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10. Brownfield infrastructures

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INTRODUCING THE NOTION OF 'BROWNFIELD INFRASTRUCTURES' IN URBAN GOVERNANCE

Contrary to 'greenfield' – that is, farmland, forest, or pasturelands that have never seen development (Adams & Watkins, 2002) – the concept of brownfield seems to have two main derivations, from United Kingdom (UK) and United States (US) planning strands. On one hand, the Article 55 "Meaning of development and new development" of the UK Town and Country Planning Act 1990 defined brownfield as previously developed land that is currently not in use (Alker et al., 2000). On the other hand, the United States Environmental Protection Agency's definition incorporated the contamination of land – "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination" (Johnson, 1996) – which implied that all brownfields are contaminated. Contaminated or not, since the early 1990s many studies have tried to identify the main features of brownfield sites through a wide range of definitions, interpretations, and perceptions, as well as to propose different typology according to criteria of localization and purpose (Alker, 1998; De Sousa, 2008; Hollander et al., 2010). Nevertheless, little attention has been paid to the meaning of brownfield in terms of 'infrastructure' in the urban environment.

The exploration of the meaning of 'brownfield infrastructures' may be an innovative way to understand how different types of abandoned infrastructures can enable urban transformation processes. In order to do this, it is necessary to also examine the notion of infrastructure and, more generally, the relationship between infrastructure and the development processes. The definition of infrastructure – that is, the basic systems and services that are necessary for a country or an organization to run smoothly, such as buildings, transport, and water and power supplies (Vitiello, 2017, 325) – goes beyond the engineered systems that provide energy, information, irrigation, sanitation and water. This definition also covers facilities – such as barracks, hospitals, and schools – and utilities such as electric, gas, telecommunication, wastewater, and water, along with streets, railway roads and highways. Infrastructure may be hard or soft[1] and works at many scales, from decentralized solar systems to highly organized global networks, such as logistics and shipping. Its meaning has recently been extended to digital infrastructure in reference to computer systems and the internet (Halegoua, 2020).

Infrastructure systems have largely shaped and reshaped urban form and urban life over time, being key innovators in planning (Neuman & Smith, 2010). Communication, energy, transportation (including ports) and water and waste man-

agement were essential for metropolitan growth, urban reconstructions and renewal, as well as national and international development from the nineteenth century onwards (Tarr, 1985; Tarr & Dupuy, 1998). However, since the 1960s, large infrastructures such as railways and highways systems have been blamed for producing ecological problems and triggering social inequalities (Jacobs, 1961). The exhaustion of Fordism and ensuing economic crises, growing social inequalities, environmental pollution and climate change, migration, and many other factors contributed to changing this negative approach in the late twentieth century. Planners started to embrace infrastructure systems as crucial assets to address the economic and environmental challenges of contemporary society under large-scale infrastructure planning (National Academy of Science, 2009).

By taking urban contexts into consideration, once infrastructures cease their original function, they constitute proper brownfield infrastructures that may leverage urban regeneration, environmental sustainability, and large urban projects. This new condition may provide the proper opportunity for urban revitalization and re-engineering urban form and functions through resilient transportation, big data, digital communication, green infrastructures, high-speed rail, renewable energy systems, and for overcoming territorial deficits in terms of public equipment and urban quality in deprived neighborhoods. On one hand, primary brownfields such as railway lines may be apt to become linear parks and greenways equipped with bike trails, outdoor games facilities, and sporting facilities. These solutions may encourage the development of areas that are not easily accessible to citizens and are substantially unrelated to the urban environment, thus resulting in new forms of tourism – ecotourism – slow mobility accessibility through pedestrian and bicycle paths and green public spaces. In so doing, former shunting yards and rail corridors may overcome their fragmentation and disorganization to create a new narrative of the city (Foster, 2010).

On the other hand, both primary and secondary infrastructures can be part of a broader and long-term strategy of local governments in the attempt to regenerate a specific sector of a city or the city as a whole (Ponzini and Vani, 2014). Planning the redevelopment of brownfield infrastructure would make urban transformation possible without consuming land, reducing growth pressures on undeveloped areas, and reconfiguring hierarchy at the urban and metropolitan levels. Also, as many infrastructures date back to nineteenth and twentieth centuries, in which cities were facing huge development and economic boom, they were made redundant over time. The change of societal needs and improvements in technologies often come up against difficulties encountered by public authorities in managing new infrastructure systems. The governance of infrastructure systems is today entwined with extremely complex choices, not only from a technical or economic point of view, but also difficulties related to the search for consensus in a context of public finance constraints (Dwarka & Feitelson, 2013).

Our aim is to explore brownfield infrastructures regeneration in connection with the notion of urban governance; that is, the processes through which infrastructure government is organized and delivered in towns and cities and the relationships

between state agencies and civil society (Raco, 2020). We particularly focus on contemporary cities in which urban governance is based on entrepreneurialism (Harvey, 1989), a primarily market-oriented model in search for competitiveness and profit, leaving welfare policies in the background. Following this trend, the private sector has increasingly participated in the management of publicly owned large urban infrastructure networks – such as telecommunications, transportation, energy, water, and waste (Offner, 2000). Despite this, in many cases there is a separation between the owners of the infrastructure networks – which tend to remain public – and the managers of user services, with greater openness to private sector involvement (Pike et al., 2020). As a result, the management of urban infrastructure has become the target of international flows of capital searching for healthy profits and high rates of return finance (Graham & Marvin, 2001).

This chapter takes the current abandoned railway infrastructures in contemporary cities as a specific case of brownfield infrastructure to examine the significance of these elements in shaping urban development. Following recent claims that brownfield regeneration in global cities is following the model of post-industrial renewal supported by transnational global real-estate investments in which capital excerpts immoderate power over the urban environment (Stein, 2019; Atkinson, 2020; Lindner & Sandovan, 2021), we are going to demonstrate that this trend is currently also happening in brownfield infrastructures regeneration. We are going to answer the following questions: What are the main features of brownfield infrastructures regeneration? Can we provide the systematization of railway brownfield infrastructures regeneration as a concrete example of brownfield infrastructures? What are the impacts of neoliberal approaches to the regeneration of former railways? For these purposes, we work with the existing literature on brownfield infrastructure regeneration that exhibit the significance of the reuse for the urban governance. In working towards the systematization of the regeneration, the chapter advances the existing literature in two central ways. First, it identifies patterns across brownfield infrastructure where the dominant scholarship has been on the wider concept of brownfield, with less attention on infrastructure. Second, addressing the railway brownfields as a proper example of brownfield infrastructure reuses in the face of often poor research on systematic analysis of the trends, we propose the systematization of regeneration that has been flourishing in recent years.

MANAGING BROWNFIELD INFRASTRUCTURES TOWARDS URBAN REGENERATION: A LITERATURE REVIEW

This section provides a literature review concerning brownfield infrastructures in terms of neoliberal urban regeneration. Our aim is to highlight resemblance and differences between the studies released and finding the research gaps. Infrastructure brownfields are particularly challenging for national and regional policymakers in terms of reinstating the land for beneficial use for society. In this respect, policies

and strategies need a combination of environmental, spatial, and urban planning approaches that conduct urban regeneration.

It is assumed that brownfield infrastructures regeneration comprises many disciplines beyond urban planning – such as geography, geopolitics, heritage and conservation – and it involves more agents than those involved in ordinary land use-change (Li & Wang, 2012). The discourse of brownfield infrastructure regeneration has gained increasing prominence due to greenfield land restrictions as well as infrastructure brownfield potential to promote urban renaissance (Ingram & Brandt, 2013). Although current literature claims the non-existence of a universal model of urban regeneration and the difficult transferability in different contexts, brownfield infrastructure regeneration seems to support the three axis of sustainable development (Franz et al., 2006): economic, as it catalyzes economic growth in deprived areas; environmental, by cleaning-up contaminated areas and saving greenfield; and social, by upgrading the living conditions of urban areas. However, urban regeneration faces several obstacles and risks in the attempt to give new uses to brownfield infrastructures due to factors such as land pollution and economic and real-estate markets deterioration along with financial expensiveness. Consequently, addressing these issues through coordination with the diverse parties is a fundamental step that may also solve conflicting interests. In balancing the contradictory goals of raising real estate values and protecting citizens' and residents' best interests, the logic of seeking-profit actors and the possibility to generate high yields on the basis of regeneration seem to prevail (Peric & Miljus, 2021).

As large-scale brownfield infrastructures are located in strategic locations of the built environment, such as inner cities, edges of urban centers, and waterfronts (Fernandes et al., 2020), they have been regarded as relevant targets for neoliberal policies influencing new place images through their regeneration, and catalysts for attracting new developments. While the renewal of the residential neighborhood directly influences people displacement and gentrification, the regeneration of brownfields is less related to direct displacement. Instead, the regeneration of disused land is more tied to begin the specific trends of neoliberal cities, such as the production of unaffordable housing and spaces for exclusive consumption that preclude the 'right to the city' (Lefebvre, 1968). For instance, one way to break the spiral of decline and the complexity of regeneration is to host mega-events such as World Expos and Olympic Games (Essex & Chalkley, 1998). The promotion of mega-events flagship projects generally adds value to event venues and may trigger successive investment. However, these regenerations often result in spaces that are scarcely integrated with the surroundings, to accommodate the wealthy, causing gentrification, or have resulted in under-used areas (Smith, 2012).

The brownfield infrastructure regeneration has aimed at city revitalization and place branding through territorial competition and economic base diversification to attract more investment: these elements redefined city image (Kunzmann, 2004). The inherited elements of brownfield infrastructures, mostly industrial and railways, were not just reconverted into specific cultural functions, such as art galleries and museums, but also designated to create a landmark statement for place repositioning

(Miles, 1995). The cultural producers helping to establish the branding of the place are subsequently driven out by the commercialization process as well, as happens in the case of mega-events. Brownfield infrastructure regeneration comprises complex arguments over the trade-offs between economic growth and socio-environmental costs and, as demonstrated by Schulze Bäing and Wong (2018), it is essential to measure them in terms of spatial and temporal benefits.

Although current literature covers several features of brownfield infrastructure regeneration under a neoliberal approach, it fails to analyze relevant aspects. The first such aspect is the many facets of the multiple European-funded projects on brownfield infrastructure regeneration (Rizzo et al., 2015). It is certainly true that several reports have been released on existing European Union (EU) projects to show tools for urban governance management, such as the inclusion of stakeholders (European Commission, 2013). However no in-depth studies have compared these EU projects , showing the main common aspects and differences (Kurtovic et al., 2014).[2]

Second, most of the existing references have dealt with a specific primordial use of brownfield infrastructure, such as factories, ports, and railways. Less attention has been paid, for instance, to military brownfield infrastructures. Military secrets and Ministry of Defense independence in managing its land have hindered an in-depth understanding of military brownfield regeneration. For instance, it is estimated that 8,000 military infrastructures around the world have been dismantled and returned to civil society, totaling about 1 million ha (BICC, 1997, 2), but no in-depth information is provided. Despite this, an increasing number of studies are shedding light on this specific type of brownfield infrastructure (Camerin and Gastaldi, 2018).

Third, along with the research on military brownfield infrastructure, an emerging topic in the field of study regards the challenges and problems on environmental and economic development created by infrastructure whose construction work is incomplete and suspended (Vv. Aa., 2018).

Eventually, the difficulties to quantify how much infrastructure has been made redundant at national level enable a comparison of diverse countries in developing the brownfield infrastructures regeneration. Standards, practices, norms, and understanding of brownfield infrastructure also vary from country to country, making it difficult to collect data in a comparable and analytical way. Despite these obstacles, the assessment of sustainable development projects based on brownfield infrastructure has been provided by comparing different countries and respective approaches (Ganser & Williams, 2007; Adams et al. , 2010; Dixon et al., 2011).

TWO EXAMPLES OF RAILWAY BROWNFIELD INFRASTRUCTURES

The previous sections explored the relevance of brownfield infrastructure through the lens of urban governance, and provided a literature review that identified important research gaps. A better understanding of brownfield infrastructure regeneration can rely on the analysis of former railway lines, for the following reasons. First, the

potential attractive location of this type of infrastructure, close to or even within the central sectors of cities, gives them a high land value (Santos y Ganges, 2007). Second, railway brownfields are high-consuming land activities that offer favorable connection within cities (Bertolini & Spit, 1998). The third reason is the relatively small reclamation cost of former railways compared with the high expenditure of military and heavy metal industry brownfields (Myers, 2010). Fourth, public–private partnerships are a fundamental tool in terms of urban governance for economic growth and development in reuse operations (Stoker, 1998). The final reason is that the tendency to reorganize and rationalize national railway groups led to redundancy of important areas of railway land, raising relevant real estate interest in redeveloping these areas into more profitable functions (Bowman et al. 2013). These are among the most prominent reasons for investigating railway brownfield regeneration in cities that tend to globalize their urban environment.

Here, we explore the reuses of a specific type of brownfield infrastructure (railways) in three groups of new functions – new traffic facilities, places for commerce and tourism, and public spaces – and their issues in terms of urban governance. We provide this classification on the grounds that this particular brownfield infrastructure is an enabler of urban regeneration. The recovery of railways infrastructural routes to reorganize entire portions of cities and urbanized territories on a vast scale can act as primary structuring elements for urban growth and transformation (Degioanni & Ferretti, 2017).

New Traffic Facilities

One possible solution to regenerate railway brownfield infrastructures can be their reuse as new sustainable transportation facilities in cities. Since the late twentieth century, an increasing number of analyses have dealt with former railroads to understand the high, medium, or low potential of these lines to be used in the future in some transportation capacity (Delaware Valley Regional Planning Commission, 1991). A large number of major cities have been equipped with new transportation facilities (light rail, urban tram lines, suburban railways, or urban roadways) running along segments of old suburban railway tracks in accordance with the existing transportation network (Hylén & Pharoah, 2002). As many railways infrastructures have been built along with the cities, retaining the transportation function might be one of the effective strategies for regenerating abandoned railways. This, in turn, can promote local economic growth and reduce carbon through modal shift, but these operations have been hugely expensive (Bottoms, 2003). To cite a few examples of such reutilizations, see the cases of French Strasbourg, one of the first experiments with a light surface metro system (Boquet, 2017); the Dutch experience of a metro network between The Hague and Rotterdam, which uses the old Hofpeinlinjin railway tracks in Rotterdam (Musterd et al., 2020); the Portuguese Porto metro that replaced approximately 50 km of old railway lines in the local transport network (Pulling, 2008); and the Italian Turin plan to bury an old railroad line crossing the city from north to south and replace it with an urban boulevard (Colanino & Dixon,

2011). These reuses resulted in large urban regeneration processes that were mostly related to the creation of new areas of centrality based on mobility changes at urban and metropolitan level. An element of interest that may be discussed through a comparison of the abovementioned cases is related to the claims of Camerin and Álvarez Mora (2019). While analyzing the reuse of Bilbao's Ametzola railway yards, these authors stressed that these kinds of reuses are strictly tied to high-end real estate developments that undoubtedly change the city hierarchy at metropolitan level.

The remains of railway lines are also suitable for fostering high-speed rail (HSR) systems and non-motorized accessibility. The HSR does not only offer opportunities to better integrate the former lines in the existing urban environment and to palliate the barrier effects provoked by the traditional railway infrastructure, but HSR is also increasingly used as a catalyst for urban regeneration projects in a station's surroundings (Bertolini & Spit, 1998). Non-motorized transport modes such as walking and bicycle lanes that replace railroads have different impacts in urban environments. They are appropriate transport modes for short distances or high-density spatial patterns due to their high flexibility and capacity but low speed and spatial reach (Eizaguirre-Iribar et al., 2021).

Commerce and Tourism in Brownfield Railways

The provision of non-motorized transport infrastructures such as greenways and rail trails mainly related to commerce, leisure, and tourism constitutes a trend to redevelop railway line infrastructures over the last three decades (Reis & Lovelock, 2014). The connection within urban sectors and between urban areas and their surroundings, and the gentle slopes that guarantee large accessibility to the paths, make former railway corridors proper brownfield infrastructures to develop these initiatives (Taylor, 2015). The potential upgrading of railway brownfield infrastructures into cultural, educational, and recreational routes can be achieved through the realization of greenways for slow mobility (Martens, 2004). In fact, numerous European Union- and state-fostered initiatives have given life back to 18,000 km of rail tracks, 1,700 km of which being individual rail-trails throughout Europe (Bartoschek, 2011).

Among the various state-fostered initiatives, the Spanish project *Vías Verdes* stands out for the reconversion of 2,700 km of rail lines, corresponding to 125 greenways that comprise 110 rehabilitated stations for new touristic and leisure uses (García-Mayor et al., 2020). Initiatives involving underused railways lines being converted into tourist railways have spread across several countries (Conlin & Bird, 2014), such as the Italian Tourist Railways (FTI, *Ferrovie Turistiche Italiane*) Blue Train and Nature Train that have been operating since 1994. The English All-Party Parliamentary Group on Heritage Rail (2021) recently stressed that these solutions are a key part of the tourism sector and growth in leisure travel by rail, and need to be supported by cooperation with national rail networks. The tourism- and leisure-oriented transport may also lead to the conservation of engineering structures or sites retained for nature, general amenity, historic environments, or contributions to the landscape (Boughey, 2013). These functions may result in greenways planned

as a network of biological corridors for providing healthier environment, as is the case with Milan's Green Railroads (Comune di Milano, 2016).

While positive impacts in terms of commerce, leisure, and tourism of greenways are shown in the literature, few studies have dealt with how the conversion from abandoned railroads to greenways impacts nearby housing markets and possibly causes gentrification, and the fact that these infrastructures are not functional to the everyday mode of transportation as they attract just niche tourists (Noh, 2019). Despite this, many greenways may provide more sustainable ways of traveling to attend daily activities, as well as being places for physical fitness activities, and may be integrated into existing ecological networks and green infrastructures (Ward & Ruff, 1986; Weston et al., 2012). Brownfield infrastructures converted into greenways may provide an opportunity to preserve ancient railway architectures and boost new cultural tourism experiences. Bridges, stations, auxiliary buildings, tunnels, and viaducts may be regenerated for accommodation (bars, hotels, or restaurants) or museums according to their former use; that is, the provision of a break during the journey (Rovelli et al., 2020). However, growing demand for these infrastructures usually deals with poor public investment available for urban regeneration (Ciomek et al., 2018).

Public Spaces

The presence of brownfield infrastructures provides opportunities to create new public spaces, being part of or even enabling urban regeneration processes. These opportunities may shape slow mobility and green-friendly spaces by the reuse of the linear spatiality of a railroad on the basis of the abandonment of the infrastructure in a time of post-industrial urban decay (Burgers, 2000). Two main examples may help the comprehension of railway brownfield infrastructures as a part of or enabler of urban regeneration processes.

An example of the first case is the realization of 3 km of urban parks and various public facilities, such as the Marbella sports pavilion, the athletics track, the municipal sailing school, and new beaches, in Barcelona's Poblenou waterfront, alongside Litoral Avenue (Camerin, 2019). This project was part of the wider urban waterfront regeneration for the 1992 Summer Olympics that provided Barcelona with a new healthy neighborhood with tertiary services on the ashes of the existing railway brownfield infrastructures; namely, the Barcelona–Mataro railway line and the Bogatell and Poblenou Stations (Martorell et al., 1992). The large urban regeneration project boosted entertainment, real estate, and tourism businesses through the creation of a metropolitan-scaled infrastructure system and public spaces, but it also severely increased the cost of living, rocketed the socio-spatial segregation process, and destroyed the existing identity that was tied to relevant pieces of industrial and railways architectures (Camerin, 2019). Claimed as a successful model for the organization of a mega event to replicate elsewhere, this kind of regeneration constituted the proper base to develop further business-friendly planning in other industrial and railway remains along the waterfront, such as the 2004 Forum, marked by such

developments as the high-rise US-style development with emblematic public and green spaces in place of industrial and railway remains (McNeill, 2003). Today, a similar project is taking place in Milan's former Porta Romana railway yards that will be redeveloped into the Olympic Village for the 2026 Winter Olympics. The post-event planning will convert the Olympic Village into a new urban district with student accommodation, tertiary functions, and green spaces.

The second case relies on the creation of new public spaces that stimulate further developments and improvements in their surroundings. The High Line in New York City, a former elevated viaduct redeveloped into a linear park that ends in the Hudson Yards mega-project, is one of the most outstanding examples (Lindner & Rosa, 2017). Claimed as a model for the adaptive reuse of urban infrastructure, the gradual reuse of this brownfield infrastructure has generated the wider regeneration of its surroundings with high-end signature architecture projects, comprising art galleries, corporate headquarters, and luxury residences, and impressive economic growth as a result of the production of aesthetically pleasing environments that have attracted mobile capital, global tourists, and wealthy people to a previously deprived neighborhood (Alaily-Mattar et al., 2020). The impressive impacts of this brownfield infrastructure regeneration have raised many critical voices about this new type of urban public space that made unequal and exclusionary items in the frame of the culture-led, neoliberal, and entrepreneurial urbanism patterns (Lang & Rothenberg, 2017; Sacco et al., 2019). However, the High Line design concept has recently inspired several projects to regenerate defunct rail lines in many cities, and the building of an elevated linear park on brownfield infrastructures has become a growing phenomenon. High Line-inspired projects include New York City's QueensWay (Larson, 2017), Chicago's Bloomingdale rail line (Sinha, 2007), Rotterdam's Hofbogen (Wesselman, 2017), São Paulo's Minhocão (Millington, 2017), London's Camden Highline (Camden Highliners, n.d.) and The Tide (Greenwich Peninsula, n.d.), Manchester's Castlefield viaduct (National Trust, 2021), and also underground linear projects such as Lowline in Manhattan (Raad Studio, n.d.).

ANALYSIS

Since the last decades of the twentieth century, strong interest has been expressed in brownfield infrastructure regeneration, producing a robust literature on different challenges for cities' urban governance. The case studies show different trends in the types of new functions, but what connects them is the search for economic yields through the re-creation of places of consumption with great aesthetic values on the basis of disused railway lines. This common element is strictly tied to the way of carrying out the city-making process, specifically urban regeneration. The late-twentieth-century period saw the proliferation of urban regeneration processes on the ground of brownfield infrastructure. The redevelopment of abandoned land has been a leitmotiv across the countries to deal with the continuous economic and ecological crisis of the last decades and many projects have been implemented. This

interest and the reuses carried out in cities appear to follow what Molotch stated in 1976, that "the city is, for those who count, a growth machine" (Molotch, 1976, 310) and entrepreneurial urbanism (Harvey, 1989). These dynamics revealed a specific way of understanding brownfield infrastructure regeneration, which for years has determined forms of government and spatial decisions in many cities. The political model of capitalist cities in the post-industrial period focused on economic increase and nature is deployed as a "key component of the total package required to […] generate economic growth" (Florida, 2002, 50).

Assuming that the brownfield infrastructure regeneration surely means taking significant steps towards the provision of healthier and more sustainable urban environments, here we develop an analysis of the main features of railway brownfield regeneration. The first feature is the dynamics behind the urban regeneration processes, such as the search for profits through real estate developments. The real estate approach on railway brownfield infrastructures regeneration has strongly marked the transition to the post-industrial period. Linear parks and green spaces in the form of green infrastructure that substitute brownfield infrastructure are producing aesthetically pleasing environments to attract mobile capital, global tourists, and wealthy people. The increasing use of environmentally friendly urban design is apparently thought of as a necessary amenity for urban regeneration in an increasing number of cities, but also new traffic facilities and commercial and touristic amenities are important targets of cities' regeneration to generate new income. In the light of poor public expenditure to finance these interventions, the public–private partnership is channeling urban regenerations by allowing private actors implementing rent-seeking functions that mostly overcome the benefits for the local communities. The provision of new traffic facilities aims not only to provide more sustainable modes of transportation on the routes of former railway lines, which may be placed underground, as happened in Bilbao's Ametzola, but also to convert the former yards to residential settlements for the wealthy. This market-oriented approach has been stimulated by the privatization of the public sector and collective infrastructures services such as the railways system.

The second feature is the attempts to replicate successful primordial projects to catalyze urban regeneration processes, most of which are public spaces. Urban interventions on railway brownfields, such as in Barcelona and New York, have been replicated, being a symptom of the globalization of urban development patterns (Muñoz, 2008). Redevelopment of Barcelona's Poblenou railway lines for the 1992 Olympics started an outstanding urban regeneration process of this neighborhood that has continued until today, being an arena for contestation due to the strong impacts in terms of gentrification, loss of the previous local identity, and the lack of spaces for social reproduction of the lower classes. Milan, which has hugely struggled over issues of land-use planning, capitalist appropriation, and public space since the late 1980s (Armondi & Di Vita, 2018), is trying to follow Poblenou urban regeneration patterns to redevelop a railways brownfield by taking advantage of the 2026 mega-event. Even more striking are the spin-off projects resembling the High Line, with the concrete risks of replicating not just the urban design, but also the severe impacts, such

as gentrification, the creation of standardized landscapes, and exclusiveness in terms of living and consumption.

Third, these projects are constituting new geographies of territorial competitiveness occurring in global cities. The reuses being carried out are functions that generate new urban economies that, in turn, aim to attract new investment locations for the circulation of capital. These trends are demonstrated in neoliberal interventions such as the High Line. This intervention produced high economic gains on the basis of a piece of brownfield infrastructure regenerated into a public amenity that, theoretically, all neighbors and residents may use. However, the reality is different. The gradual reconversion of the old railway track has had the effect of transforming derelict land into a global space to attract the constant search for profitability and resulted in speculative real estate booms (Katz, 2001). New York City has strengthened its competitiveness through the production of place-specific conditions to create one of the most impressive megaprojects in the world: Hudson Yards on Manhattan's Far West Side.

More research is needed to find out the impacts of railway brownfield regeneration into new traffic facilities, places for commerce and tourism, and public spaces. For instance, future research may be continuing the work of Lindner and Rosa (2017) to compare High Line-inspired projects that are taking place in several cities, to analyze the impacts of urban greenways in their surroundings and to study the military brownfield infrastructure regeneration more in detail.

In conclusion, brownfield infrastructures are essential for urban regeneration, both at small- and large-scale interventions, in which several urban governance aspects need to be addressed to provide the 'right to the city'. Both the literature review and the case study analysis have shown the relevance of social changes and gentrification, environmental issues such as land remediation, preserving or redefining the identity of places, managing controversies among inhabitants and new-comers, and balancing economic issues such as public/private property.

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NOTES

1. Hard infrastructure are large physical networks necessary for the functioning of a modern industrial nation, whereas soft infrastructure refers to all the institutions required to maintain the cultural, economic, health and social standards of a country, such as the education, financial, government, health care and law systems, as well as emergency services (Portugal-Perez & Wilson, 2010).
2. The examples of EU projects are, in chronological order, the following: 1996–1998 Concerted Action on Risk Assessment for Contaminated Sites in Europe (CARACAS); 1998–2002 Contaminated Land Rehabilitation Network for Environmental Technologies (CLARINET); 2000–2006 Towards More Effective and Sustainable Brownfield Revitalization Policies (REVIT); 2001–2004 Concerted Action on Brownfield and Economic Regeneration Network (CABERNET); 2002–2005 Regeneration of European sites in cities and urban environments (RESCUE); 2004–2007 Brownfield's Europe Regeneration Initiative (BERI); 2007–2013 Revitalisation of Traditional Industrial Areas in South-East Europe (RETINA); 2008–2012 Manager Coordinating Brownfield Redevelopment Activities (COBRAMAN); 2010–2014 Holistic Management of Brownfield Regeneration (HOMBRE); and 2011–2014 Tailored Improvement of Brownfield Regeneration in Europe (TIMBRE).

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