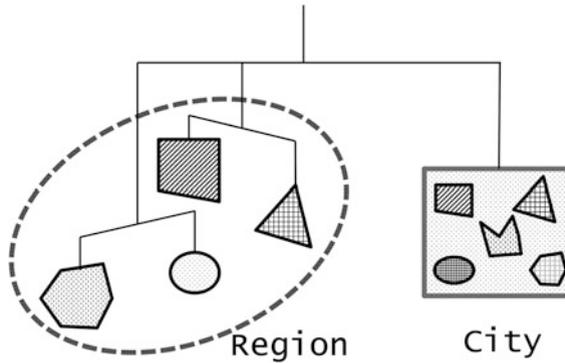


## Chapter 2

# The Background: A Critical Analysis of the Ongoing Milan ICT Projects

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This chapter aims at introducing the rapid development of the smart city concept and its different meanings and at highlighting at the same time its potentials and risks through a review of bibliographical references: from the original concepts of intelligent, digital and creative city, to the recent ones of human smart city and sensible city. Considering the Italian context, in light of a smart concept that to date has been mainly restricted to the urban scale, Milan is investing significant efforts and resources in smart city projects, also in relation to the 2015 Universal Exhibition. Many initiatives have been directly launched or supported by the municipality, while others have been promoted by the mega-event management company Expo 2015 Spa. Whilst Milan is the main urban pole of a larger metropolitan area that extends beyond the traditional administrative boundaries (metropolitan and regional) and is included in the wider Northern Italy city-region context and whilst the theme of Expo 2015 (*Feeding the planet, energy for life*) directly involves the agricultural area all around the inner city, the research project suggests a shift from a smart city concept to a smart region one (Fig. 2.1). In this perspective, it also suggests to pay particular attention not only to the main urban centers but also, and especially, to the peri-urban and intra-urban areas in order to remedy their marginality with respect to the stronger nodes.



**Fig. 2.1** The shift from the smart city concept to the smart region one, in the perspective of a new mutual balance between City and Region. *source* Rolando

## 2.1 Smart Cities in Italy: Problems and Potentials

Amid the development of the service and knowledge-based society and economy in the past decades, the recent growth of the new manufacturing sector, and the deep discontinuity produced by the global crisis, the increasing attractiveness of urban poles influences current public policies throughout the world. In this general context, by restricting the research field to the European area, and in particular to the Italian one, specific attention to the urban space could be recognized within the policies of the European Union and its member states: policies aimed at enhancing the role of cities as engines of innovation and territorial cohesion, and at addressing the significant social inequalities and the critical environmental issues generated within the urban areas.

While the 19th century was the century of empires and the 20th century was the century of nation-states, the 21st century will be the century of cities (Guallart 2012) connected by global networks of infrastructures (that is, the hardware) and information (that is, the software). In Italy, for instance, cities are playing an important role in the national development: they host almost 80 % of the Italian population, they are centers of economic and social innovation, they concentrate serious problems (such as pollution, waste, hydro-geological risks, safety, social exclusion and conflicts), but also a high amount of human physical, intellectual and cognitive capital. For these reasons, Italian cities require the superseding of fragmented and sectoral policies and the spread of a strategic approach oriented to improvement of their quality of life and to their international repositioning (CIPU 2013). For these purposes, several programmes and projects have been promoted by the European Commission or by the Italian government to tackle the issues raised by the new urban agenda, which is influenced by the impacts of the financial and economic crisis and by the growing environmental, climatic, energetic and social emergencies.

Among the latest policies and regulatory tools of the European Union and its member states, which affect the urban agendas, a specific contribution is made by programmes concerning digital innovation, sustainable mobility, energy efficiency, as well as spatial, environmental, economic and social regeneration, which are often expressed in and summarized by the ‘smart city’ notion. From a theoretical point of view, this is an innovative concept because it is not verticalised; instead, it is intersectoral and multidisciplinary, providing opportunities for the coordination of different sectoral strategies. Since the early 2000s, and in particular in most recent years, the smart city notion has undergone exponential growth, also because it has been frequently considered a useful response to the 2008 global crisis currently ongoing in European countries. The smart city concept could activate multidisciplinary skills and interests through the promotion of new relations between digital technologies and urban studies at different scales (local, urban, regional). These relations could, for instance, increase the understanding of urban and regional phenomena and the development of innovative projects in terms of enhancing the physical space and strengthening social practices.

The digital revolution of recent years has greatly transformed people’s lives and jobs by enabling unprecedented organizational and networking capacities with significant consequences for work processes and daily life, as well as for urban spatial organization and planning, beginning with the improvement of worldwide communications and transports, urban systems efficiency, and the knowledge-based economy (Fernández Maldonado 2012). For instance, within the current so-called information or network society (Castells 1996; Edgar 2006), the boom of ICTs has modified urban space use (through the increasing web purchases of goods and services, or the growing e-governance that favours online interaction between public administrations and citizens, city users and companies) as well as the urban study, planning and design processes. This is so in terms of both knowledge acquisition and outcome monitoring (beginning with the increasing use of open and real-time data) and in terms of decision-making (through the participation of different stakeholders) (Fusero 2008). Information and Communication Technologies are radically transforming the observation of urban phenomena and trends, with effects on the development of urban studies, plans and projects. The growing number of satellites, drones and sensor networks, at macro-level, as well as the myriad of personal devices, able to furnish a huge and exponentially growing amount of real-time data which are increasingly more open and sharable, raise new research questions: for instance, how to make their use meaningful for analyses, as well as useful for increasing urban efficiency, quality, resilience and smartness, and for designing cities according to social needs. These dynamic data enable planners and designers better to assess and understand the complexity of the urban context and of its spatial, economic and social components. At the same time, these open and real-time data are radically changing the interaction between people and places, empowering citizens to make active contributions to the urban planning, design and management of cities (Luebkehan and Hargrave 2014).

Within the currently developing global economy and city network (Sassen 2001), even though urban smartness could enhance urban sustainability and

attractiveness (through spatial regeneration, economic and social innovation, or environmental quality improvement), it is not possible to ignore the risks of a smart city development exclusively based on a technocratic and market-oriented approach: that is, mainly intended to support urban marketing programmes and only based on ICT solutions proposed by large multi-national companies rather than on actual environmental and social needs. This approach may therefore induce a decrease in urban space complexity, as well as in the richness of political debate because of an acritical use of new technological devices (Fernández 2014; Di Vita 2015).

Contemporary cities are affected by the spread of means of information and communication: on the one hand, ICTs ensure consistent and accessible information flows, which influence economic activities and social practices; on the other, they require the establishment of related infrastructures and interfaces, which often qualify spaces and buildings. The smart city perspective is therefore also expressed in terms of the 'media city', although this approach tends to overemphasize the role of innovative technologies in improving the efficiency of the existing city: the long-term impacts on the urban quality and sustainability are often underestimated unless a critical assessment of the urban development, useful to support a radical change of lifestyles, is conducted.

Technology may be considered an opportunity to support innovation if the ecological and social approach is not once again subordinated to economic growth (Franz 2012). ICTs can make a valuable contribution to dealing with common urban emergencies, but they are not enough: innovation should be embedded in a wider development vision, which requires multidisciplinary skills and actions generally used to go beyond the capacity of local administrators. Therefore, necessary is coordination among different sectoral policies, which may be synthesised into the smart city platform: the implementation of a technological infrastructure able to support the exchange of information, producing intelligence and inclusion, and improving the local quality of life (Granelli 2012).

Since the beginning of the new millennium, and with an acceleration since 2010, the smart city concept has widely and rapidly spread within urban development policies. In the absence of a single and shared definition, in a few years its meaning has been extended from that of a digital, intelligent or wired city, mainly connected to the development of technological infrastructures (hardware), in particular media, to a wider meaning of an attractive and creative city, environmentally friendly and socially inclusive, particularly connected to the enhancement of human and social capital (software). This evolution from connected or intelligent city (Mitchell 1995; Graham and Marvin 1996) and digital city (Aurigi 2005) to creative city (Florida 2005) and their current convergence in the smart city concept correspond to the development of their purposes from a perspective of urban efficiency to a perspective of quality of life (Boscacci et al. 2014); that is, a shift in focus from ICTs and physical spaces to people (ICT and space users), to which the research presented in this book directly referred. This is a very short but deep transformation of meanings, which may be synthesised by the recent notion of the (smart) 'sensible city' (Ratti 2012). Within this cultural context, the smart city concept may therefore

express an urban model able to guarantee a high quality of life and the personal and social growth of people and companies in relation to sustainability targets (ABB and The European House-Ambrosetti 2012).

The definition of *smart* applied to cities is now much abused and frequently accompanied by rhetoric, often excessively awarded by a salvific value in relation to local critical issues worsened by the crisis. At the same time, it is often trivialized, because it is frequently implemented by episodic projects unrelated to an organic vision of innovation and urban development (Cassa Depositati e Prestiti and Politecnico di Torino 2013). For this reason, if it is possible to state that the internet has changed our lives, it is also possible to recognize that it has not yet changed our cities (Guallart 2012). The smart city concept is increasingly applied within the marketing strategies of cities and multinational ICT companies. Even though there is no single definition of urban smartness—because the concept involves several disciplines and consequently cannot be framed (Paris 2014)—a city can be considered smart if investments in infrastructures (such as transports and ICTs) lead to economic, environmental and social development, as well as to new opportunities and forms of urban governance and participation (Seisedos 2007); that is, if it integrates into a networked urban pattern goals and actions of environment protection, social sharing, energy efficiency, economic sustainability, as well as urban management participation (Imbesi 2014). Whilst the smart city concept generally refers to a system of strategies intended to improve the quality of life in cities through the exploitation of ICT potentialities, the relations between innovation, new technologies and new urban form patterns are still missing (Paris 2014).

The main value of the smart concept, often belied by its real applications, resides in its capacity to stimulate, also through the use of ICTs, a lifestyle change and, therefore, profound reflection on the environmental and social critical issues which are frequent in the urban areas (decay, imbalances, poverty, un-safety, conflicts). However, in smart cities, technology (with its commercial implications) should not be seen as an end, but rather as a means to improve the quality of life (environmental, economical, social). Regardless of their spatial dimensions, smart cities must not only be based on smart infrastructures; they must also, and especially, recognize the centrality of the needs of different urban populations expressed on the public policy agenda (Castells and Himanen 2002). If people's lives are increasingly influenced by the use of digital devices which modify the perception and use of urban spaces (Ciuccarelli et al. 2014; De Waal 2014; Ferraris 2014; Morandi et al. 2013a), local administrators must promote the training of smart citizens, who should be involved and educated in planning processes through effective communication and participation activities (made possible by ICTs). From the perspective of a truly human smart city, mainly and directly oriented to different urban populations, rethinking urban spaces should be favoured principally by recognizing citizens' needs and stimulating their contributions, and not just by rationalizing the use of resources or improving the efficiency of services through the application of technology, which should be considered a tool and not as a goal (Peripheria 2014).

Despite the rhetoric frequently surrounding the smart city issue, several cities, universities, utilities and companies seek to promote services and implement

products able to support the development of urban smartness (Van Beurden 2011). Most of the projects promoted to date at worldwide level favour sustainable mobility, energy saving, intelligent buildings, or a decrease in the environmental footprints of urban settlements; but the broad and not clearly defined smart city concept involves other and different sectors. An international reference in this regard is the classification drawn up by the University of Vienna, together with the Universities of Ljubljana and of Delft, now called the *Vienna Model* (Giffinger et al. 2007), which identifies the following categories of urban smartness:

- smart environment (that is, natural resources);
- smart mobility (that is, transports);
- smart economy (that is, competitiveness);
- smart governance (that is, participation);
- smart people (that is, social and human capital);
- smart living (that is, quality of life).

Within a critical framework concerning the potential for development in the European context (Kunzmann 2011), the first indications of the Italian government, expressed by the Monti government (2011–2012), stress the importance of identifying an Italian way to smart cities. This should be based on local potentialities to be exploited and on local criticalities to be solved. This specific issue has been suggested also by some recent studies and publications. On the one side, there are the resources consisting of the heritage of ancient villages and historic town centers and widespread cultural resources (not only in terms of digital service application in order to improve their enjoyment, but also in terms of innovated construction techniques in order to improve their restructuring and requalification); the traditions related to food and nutrition, now emphasized by the Milan Expo 2015; and the richness of art and craft activities. On the other side, there are the threats of the anthropic pressure of tourism; population aging; welfare system complexity; and the difficulties of multi-ethnic coexistence (Granelli 2012).

One of the European countries where investments in smart cities have been most intense is also one of those most penalized by the crisis: Spain, whose cities have seen this innovative approach as an opportunity to address the severe difficulties caused by the lack of resources (Postacchini 2012). With some delay, also in Italy this challenge is now being rapidly taken up: several projects have been recently implemented or activated in Italian cities, although the most common types of projects within the cities monitored by the *Osservatorio Nazionale Smart City* of the *Associazione Nazionale Comuni Italiani* (ANCI)<sup>1</sup> mainly refer to green mobility, urban and environmental regeneration, renewable energy, and smart building (from the energetic and seismic points of view). However, their slogans often exceed the real quality of the proposals, which, moreover, are very different in their content and method of implementation (Associazione Nazionale Comuni Italiani, Osservatorio Nazionale Smart City 2014).

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<sup>1</sup>Website: <http://osservatoriosmartcity.it>.

The economic resources to date allocated to smart city projects are based on a large percentage of public resources which, however, are unlikely to be available in the coming years.

They divide among:

- municipal funds (53 %);
- regional funds (16 %);
- public-private partnerships (10 %);
- European funds (8 %);
- national funds (6 %);
- private sponsors and endowments (5 %);
- other funds (2 %).

(Fiordalisi and Tripodi 2014).

The spread of the smart city concept is relatively recent. It has been encouraged by recent European policies and, in Italy, by measures approved by the national government: for instance, the so-called *Decreto Crescita 2.0*<sup>2</sup> interpreted urban smartness as an opportunity for innovation of the production system and, therefore, for economy recovery in the current crisis.

The consequent scientific debate is mainly centered on exploitation of smartness potential from the perspective of local communities. It emphasises the importance of combining the technological dimension and the commercial repercussions of smart city projects with greater sensitivity and responsibility towards people's services: for instance, by increasing the quality of administrative functions or the sharing of information with citizens and city users, beginning with the supply of open data; by developing new (real-time) urban studies, plans and projects, as well as new (flexible and often personalized) urban services through the connection of the large amount of available data; by encouraging the cultural use, the social inclusion and, therefore, the development of a real smart community (Cassa Depositi e Prestiti and Politecnico di Torino 2013; De Pascali 2012; Manfredini et al. 2012; Morandi et al. 2013a).

Because of the 2008–2014 crisis, and the consequent economic downturn, there are signs that the collective enthusiasm for smart cities is declining. The former expectations have been somewhat reduced owing to the increasing difficulties of public finances, as well as to a frequently superficial approach based on the acritical importation of global models not always easily applicable at the local level (Manfredi 2014). The first critical aspect of these projects concerns their feasibility. If the interventions hitherto promoted by the Italian cities have mainly used public funds, the scenario for the future is entirely different because of the current contraction in the economic resources availability and in the spending power of local public administrations (due to the crisis), which have been determined by the so-called *Patto di Stabilità* and *Spending Review* policies adopted by the Italian government.

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<sup>2</sup>Italian Government Decree n°179/2012.

Besides the improvement of advanced forms of public–private partnership, entrepreneurship and green public procurement, a significant contribution could also be made by the 2014–2020 European funds for urban renewal, beginning with the recently-published first Horizon 2020 calls. These are important resources, but they must be integrated with private investments and innovative financial tools, together with good programming skills of local governments (Fiordalisi and Tripodi 2014; Fusero 2008). Especial attention should be paid to the infrastructural investment potential of companies operating in the ICT sector, which could be encouraged by political and legislative stability, simplification of administrative procedures, public administration efficiency and technical skills: features in regard to which Italy unfortunately has huge difficulties. The Italian share of ICT investments in relation to GDP is one of the lowest in Europe (2 %), while digital innovation could be an opportunity for economic development and the solution of important social challenges (Cassa Depositi e Prestiti and Politecnico di Torino 2013).

A second critical point concerns planning capacity. Among the methods used to promote smart city projects, only a few local administrations have until now operated on the basis of an overall urban development strategy: a wider and systemic strategy which should be based on multidisciplinary contributions and designed not as a dirigist plan but as a flexible and shared process. This tool should coordinate different sector policies, and identify and enhance the vocations of places hit by the crisis. If urban smartness must, by definition, favour bottom-up design and construction, it is also necessary to integrate these different bottom-up proposals within the framework of a shared strategic vision which should be organic and long-term, as well as being promoted by local governments. This scenario should support the identification of priority intervention areas within a general context of increasingly scarce resources (Cassa Depositi e Prestiti and Politecnico di Torino 2013). Although this approach is widely shared, most of the Italian cities seem to operate through episodic and non-integrated interventions, which have been previously designed and which are only subsequently communicated as smart city projects.

The technological vision and the financial planning, which underlie the urban smartness, must therefore be oriented toward a social vision by requiring the hybridization of different disciplinary skills. Whilst the current schemes have been mainly centered on the use of technology to engage citizens in public decision-making processes, the smart planning challenge must be treated as an opportunity to build a stronger and more shared local governance. The latter should be based, on the one hand, on a wider partnership between territorial institutions and actors (local, regional, national and European), functional institutions, associations, enterprises, citizens and their representation; and on the other, on a suitable organization (in terms of facilities, procedures and skills) and skills improvement of the involved stakeholders about the use of ICTs to manage and develop cities. Thus the top-down approach should be integrated with a bottom-up one.

The challenge of urban smartness requires superseding the technological top-down approach (based mainly on the use of sensors), and it should offer opportunities for the development of a new awareness of its potentials (Bolocan

Goldstein and Bassetti 2014). The integrated platform, in which a smart city project should be implemented, must refer to local features. In the case of Milan, for instance, the inner city is the main urban pole of a larger metropolitan area that extends beyond the traditional administrative boundaries (metropolitan and regional) and is included in a wider context by now identified as Northern Italy global city-region (Perulli and Picchierri 2010; Scott 2001), from an economic perspective, or mega-city region (Balducci 2005; Hall and Pain 2006), from a spatial perspective: a system of urban nodes (characterized by different size and importance, and connected by an articulated infrastructural network) which constitutes a single, large, and world-level urban area.

In this scenario, the development of this city-region, which stretches from Milan to the entire Po Valley, requires enlargement of the conceptual space from smart city to smart land by disrupting the localistic logic that is usually adopted by single municipalities and frequently risks penalizing both technological and socio-economic development (Bonomi and Masiero 2014). This entails a shift from a smart city to a smart city-region (Rete Consultiva per Milano Glocal City 2013), or simply a smart region, brought about by paying particular attention not only to the main urban centers but also, and especially, to the peri-urban and intra-urban areas and, consequently, by remedying their marginality with respect to the stronger nodes (Morandi et al. 2013b).<sup>3</sup> This new conceptualization of physical space relates directly to the growth of virtual space articulated in a system of ICT nodes and networks which traverse administrative borders and influence economic activities, social relationships, as well as space use (Sepe 2013).

As said, by limiting the research scenario to the European area because of the relative homogeneity of its spatial and socio-economic features, the majority of smart city programmes (which have been until now launched) refer to an urban scale (Associazione Nazionale Comuni Italiani, Osservatorio Nazionale Smart City 2014; Directorate-General for Internal Policies, Policy Department A 2014). Large-scale schemes are rare. In Italy, for instance, on the one hand there are inter-municipal projects related to smart economy, environment, governance and living within the *Unione dei Comuni della Romagna Faentina*, or to the smart economy, environment, living and mobility within the *Comunità Montana Vallo di Diano* (Associazione Nazionale Comuni Italiani, Osservatorio Nazionale Smart City 2014). On the other hand, there is the experimental proposal for technological and governance innovation of the entire *Provincia di Mantova* within the so-called *Mantova Smart Region* project (Bolici and Mora 2012).

The potentialities of wider-scale smart programmes and projects relate to the involvement of marginal areas (such as peri-urban and inter-urban areas, as well as small cities in peripheral regions, often penalized by high levels of digital divide) in socio-economic innovation processes and in spatial and environmental regeneration plans also based on the improvement of ICT nodes and networks. Certainly, the conceptual transition from smart city to smart region implies not only the necessary

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<sup>3</sup>See Sect. 2.4.

reference to a new spatial scale, but also the transfer of methodology and contents to low-density areas: issues which will be discussed in the final part of the book.<sup>4</sup>

## 2.2 The Milan Smart City Programme

The financial and economic crisis and the technological development seem to have induced a metamorphosis of the economy and society (such as, production activities and enterprise organization) characterized by the growth of digital services and manufacturing (Berta 2014; Campagnoli 2014). Some important signals of this change are apparent in the current urban policies of several European cities, beginning with the increasing development of smart city initiatives.

According to *Cittalia-Fondazione ANCI Ricerche*,<sup>5</sup> the first Italian cities to have promoted smart city projects are Turin, Genoa, Piacenza, Florence, Naples, Bari and Cosenza. Only in a second phase have other cities across the country, including Milan, activated similar strategies (Fiordalisi and Tripodi 2014). In particular, the Lombardy capital is currently investing significant resources in projects aimed at digital innovation, environmental sustainability and social inclusion, also with a view to the 2015 Universal Exhibition (Di Vita 2014). In recent years, Milan—which is the main urban pole of a wider metropolitan area, as well as of the entire Northern Italy mega-city region or global city-region, and which is an important node of world networks (material and immaterial)—has been affected by major weaknesses and delays in terms of the deployment and capitalization of digital infrastructures compared with the other European cities. This has determined a detriment of businesses and citizens (Bassetti 2012). For this reason, in 2011 the municipality of Milan established the new Innovation and Smart City Sector, which has begun to play a significant operational role. On the one hand, the municipality has promoted urban smartness initiatives supported by both public funds (e.g., local investments), as well as regional financings such as the POR FESR<sup>6</sup> application *Smart Cities and Communities*, national financings such as the MIUR<sup>7</sup> application *Smart Cities and Communities and Social Innovation*, and European financings such as a Seventh Framework Programme and an Horizon 2020 applications and private funds (e.g., collaboration with partners), for a total amount of 113 million euros (up to December 2014). On the other hand, the municipality has joined

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<sup>4</sup>See Sect. 5.2.

<sup>5</sup>Website: [www.cittalia.it](http://www.cittalia.it).

<sup>6</sup>POR FESR is the *Programma Operativo Regionale* (POR) promoted by the Lombardy Regional Government in order to identify projects which may be funded by the Fondo Europeo di Sviluppo Regionale (FESR).

<sup>7</sup>MIUR is the Ministero dell'Istruzione, dell'Università e della Ricerca of the Italian national government.

national and international city networks oriented to ICT experimentation<sup>8</sup> (Associazione Nazionale Comuni Italiani, Osservatorio Nazionale Smart City 2014; Di Vita 2014, 2015).

Together with the local chamber of commerce, the Milan municipality has developed the Milan Smart City programme by integrating a wide system of initiatives. The purpose has been to catch up with other Italian and European cities and rapidly become a national and international reference. At the beginning of 2013, an internal detection led to the identification of projects and plans already activated by diverse sectors of the municipality itself, and concerning the following topics: digital city; mobility; environment; social inclusion and cohesion; services for citizens; culture and urban attractiveness. In parallel, a public hearing process has involved diverse stakeholders in the city (such as companies, universities, citizens, third sector)—consequently raising their awareness—in the design of urban smartness through the organization of participative clusters: seven focus groups, six of which are specialized in single issues related to the smartness categories proposed by the Vienna Model (smart economy, environment, governance, living, mobility and people),<sup>9</sup> whilst one is specifically dedicated to Expo 2015 (Milano Smart City 2014; Di Vita 2014, 2015).

The projects activated are very heterogeneous and deal with diverse topics: the innovation of services for local communities and companies (such as the city Open Data and Open WiFi, the UNI Agency and many other services for culture and tourism development, citizen inclusion and enterprise innovation); a reduction of energy consumption and pollution emissions (such as grid energy efficiency projects, district heating plans, tree-planting programmes); building retrofitting; smart public lighting; traffic and public transport planning and management; the dissemination of real-time mobility information and services; and logistics innovation (such as the Area C congestion charge, bike and car sharing, a new smartphone application system<sup>10</sup>). From the perspective of the research presented in this book, and in light of its theoretical concepts of the internet of places and urban digital nodes,<sup>11</sup> the following projects seem particularly significant:

- *My Neighbourhood—My City*, which aims at co-designing innovative services for the local community and the entire city, and at increasing social inclusion in the problematic Quarto Oggiaro district, through the use of ICTs for the connection of people, ideas and resources and through the establishment of innovation incubators (for instance FabriQ);
- *Smart City Lab* (under construction on a brownfield site in the southern city sector), an incubator and accelerator of smart city initiatives and technology

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<sup>8</sup>Such as the national networks *MiToGe* or *Osservatorio Nazionale Smart City* and the international ones *Smart Cities Stakeholders Platform*, *C40* and *Eurocities*.

<sup>9</sup>See Sect. 2.1.

<sup>10</sup>For instance, the APPs BikeMi, iATM, ATM Mobile, PULLamo, MilanoEventi, GuidaMilano.

<sup>11</sup> See Sects. 1.2 and 1.3.

start-ups intended to improve the city's livability, accessibility, energy conservation, and environmental protection (Milano Smart City 2014).

The smart city transformation requires a radical innovation of infrastructures (material and immaterial), people's lifestyles, economic activities, urban governance, urban policies, urban design and planning. For this reason, although the Milan municipality has historically lacked a regional and metropolitan strategic vision, it has recently issued the first *Milan Smart City Guidelines* intended to transform the city into a real world city, not only technologically intelligent and economically attractive but also environmentally and socially sustainable: that is, a national and European laboratory of sustainable mobility, environment and energy policies, social inclusion, urban health, simplification of public administration bureaucracy, new economic activities and companies, beginning with the development of open data and open services (Comune di Milano, Assessorato Politiche per il lavoro, Innovazione economica, Università e Ricerca 2014a).

Together with environmental connectivity and social connectivity, ICTs generate an economic connectivity reflected in the development of new economic activities through the integration of production and services. This means that ICTs are significant drivers of economic changes and contribute to the shift from place-based mass production to global, flexible and knowledge-based organization (Fernández Maldonado 2012). For these reasons, beside its smart activities, the Innovation and Smart City Sector of the Milan municipality is also in charge of monitoring, supporting and promoting other innovation initiatives (also providing specific economic resources). These projects are frequently related to ICT development, and they are contributing to Milan's socio-economic transition towards the new economy based on increasing digital services (Alexander 1983), and the new manufacturing economy based on increasing digital productions (Various Authors 2012). For instance, they start from bottom-up proposals for business incubators, co-working spaces and fab-labs, which often stimulate new urban regeneration processes (Bolocan and Tajani 2014; Comune di Milano, Assessorato Politiche per il lavoro, Innovazione economica, Università e Ricerca 2014b). Because the challenge of the twenty-first century is the resumption of productivity (Guallart 2012), albeit in new and more specialized forms mixing manufacturing and services, the recent advances in ICT (determined, for instance, by the development of the internet, open-source services and new generation printers, as well as by the improvement of personal mobile devices) have favoured not only the transmission of information but also the interaction among users, with the consequent boom in shared production and consumption (Ratti 2014). This is a shift from the centralized model of resource management in industrial society, flowing from large-scale production centers to small-scale individuals, to a distributed model in the information society, connecting people with people, objects with objects, buildings with buildings, or communities with communities (Guallart 2012). The above-mentioned innovative workspaces, which usually re-use abandoned buildings, therefore correspond to the rapid and structural transition of the contemporary economy (and society) towards new sharing practices enabled by ICTs: that is, the sharing of

goods and services, ideas and skills, time and money (Campagnoli 2014; Sharexpo 2014; Valentino 2013). It is for these reasons that the high technological endowment and the reference to sharing practices of these workspaces may allow their consideration within the urban digital nodes concept proposed in this study.<sup>12</sup>

### 2.3 The Digital Expo 2015 Programme

In parallel with the initiatives and projects directly promoted by the municipality of Milan, also Expo 2015 has recently adopted a digital profile through the promotion of innovative experimentation with ICTs in the field of large events by the official management company *Expo 2015 Spa*. The scheme divides into three levels:

- at the local level, the *Digital Smart City Expo* project, based on diverse devices and applications, to develop digital services for both the management of the exhibition area (energy, lighting, security) and the hosting of visitors on the Expo site located in the surroundings of the Milan Trade Fair in Rho (information, communications, payments);
- at the global level, the web-based *Cyber Expo* project to develop digital services aimed at broadening Expo participation and at disseminating its contents on a world scale by favouring a virtual experience of the event;
- at an intermediate level, the *E015 Digital Ecosystem*<sup>13</sup> that enables the technological integration of multimedia totems, internet websites, and smartphone applications within the entire Milan metropolitan area in order to develop digital services furnishing information (in the fields of culture, events and news, Expo 2015, mobility, Made in Italy, accommodation, smart city and other information) to different urban populations (permanent or temporary).<sup>14</sup>

Particularly interesting from a smart region perspective is the *E015 Digital Ecosystem*. Promoted as a community of service providers (which more than 230 public and private operators had already joined by November 2014), this system is based on collaboration rules and common technological standards useful for sharing data and for the consequent development of a system of interoperable digital services (Di Vita 2014). This is an opportunity for innovation in terms of both methodology and contents, although it will be possible to verify its concrete potentialities only during the Universal Exhibition and in the post-event phase, when the digital ecosystem will be completely in operation.<sup>15</sup>

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<sup>12</sup>See Sect. 1.2, 1.3 and 5.1.

<sup>13</sup>Developed with Confindustria, Camera di Commercio di Milano, Confcommercio, Assolombarda and Unione del Commercio, with the technical and scientific coordination of Cefriel-Politecnico di Milano.

<sup>14</sup>Website: [www.e015.expo2015.org](http://www.e015.expo2015.org).

<sup>15</sup>By November 2014, only a first experimentation of the mobility system had been conducted by integrating the digital services offered by different transport operators in the Milan metropolitan

The digital innovation challenges, simultaneously but independently promoted by the Milan Municipality and the Expo 2015 management company, merge in the *Electric City Mover* project. This initiative, undertaken in collaboration with Telecom Italia, contributes to sustainable mobility development through the implementation of a *Digital Islands* system, distributed across the city, where users can rent electrical vehicles and use various services made available by equipped benches and multimedia information totems: these smart facilities provide free wi-fi, mobility information, power sockets to recharge personal devices, as well as NFC technology for purchase services. This urban-scale project of digital islands has ‘inspired’ the broader proposal of digital nodes developed through the research presented in this book: both by studying their potential locations and by identifying an articulated system of possible functions and services in relation to the specific features of the various local contexts.<sup>16</sup>

The list of smart projects related to the Milan Universal Exhibition is completed by another digital services system aimed at improving the quality of local hosting and accommodation: on the one hand, the web platforms *Explora* (developed by the Milan Chamber of Commerce with the Lombardy regional government to promote the tourist attractions and receptive facilities of the Lombardy regional area)<sup>17</sup> and *Expo in Città* (developed by the Milan Chamber of Commerce together with the Milan municipality to promote the Expo’s collateral events within the Milan metropolitan area)<sup>18</sup>; on the other hand, the projects entitled *Fondazione Triulza* (developed by a specific consortium of associations set up to promote local and national third-sector activities beginning with the civil society pavilion within the Expo site and integrating other experiences and locations outside it)<sup>19</sup> and *Sharexpo* (developed by Fondazione ENI Enrico Mattei to promote sharing economy activities).<sup>20</sup>

Without excessive expectations or prejudices regarding the spread of technology within urban spaces—for which a qualitative rather than quantitative approach should be privileged—ICT experimentation and digital services implementation may contribute to development of a material and immaterial legacy of the event outside the Expo site and the municipal borders of Milan (Di Vita 2015). Even though any evaluation of the ICT potentialities should be postponed until after the 2015 Universal Exhibition, this experimentation distinguishes the Milan Expo from the previous ones. It can be considered an opportunity for an event whose originally planned implementation of physical infrastructures has been obstructed by several

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(Footnote 15 continued)

area (Atm, Autostradale, Trenitalia, Trenord, Malpensa Express, Sea, Orio al Serio International Airport, Infoblu—Autostrade per l’Italia, Milanoserravalle—Milanotangenziali (website: [www.e015.expo2015.org](http://www.e015.expo2015.org)).

<sup>16</sup>See Sect. 3.3.

<sup>17</sup>Website: <http://www.exploratourism.it/>.

<sup>18</sup>Website: <http://www.expoincitta.com/>.

<sup>19</sup>Website: <http://www.fondazionetriulza.org/>.

<sup>20</sup>Website: <http://www.sharexpo.it/>.

problems: not only management difficulties and corruption, but also the decrease in funds due to the financial and economic crisis that has marked a profound discontinuity with the expansionary phase in which the past Expos were developed (Di Vita 2014).

In the complex network of relations among the different actors and stakeholders involved in the 2015 Universal Exhibition and the Milan Smart City processes—in which public and private players have significantly invested in the city's future—the Expo's digital legacy (local and urban) should be adequately capitalized. On the one hand, through the *Digital Smart City Expo* project, re-use of the Expo site could exploit the advanced technological services introduced for the event in order to support the activities that will be hosted in the area in relation to its post-event transformation. On the other hand, considering the *E015 Digital Ecosystem* and all the other web platforms and initiatives (such as *Explora*, *Expo in Città*, *Fondazione Triulza*, *Sharexpo*), empowerment of the new Metropolitan City could benefit from the digital innovation projects promoted throughout the metropolitan area on the occasion of the event. This would encourage socio-economic innovation and, consequently, its spatial and architectural configurations (Di Vita 2014, 2015).

## 2.4 Expo 2015 as a Node of a Future Milan-Turin Smart Region?

The current technological standards and digital services, promoted in relation to a spatial context extending beyond the municipal borders of the inner city, could contribute to develop the urban smartness on the wider scale of the Milan metropolitan area (but only after verifying the effectiveness of those standards and services during the event and in the post-event phase). However, from a smart region perspective, the more direct involvement in the event of a more extensive system of places (often marginal) outside the Expo site could have created better conditions for sustainable regional rebalancing: for instance, through the enhancement of the nodes located within the existing infrastructural networks (Rolando 2011, 2014; Rolando and Scandiffio 2013).

From this perspective, the efforts made by the City of Milan, the Expo 2015 management company, and all the other above-mentioned players should have replaced their current incidental convergence with effective cooperation; that is, they should have remedied both the lack of a metropolitan strategic vision and the fragmentation of ongoing projects by promoting a stronger coordination and integration of the different initiatives. It would have been an opportunity to exploit the territorial potential of the Universal Exhibition in time and space, with possible positive effects on the event's legacy, as well as to lead to a concrete consolidation of smart city projects and their evolution to a smart region scale.

This system of digital services provided for Expo 2015 extends beyond the city's traditional administrative boundaries. In this way, it intercepts some recent

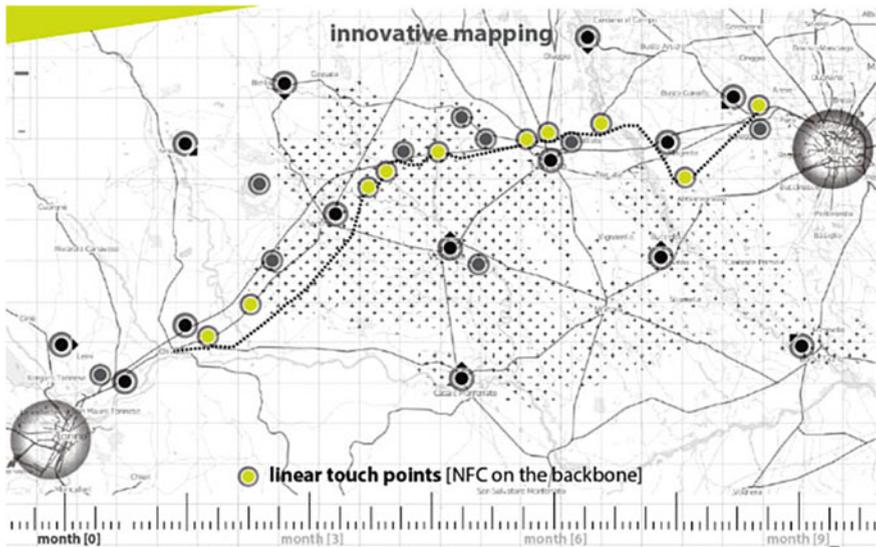
reflections developed in the scientific debate on the scale and scope of large events (Battisti et al. 2011). In the context of socio-economic globalization and global crisis, spatially marked by the already-mentioned growing regionalism of cities (Bolocan Goldstein 2008) and by clear risks of unsustainability of large-scale interventions related to world events, it seems necessary, even for mega-events, to enlarge the spatial scenario for the relative governance and projects from the urban to the regional scale; that is, to replace individual urban projects with regional regeneration processes based on the widespread exploitation of local resources and included in shared and durable strategies responding to local needs in relation to global flows. In this regard, a best practice is apparent in the experience of the German Ruhr conurbation, which has integrated projects for the IBA Emscher Park (1989–1999) and the Ruhr 2010 European Capital of Culture events within the goals and actions of regional strategic plans promoted in the past 30 years: that is, within an organic process of landscape, environmental and spatial regeneration, and of social and economic renewal (Rolando 2009).

Given the potentialities offered by the increasing application of ICTs to spatial phenomena, Expo 2015 could be an opportunity to extend sustainability issues from individual projects to the entire process. If properly integrated into a cohesive system of public policies within a post-event perspective, the event could be an occasion to enlarge the potential smart city development to either a wider smart (city)-region extending from Milan to the whole Northern Italy or (considering the Expo site's location in the north-western sector of the Milan metropolitan area) at least to a larger smart (metropolitan) region extending between Milan and Turin (Morandi et al. 2013b).<sup>21</sup>

Whilst at the world level large cities are affirming themselves as the most important telecommunication nodes, there is a growing digital divide between the most connected places, such as urban and central areas, and generally disconnected places such as rural and peripheral areas. On the contrary, one of the main requirements in order to promote the balanced and smart development of any spatial context is the provision of all places and users with adequate access to ICTs (Fernández Maldonado 2012). To this end, the *E-Scape* project of Alta Scuola Politecnica (ASP) in partnership with Telecom Italia has sought to give Expo visitors opportunities to experience the event's themes—concerning food and nutrition—by directly learning from places in the Milan-Turin metropolitan region (where the rural culture, landscape and production is particularly intense) through exploitation of different ICT potentialities: from QR codes to location-based services or augmented reality applications integrated into a system of places of interest in order to provide information and knowledge related to them. Because this ASP project starts not from the main urban poles, but from the in-between areas, the proposed use of ICTs may contribute to rebalance the territorial conditions of different places. On the one hand, it may do so by making each of them more attractive in terms of services and spatial quality, not only for the Expo visitors but also for the post-Expo travellers; not only

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<sup>21</sup>See Sect. 2.1.



**Fig. 2.2** *E-scape* project developed by Alta Scuola Politecnica (ASP) in partnership with Telecom Italia: the map of places of interest enriched with ICT services for their permanent and temporary users. *source* Rolando and Djordjevic 2013

for tourists and other temporary populations but also for residents. On the other hand, it may do so by driving the spatial innovation of the entire metropolitan region (Rolando and Djordjevic 2013) (Fig. 2.2).

By integrating a top-down approach (beginning with the potential development of wide-scale visions of collective interests promoted by official policy makers) with a bottom-up approach (beginning with the potential definition of site-specific information and knowledge by temporary and permanent users), this project drew on different disciplines, such as urban planning and spatial representation, and different concepts, such as mapping and interface, because it is not yet clear (practically and theoretically) how to fit regional scale information into mobile terminals of small size. Whilst the project tested analysis methods oriented to provide traditional and digital services and to experiment with the use of information and design tools based on GPS tracking technologies (van der Spek and van Schaick 2008), its main outcome was the design of interfaces between users and the knowledge related to places, that has figured out the *(e)-scApp* smartphone application based on a situated cognition model (requiring the users to be within the material space). On the one hand, this application provides information to users; on the other, it allows users to participate in the mapping process and to implement local information and knowledge, with the consequent enhancement of local resources and the creation of social communities. Hence, the use of sensors leads to collect instantaneous perceptions by users and of real-time information by places, with possible effects on the smart organization, use, and experience of the spatial components of the metropolitan region, not only during the Expo, but also in the

post-event phase: for instance, by determining new material and immaterial flows of people and information—that is new social behavior and statistical data—making a potential contribution to the rebalance between the main urban poles and the intermediate areas (Rolando and Djordjevic 2013).

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