental, social and economic sustainability.

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