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Conference Paper — Published Version

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Suggested Citation: Ricciardelli, Alessandra; Raimo, Nicola; Manfredi, Francesco; Vitolla, Filippo (2021) : Sustainability of Urban Regeneration Projects in Resilient Cities: a Multiple Case Study, In: 16th International Forum on Knowledge Asset Dynamics - Proceedings: Managing Knowledge in Uncertain Times Distribution – Rome, Italy 1-3 September 2021, International Forum on Knowledge Asset Dynamics, s.l., pp. 1448-1472

This Version is available at:

<https://hdl.handle.net/10419/246779>

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Sustainability of Urban Regeneration Projects in Resilient Cities: a Multiple Case Study

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Abstract

In recent years, the integration of sustainability principles in urban planning has become increasingly important. The growing attention to economic, social and environmental aspects is also influencing the practice and policy of urban regeneration. In particular, the search for new ways to regenerate cities in a sustainable way has led to the concept of sustainable urban regeneration. However, despite the relevance of this concept, only a few contributions have quantitatively examined the actual sustainability outcomes of different urban regeneration interventions. This study aims to fill this important gap by examining the level of sustainability of urban regeneration interventions in the Apulian context. The results of the multiple case study analysis show a high level of sustainability of the interventions in all three contexts examined. However, they show some weaknesses related mainly to the absence of strategies aimed at the inclusion of women in the labour market

and to the low efficiency in the use of energy. The results offer important implications and guidelines for municipalities implementing urban regeneration projects.

Keywords - Urban regeneration; Urban sustainability; Sustainable urban regeneration; Sustainability indicators; Apulia

1 Introduction

The dynamics of urbanisation have changed considerably over time, driven mainly by industrialisation, which has increased the concentration of socio-economic organisations in cities, thereby increasing the urban population (Korkmaz and Balaban, 2020). Today, most of the world's population lives and carries out economic activities inside cities. However, unbridled urbanisation has important consequences mainly related to economic, environmental and social aspects. According to the United Nations (2015), cities occupy only 3% of the earth's surface, but are responsible for 60-80% of energy consumption and 75% of carbon emissions. The disproportionate growth of cities could, therefore, lead to a depletion of the earth's water and food resources, the suffocation of natural ecosystems and could also have major consequences on public health, both because of the high presence of slums (with all the resulting hygiene and public order consequences) and because of the worsening climatic and atmospheric conditions (United Nations, 2015).

In view of this, cities are considered among the key players in achieving the 17 Sustainable Development Goals set out by the United Nations (2015) in the so-called 2030 Agenda. Considered as huge human collectors, economic aggregators and high-impact elements, cities will necessarily have to configure themselves as real spaces for change in economic, social and environmental terms. In this regard, among the 17 Sustainable Development Goals, Goal 11 reads 'Make cities and human settlements inclusive, safe, durable and sustainable'. Therefore, achieving this goal by 2030 should include combating inequalities, improving public transport, strengthening and implementing waste management systems. Moreover, it should include the protection of cultural and artistic heritage, the direct participation of citizens in the management of the city, the enhancement of network economies within the public space and, above all, it should prefer urban regeneration to building speculation.

In this context, the need for sustainability approaches for the definition of urban transformation practices and policies is therefore increasingly emerging (Newman and Jenning, 2008; Evans, 2012; Vojnovic, 2014; La Rosa et al., 2017). The implementation of strategies, programmes and planning strategies for sustainable cities, such as the redevelopment of degraded urban spaces or the reuse of abandoned buildings and previously disused urban land (La Rosa et al., 2017), help to increase the attractiveness of urban centres and the well-being of citizens (Couch and Dennemann, 2000; Turcu, 2012). In this regard, urban regeneration represents one of the most effective tools available to urban planners and designers to address a wide range of urban issues and to find long-term solutions to the economic, social, environmental and physical problems that plague contemporary cities (Roberts, 2000; Alpopi and Manole, 2013). Urban regeneration represents a multidisciplinary field of research and a broad practice. It is characterised by an integrated and comprehensive vision aimed at solving urban problems and promoting the development of the urban communities concerned (Roberts, 2000; La Rosa et al., 2017). Best practice models and general principles underpinning urban regeneration are fairly well known (La Rosa et al., 2017) and emphasise that urban regeneration interventions should always be adapted to local governments' urban development models and specific geographical contexts (Kleinhans, 2012; La Rosa et al., 2017; Korkmaz and Balaban, 2020). In particular, sustainable urban regeneration interventions (Evans, 2012) should have effects not only at the neighbourhood level but at the city scale (La Rosa et al., 2017) and should address issues such as: the redevelopment of public spaces and the enhancement of public services (Privitera et al., 2013), upgrading urban infrastructure (Huston et al., 2015), improving living conditions in residential neighbourhoods (Alpopi and Manole, 2013), increasing earthquake response and energy performance (Deakin et al., 2012; Güzey, 2016) and improving the working conditions of inhabitants (Korkmaz and Balaban, 2020).

However, despite the relevance of urban regeneration interventions in the development and design of sustainable cities and in achieving SDG 11, only a few contributions have quantitatively examined the actual sustainability outcomes of different urban regeneration interventions (Villagra et al., 2014; Zheng et al., 2014; Laprise et al., 2015; La Rosa et al., 2017; Korkmaz and Balaban, 2020). This study aims to fill this important gap by examining the level of sustainability of urban regeneration interventions in the Apulian context (an important Italian tourist

territory). In particular, therefore, this study answers the following research question:

RQ1: What is the level of sustainability of urban regeneration interventions in the Apulian context?

In order to answer these questions, this study examines the urban regeneration interventions implemented in the northern Salento area. This area was chosen mainly because of its great relevance from the point of view of tourism.

The remainder of this work is organized as follows: Section 2 introduces the background of this study; Section 3 presents the research methodology. Section 4 offers the results, while Section 5 draws conclusions.

2 Background

2.1 Evolution of sustainable urban regeneration

Because urban systems are assumed to be affecting physical and social and economic transformations, they are particularly dynamic and complex. It follows that urban regeneration, as a tool used in urban policy following the eighties, cannot merely imply a city's physical development as it refers to all crucial and significant urban development's aspects.

Literature on planning has provided a host of urban regeneration's definitions. Amongst those, there is one that comprehensively explains urban regeneration as an across-cutting vision aimed at finding solutions to urban problems by delivering strategic and long lasting physical, social, environmental and economic opportunities and improvements to area subjected to change and transformations (Lichfield, 1992).

Another definition asserted by Roberts (2000) depicts urban regeneration as an emerging integrated action oriented toward the search of long-term solutions to physical, social, economic and environmental issues through the engagement of stakeholders who co-operate between them.

By the same token, there is the argument put forward by Donnison (1993) that considers regeneration as a method as well as a way that solve simultaneously the environmental, physical, social and economic problems occurring in areas subject to collapse.

It is possible to discern a common denominator to all three definitions: urban regeneration has a multi-dimensional and complex nature.

The concept, however, has evolved over time. According to Güzey (2009), from being a mere physical change it has changed into a more holistic and general approach to regenerating cities through the adoption of via place-specific strategies to solve physical, economic, environmental and social issues.

Currently, urban regeneration is acknowledged to be, as Leary and McCarthy (2003) have assumed, a multidisciplinary model which combines processes of policy-making and implementation in the field of urban development, sustainable solution, economy, urban planning, housing design, urban design, and transportation.

According to Güzey (2009), urban regeneration practices are diverse and there is no single recipe for urban regeneration that stands as a crosscutting field of urban policy.

Nevertheless, urban regeneration's common denominator is fourfold:

- a policy intervention that has an integrated and a wide-ranging nature,
- it refers to a specific area and is durable and strategic,
- as a long-term process, it involves actors across different sectors which are organised according to partnerships,
- it is oriented towards the achievement of a sustainable environment.

The latter provides a solid and inextricable bondage between urban development and environmental issues towards whom cities are deeply responsible. It is for this reason that, according to scholars, sustainability is instrumental to the planning and development of cities that it has been included into systems and processes of planning and management (Wheeler and Beatley, 2008; Evans, 2012). Even though sustainability became popular in the eighties as combined to development, it is, today, is very central to cities' development across the world. Both terms became notorious in 1987 when the World Commission on Environment and Development released the Brundtland Report on common future.

The report gave an inspirational definition of sustainable development where the latter fulfils present needs without compromising next generations' capacity to fulfil their own. In this light, it is assumed that sustainable development implies harmony on human-environment interactions so that relationships among population, resources, environment and development is balanced so establish the foundation of sustainability and health of resources and environment for future generations.

After the failure of the projects of urban regeneration conducted in the eighties, the agenda on urban regeneration has been dependent upon the discussion on sustainable development to the extent that the latter has influenced the former. From 1990s, both concepts have become inextricably connected (Balaban and Puppim de Oliveira, 2014) to the extent that the concept of sustainable urban regeneration emerged. Considered as an urban policy, Güzey (2009) has argued that projects of urban regeneration have been considered as an important instrument and a chance to attain sustainable development through a balanced combination of urban development and natural preservation.

Arguably, urban regeneration carried out through the key of sustainability does not simply emphasises on the physical and economic dimensions of regeneration processes. Above all, in any regeneration, it purposely combines the economic, environmental and social dimensions of sustainable development, at the same time. By this perspective, sustainable urban regeneration has the goal to avoid natural environment be destroyed by urbanization, hence, it prevents that urban resources decrease in the long run (Wheeler and Beatley, 2008; Evans, 2012). Therefore, it could be argued that sustainable urban regeneration represents a policy framework that, from one side, aims at protecting natural environment from eventual urban development's negative impacts, and from the other side, it represents a policy framework that improves the social and economic circumstances inside urban areas. Moreover, this concept offers a host of strategies and policies that while improving the spatial, social and economic organization of urban cities do also preserve the environment by adverse impacts.

Some scholars put forward the argument that sustainable regeneration supports the attainment of other targets such as the delivery of social care through providing social and regional balance, the prevention of local people displacement, support in building participation, engagement of stakeholders and creation of partnership between government and local actors, in other words, the improvement of the quality of urban life (Tallon, 2010; Czischke et al., 2015). Recent evidence from some countries on urban regeneration projects conducted according the perspective of sustainability includes an unequivocal dimension of climate change as they are oriented toward the building of climate-friendly and resource-efficient neighbourhoods. In these urban contexts, as Balaban and Puppim de Oliveira (2014) have demonstrated, the potential of global warming has been reduced by establishing an ecological imprinting to urban development.

2.2 Sustainable urban regeneration and social innovation

There has been a wide consensus amongst scholars that social innovation, considered as a process of territorial development that takes place within urban regeneration, is creative and contextual. Social innovation has a relationship of path dependency with urban regeneration (Moulaert et al., 2013). Urban regeneration brings to life of urban areas with the cooperative effort of municipalities, citizens and all the stakeholders involved in improving living conditions, enhancing the quality of the environment and the social fabric while strengthening the local economy. Given this backdrop, urban neighbourhoods have become a privileged unit of observation because social innovations aim to develop a specific territory in order to improve the quality of life.

Social innovation is considered as a new structural solution to a social problem and generates a social change. It is a solution because it determines either an improvement in the existing situation either an increase in the quality of life for groups of individuals, communities and the whole society. Social innovation is a solution that is disseminated and adopted whose main purpose is not the profit of a group of people.

According to Cooperrider and Pasmore (1991), the first researcher who used "social innovation" as a term was Taylor (1970). However, literature shows that, at the same time, researchers seem to have adopted a developmental or territorial approach. According to this perspective, social innovation refers to new ways of doing things for the clear purpose of addressing social needs, such as delinquency and poverty. Therefore, the emergence of social innovations is the result of the creation of multidisciplinary teams. By this light, it comes that the object of social innovation, is the solution to the problem and refers exclusively to what is being implemented.

Gabor (1970), for example, views social innovation as a tool for fighting against pollution, crime and corruption, violence, economic inequality, urbanization. Social innovation, therefore, in the development of such a "new social arrangement", stand as a positive response to the social consequences that they entail.

Eradicated within the context of neighbourhoods, social innovation is assumed to generate both spatial and social change in urban quarters by altering social connections between individuals and groups and transforming power relations throughout the process of planning. Social innovation can also promote an

innovative and learning society. In other words, it is a starting point for creating the social dynamics. In fact, given the orientation to community groups and to their surrounding environment, social innovation fit into practices of urban regeneration process ready to be implemented in a marginalized, poor and socially isolated urban area (Walters, 2001).

If at one side, heterogeneous neighbourhoods are expected to show a high degree of capacity to socially innovate, at the other side there is a debate on how social innovation practices develop in such an inclusive and cohesive manner.

Scholars and academics interested on social innovation have emphasised on the potential risk that, within the urban fabric, weak social groups' (Marconi and Ostanel, 2016), needs are marginalised despite a social innovation-based approach. In fact, it could be argued that policy interventions that do not contemplate social exclusion and fragmentation at the local community level have the risk to reproduce and deepen that social gap between the excluded groups versus the integrated ones. The social innovation's debate, more specifically, urges institutions to encourage regulation of durable and enduring practices of social innovation that unfolds within the realm of a democratic state where all citizens' rights are fully recognised.

There is a scholarly recognition on the extent of social innovation initiatives to drive change that particularly occurs in neighbourhoods whose problems are intensified by macro-economic forces. Place-based mechanisms and initiatives that increase the welfare of the individuals drive towards the development of urban regeneration's innovative multilevel governance that sustain institutional learning while solving, at the same time, that "solo" local policies are ineffective. This perspective leads to configure the social and spatial change not in moral communities but in spatialized ones since inequality is considered to be within the spatial and social distribution of disadvantage.

From these premises, it follows that social innovation is a context-specific issue which is studied inside spatial and institutional sites. Rather than being considered as a convenient "tool box" as it offers fast and easy solutions to challenging and demanding issues, social innovation can be better represented as an existing potential, hence as a local resource for change, inside any community.

By this light, this approach view urban regeneration as a process that is bottom-up and incremental to the extent that it leverages on community's cohesive organizations that overcome the top-down regeneration initiatives that, for long, have demonstrated their weaknesses. In this scenario, it is clear that

investments of revitalization as well as regeneration initiatives are supposedly originated from inside the community. This means that the latent potential is expressed and activated by the current community assets.

What is pivotal and crucial in processes of urban regeneration is the public space. The latter is, from one side, a means of empowerment, and at the other side, a host of significant secluded comfort areas that lead up to relevant forms of marginalisation and exclusion as well as enclavization. Also, public space is conceived as an asset used to mobilize a place's genius loci through facilitating social interaction. However, it is opportune to point out that, at times, public space has been used, in a strategic manner, to enhance and boost marginal community groups' exclusion during processes of gentrification (Lees, 2008). Nevertheless, it is worth depicting daily urban space as a set of mutual and dynamic relations enriched with power and symbols (Ostanel, 2014). In this scenario, heterogeneity and differences such as class, ethnicity and gender are portrayed in social constructions and representations that deliver a novel perspective through which the relationship between space and society is interpreted and analysed (Sandercock, 2000).

This study, therefore, considers urban regeneration as a practice of social innovation. However, for an urban regeneration intervention to be in line with social innovation, it must respect the parameters of sustainability.

3 Methodology

This study is based on a multiple case study analysis. This methodology is particularly suitable for analysing the sustainability of urban regeneration as it is particularly effective in investigating complex phenomena that represent a relatively new line of research (Eisenhardt, 1989; Vitolla and Raimo, 2018). In particular, the use of a multiple case study makes the results more robust and favours their generalization (Yin, 1996).

3.1 Selecting case studies

This study involves the analysis of three different cases represented by three different areas: San Vito dei Normanni, Brindisi and Mesagne.

The first case study concerns the San Vito dei Normanni area. Among the urban regeneration projects that the municipality of San Vito dei Normanni carried out in 2011, aimed at identifying tools and governance models for the available

public real estate, is a community incubator called Ex Fadda. This project was set up in 2011 thanks to the Apulia Region's 'Bollenti Spiriti' youth policy program, which included, among its measures, a massive urban regeneration action through the transformation of a series of disused, publicly-owned properties into spaces for youth activation. Among these properties was the former 'Dentice di Frasso' wine factory in San Vito dei Normanni. Ex Fadda is now a public space where people can come together, create and innovate in society. It has enabled the urban regeneration of not only the physical but also the human aspects of a community, with the aim of creating relational devices useful for activating the entire population for the revitalization of urban space through the sustainable use of disused green areas. The regeneration project for this container also envisages cultural activities as well as catering based on the principle of employing people with disabilities. An xfarm has also been set up to reuse land confiscated from crime, with the aim of involving young people in agricultural work.

The second case concerns the Brindisi area. Specifically, Punta Del Serrone area is located on the north coast of the city of Brindisi, and was inaugurated in 2014 after the restoration and reclamation of the area known as "cavallino bianco", which reaches as far as the Granchio Rosso beach area. It is a park covering 23 hectares and includes a large expanse of rocks with spontaneous vegetation with various autochthonous essences of the Mediterranean maquis, some of which are also endangered. The area is fenced off with free fronts with gates and pedestrian entrances. Inside, there are flush pedestrian paths with suspended walkways with the addition of signage and information and illustration boards. The park contains elements of naturalistic and landscape interest as well as historical interest.

The third case concerns the Mesagne area. More in detail, the regeneration of Potì Park represents a project inaugurated on 8 May 2016 thanks to funding from PO-FESER Puglia 2014-2020. The inauguration party was accompanied by the marathon of peoples and other various events aimed at sponsoring the different areas of the park. The main themes are those of urban and social regeneration in an area of about 25,000 square meters. In the 1940s and 1950s, the district where the current Potì Park is located hosted the weekly municipal market, a commercial, social and cultural meeting place for the city. Within the area there was a sports facility that was abandoned in the 1990s. The inhabitants of the neighbourhood were mainly elderly people forced to stay at home because of the lack of services and facilities. This project aimed to reverse the situation and create a large public green park in the area of the former sports ground, making

the neighbourhood a new central part of the city. Together with the large park, new services have been created and the entire mobility has been rethought, making it sustainable, slow and safe. Of the 25,000 square meters of the entire park 7590 were allocated to the green area; 13000 have been allocated to a drainage area; 4000 have been allocated to the so-called "zone 30".

3.2 Identification of the framework for the assessment of sustainability

In the framework of the academic literature related to sustainable urban regeneration, an important question is how to assess the sustainability performance of urban regeneration projects. However, the academic literature has not identified an unambiguous answer. In fact, although there are several studies and researches aimed at identifying tools and frameworks for sustainability assessment, studies assessing the performance and effectiveness of urban regeneration projects against the social, economic and environmental pillars of sustainable development are still insufficient (Zheng et al., 2014). Some of the current evaluation frameworks suggest measures to assess situations where urban regeneration strategies have been implemented and analyse the effects of policy actions (Hemphill et al., 2004). Although good practices for urban regeneration seem to have benefited from some general principles, it is widely accepted that urban regeneration projects should always take into account the circumstances of the territory and be adapted to specific local contexts (Kleinhans, 2012). This principle is also crucial for the design or selection of methods and criteria for assessing the sustainability of urban regeneration projects (Korkmaz and Balaban, 2020). There is a growing recognition that sustainability assessment methods need to be more representative of local conditions and aligned with the values of the target audience (Dahl, 2012). The local context is therefore the most important element in the evaluation of urban regeneration projects (Conte and Monno, 2012). This circumstance makes it necessary to use methods that are more flexible and adaptable to different contexts (Korkmaz and Balaban, 2020). Methods for assessing the sustainability of urban regeneration should also be dynamic in order to allow researchers to understand the long-term effects of interventions (Korkmaz and Balaban, 2020). The academic literature, among the tools for assessing the sustainability of urban regeneration projects, shows a prevalence of indicator-based frameworks (Peng et al., 2015).

However, such frameworks have some limitations. Indeed, they represent a highly technical means of measuring sustainability and, therefore, tend to reduce the idea of sustainability to a set of easily quantifiable aspects of socio-economic development (Weingaertner and Barber, 2010; Elgert, 2018). Thus, the use of indicator-based frameworks carries the risk of ignoring the qualitative outcomes of the urban regeneration project due to a virtually exclusive focus on quantitative results (Korkmaz and Balaban, 2020). This is an important limitation since sustainability cannot be expressed only in quantitative terms (McCool and Stankey, 2004). Therefore, to overcome this limitation, sustainability assessment frameworks from urban regeneration must necessarily include indicators that go beyond quantitative measures (Boyle et al., 2018; Hemphill et al., 2004). So, a third characteristic that urban regeneration evaluation frameworks should have is a proper balance between quantitative and qualitative indicators. The academic literature has identified several indicator-based frameworks for assessing the sustainability of urban regeneration projects (Balaban, 2013).

However, there is no consensus on which framework is the most suitable. The main frameworks are the one developed by Hemphill et al. (2004), Laprise et al. (2015), Larsson (2012), Couch and Dennemann (2000) and Korkmaz and Balaban (2020). In particular, this study is based on the framework used by Korkmaz and Balaban (2020) to measure the sustainability performance of urban regeneration interventions implemented in the Turkish context. This framework is based on the one developed by Couch and Dennemann (2000), but at the same time takes into account the local context. In this regard, the specificities of the Italian context are similar to those of the Turkish context. Both are characterised by the difficulty in collecting quantitative data. These circumstances make the framework developed by Korkmaz and Balaban (2020) particularly suitable for the present study. Table 1 presents in detail the framework used, highlighting the three dimensions of sustainability, the eight aspects analysed and the twenty indicators used. It also provides an overview of the data and information sources in relation to each indicator.

Table 1 - Assessment of the sustainability of urban regeneration, adapted from Korkmaz and Balaban (2020)

Dimensions	Aspects	Indicators	Data
Social	Participation of Stakeholders	Encourage decision-making and action-taking at the local level Community involvement in developing the project	S, I, DO S, I, DO
	Land Use and Buildings	Under-represented groups are taken into account sufficiently	S, I, DO
		Amenities/services are provided locally Low capacitated residents are provided with improved access	S, I, DO
		Building are reused or conserved	S, I, DO
Economic	Economy and Jobs	Increased chances for employment Improved environmental awareness of local businesses Support local employment by creating new jobs around the project site	S, I, DO S, I, DO S, I, OD
Environmental	Transportation	Walking & cycling are encouraged Public transport use is encouraged Private car use and traffic is discouraged	S, I, DO S, I, DO S, I, DO
	Environmental Pollution	Reduced levels of air and water pollution	S, I, DO
	Energy Use	Maximization of efficiency in energy use Renewable energy generation and use	S, I, DO S, I, DO
	Waste Management	Reduced waste generation Encourage recycling, reuse and/or repair	S, I, DO S, I, DO
	Open Spaces and Wildlife	Increase the sum of green space per capita Supporting connection with the city's green axis created Support the use of open spaces for public interest	S, I, DO S, I, DO S, I, DO

Note: S: Survey; I: Interviews; DO: Direct observation

3.3 Data collection and analysis

This study is based on primary data. In particular, it is based on data collected through surveys, interviews and direct observation.

The questionnaire consisted of 29 questions under eight titles: community participation; land use and buildings; economy and jobs; transportation; environmental pollution; energy use; waste management; and open space and wildlife. Sixty surveys were completed for each of the three contexts examined. Therefore, a total of 180 surveys were completed. In order to allow for quicker compilation, the web and social networks were used as channels for the transmission of the questionnaire.

In addition to the questionnaires, numerous interviews were conducted with main actors who took part in the conception and implementation of the urban regeneration projects examined. In particular, interviews were conducted with representatives of the municipalities and the companies that carried out the works. In a first phase, the interviews were not structured and were aimed at providing a first approach to the survey topic to the interviewees. Subsequently, in a second phase, the interviews opted for semi-structured interviews in order to enhance the phenomenon with respect to the research objectives of this work.

Finally, in addition to the questionnaires and interviews, direct observation was carried out by the researchers. In particular, the researchers visited several times the places affected by the urban regeneration interventions and the surrounding areas in order to understand and evaluate first-hand the effects of these interventions in relation to sustainability.

The data collected were aggregated and subjected to triangulation. This technique corresponds to the reliability tests of quantitative research (Creswell, 2007; Morrone et al., 2020; Ricciardelli et al., 2020; Vitolla et al. 2020; Raimo et al., 2021a, b) and ensures validity, credibility and accuracy to the results of qualitative studies (Denzin, 1984; Stake, 2000; Creswell, 2007). This study has used three types of triangulation.

Taking into account Katamba, Marvin Nkiko, and Ademson (2016), the first type is defined in terms of data triangulation implying that data, previously collected from the available diverse sources, have been subject to examination (direct observation, survey and interviews) and comparison. This triangulation of sources guarantees a more complete view of the phenomenon that has been investigated.

In addition, triangulation of sources ensures that the collected data are compared by allowing reliability of data themselves.

The second type of triangulation is the methodological one. It contemplates that there are diverse methods for data collection from different sources available. The goal of this technique is to clean data collected from eventual weakness deriving from each single method that has been used.

The theoretical triangulation is the last type of triangulation being used. In this regard, it is necessary to point out that researchers have carried out investigation and, later, implementation of data analysis by leveraging on their different personal theoretical background. To be more precise, one side of researchers has specific knowledge of organisational studies, the other side, instead, owns a background in managerial studies. By this technique it has been possible to emphasise on the common elements of all researchers by leaving aside their diverse theoretical backgrounds. It is important to stress out that all three types of triangulations have enabled not only data reliability and validity but they have, more importantly, increased awareness of the phenomenon on which this subject is based on.

The process of data analysis has unfolded in three different phases: cross-examination of raw data, derivation of descriptive statements and themes from raw data, and interpretation. In the first phase, an assessment and visualisation of the data was carried out, which led to the exclusion of data considered not in line with the objectives of this study. In the second phase, a data coding activity was carried out which involved the identification, naming, extrapolation and classification of the data collected. These activities were fundamental in order to obtain a holistic overview of the sustainability of urban regeneration. Data were classified according to the method used (survey, interview, direct observation). The third phase involved the collection of explanations that clarify themes and observations obtained by data.

4 Results

In this section we examine in detail the sustainability performance of urban regeneration interventions in the Apulian context with particular reference to three different areas: social, economic and environmental.

4.1 Social sustainability

Some important characteristics of social sustainability are justice, stakeholder participation in the decision-making and implementation processes of urban regeneration interventions and land use. These are the aspects examined in order to assess the social sustainability of urban regeneration interventions in the Apulian context.

With regard to the first elements, the results show an important justice and participation of stakeholders in the decision-making and implementation processes of urban regeneration interventions. In particular, the results of the questionnaire showed particularly high results to the questions related to community participation in all three cases examined, as highlighted in Table 2. In particular, as emerged from direct observation, the three cases examined demonstrate the participation of stakeholders in the decision-making process through the creation of specific information campaigns through the use of social networks. These information campaigns were aimed at learning about stakeholders' needs, presenting projects and gathering feedback from citizens. In addition, as emerged from the interviews, numerous meetings were organised with cultural and environmental associations in order to make citizens participate in urban regeneration processes. These associations were also listened to and involved during the implementation phase of the urban regeneration interventions in order to know the citizens' opinion about the progress of the works. The most vulnerable citizens, such as the elderly and the disabled, were also listened to in order to ensure that their needs and requirements were met. They may have different interests and needs than the rest of the population. The interviews also showed that local governments have tried to involve not only active citizenship, but also those who normally do not care about urban regeneration issues in their area. This fact, according to the interviewees, represented the real challenge, since only urban regeneration projects of a certain value attract the interest of citizens who are not familiar with urban regeneration and the issues of their territory.

In addition, the results of the questionnaires showed a high level of citizen satisfaction with land use and buildings. Accessibility is an increasingly important issue in urban regeneration projects. In this regard, the project areas have easy pedestrian access for people with limited mobility, such as disabled, elderly and pregnant people. Direct observation also showed us a strong relationship

between pedestrian pathways, sociocultural and open spaces. Furthermore, an important need of citizens is connected to the possibility to access all daily services and facilities in and around the urban regeneration project area. In this regard, it is necessary to underline the presence of several essential services for citizens in the urban regeneration areas. Citizens can easily access banks, pharmacies and supermarkets. Finally, the presence of numerous socio-cultural facilities, also demonstrated by the values obtained in the survey, is also noted.

Table 2 - Results of the survey regarding social sustainability

	San Vito dei Normanni	Brindisi	Mesagne
COMMUNITY PARTECIPATION			
The Municipality organized regular meetings along the planning process to inform all stakeholders and enabled them to participate	3.5	3.1	3.5
Your demands and expectations were taken into consideration and the promises granted during the planning process were sufficiently fulfilled	3.4	2.9	3.3
The promises made during the project planning process have been kept	3.8	3.5	3.8
Strong relationship between the Municipality and the stakeholders continued after the project	3.8	3.4	3.7
You can easily transfer your demands and expectations to the Municipality via nongovernmental organizations	3.8	3.3	3.8
LAND USE AND BUILDINGS			
The pedestrian access is easy and well designed in project area	3.7	3.6	4
You can easily meet your daily needs from project area and its nearby surroundings	4.1	3.8	4.1
There are enough socio-cultural facilities in project area and its surroundings	4.1	3.5	3.8

4.2 Economic sustainability

Economic aspects are the second pillar of sustainability. In the context of urban regeneration, projects should contribute to the growth and economic development of the project area and its surroundings. In this respect, it is to be expected that a valuable urban regeneration project will create new job

opportunities for the local inhabitants and in particular for special categories such as young people and women in the different phases of planning and implementation as well as in the post-completion phase.

The results of the survey, as shown in Table 3, demonstrated a wide satisfaction of citizens with the impact of urban regeneration projects on employment levels. Through the interviews and direct observation, the involvement of local businesses in the works related to urban regeneration emerged first. This concerned both the definition and implementation phases of the projects. The involvement of local enterprises not only increased the employment level of the municipalities surveyed but also fostered a sense of belonging among the citizens who felt directly involved in the urban regeneration projects of their territory. In addition, people living in the project areas were employed in commercial structures and in the provision of cultural and artistic services within the urban regeneration areas. The increase in employment levels mainly concerned young people. However, it must be stressed that there were no specific strategies and policies to support the participation of women in the entrepreneurial life of the project areas either in the design and implementation phases of the projects or in the post-completion phases.

Table 3 - Results of the survey regarding economic sustainability

	San Vito dei Normanni	Brindisi	Mesagne
ECONOMY AND JOBS			
The project provided job opportunities for you and your acquaintances during preparation and implementation processes	3.5	3	3.3
After the project was completed, new job opportunities emerged, and some of my acquaintances could find work	3.9	3.1	3.3
The project created new job opportunities for women	2.3	1.7	1.9

4.3 Environmental sustainability

Environmental sustainability is assessed mainly in terms of transport, environmental pollution, energy use, waste management, and open space and wildlife. In this perspective, sustainable urban development is based on the extensive use of efficient and well-organised transport systems, the reduction of

environmental pollution and energy consumption, the use of sustainable energy resources, extensive waste recycling, and the use of large green open spaces. In light of this, urban regeneration interventions should contribute to improving aspects related to transport, pollution, energy, waste and green open spaces. The results of the questionnaire firstly showed a high level of citizen satisfaction with transport. These results are also confirmed by interviews and direct observation. They showed that urban regeneration projects discouraged the use of cars and favoured the use of bicycles and bus-based public transport. They have also encouraged walking by citizens. These interventions have therefore reduced city traffic both in the urban regeneration area and in the surrounding areas. The questionnaires also showed high results in relation to environmental pollution. In this regard, citizens were particularly satisfied with improvements related to air and soil quality, while there was less satisfaction with water quality. This is also evident from the interviews and direct observation that the many green spaces created have significantly increased air and soil quality. In relation to energy use, the results of the questionnaire showed a low level of citizen satisfaction. Interviews and direct observation confirm the lack of use of renewable energies and a not total maximisation of the efficiency of energy use. In this respect, the absence of motion sensors does not support the achievement of full efficiency. In relation to waste management, the results of the questionnaire showed a high level of citizen satisfaction.

This satisfaction derives both from the level of information local governments provide to citizens about waste issues and from waste management. The interviews and direct observation showed that, thanks to urban regeneration interventions, levels of waste production and abandonment have been reduced. Furthermore, thanks to the urban regeneration interventions, the level of waste separation has increased and the level of waste recycling has increased. In addition, these urban regeneration interventions have also changed the culture of a part of the citizens previously not oriented towards separate waste collection. Finally, in relation to open space and wildlife, the results of the questionnaire showed a high level of citizen satisfaction. The urban regeneration interventions have in fact provided citizens with additional green spaces which, as emerged from the interviews and direct observation, are used as meeting places for young people and families. In this perspective, urban regeneration interventions further stimulated the use of open spaces by citizens who increasingly prefer to enjoy

nature instead of staying at home or going indoors. The creation of new green spaces is also an engine for tourism.

Table 4 - Results of the survey regarding environmental sustainability

	San Vito dei Normanni	Brindisi	Mesagne
TRANSPORTATION			
There is easy pedestrian access to public transportation as well as between public transportation stops, facilities and residences	3.8	3.6	3.9
Pedestrian and cycling routes are well designed and integrated to each other	3.6	3.7	3.7
The frequency of public transportation is not adequate	3.5	3.5	3.8
Having a car is a need that makes life easier in project area	3.6	3.5	4
Low-capacitated residents (i.e. disabled) can reach anywhere on foot in the area	3.9	3.6	4.1
ENVIRONMENTAL POLLUTION			
The project has improved the quality of the air in the area	3.2	3.3	3.5
The project has improved the quality of the water in the area	2.9	3	3.2
The project has improved the quality of the soil in the area	3.2	3.2	3.5
ENERGY USE			
Residential units have no heating problems due to good insulation and solar orientation	2.1	1.9	1.9
Heating expenditures is quite high	1.7	1.6	1.7
WASTE MANAGEMENT			
Municipality collects the wastes regularly	3.9	2.8	4
Residents are informed about waste separation and importance of recycling	4	3.9	4
Recyclable wastes and vegetable oil wastes are collected separately	3.4	3.3	3
OPEN SPACE AND WILDLIFE			
There are enough green spaces, sports areas and playgrounds in project area	4.3	3.9	4.4
You are pleased with the use of open and green spaces around residential areas	4.2	4	4.4
You can use public spaces in the project area at any time of the day	4.2	4	4.1

There are public spaces where different income groups can come together	4.3	4.1	4.4
You prefer to meet with your acquaintances in open spaces in project area	4.4	4.1	4.3

5 Conclusions

This study aimed to investigate the sustainability of urban regeneration interventions in the Apulian context. The results showed a high level of sustainability of these interventions in all three contexts examined. However, there are some weaknesses related mainly to the absence of strategies aimed at the inclusion of women in the labour market and to the low efficiency in the use of energy. This study contributes to the academic literature and practice in different ways. Firstly, it contributes to knowledge about the sustainability of urban regeneration interventions. In particular, it represents one of the first attempts to measure the sustainability of urban regeneration in Italy. Secondly, this study provides an important framework for measuring the sustainability of urban regeneration. This framework will be useful for practitioners and professionals to examine this phenomenon in other contexts and for professionals interested in assessing the goodness of urban regeneration interventions implemented by municipalities.

The results of this study have important implications for municipalities implementing urban regeneration projects. In particular, it shows a number of elements that municipalities should pay attention to in order to increase citizen satisfaction and thus gain acceptance. In particular, when implementing urban regeneration projects, municipalities must pay attention to social, economic and environmental aspects. In the field of social aspects, municipalities must first of all involve stakeholders in the planning and implementation of urban regeneration projects. In particular, they must pay attention to and involve the weakest and least represented stakeholders. Furthermore, municipalities must pay attention to land use and the preservation and re-use of buildings. In the field of economic aspects, municipalities must pay attention to revitalising the local economy and increasing the level of employment. In this regard, they must also devise strategies for getting young people and women into work. Finally, in the area of social aspects, municipalities must pay attention to policies related to transport, environmental pollution, energy use, waste management and open and green spaces. With regard to transport, municipalities should discourage car use and

encourage the use of public transport and bicycles. Regarding environmental pollution, they should develop policies to reduce noise and improve air and water quality. Regarding energy, municipalities should maximise the efficiency of energy use and promote the generation and use of renewable energy. Regarding waste management, municipalities should develop policies aimed at reducing the amount of waste produced and increasing separate waste collection. Finally, with regard to open spaces, municipalities should create new green spaces that welcome young people and families.

However, this study is not without limitations. A first limitation is related to the use of only primary data and the absence of secondary data. This may limit the objectivity of the data collected. A second limitation is related to the relatively low number of answers to the questionnaires. However, these limitations do not reduce the overall quality of this work and offer important insights for future research. In relation to the first limitation, they will be able to replicate the study by extending the number of sources used and incorporating secondary data. In relation to the second limitation, they will be able to extend the number of responses to the questionnaires by identifying additional dissemination channels to facilitate circulation. Finally, future studies could examine the sustainability of urban regeneration projects in other contexts and make international comparisons.

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