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Sustainable Mobility and Resilient Urban Spaces in the United Kingdom. Practices and Proposals

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Abstract

The development of integrated and multi-scalar regeneration strategies focused on public space and involving innovated mobility, environmental and historic networks is a key issue of international references and an actual challenge of pandemic and social distancing measures. The innovation of urban planning and design toward multi-scalar and integrated methodological and operational references is the topic of a research and didactic path carried out at Sapienza University, focused on the regeneration of infrastructure and public space networks. In this framework, United Kingdom represents an interesting field of study for the conditions that have recently led to an efficient cooperation model among local authorities, aimed at achieving sustainable common goals. A shared territorial governance that promotes the integrated management of soil, water and biological resources from an eco-systemic perspective. A collaborative planning approach based on a responsible, inclusive and sustainable strategy for the construction and networking of new resilient urban spaces, green infrastructures and new forms of sustainable mobility. The networking of green spaces, waterfronts and cycle paths represent a resilient response to cities' regeneration for the contribution provided by ecosystem services in increasing health and well-being and a greater adaptability to climate change. The paper aims to illustrate the main methodological and operational references, case studies and results of the research and didactic path focused on multiscale and integration of planning and projects through the design of public space along blue and green networks in the United Kingdom. Key concepts that link together the phases of contextualization of the national planning background, the analysis of ongoing regeneration practices on waterfronts and the experimentation related to a regeneration proposal for King's Lynn, in Norfolk County (England). Research and practices that integrate green, blue and grey infrastructures addressing the UN Agenda 2030 and the National Planning Policy Framework of England.

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1. Introduction. Goals and methodology of the research and didactic path

The equal distribution, the eco-friendly design, and the quality of public spaces are fundamental components of urban regeneration strategies concerning long-standing sustainable development goals as well as concerning pandemic emergency (UN, 2015; OECD, 2020a). The innovation of public space is, in fact, a relevant driver of the *paradigm shift* toward resilient, inclusive, and green cities, enabling the strengthening of soft mobility and ecological connections (EC, 2013; Eurovelo Programme) as well as the enhancement of social and cultural networks (Masbouni, 2013), despite distancing measures (Un-habitat, 2020).

In this framework, the purpose of the paper is to illustrate the main methodological and operational references, that represent the results of a research and didactic path carried out at Sapienza University of Rome, through a strong interaction between experimentation and proposal related to the innovation of urban regeneration strategies based on the strengthening of infrastructure networks and public spaces, considered as “resilience paths” (Ravagnan, 2019; Ravagnan & Amato, 2020; Rossi, 2020). The methodological framework involves a structure articulated in three planning levels and three disciplinary perspectives that are combined and coordinated to propose an integrated and multiscale analysis and design approach between urban planning and transport planning.

The phases of the path include a phase of contextualization of the legislative framework, a phase of analysis of the ongoing best practices and a phase of experimentation along a didactic activity related to a Master’s Thesis.

The phase of contextualization (illustrated in §2.1) is aimed at describing the references of a multilevel governance that overcomes the simple sharing of elementary functions between local authorities toward an efficient cooperation model, aimed at achieving common goals (McGarvey, 2012). The establishment of supra-local bodies in which more local authorities play a role, has led to practice municipal association as a collaborative approach to territorial planning that promotes the integrated management of infrastructures, soil, water and biological resources from an inclusive and sustainable development perspective. A shared territorial governance (EP, 2015), based on a responsible and ecology-based strategy for the construction of new resilient urban spaces, the implementation of green infrastructures, the experimentation of new forms of sustainable mobility.

In consistence with this framework, the phase of analysis of the case studies (illustrated in §2.2, 2.3) focuses on multiscale and integration within two practices: the regeneration of the waterfront of Newcastle and the cooperative project of the Green Network in Glasgow. In this practices, the networking of green and historic networks, waterfronts and public spaces represent the opportunity for a safer and inclusive approach to the cities, in which it is possible to link citizens needs with ecosystem services (UN, 2005) and with historic urban landscape (Unesco, 2011), increasing the levels of physical well-being, with a consequent improvement of population health, and pursuing a greater capacity to adapt to climate change and to enhance local identity. The research activity outlines the articulation of three different functional, morphological and ecological perspectives as well as the coordination between three different level of planning (the territorial level, the urban level and the project scale) for a regeneration strategy based on multiscale and integrated networks: ecological networks, public space and mobility networks (Tiboni et al., 2021).

This methodology is also the framework for a (third) phase of experimentation (illustrated in §3) that relates to a simulation of a multiscale planning process aimed at the regeneration of the waterfront of King’s Lynn that is the crossroad of different networks. The systemic approach articulated in three perspectives links the analysis, assessment, goals, and project outlining in the Masterplan the integration of mobility, public space, historic and green network as a regeneration strategy. These networks are the base for urban resilience related to the enhancement of local identity, sustainable mobility, and accessibility.

The experimentation provides an integrated approach that proposes a methodology of intervention in existing cities, in consistency with the new references of *Sustainable development goals* (UN, 2015) and the *Millennium Ecosystem Assessment* (UN, 2005), combining urban planning and mobility issues. The methodology is also in line with the *New European Bauhaus* that promotes a new approach aimed at achieving a new relationship between cities and the environment toward beautiful, sustainable, and inclusive spaces. The top-down rebalancing and bottom-up re-appropriation of public spaces along waterfronts and green networks toward walkable and green cities is the first path for an improvement and an equal distribution of the quality of life and the strengthening of eco-friendly social behaviors (OECD, 2020b), in order to face climate changes and health risks.

2. The United Kingdom as a field of study

2.1. Cooperation policies for sustainable regeneration: two case studies

United Kingdom represents an interesting field of study for its legislative structure which refers to a unitary state, composed of four constituent nations, the Home Nations: England, Scotland, Wales, and Northern Ireland. To this peculiar composition, defined as a 'nation state' or 'countries within a country', it has always corresponded a historically complex territorial articulation. The recent constitution of city-regions, as the pertinent scale for economic development policies, has promoted a new collaborative and strategic vision establishing supra-local bodies, in which more local authorities play a role in order to overcome the simple sharing of elementary functions for the implementation of a new efficient and sustainable model in achieving common goals (McGarvey, 2012).

An institutional and shared approach that promotes integrated management of soil, water and biological resources from an inclusive and sustainable development perspective to be pursued at a territorial and local scale, based on a responsible and ecology-based strategy for the construction of new resilient public spaces, the implementation of new green and historical networks, the experimentation of new form of sustainable mobility (EP, 2015). Therefore, by 2015, the United Kingdom is playing a central role in the formulation and adoption of the 2030 Agenda for Sustainable Development, including the 17 Sustainable Development Goals and it is working hard for commitments on gender equality, peace and security, and the underpinning promise to 'Leave no one behind'.

In the National Planning Policy Framework the government priorities relate clearly to the Goals, with work taking place on multiple levels and scales to strengthen delivery across the UK strongly respecting the devolution settlements in Scotland, Wales and Northern Ireland. Each country becomes responsible for implementing its own policies, resulting in approaches that respond to national and local objectives: an economic objective – to build a strong, responsive and competitive economy; a social objective – to support strong, vibrant and healthy communities; an environmental objective – to protect and enhance the natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimizing waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy (National Planning Policy Framework, 2019).

In this perspective, the phase of methodological and operational analysis of the case studies focuses on multiscalarity and integration in urban regeneration strategies, toward green, inclusive and resilient cities, fostered in the framework of efficient cooperation between local authorities. In particular, cities such as Glasgow, Newcastle, Liverpool, and London are emblematic cases of how a de-industrialised waterfront can become a strategic site to strengthen green and blue infrastructure in connection with soft mobility and public space networks, as well as the project of enhancement of cultural heritage. Riverbanks and coastlines are par excellence gateways for the interactions of people. To this end, cooperation in urban planning and design can enable post-industrialized waterfronts to continue carrying out these roles in the framework of sustainability and resilience principles toward green and circular economy, well-being and safety in the context of climate changes and pandemic.

In these practices, it is possible to link citizens' needs with ecosystem services (UN, 2005) and enhancement of identity and inclusion in urban communities, increasing the levels of environmental quality, with a consequent improvement of population health, and pursuing a greater capacity to adapt to climate change and social challenges. The research activity outlines the articulation of different functional, morphological and ecological perspectives as well as the coordination between different levels of planning for a regeneration strategy based on multiscalar and integrated networks: ecological connections, public space and mobility infrastructures.

2.2. The case of Glasgow

The Glasgow and Clyde Valley Strategic Development Planning Authority (GCVSDPA), known as Clydeplan, through the approval of its second Strategic Development Plan (SDP) for the Glasgow and Clyde Valley area in 2017, set up the basis for a common vision aimed at "recognizing in the well-being of its communities common economic, social and environmental objectives within a shared and strategic vision of sustainable development". The Plan, in consistency with the planning objectives contained in the National Planning Framework, pursues actions that

contribute to make the shared territory of the 8 Authorities a sustainable, low-carbon, resilient and accessible place ("A Successful and Sustainable Place, a Low Carbon Place, a Natural, Resilient Place, and a Connected Place").

An important response to a cooperation model on a large scale, that transcends the individual boundaries of local authorities to unite more than one city on issues related to economic development, green networks, hydrogeological risk, climate change adaptation, health, services and transport. The GCV Green Network (GCVGN) is thought as a part of a wider project, the Central Scotland Green Network (CSGN), which is the national development strategy for improving local communities and enhancing natural habitats, and corresponds, on a regional scale, to the sustainable development objectives set out by the Clydeplan. A project created in 2006 and shared by Clydeplan with the Authorities encharged of the protection of Scotland's natural and cultural heritage- the *Forestry Commission Scotland*, the *Scottish Environment Protection Agency* and *Scottish Natural Heritage*- to create and guarantee the population an accessible system of green spaces, cycle paths and gardens, as active parts of a social-economic development and of a territorial cohesion project. The Green Network will also provide safer environments for the communities encouraging wellbeing and quality of life, as well as well-designed and sustainable places to live. At the local scale, the ambition of the Green Network is to integrate more than 3,500 hectares of vacant and derelict land with the existing but poor quality green spaces which represent its greatest potential. The internal connectivity of the Green Network according to parameters of accessibility between people and open spaces and between animal species and natural habitats, has led to identify the Green Network Strategic Delivery Areas, in which to concentrate the regeneration design solutions and in which to pursue an increase in the level of physical well-being and a consequent improvement in health. Three Strategic Delivery Areas are currently at an advanced stage of implementation: the Clyde Gateway, Maidenhill and the Seven Lochs Wetland Park.

In particular, the masterplan of the Seven Lochs Wetland Park, undertaken as part of the SIGMA for Water programme funded by the INTERREG IVC (2010-2013) aims at the restoration of existing lakes and wetlands for adaptation to climate change, improving the environmental quality of territories, supporting the creation of habitat networks. The project of the Park is therefore based on two main objectives: 1) to be an ecologically diverse wetland that supports and protects a range of habitats and species and 2) to represent an attractive and accessible recreational resource for local communities. The adoption of resilient design solutions has led to the implementation of the cycle system as the new backbone of the Green Network and to the integration of the quality green spaces with enhanced public spaces. The construction of new green infrastructure as part of the planned development so represent the means to protect natural resources while strengthening sustainable tourism, urban lifestyles and mobility. The involvement of people, particularly young people, in the planning and design of the park has also generated a sense of ownership and respect for the wetlands among the surrounding communities.

2.3. The case of Newcastle-Gateshead

Newcastle has been, from ancient to contemporary times, a crossroad of networks as it is on the line of Hadrian's Wall which was built by the Romans in the 2nd century AD when the city was known by the Italian name of *Novocastro*. It is also located on the north bank of the River Tyne, approximately nine miles from the North Sea where the river system is connected to international ways, across the sea and along the Eurovelo *12 North Sea Cycle Route*.

The modern growth of the city was related to the industrial development that has been accompanied by the development of the port and the construction of warehouses and factories, as well as the iconic "Tyne Bridge" which represents from 1928 the symbolic industrial urban landscape and infrastructure of the metropolitan area. The crisis of industrial activities, such as the coal mine, shipbuilding, wool and glass industry has been connected to the necessary regeneration of the port and the waterfront in the framework of the urban planning and mobility evolutions.

In this context, characterized by historic, environmental and mobility networks, the regeneration of the city along the Tyne River has been faced through different planning tools related to several scales of intervention.

Nowadays, Newcastle is improving the waterfront in the general context of strategies toward a "smart, liveable and sustainable city". First of all, the Community Strategic Plan Newcastle 2030 focuses on specific guidelines which include *Integrated and Accessible transport* in a coordinated way with Newcastle Transport Strategy 2014, Newcastle Cycling Strategy and Action Plan, 2012 Connecting Newcastle, 2017 Disability Inclusion Action Plan, 2016 – 2019.

In this framework, the Newcastle-Gateshead is often portrayed as an exemplar of the revitalising benefits of culture-led regeneration as it is the result of a collective and inter-municipal cultural strategy (van der Graaf, 2009). In

particular, public space and industrial heritage represent the strategic component for the success of the practice. On the one hand, public art has been considered a participatory tool in urban renewal, fostering in the deprived waterfront new meaning for residents, resulting in more attachment and stronger feelings of ownership towards the environment. On the other hand, the enhancement of cultural heritage and industrial architecture has strengthened urban identity.

At the scale of the street, the City of Newcastle is also working on the transformation of some streets in the center into pedestrian areas, involving the stakeholders, such as the local business and inhabitants. In this perspective, the pandemic has fostered this process pointing out the importance of soft mobility and open safe spaces in urban areas. The new pedestrian areas are defined in the ongoing Traffic Regulation Order (TRO) for the city center, which will also include changes to bus stop locations, revised servicing and delivery times, and changes in on-street parking.

3. From research to proposal. An Urban Project for King's Lynn

3.1. 3.1 The methodological framework

The phase of experimentation is related to a regeneration proposal for King's Lynn, in Norfolk County (England), developed in the framework of a Master's Degree Thesis in Architecture – Conservation, implementing a multiscalar approach to urban regeneration focused on mobility issues and the relation with public space design.

The experimentation, that simulates a multiscalar planning process, was carried out through different scales, focusing on the principles of urban, environmental, and socio-economic sustainability. The study began with the diachronic analysis of the area to investigate the evolution and transformation of the morphology through different periods, followed by the synchronic analysis of the actual system.

The synchronic evaluation of the urban context was initially conducted in a relatively wide area of West Norfolk County, through a systemic approach, dividing the area into three perspectives: 'Historic-Environmental and Landscape System', 'Settlement System' and 'Mobility System'. Afterward, the analysis moved to a more specific area limited to King's Lynn town, concentrating on the existing elements to identify the historic, environmental, settlement, and mobility components.

The synthetic assessment of the components was subsequently conducted to evaluate their current state, which was the foundation for identifying the goals. The objectives and actions of the project were set within the scope of the guidelines of the United Nations, the 17 'Sustainable Development Goals' and within the National Planning Policy Framework of England to ensure the planning system contributes to the achievement of sustainable development and urban resilience. Furthermore, the regeneration strategy is aimed at achieving a walkable, cyclable and liveable city through the experimentation of resilient design solutions adopted in European practices, with particular references to the case studies: expansion of pedestrian areas (in particular in river banks and squares used as parkings), implementation of an urban and extraurban cycle system that represents the backbone of green networks and infrastructures, enhancement of public spaces as places of healthy and inclusive social interactions through the rehabilitation of the industrial heritage and the development of public art.

3.2. King's Lynn. Urban evolution and actual situation

King's Lynn is a seaport and market town located in Norfolk County, eastern England, 98 miles north of London and 44 miles west of Norwich. In the early 12th century, it was *known* as one of the principal ports of England. It was considered as important to England in the Middle Ages as Liverpool was during the Industrial Revolution. In the 12th century, the town was fortified by a ditch and earth ramp, and stone walls were built by the 14th century. Some remains of the historic wall, including the 15th-century South Gate can still be seen. Built in 1406, St. George's Guildhall is one of the oldest and largest merchant guildhalls in England.

The Customs House (1683) and several merchants' homes reflect the town's commercial background and its former wealth and prosperity. It is worth mentioning that the modern town still serves as a small port, market, and service center for the vast local farming district.

In 1101, the first settlement was founded by the Bishop De Losinga, between the Purfleet in the North and Millfleet in the South. He authorized the formation of St Margaret's Church and assigned a Market place to be held on Saturday. In the middle of the 12th century, by increasing the trade along the river, Bishop Turpus expanded the town in the

North of the Purfleet. He also built St Nicholas church and established Tuesday marketplace. Shortly after the Industrial Revolution, the first railway line arrived in the town in 1846 which linked King’s Lynn to Dereham. Afterward, several railway lines were opened to connect the town to other parts of England. However, many of these services are now closed. Fig. 1 displays the growth of the town fabric as well as the arrival and closure of railway lines, from the early 17th century.

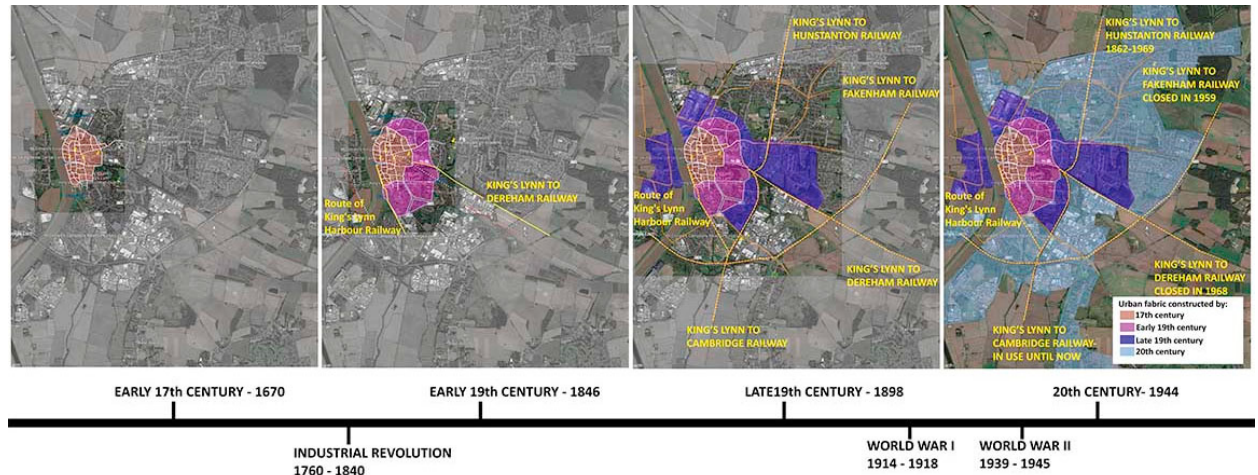


Fig. 1. Urban Fabric and Railway Line development throughout the History.

3.3. Main goals of the regeneration project

The planning process focuses on a regeneration strategy aimed at improving and reconnecting green networks, improving health and well-being through different functional, environmental and morphological design perspectives. The main focus is to design a resilient public space along the river and to connect different green and historical networks together, which can improve citizens’ quality of life and healthy urban behaviors and lifestyles, as it can be seen in Fig. 2. In a post-industrial town like King’s Lynn, the decline of the waterfront has brought many opportunities to propose a sustainable and efficient regeneration plan. The waterfront is transformed from an industrial zone to a tertiary area, accompanied by the divestment of industrial buildings and warehouses.

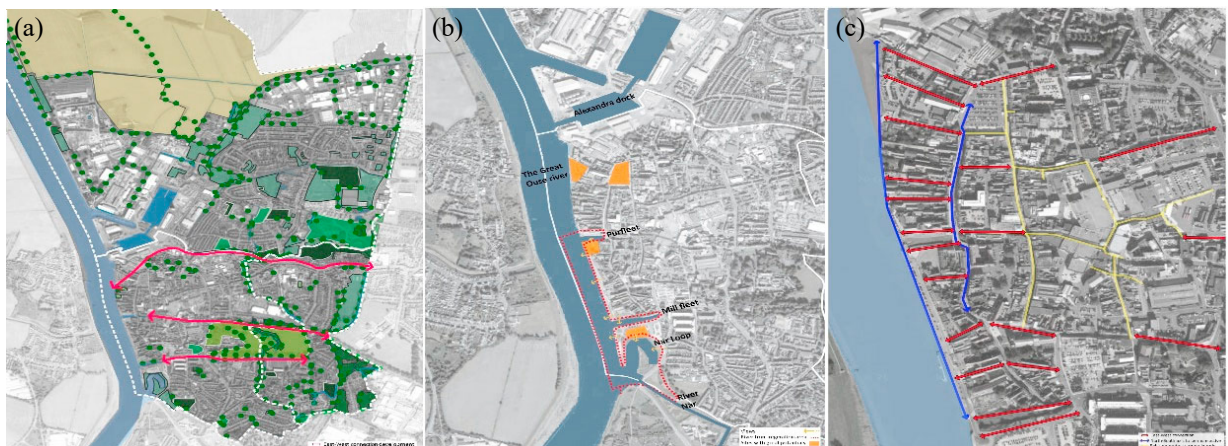


Fig. 2. (a) map of the regeneration goals for the Historic-Environmental and Landscape System; (b) map of the goals for the Infrastructure System; (c) map of the goals for the Public Space Morphological System.

The proposal aims to regenerate the dismissed areas involving the strengthening and the reconnection of historic, environmental and mobility networks through:

- the connection of green and blue network from the green polarities to the waterfront;
- the regeneration of public space along the waterfront;
- the improvement of pedestrian areas among historic heritage;
- the strengthening of sustainable tourism and urban lifestyles through soft mobility;
- the reuse of disused railway lines for future pedestrian and cycle path;
- the adaptive reuse of abandoned industrial heritage and infrastructures.

Finally, in consistency with the previous analysis and goals, the Masterplan fosters an integrated sustainable urban development and specific actions.

3.4. The Masterplan

The final proposal for the Masterplan can be seen in Fig. 3. The Masterplan focuses on urban design solutions based on resilience related to adaptation to scarcity of resources and mitigation risks, the improvement of the flexibility of uses in public spaces (Un, 2015), and the enhancement of historic urban landscape (Unesco, 2011).



Fig. 3. masterplan (detail)

The interventions involve:

- the reconnection and the environmental reclamation of green and blue networks;
- the strengthening of the walkable and bicycle public space system, adding street furniture, light pedestrian shelters, and recreational facilities for outdoor activities along the river;

- the reuse of the neglected Sommerfeld and Thomas industrial heritage warehouse as an exhibition center;
- the revitalization of the Tuesday market with removable market stalls;
- the prevision of affordable housing in the neglected Boal quay.

4. Conclusions

The importance of multiscalar and integrated strategies, in order to achieve green, inclusive and sustainable cities intend material and immaterial networks as infrastructures and common goods that can strengthen resilience toward the achievement of beautiful, sustainable and inclusive cities. The situation related to covid-19 has pointed out the importance of public space, green networks and soft mobility, as also fostered by the SDGs and by the new European Bauhaus. Thanks to the special awareness of authorities and citizens, regeneration processes can contribute to this paradigm shift toward healthier cities, based on sustainable lifestyles for environment and people. The construction of resilient public spaces able to foster an overall implementation of environmental and social networks is the frontline for urban resilience against pandemic and climate changes. Green networks conceived as the field for an in-depth relationship between natural and anthropic systems represent an innovative response and a "multifunctional" resource to offer benefits in terms of landscape quality, ecological cycles and quality of life, enhancing identity and belonging while respecting the heritage and habitats. Moreover the green infrastructure whose interventions are strictly integrated with the existing urban areas can provide maximum benefit, working across political boundaries and agenda, delivering multiple outcomes, as shown by the two case studies and the proposal.

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References

- EC, European Commission, 2013. Green Infrastructure Strategy. Bruxelles.
- EP, European Parliament, 2015. Territorial Governance and Cohesion Policy. Bruxelles. Disponibile. <http://www.europarl.europa.eu/studies>.
- Glasgow and the Clyde Valley Strategic Development Plan, 2011. Green Network Spatial Priorities. <https://www.clydeplan-sdpa.gov.uk/docman/previous-strategic-development-plan-may-2012-background-reports/97-br08-green-network-spatial-priorities/file>.
- Masboungi, A., 2012. *Projets urbains durables: strategies*. Parigi: Moniteur
- McGarvey, N., 2012. Inter-municipal Cooperation: The United Kingdom Case. *Istituzioni del Federalismo*, 3.
- National Planning Policy Framework, 2019. Ministry of Housing, Communities and Local Government.
- OECDa, 2020, Respacing our cities for resilience. <https://www.itf-oecd.org/sites/default/files/respacing-cities-resilience-covid-19.pdf>
- OECDb, 2020, City policies responses, in *Tackling Coronavirus. Contributing to a Global effort*. <https://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/#part-d1e2443>
- Ravagnan, C., 2019. *Rigenerare le città e i territori contemporanei. Prospettive e nuovi riferimenti operativi per la sperimentazione*. Roma: Aracne.
- Ravagnan, C., Amato, C., 2020. *Percorsi di resilienza. Rilancio e riuso delle ferrovie in dismissione nei territori fragili tra Italia e Spagna*. Roma, Italia: Aracne
- Rossi, F., Cantaro, A. 2020. *Coast-amination. Regeneration paths between water and land along the Lazio southern coast*, in C. Gambardella, *World Heritage and Contamination, Atti del XVIII International Forum di Studi, Collana Architecture, Heritage and Design*. Gangemi
- Tiboni, M.; Rossetti, S.; Vetturi, D.; Torrisi, V.; Botticini, F.; Schaefer, M.D. *Urban Policies and Planning Approaches for a Safer and Climate Friendlier Mobility in Cities: Strategies, Initiatives and Some Analysis*. *Sustainability* 2021, 13, 1778. <https://doi.org/10.3390/su13041778>
- Unesco, 2011, *Recommendation on Historic Urban Landscape*.
- UN, 2005. *Millennium Ecosystems Assessment*.
- UN, 2015. *2030 Agenda for Sustainable Development*,. <https://www.un.org/sustainabledevelopment/development-agenda>
- UN-HABITAT, 2020. *Un-habitat Guidance on Covid-19 and public space*.
- Van der Graaf, P. F., 2009. *Out of place? Emotional ties to the neighbourhood in urban renewal in the Netherlands and the United Kingdom*. Vossiuspers - Amsterdam University Press. <http://en.aup.nl/books/9789056295592-out-of-place.html>