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Urban regeneration as an opportunity to redesign Sustainable Mobility. Experiences from the Emilia-Romagna Regional Call

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Abstract

Urban regeneration processes represent an opportunity to pursue a sustainable city model. From a sustainable city perspective, the contribution to the redesign of public spaces and mobility infrastructures and to the improvement of pedestrian and cycle accessibility to local public services is undoubtedly significant. Within this framework, the Italian Region on Emilia-Romagna, promoted an *Urban regeneration Call* in 2018 to which cities submitted project proposals concerning the redevelopment of both architectural emergencies and public open spaces, paying particular attention to sustainable mobility issues. 43 municipalities received funding, out of about 100 submitted proposals. This paper analyses in particular the proposals submitted by the provincial capital cities, through a comparative approach and focusing on open spaces redevelopment, mobility and accessibility improvements. The aim is to highlight similarities and differences in order to identify some common guiding principles.

Keywords: Sustainable mobility; Urban redevelopment; Urban regeneration; Public spaces.

1. Introduction

Urban regeneration aims at rehabilitating impoverished urban contexts by large scale renovation projects or the reconstruction of buildings and urban spaces, involving comprehensive and integrated actions which seek to solve urban problems and bring lasting improvements in the economic, physical, social and environmental condition of an urban area. It is nowadays clear that urban regeneration processes represent an opportunity to pursue a sustainable city model and, in this perspective, the redesign of public spaces and mobility infrastructures (see, i.a., Tiboni et al., 2021, Congiu & Plaisant, 2018; Caramona et al., 2003; Gonzales-Urango et al., 2020) becomes rather significant, comprising the enhancement of pedestrian and cycle accessibility (Tight et al., 2011; Banister, 2008; Vasilev et al., 2018; Vale et al., 2016) to public amenities for all the users, including the most vulnerable ones (see, i.e., Campisi et al., 2020;

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Gaglione et al, 2019; Guida & Carpentieri, 2021; Ignaccolo et al., 2020; Tira, 2018). The theme of sustainable urban mobility is one of the issues addressed by the United Nations 2030 Agenda (2015), in particular by Goal 11 "Sustainable cities and communities", and it has often been already declined in the urban planning practice by the Sustainable Urban Mobility Plans (SUMPs), drawn up by many cities according to European guidelines.

Within this framework, this contribution aims at understanding how accessibility and slow urban mobility issues are involved in urban regeneration interventions promoted in Emilia-Romagna, an Italian region that recently adopted a new urban planning law which places particular emphasis on urban regeneration and sustainability. Is the issue of mobility an integrated part of regeneration projects? Do these regeneration interventions increase accessibility levels or, in any case, take advantage of the existing accessibility conditions in the surrounding area? Which strategies have been explored to enhance walking and cycling connections? What relationship do the projects have with the SUMP strategy?

To answer these questions, the paper examines, a set of urban regeneration projects submitted to the Emilia-Romagna Regeneration Call (2018) by the provincial capital cities. Urban regeneration projects are assessed considering their sustainable mobility measures, such as the improvement of cycling and walking infrastructures, the enhancement of safety conditions and equity in access also for vulnerable users. The study is developed through a comparison of the projects' main features, such as location and proximity to the city center or to public transport and shared mobility nodes; the funding sources; the redevelopment actions, especially focusing on the implementation or redesign of slow mobility infrastructures; and finally, the indicators used by public administrations to monitor and assess the overall urban improvement. The goal is to highlight similarities and differences, including the resulting impacts on accessibility, safety and equity conditions for all the involved social groups of road users.

The paper is structured as follows: chapter 2 starts with an overall presentation of the Emilia-Romagna Regeneration Call, and highlights the different funding sources (municipal, regional, national and also private) that are contributing to the implementation of the proposed projects; chapter 3 describes the analysed regeneration projects and provides a comparative analysis of their main characteristics, including accessibility to the area by different means of transport; chapter 4 presents the indicators that have been set to assess the regeneration projects and examines in more detail the urban and regional strategies in which the projects are placed. In fact, the financed urban regeneration projects often form part of broader strategies, also promoted by SUMPs, which provide for an improvement in liveability and accessibility levels for tourists and citizens. Finally, the conclusions (chapter 5) try to outline and sum up some guiding shared principles of the sustainable mobility strategies in the different proposals, highlighting possible synergies with the existing SUMPs.

2. The Emilia-Romagna regional Call for urban regeneration

The Emilia-Romagna Region, with its recent Urban Planning law (L.R. 24/2017), confirmed a planning approach based on urban regeneration processes and the reduction of soil consumption, rather than on urban expansion.

In line with these principles, a regional Call, launched in 2018 (DGR n. 550/2018), aims at financing and boosting the regeneration of deteriorated urban contexts. Each municipality had the opportunity to submit urban regeneration project proposals (also in partnership with other authorities) and indeed 112 proposals have been submitted. With an overall budget of about € 41 million, the Call then funded 43 municipalities, including the provincial capital cities, except for the city of Piacenza.

Two main funding sources were involved: FSC (*Fondo per lo sviluppo e la coesione),* development and cohesion funds for the construction or redevelopment of public facilities, and CDP (*Cassa Depositi e Prestiti*) funds aimed at supporting social housing policies and related territorial facilities. The Call required the setting up of a regeneration strategy covering a large area, potentially already identified by municipal urban plans, and a financial participation in the projects between 30% and 50%. In addition, the Call placed particular emphasis on mobility issues, on the regeneration of degraded and unused networks, and on the implementation of slow mobility and intermodality, with the aim of pursuing environmental sustainability and the reduction of GHGs emissions, according to European policies and initiatives, such as the Covenant of Mayors (2008), the Europe 2020 Strategy, and the most recent European Green Deal (2019).

3. An overview of the mobility strategies implemented in the cities' projects

With regard to the Regional Call, Table 1 provides a brief analysis and description of the financed projects presented by the provincial capital cities, by comparing their funding sources, their location with respect to the city centre, their proximity to mobility services and the different redevelopment actions concerning built-up areas or open spaces, especially focusing on slow mobility infrastructures. The proximity to the historical centre is a relevant feature because of the possible connections to functions with the highest rank, and a wide range of cultural, commercial, and institutional services. Similarly, importance has been also given to proximity to the main roads and public transport nodes, considering also the most technological and modern mobility services, such as bike sharing.

Table 1. Comparison among the allocation of the regional financial contributions and the regeneration strategies for each provincial capital city.

CITY	CONTRIBUTIONS	PROJECT LOCATION	PROXIMITY TO MOBILITY SERVICES	INTERVENTIONS ON BUILDINGS	INTERVENTIONS ON OPEN SPACES (SQUARES, ROADS, PATHS)
Bologna	CDP fund 2.499.999,30 €	Proximity to the city center 	- public transport stops to the West and the East; - primary communication roads; - cycle path to the West - pedestrian interior; - 30 km/h zone.	[	Y - make paths clear and recognizable; - redevelopment of existent inner paths; - limitation of motorized vehicles; - introduction of play and sports areas.
Piacenza (Union of Municipalities)	FSC fund 1.000.000,00 €	Provincial territory 	- proximity to the Via Emilia	[	Y - improvement of the safety of the roads; - reconfigure the signage to make it clear and visible; - integration of the street furniture; - requalification of the accommodation facilities etc.
Parma	CDP fund 2.100.000,00 €	Proximity to the city center 	- public transport stops; - cycle path to the East; - major traffic route to the South.	Y	Y - rehabilitation of damaged footpaths; - implementation of road lighting; - measures to reduce speed in surrounding streets.
Reggio Emilia	FSC fund 1.500.000,00 €	Proximity to the city center 	- public transport stops; - railway station to the North; - important communication routes; - bike sharing in Piazzale Europa, to the North; - bicycle and pedestrian network along main axes.	Y	[- redevelopment of the most important surrounding streets; - restoration of the bicycle-pedestrian underpasses; - reshaping the structure of Viale Ramazzini to include bicycle lanes.

Modena	FSC fund 1.500.000,00 €	Suburbs 	- public transport stops; - cycle-pedestrian paths to the North and West.	Y	Y	- redevelopment of existing buildings; - implementation of pedestrian cycle routes in the South and East and conclusion of those in the North; - limitation of motorized vehicles; - integration of the vehicular traffic road in the South.
Ferrara	FSC fund 1.500.000,00 €	Proximity to the city center 	- public transport stops; - surrounding pedestrian cycle routes.	Y	[	- expansion of the ex Mof underground car park.
Ravenna	FSC fund 1.500.000,00 €	City center 	- Southern pedestrian route; - North-West cycle path; - along the historical and cultural pedestrian route; - bike sharing stations within walking distance to the East and West.	Y	Y	- demolition of part of the buildings; - reconfigure the signage to make it clear and visible; - creation of a urban park with different functions and inner paths.
Forlì	FSC fund 1.500.000,00 €	City center/ Suburbs 	- public transport stops; - beltway to the North; - pedestrian cycle path to the North-West on the main road; - major traffic route to the West.	Y	Y	- rehabilitation of existing awnings; - creation of an urban park with different functions and a play area; - redevelopment of the existing car park; - inclusion of internal paths.
Cesena	FSC fund 1.500.000,00 €	City center 	- public transport stops to the West; - bike sharing stations in Bufalini square; - 30 km/h zone; - limited traffic zone.	[	Y	- creation of limited traffic areas; - pedestrianisation of the squares.
Rimini	FSC fund 1.500.000,00 €	Waterfront 	- public transport stops; - main traffic axis.	[	Y	- division of the seafront street; - make it pedestrian and bicycle accessible; - set back vehicular traffic and car parks to inner roads.

From the analysis of the strategies undertaken, it is possible to identify some recurring tools and to highlight some differences. Only the cities of Bologna and Parma presented projects that have been included in the CDP fund, while all other cities have received funding through FSC funds, because they mainly dealt with the redevelopment of public facilities or public utility facilities.

The location of the projects varies, but most of them are in the historic center or in the immediate proximity, in degraded places, both physically and socially and often abandoned, without any historical or cultural connotation. One exception is Cesena's project, which plans to redevelop the three historical squares in front of the *Biblioteca Malatestiana*: the project does not include the demolition or construction of new buildings, but only the open spaces renewal and the reconfiguration of functions. Another case is Piacenza's project, which deals, as in the case of Cesena, with the increase in safety and attractiveness of historical and cultural paths. Another fundamental aspect, which has helped the orientation of each strategic choice, is the proximity not only to the historic center but also to the main mobility infrastructures and services; these include major avenues and roads, nodes such as the railway station, but also cycle paths, pedestrian routes and the technological bike sharing stations. All the areas subject to funding are located close to local public transport stops, except for the block of Ravenna, which is, anyway, not far from public transport routes. In common to seven cities, there is the closeness to cycle and pedestrian paths that, anyway, need often to be implemented. Finally, the proximity to major traffic arteries or boulevards can be found in five cities, making the regeneration sites more easily connected to other urban strategic areas. Another important issue is the presence of bike sharing stations, which all sustainable mobility plans intend to boost, also in line with the regional project *Mi muovo* which proposes a better intermodality; among the cities, Cesena already set up a bike sharing station in the project site, while Reggio Emilia and Ravenna already had them in the surroundings.

As shown in Table 1, mobility, despite being part of all regeneration operations, is the main focus of eight projects (Bologna, Piacenza, Parma, Modena, Ravenna, Forlì, Cesena and Rimini), while in the other two (Reggio Emilia, Ferrara) it is part of a wider regeneration strategy, involving a larger urban sector in which the financed project is located. The redevelopment of streets and public squares, as part of regeneration projects, is always considered by the public administrations and taken as an opportunity to make these places even more accessible, to foster quality of life, increase safety for all users, exclude motorized traffic, and promote slow mobility. Only the city of Rimini based its whole strategy on the redevelopment of the seafront road system, fully integrating the concept of mobility with that of environmental sustainability. The regeneration of existing spaces for mobility is mainly achieved by redesigning the road section to add lanes especially for cyclists, as in the city of Reggio Emilia and Rimini, rebalancing the parking spaces, enhancing the use of sustainable means, redeveloping or creating pedestrian and cycle routes, as in Bologna, Modena and Cesena. The limitation of motorized traffic from the regeneration project area is a prerogative of most of the analyzed projects (Bologna, Modena, Cesena, Rimini), which choose to move traffic outside the regeneration area, mainly along the perimeter, or create new flows in other directions. The considered areas remain available exclusively for pedestrians and cyclists becoming, in most cases (Bologna, Ravenna, Forlì, Cesena, Rimini), urban parks. Instead, cities like Ferrara and Ravenna, which still have city walls, aim at the environmental regeneration and upgrading of the green areas surrounding the ancient perimeter, enhancing slow mobility routes.

Technology, thanks to the recent transition towards the Smart City (Buscema, 2020; Fistola, 2013; Garau et al., 2017; Moraci and Fazia, 2013; Papa et al., 2013), is increasingly used even to deal with environmental issues and social integration. In some of the projects it is used to promote tourism, as in the case of Piacenza and Modena, which provide for the installation of interactive totems or exhibition routes that explain the urban attractions, even in an intermodal logic.

4. Discussion

The implementation of the projects financed in 2018 have already started, and it will continue in the next few years. In the meantime, the Municipalities have drawn up sets of indicators to monitor the implementation of the regeneration strategy. These indicators are mainly quantitative and aim at assessing the overall and continuous urban improvement of the regeneration areas. Table 2 summarizes the main indicators adopted by the cities. They have been divided into categories, identifying those referring to pedestrian or cycling mobility, to the accessibility of the areas, to the urban quality of the public space, usually including the redevelopment of green areas, to road safety and attractiveness. Most

of the adopted indicator refers to the number of inhabitants and users involved by the project; other indicators consider the total surface of the regenerated areas, the number of new cycle or pedestrian accesses, the lengths of new cycle paths. Only the cities of Cesena, Ravenna and Ferrara have set up no monitoring indicators for their strategies.

Table 2. List of the most frequent indicators applied by the analysed cities to monitor the impacts of the regeneration strategy.

INDICATORS		CITIES INVOLVED
PEDESTRIAN MOBILITY	Pedestrian paths area	Bologna, Rimini
	Users of the pedestrian paths	Rimini
	Pedestrian accesses	Forlì
CYCLING	Surface of cycling paths	Bologna, Rimini
	Linear meters of cycle lanes	Forlì
	Nr. of bike sharing stations	Forlì
	Users of bike sharing service	Forlì
	Users of the cycle paths	Piacenza, Rimini
ACCESSIBILITY	Vehicular traffic area	Rimini
	Roadside car park area	Rimini
	Nr. of free visuals	Bologna
	Nr. of bicycle accesses	Bologna, Forlì
	Nr. of pedestrian accesses	Forlì
	% of accesses without architectural barriers	Bologna
	Presence of solutions for the recognition of spaces/pathways	Bologna
	Clear signage and charts, maps for blind people	Bologna
	Reduction of travel time in critical areas	Reggio Emilia
	Nr. of public transport users that access the area	Forlì
URBAN QUALITY	Green area	Rimini, Forlì
	Nr. of seats	Bologna
	Equipment for the disabled	Bologna
	Nr. of water fountains	Bologna
	Surface of regenerated areas in environmental and microclimatic terms	Reggio Emilia, Rimini
	Nr. of new trees	Reggio Emilia
	Surface of de-sealing areas	Reggio Emilia
	Redevelopment of public areas with pieces of art and street art	Forlì
ROAD SAFETY	Nr. of road accidents involving cyclists and pedestrians	Parma
	Nr. of efficient poles replaced/installed	Parma
	Suitable street lighting	Bologna, Parma
ATTRACTIVENESS	Nr. of new residents and/or tourists using the new physical connections	Piacenza, Reggio Emilia, Parma, Modena, Forlì
	Nr. of new collective initiatives	Piacenza, Modena
	Nr. of bike sharing users	Forlì
	Nr. of public transport users that access the area	Forlì

However, also looking at the indicators, it emerges clearly that these urban regeneration interventions, are often included in a wider planning perspective, which generally relates to the SUMPs strategies. Indeed, besides indicators that refer directly to mobility monitoring (length of cycle paths, pedestrian accessible areas, new bike sharing stations etc.), there are also indicators to assess urban quality, e.g., the number of users of the new infrastructure, the number of collective initiatives.

It is also interesting to highlight that all the analysed projects pay attention to road safety issues for all the road users (pedestrians, cyclists and vulnerable users such as children and older people), proposing specific interventions also in the surroundings of the regeneration areas. The Region already gave strong impulses to the development of

sustainable mobility projects such as "Bicibus" and "Pedibus", which involve children and young people, and to redevelopment projects aimed at removing architectural barriers.

The main interventions, planned by SUMPs, provide the extension of the Limited Traffic Areas (as in Ravenna) to the whole city center or, if possible, the diversion of motorized traffic outside the centre (Rimini). In the case of Cesena the aim is to connect strategic points through pedestrian routes.

One of the main actions is to compartmentalize different zones, pedestrianize squares (Cesena), defining a road hierarchy (Bologna, Rimini), using underground or interchange car parking at the edges of urban areas (Ferrara) and creating separate lanes in the roadway. This also helps tourists giving them a clearer and safer vision of the places to visit, as happens in Rimini and Ravenna. An exception is the city of Piacenza, which deals with the regeneration issue on a larger scale, with a project aimed at serving the pilgrims paths, and accompanying them during their journey.

Social security is another point of interest, as in Parma, where the project operates on public lighting to make inner streets more secure and available for everyone.

In general, all the financed regeneration strategies paid a lot of attention, aside from accessibility and social inclusion, also to environmental sustainability, which represents another fundamental pillar in all the analyzed interventions. Environmental aspects, aimed at improving the microclimate, reducing the heat island effect, and promoting adaptation to climate change, have been considered both in the architectural and in the open space design, using adequate materials, providing many green areas and water surfaces.

Furthermore, there are some external projects in relation to the regional call, which municipal administrations are carrying out, such as Smart City projects or projects linked to European initiatives dealing with environmental and energy saving issues, and which have an impact on the municipal mobility planning. The Region aims at reducing polluting emissions with the “Integrated Regional Air Plan” developed in 2014 and the “Po Regions Engaged to Policies of Air Project” in 2016. Each city also joined projects mainly focused on sustainability and adaptation to climate change, like the city of Bologna and Ferrara. Seven of these cities also joined projects on sustainable mobility, both European and national initiatives, with the aim of promoting slow mobility, sustainable mobility, intermobility, and developing the SUMP, the Sustainable Urban Mobility Plan.

5. Conclusive remarks

The "Agenda 2030 for Sustainable Development" signed by the UN in 2015, with goal 11 aims to "make human settlements inclusive, safe, durable and sustainable" and outlines a number of actions to achieve the goal, including the strengthening of local public transport and a focus on vulnerable road users. A combined strategy of urban regeneration and redevelopment of public spaces for mobility and services, such as those we have seen above, can contribute to achieving this goal. The contribution analyzed how the development of sustainable mobility, a theme strongly supported at European level but also in local policies, has been transferred into urban regeneration projects within the Emilia-Romagna Region. The presented projects show how much urban regeneration and mobility issues are closely intertwined: urban mobility, safety and environmental sustainability represent pillars of all the analyzed regeneration strategies. The strategies are examples of how urban regeneration, which is not only architectural but also social and cultural, can be used to redesign public spaces for collective life and mobility, thus becoming an opportunity for a widespread regeneration of the urban mobility network. And the outcomes show how much soft mobility plays a crucial role within urban regeneration policies. Promoting walkability, as emerged from the comparative analysis, is one of the best tools in the hands of public administration to develop sustainable mobility policies that are both people oriented and climate friendly. And nowadays, those approaches may be pursued mainly through urban regeneration interventions: urban regeneration today can, and must, be the opportunity to rethink soft mobility in our cities aiming at promoting a widespread accessibility. Walking, or cycling, should become an 'attractive' alternative to motorised transport over short distances and a mode of transport integrated with an efficient public transport system. The decision of removing vehicular traffic, where possible, can greatly improve also safety issues, making the street a safer place for pedestrians and cyclists. In this vision, Sustainable Urban Mobility Plans (SUMPs) can be considered a tool able to integrate the long-term goals for transport users at all mobility levels by proposing planning practices with a human-centered approach, to be pursued by regeneration strategies, considering their needs and highlighting the importance of citizens’ quality of life.

Further developments of the presented work may involve the follow-up of the analysed regeneration projects, and the assessment of the proposed indicators to monitor the strategies and provide a comparison among the different initiatives.

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