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Preface: World Multidisciplinary Civil Engineering-Architecture-Urban Planning Symposium - WMCAUS 2022

The selected articles from the 7th Anniversary of the "World Multidisciplinary Civil Engineering-Architecture-Urban Planning Symposium" held in Prague from September 5-9, 2022, are included in this volume of "AIP Conference Proceedings". In order to encourage the potential for future partnerships, the WMCAUS 2022 aims to provide a platform for debate of the most recent research and technological developments in several areas of Civil engineering, Architecture, and Urban Planning. It serves as a forum for early career researchers to share their work and engage in dialogue with experts in many areas of these domains. It provides a venue for exchanging information and experiences.

WMCAUS 2022 was initially scheduled to take place from June 13-17, 2022; nevertheless, it was moved to September 5-9, 2022, and hosted in Prague (Czech Republic) with participants attending in person. Despite the Covid-19 epidemic conditions and geopolitical situation, the symposium went effectively as planed thanks to the participants' very valued efforts.

The World Multidisciplinary Civil Engineering, Architecture, and Urban Planning Symposium (WMCAUS 2022) successfully accomplished all of its objectives, and 278 peer-reviewed publications were released. We want to express our gratitude to all the reviewers for working so hard to ensure the excellent calibre of published papers.

We sincerely thank the respected WMCAUS's distinguished Scientific Committee and Institutional Scientific Partners. Main focus was given to the completion of the Scientific Committee and Institutional Scientific Partners of WMCAUS, and all members were chosen from among well-known, highly esteemed, productive representatives of many countries.

We extend our sincere gratitude to the WMCAUS 2022 sponsors, including the primary sponsors LAMA Energy Group, LAMA Gas and Oil, CIHELNA Sterboholy, as well as MDPI - Academic Open Access Publishing Since 1996, for invaluable assistance in making the symposium possible. Furthermore, we would like to express our profound appreciation to all participants for their involvement in and contributions to the 7th Anniversary WMCAUS 2022, which has received more than 381 submissions from more than 59 different nations worldwide. Many thanks go to the WMCAUS crew for their greatly valued high workload year-round. We hope to meet the attendees of WMCAUS 2022 once again at the 8th WMCAUS 2023, which will be hosted in Prague (the Czech Republic).

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Social Impact and Urban Quality: Graphic Representation Tools for Programming and Planning

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Abstract. The contribution proposes an ongoing part of a larger work that will be completed in the coming months. The pretext is the update of the evaluation of the social return on investment index carried out in 2015 by the Turin-based Fondazione Sviluppo e Crescita CRT with Politecnico di Torino. In 2021 it will be ten years of activity for Sharing, the first example of social housing in Turin, and so it was decided to give an up-to-date reading of the social return by defining an assessment model that on the one hand makes the process of data collection and analysis more rapid, and on the other includes in the study variables of a broader context, at the scale of the neighbourhood, incorporating parameters and indicators of urban quality and resilience, always read through the filter of social impact and its implication with urban quality.

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INTRODUCTION

The work presented here takes its cue from the studies begun in the last decade by the research group coordinated by Giorgio Garzino and Maurizio Marco Bocconcino (see Acknowledgement) on the subject of well-being and urban quality and graphic codes to support interpretation and design [1]; 2], including over time the reading of vulnerability [3] and the definition of new ways to represent the aspects of resilience and regeneration capacity of territories and building tissues that characterize the 'urban form' [4; 5], this not only in relation to the central and stratified courtly area, but also with reference to other structuring and characterizations that characterize the peri-urban and neighbouring municipal areas [6; 7; 8]. Mitigation and adaptation are the two fundamental conditions for the pursuit of resilient urban environments and possible actions-solutions-strategies aimed at offering scenarios on an urban scale, oriented towards emergency or planning [9].

Social Housing Sharing Torino is an urban and social renewal project promoted by Fondazione Sviluppo e Crescita CRT; the Foundation has participated in the whole generative chain as an investor, but also supporting the manager up to the exit through the purchase by the Piemonte Fund C.A.S.E., managed by REAM SGR S.p.a. It is the first of the most important examples of temporary social housing in Turin, with an intervention in 2011 that made it possible to convert a former Italian Post Office building, located in the northern suburbs of Turin, into a structure intended for various forms of social and tourist residence. Social Housing Sharing Torino represents a significant case not only because it is a pilot project in an urban reality of virtuous dynamism and visible social, cultural and economic renewal. In recent months, an evaluation model is being prepared to estimate the social impact of the intervention. On this occasion we illustrate the components of the model relating to relief and urban quality. The evaluation model being prepared is intended to be light and simple to apply, while maintaining transparency, representativeness and significance. The objective is twofold: on the one hand to read the evolution of this node within the urban fabric in which it lives. On the other hand, to define an evaluation tool that can operate in the monitoring of different interventions (which will obviously also need to have variables sewn up case by case), but that can also provide

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elements to identify in advance, ex ante, those social and territorial realities that could support the success of the investment in terms of social impact. This is a field in which social impact must be linked together with local actions and urban infrastructure triggers, involving public and private actors.

The survey and the urban project see illustrious references in the research; in particular, significant perceptual approaches were disseminated through authors, visual approaches linked to the reading of urban space, scenes collected apparently in an extemporary manner, in a rush, dense with layers of reading, as well as analytical approaches, which break down the image of the city and operate synthesis at different levels of interpretation. The research group's attention is also focused on the codes of representation, the graphic language that gives access to knowledge and enables the conception and realisation of conscious projects. Urban survey is a lively field of research, sensitive to innovation in methods and tools of investigation. Access to an ever-increasing range of data makes it possible to answer complex questions about the use of urban space and the social impact of its quality.

The urban and social regeneration group of the Foundation sees the joint work of professionals embedded in the Foundation and academic profiles from the university world and in particular from the Politecnico di Torino. Turning to the models operating in the United Kingdom belongs to that red thread that traditionally binds the corresponding national panoramas. Think of the urban planning principles that have inspired historical transformations in the Turin area with mixed results, but which today provide an opportunity to remedy the mistakes of the past. If country houses are the best known English contribution to 18th century architecture, equally important is the urban planning vision which, particularly since the industrial revolution, has been based on environmental and ecological themes.

In Europe the movement of 'neo-urbanism' coincides with the Urban Renaissance movement. Both movements have common development times and principles. In the UK, the principles of American and European neo-urbanism have been practised and developed by The Prince's Foundation for the Built Environment. Other organisations that have promoted neo-urbanism or parts of it are INTBAU and A Vision of Europe. Since 1996, the Urban Renaissance Movement has spread throughout Europe, from the new town of Poundbury in England (1988-2007) built according to the plan of Luxembourger Leon Krier. Fondazione Sviluppo e Crescita CRT and Politecnico di Torino have long established and maintained a fruitful relationship with a number of players in the United Kingdom, in particular the Prince's Foundation and Kellogg College of the University of Oxford (UK).

The character of the survey as an open system of knowledge requires a plurality of skills of an interdisciplinary nature. From consolidated and ongoing urban survey experiences, methodological aspects have been highlighted, aimed at environmental reading and the consequent identification of resilient solutions. Drawing is a tool to know and to conceive, appropriately codified it can become a shared language and a place of transparent interaction between the actors of the city government. The resilience of urban and territorial systems must be understood and represented in order to provide integrated analysis tools for planning and design. One of the objectives of the assessment work is to define the setting of graphic systems to support the analysis and interpretation of a series of significant examples; central is the theme of the graphic representation of natural and anthropic risk and vulnerability of places, also in relation to the integrated reading of parameters and indicators for the measurement of resilience in environmental systems.

METHODOLOGICAL APPROACH AND APPLICATIONS

Significant elements in the Pietra Alta district are the presence of green areas, in particular the Parco Stura Nord to the south, the SNIA Viscosa workers' village to the north, the Vittorio towers practically at the entrance to the motorway to and from Milan, numerous public transport lines, including metropolitan ones, the Stura metropolitan railway station and an interchange car park to the north of the district. This is a place where various projects of the City of Turin related to urban recovery and redevelopment have tried to correct the many uncoordinated layers over time in a unitary design. The different phases of growth of the borough and also the mixture of public and private buildings are among the main reasons for the heterogeneity observed. The establishment of new centres for large-scale retail trade has had a major impact on small local businesses. The building fabric is sparse, not very compact and not homogeneous (see following paragraphs).

In the context of the complexity of assessment processes and the wide range of measurement tools, the development of this research, which should be significantly completed in the second half of this year, is developing around the role of indicators in the description of urban and social quality for its ex ante evaluation and monitoring. Transformation and regeneration processes are complex, and it is complex to articulate them in a plurality of functions that support local regeneration and housing policies alongside social infrastructure interventions. We first considered taxonomies found in the literature concerning the definition of risk in the urban context. This first reference framework

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becomes useful in general to identify territorial vulnerabilities among which the social component plays an important role. Subsequently, a set of thematic indicators was set up on the urban map. This work has defined a series of overlapping cartographic layers from which it will be possible to operate weighted overlay readings between themes linked to functions, infrastructures, demographic and income distribution, services and urban standards. These aspects become particularly interesting when compared with field surveys through interviews and questionnaires submitted to citizens. Opinions and feelings must be cross-checked with objective elements and measurements in order to be able to prepare intervention policies that really affect people's well-being, also through information and communication campaigns for the dissemination and diffusion of knowledge. This last aspect is emerging also for Pietra Alta as a discriminating element for the creation of communities and local identities, as confirmed by studies and researches on different urban areas.

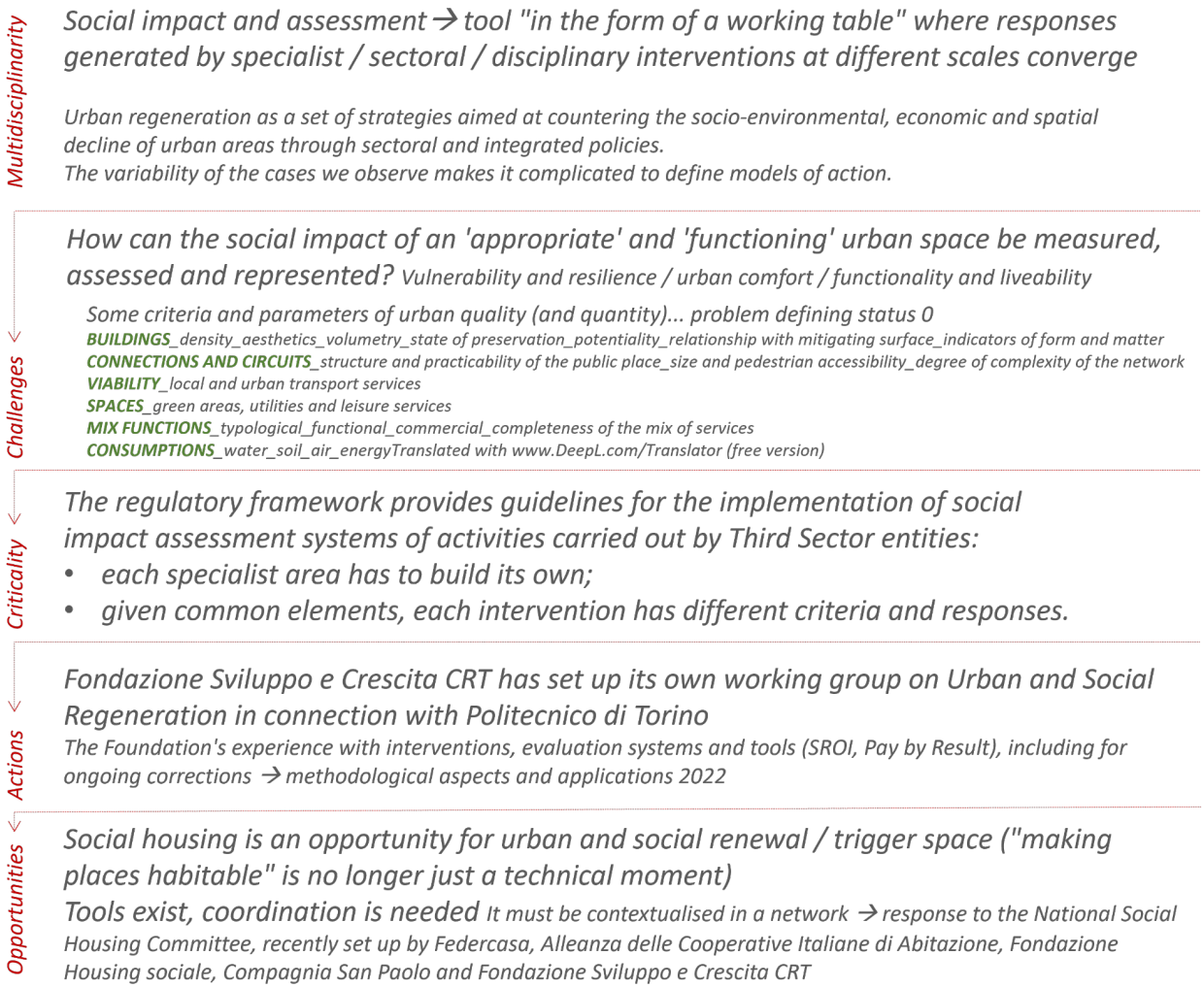


FIGURE 1. From multidisciplinarity to opportunities: pathways to defining social impact.

Among the elements considered in the thematic sets of map reading, the quality of urban routes, with a synthetic term walkability in Anglo-Saxon literature, its evaluation, includes estimation approaches that are defined as objective, others that are more properly subjective and must be weighted. The research work is trying to incorporate both methods by trying to combine perceptual elements and therefore variable according to the subject, the pedestrian, the person (which we will collect through questionnaires) and objective parameters derived from direct readings and deferred interpretations, as well as from digital information models where different technologies interact for data management. The study of the accessibility of public spaces and urban walkability is part of a broader research area that examines the connections between land use and mobility and in particular how the two can be used to create more liveable communities. Walkability is also considered a key factor in promoting health goals and is associated with the goal of

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an 'active community', while in the sustainability literature it is seen as a way to potentially reduce the ecological footprint, minimise car travel, reduce energy consumption and limit the occupation of undeveloped land. Recent research notes that its quality can effectively lead to healthy and vibrant urban places. It is a concept that is gaining increasing strength and frequency in social and environmental well-being assessments, particularly as a means of developing identity and recognisability of places. Surveying and representing walkability in urban spaces must be considered within the complexity of assessment processes and the wide range of measurement tools. From the need to move independently on foot, given a safe and comfortable environment, people seek utility, a sense of belonging and pleasantness as additional and distinct needs to improve their living experience in city neighbourhoods. Using survey data and assuming relief from geo-referenced interviews, the work builds on the integration of inhabitants' perceptions and objective measures to understand the impact of environmental features on the views and behaviour of people living in the neighbourhood.

The modelling of the areas on an urban scale was carried out in different processing environments, bearing in mind that the technology, the tool and the representation technique used, will need to be associated with specialised training of the survey operators both for the data acquisition phases and for the subsequent reading and management operations, in order to prepare, draw up and validate a structured process of acquisition, processing and implementation of the data collected, making them questionable and supporting the analysis and planning phases: GIS&BIM information model; social analysis through questionnaires and integrated readings on movements, flows and use of public space.

Overview of Pietra Alta territory and first risk taxonomies

The Pietra Alta district is part of the first suburbs of Turin, from the Piedmontese word pràuta, which indicated a milestone that marked the crossroads when there were only fields and farmsteads [10]. A triangle of land enclosed between Corso Giulio Cesare, Via Ivrea and Corso Vercelli, whose main function has always been to be a transit area, representing a passage, a place of travel to and from the city centre. The neighbourhood has some elements of architectural interest, including the SNIA Village, the former Dazio, the Di Vittorio Towers, service points for the neighbourhood community, such as the urban parks - Corso Vercelli, Parco Stura Nord, Via Cavagnolo - and meeting areas, such as the one near the Church, requested by the neighbourhood inhabitants (Figure 4).

The subject of various urban regeneration interventions, promoted and financed both by the Comune di Torino and by private bodies and associations, the Pietra Alta area is now an area of particular interest for assessing the impact of interventions on the quality and well-being of individuals. Within this context and this portion of territory, which is so fragmented and complex, the first temporary Social Housing in Italy was born in 2011: housed inside the 1970s building owned by the Italian Post Office, with the aim of creating housing for postal employees, following the complete functional reorganisation of spaces and connections [11].

A territory undergoing many changes, both structural and social, the area undergoing the urban regeneration of Via Ivrea becomes a field of study for the evaluation of the multidimensional character of the intervention. The urban regeneration strategy, in order to be effective and efficient on an area full of history and character, such as Pietra Alta, must have a multidimensional and integrated character, which is able to affect all the dimensions with which the processes of obsolescence and degradation occur on the area under study.

Risk	Description	Phenomena
Social & Welfare*	Social risk is very broad and can be applied to almost all areas of human life. Its presence has increased in proportion to the development of society and its evolution. A social risk can be defined as any factor that, if it occurs, can negatively affect a person's social and/or material status.	a. Activating creative districts a. Crime and violence c. Population decline d. Ethnic inequality e. Unemployment and precariousness f. Ageing population g. Lack of affordable housing h. Lack of social cohesion i. Neighbourhood services and community development l. Inadequate education systems m. Social housing n. Promotion of art and culture



FIGURE 2. Table of risks and phenomena for the evaluation of urban regeneration.

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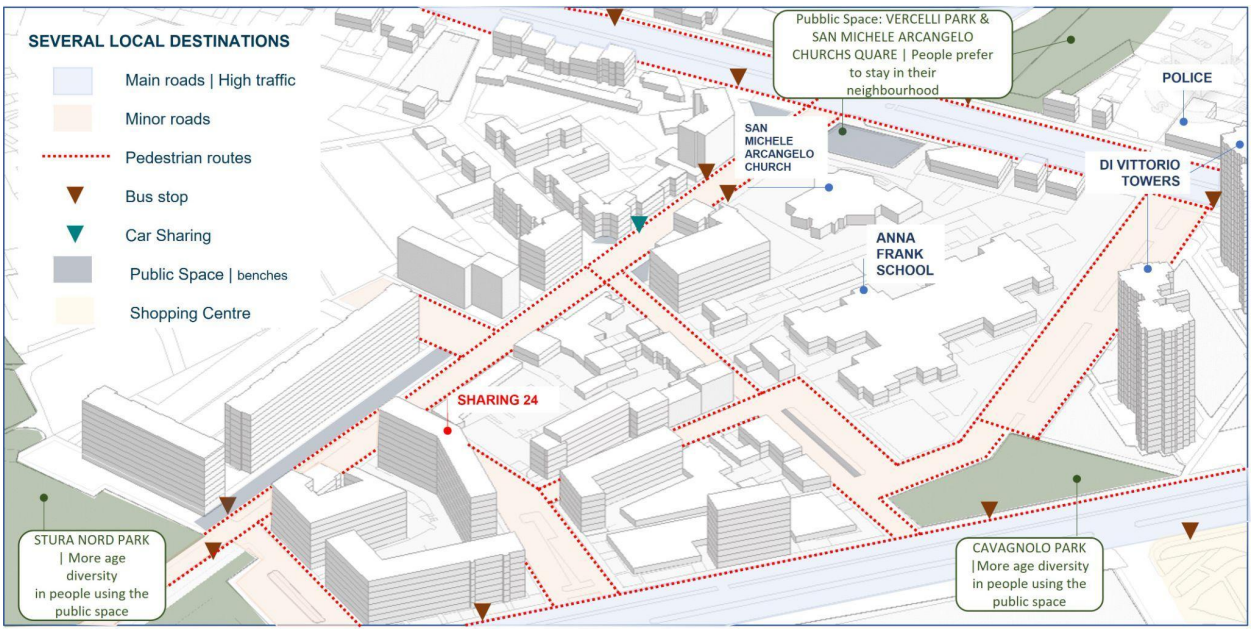


FIGURE 3. Some of the markers of places in the Pietra Alta district.



FIGURE 4. The Pietra Alta triangle: between transit area and architecture.

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In order to orient future strategies, it is, therefore, necessary to evaluate two orientations of interventions at the same time (Figure 2): a.. place oriented: referring to aspects linked to the urban built tissue, to built and unbuilt spaces, to the impact of nature on places, to changes linked to climate, etc.; b. people-oriented: referring to the needs of the users of places, to social identity, to the participation of places and how they are experienced in certain contexts. In the light of the above, through the definition of parameters and indicators aimed at assessing the impact of the social evolution of an area of the urban fabric of Turin, where a redevelopment project has been carried out, the objective is to highlight the changes, positive and/or negative, in the morphology and identity of the places (9). Specifically, the insertion of the new Social Housing building in Via Ivrea 24 led to the exploration of new pedestrian routes and the rediscovery of the neighbourhood's potential, through the enhancement of previously little-visited places. Thus "markers" were defined, i.e. reference points on a neighbourhood scale, such as points of particular interest to people, green areas, etc. (Figure 3), which led to a rediscovery of the neighbourhood and areas that had once been neglected.

Sharing Torino framework and indicators

Within the described context and territory, so fragmented and complex, multi-functional social housing Sharing Torino was born in 2011: housed in the 1970s building owned by the Italian Post Office, to create housing for postal employees, following the complete functional reorganisation of spaces and connections, it has now been converted into 122 residential units and 58 hotel rooms. The project idea (designers Costa&Partners and Mellano Associati) was realised also thanks to the valuable collaboration with the City of Turin and today constitutes a significant "best practice" in public/private collaboration. The 10,000 square metre building currently houses a number of different communities, including young workers, Italian and international students, families in housing emergencies, tourists and city users. Sharing also hosts an integration project for asylum seekers managed directly by the educators and operators of the D.O.C. Cooperative. The world of Fondazione CRT is also involved in this intervention in the neighbourhood with the presence of Fondazione Ulaop-CRT Onlus, which provides an after-school service within the structure for all the young people of the Pietra Alta neighbourhood (Figure 5).

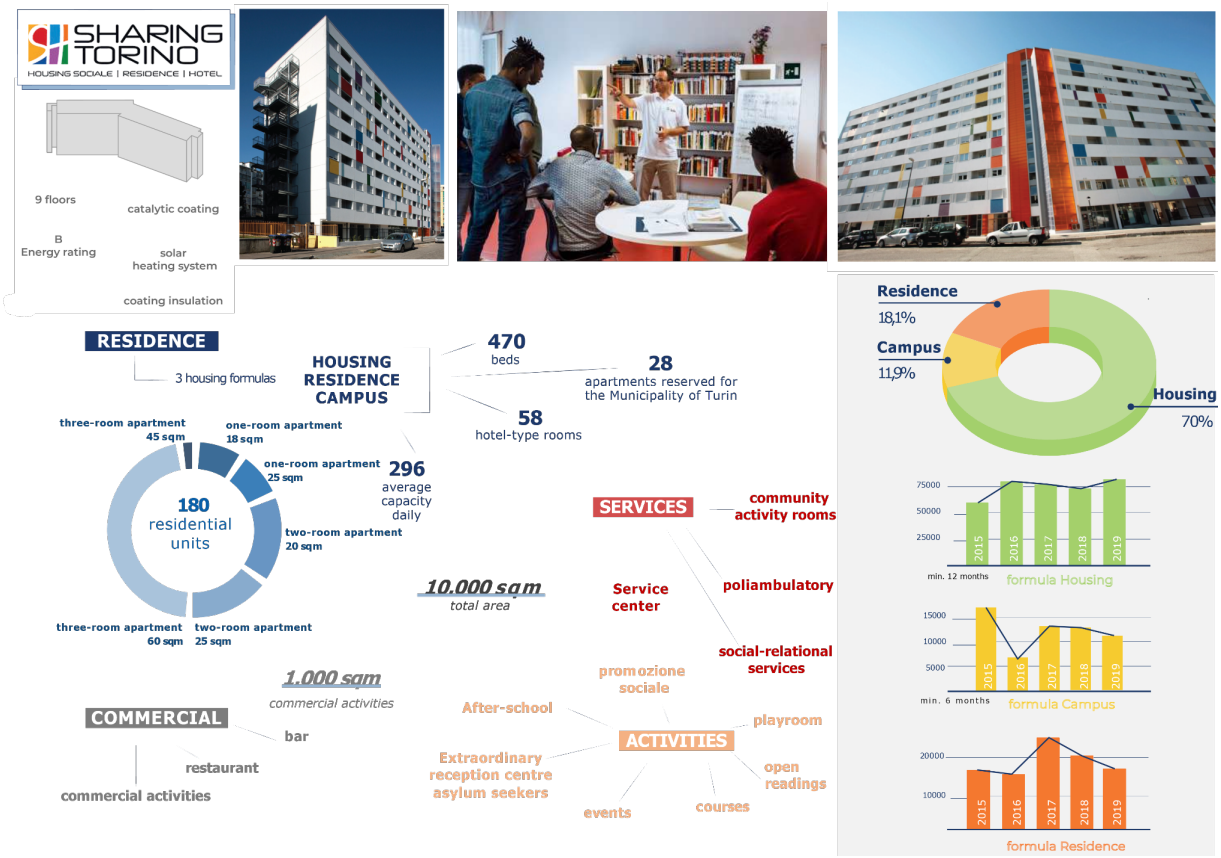


FIGURE 5. Sharing Torino: functions and data for an evaluation.

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The building offers good quality temporary residential solutions at affordable rates, with a total of 470 beds distributed in a wide range of housing types, as well as social, health and commercial services. It is an inclusive project targeting the grey segment of the population that is not satisfied by the rental housing market. The intervention, as far as the flats are concerned, is aimed at families, young couples, expatriate workers, students and migrants. The project benefits from a service contract with the City of Turin for families in housing emergencies related to blameless evictions or precarious housing conditions and waiting for the assignment of a council house. The hotel, for its part, offers quality rooms for tourists, participants in directly organised training courses, events organised by private bodies and institutions, and city users.

After eleven years, the Via Ivrea 24 housing project is now a positive reality, with a turnover of more than €1.4 million and over 110,000 days of occupancy. It remains a successful model of investment with a social impact, a concrete demonstration of the possibility of realising Social Housing according to a logic of economic sustainability, enhancement of the surrounding neighbourhood and growth of professionalism in social management. This path of urban regeneration offers new faces to places that are difficult to use, creating infrastructures with refurbishment and new works, using participatory and shared design methodologies that contribute to the well-being of the inhabitants.

In 2015, the Foundation conducted a study on Social Return Of Investment (SROI), based on the Theory of Change method. As mentioned above, Fondazione Sviluppo e Crescita CRT thought it would be useful to update the assessment of Social Housing for the following years until 2019 and at the same time implement new parameters for assessing social impact that take into account not only the Theory of Change but also the Sustainable Development Goals (SDGs), i.e. the United Nations objectives. The work is being carried out by the Foundation's impact assessment area in collaboration with the Politecnico di Torino.

SOCIAL IMPACT ASSESSMENT FOR SHARING TORINO

In 2015 Fondazione Sviluppo e crescita CRT implemented a Social Return of Investment assessment in line with Social Value's methodology on Social Housing Sharing Torino and took a significant step in the direction of assessing the social impact of investments. The in-depth look at the results produced in the three-year period 2012-2014 has made it possible to identify the actions within it that are capable of developing positive consequences on the lives of people related in various ways to the project. We can imagine the impact as a stone thrown into a body of water and the circles created around it. The movement reverberates at different levels and produces consequences, i.e. outcomes. The cultural revolution that has led the non-profit and philanthropic worlds, and increasingly also the business world, to assess the effects of their actions on their stakeholders, i.e. those who have a direct or indirect interest in the action, makes it possible to evaluate business actions and projects in a holistic way, integrating financial reporting and a snapshot of the services/products obtained with a measurement of the consequent benefits that affect people's lives. Being able to compare financial, human and material resources with direct and indirect results in a transparent and measurable way allows an organisation to make more informed decisions and correct any inefficiencies in project implementation. Fondazione Sviluppo e Crescita CRT is a member of Social Value Italia and applies in its choices a vision in line with the proposed principles of social and environmental impact assessment, also through targeted analyses on projects. In addition, the financial commitment dedicated to Social Real Estate, through investment in ethical funds in the sector, has been an impetus to deepen and build measurement techniques that are suited to the booming sector and that at the same time do not lose sight of the primary target, i.e. the people of each project on whom the effects are poured. The work of recent years has led to the creation of a group made up of resources from the Foundation and the Politecnico di Torino to develop data collection systems to enable monitoring and evaluation according to the criteria of the Theory of Change (Figure 6).

It was decided to update the evaluation of Sharing Torino using this method of measuring change, capturing the evolution of the effects over the period 2015-2019 through the measurement of effects and quantification, with intensive stakeholder involvement. The work was carried out with the active collaboration of the cooperative that manages the intervention (Cooperativa D.O.C.), both in providing aggregated data according to the indications of the working group and in allowing the carrying out of focus groups and interviews with quantitative assessment of the various stakeholders involved in the project, i.e. the manager and its workers involved in Sharing, the Centro Accoglienza Straordinaria that implemented an important project of integration of migrants, the associations of the neighbourhood that interact with Sharing, the Fondazione Ulaop CRT. The social impact assessment process aims to asseverate the value created and concretely measured for the actors involved in the project.

First of all, it is important to underline the overall value of a social impact assessment that develops relationships between decision makers, intervention providers and beneficiaries and allows for an overall vision that generates more

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performing actions, both in terms of resource allocation and results, without neglecting the opportunity for professional and human growth of all those involved, starting from the Foundation itself that draws energy, more and more awareness and inspiration from the direct relationship with the actors with whom it interfaces.

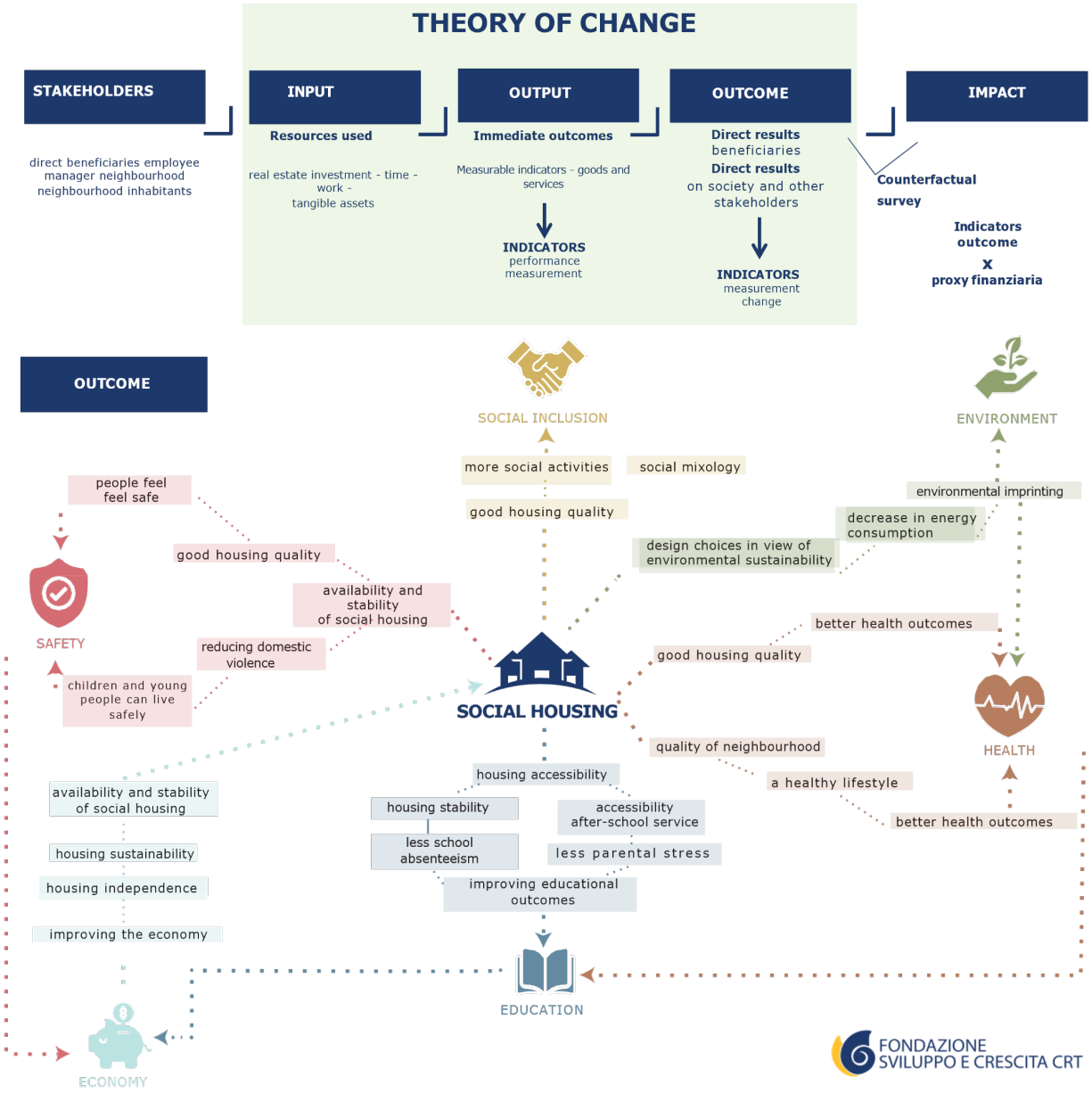


FIGURE 6. Summary outline application of theory of change and focus on outcome in the Sharing Torino case.

The first part of the evaluation is dedicated to the four-year period 2015-2019 of the Social Housing Sharing Torino intervention, while a second part of the evaluation work, currently being analysed, will be published on the period 2020-2021, the years of the pandemic, analysing the dynamics with the aim of obtaining indications that will allow the development of projects that take into account new needs and an adaptable impact monitoring scheme that can be applied to the sector in an increasingly effective and efficient way.

The Foundation's involvement in the process of deepening the materiality of social impact stems from the increasingly pressing awareness of being developers of positive processes, concretely aimed at people, with the ability to evolve and share a culture of effective and widespread well-being.

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CONCLUSION

The 'urban question' requires complex multidisciplinary and methodological approaches, different reading filters and therefore information tools that allow the city-neighbourhood-island to be related through multifunctional and multi-scalar protocols using shared processing environments. The main externality of good urban quality is the well-being of the individual.

In addition to providing itself with parameters and indicators of direct social effects, deliberately identified for their availability and simplicity of use and processing, some general and others specific to the study areas, the model incorporates elements for assessing the impact of urban quality on social health.

The contribution first compared and then followed up with different computer-based approaches that, at the current state of the art, guarantee the most efficient management of data and information for urban analysis. The objective is to define a methodological proposal that favours the permanence of data, in a shared and participated environment, from the scale of the urban plan to the project scale, and allows, in the phases of progress and definition of the intervention of transformation and reuse, to constantly compare the original hypotheses or to reformulate new ones.

In these illustrations we have listed a number of indicators, several of which are illustrated in the literature. At a first reading level we are sticking to those we can consider most recognised. New ones are emerging and derive from new possibilities of access to data, numerous, related to the use of public space (e.g. real-time recordings, but also asynchronous readings of places). Representations, images and physical ideas of the city play a fundamental role in orienting and defining projects and processes of transformation of the territory.

The importance of representations in the transformation processes of the urban territory becomes evident in the case of Turin: some components of the local physical landscape, or certain historical constructive figures of the city (the orthogonal grid, but also the settlement matrixes of the industrial city), are denied or reinforced by projects.

The research develops around the role of indicators in the description of architecture, the city and the territory for the evaluation and monitoring of strategies aimed at recognising urban quality starting from the planning of spaces (nodes) and routes (networks).

The collection of indicators representative of the urban and social evolution of an area where new developments with a variety of functions, including social housing, arise is one of the starting points for highlighting changes in the form and identity of the place.

The northern area of Turin is now affected by complex processes of transformation and regeneration articulated in a plurality of functions that support social reanimation and housing policies alongside temporary residential and commercial interventions. A specific district of Turin, Pietra Alta, is presented as an application case of the indicators and graphic codes that the methodological approach of the research is gradually outlining.

The results, guided and supported by effective modes of representation, broaden the understanding of the hierarchy and criteria of the needs to move independently on foot and confirm that, given a safe and comfortable environment, people seek utility, a sense of belonging and pleasantness as additional and distinct needs to enhance their living experience in the city's neighbourhoods.

Using survey data and assuming relief from geo-referenced interviews, the proposed work emphasises the integration of residents' perceptions and objective measures to understand the impact of environmental characteristics on neighbourhood behaviour. The active involvement of citizens is the development that will be given to the work, including new tools for collecting and analysing the feelings of those who live in the places. The issue of solutions remains open, an abacus, a handbook that in some way provides us with a vocabulary to construct a discourse of possible interventions to improve the quality of public space and urban well-being.

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The theme of urban investigation has been at the core of our department's activities since the first studies on the city of Turin started by Professor Augusto Cavallari Murat and continued by Professor Dino Coppo and Professor Pina Novello. The concept of urban resilience has long since become part of our research objectives. Since the establishment in 2017 of the Interdepartmental Research Centre on Risk Resilience, this particular vantage point is central to our activities. The contribution is part of a broader research work on the study and representation of urban and environmental quality and related resilience aspects initiated by Giorgio Garzino and scientifically coordinated by Maurizio Bocconcino.

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