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Makers

The Making of the Human City

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About This Book

Contemporary development trends are increasingly pushing cities away from a path of socially just and sustainable development that could offer a decent life to all city-dwellers. Even in cities with a vital economy we are witnessing a dramatic decoupling of economic growth from social development, resulting in all sorts of problems. The model of "the human city" suggests an integrative path in order to move toward that harmonious development of society and economy.

The text of *The Milan Charter*, scientific legacy of Expo Milano 2015, is available at the end of the book.

Summary

Makers

The Making of the Human City

1. Introduction

The importance of cities goes well beyond the increasing number of people living in them. Cities play a key role in socio-economic development: 67% of the European GDP is generated in the metropolitan regions (*i.e.* large urban areas with more than 250,000 inhabitants) where 59% of the population lives. At present, cities are engaged in the remaking of political and economic space; it is within major cities and city regions that major transformations have occurred as dynamic reactions to the most recent economic and financial crises and attempts to revive socio-economic development have been devised and implemented. Spatial and social changes reflect the shifting away from manufacturing and real estate as drivers of urban growth to the new, emerging focus on knowledge, innovation, creativity and art in fostering socio-economic development in urban areas (Scott, 2008; Storper, 2013). As places of production and consumption, cities can be engines of innovation and mines of opportunities, particularly when mechanisms of integration are at work in sustaining a harmonious development of society and economy.

Contemporary development trends are increasingly pushing cities away from a path of socially just and sustainable development that could offer a decent life to all city-dwellers; even in cities with a vital economy we are witnessing a dramatic decoupling of economic growth from social development, resulting in all sorts of problems. The model of "the human city" suggests an integrative path in order to move toward that harmonious development of society and economy.

Socio-economic development has become an issue because continuous economic growth has come to a halt and there are serious threats of decline and stagnation in many cities. In general, cities face major difficulties in

creating economic opportunities in a framework of high competition, shrinking markets and reduced resources. The work of experts from all over the world points to new forms of production in the post-industrial city, in particular a collaborative mode of production based on the sharing of knowledge and skills, which has begun to emerge in a number of different industries. In envisioning the possibilities of economic development, it is important to look at the potential of these new forms in the future of urban economies. What is certain is that they are emerging thanks to resources and conditions which are peculiar to cities. It is also known that these new forms take root where alternatives to the market logic are present both in the culture and in the economy.

Collaboration and sharing seem also to counteract the disruptive features of our "liquid modernity", such as fragmentation and individualization, and, more importantly, increasing inequalities, social polarization, marginalization and exclusion. In the face of these disintegrative processes, we discuss emerging practices of collaboration and shared knowledge and we highlight their potential to resist and counter these exclusionary and socially corrosive trends through the re-organization of socio-spatial relations and the activation and empowerment of individuals and communities.

2. A new mode of production in the making

Sharing economy, peer production, collaborative consumption, maker-spaces are all terms that pertain to a new collaborative economy that is emerging out of the crisis of corporate capitalism in its neoliberal version. The collaborative economy is developing in opposition to corporate practices (as in the case of the free software movement) as well as within corporate organizations (as in new "collaborative communities" developing advanced forms of knowledge work in firms, see Adler and Heckscher, 2006). In between these extremes, a number of hybrid formats proliferate. Overall, the sharing economy is a new mode of production defined by the use of common resources and the ethic of sharing as a source of value.

The collaborative practices of the sharing economy have been either celebrated as signals of a new economic system to come with the potential to become dominant, or interpreted as a marginal phenomenon contributing to cultural and social change but whose consequences for the economic system are scarcely relevant. However, a good part of these discourses remains rhetorical, and thorough analyses of the collaborative economy are few and far between. In particular, little work has been done to assess the economic potential of the sharing economy.

The goal of this paper is to make a preliminary exploration and assessment of the economic sustainability of the sharing economy by investigating the case of the so-called *maker movement*.

This term is usually applied to all productive practices bridging the DIY (Do It Yourself) culture with the sharing principles and ideology and mixing digital elements with material ones. The makers' culture is centred on open technology that is accessible to anyone; it is focused on the development of

community values and on the production of responses to people's needs, and aimed in the end at improving society as a whole. The projects created by makers produce social as well as economic value; a case in point in the field of electronic software and hardware is the Italian Arduino project: Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software, which is intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. In mid-2011 over 300,000 official Arduinos had been commercially produced, and in 2013 over 700,000 official boards were in users' hands.

Two technologies enabled the development of the maker culture and maker movement: on the one side, the Internet allows the creation and diffusion of digital communities using forums, blogs and social networks to interact (Toffler, 1980). Such communities are often based on content production, and on voluntary participation of members who dedicate time and energies to reach a common goal. On the other side, the development of digital fabrication technologies, both additive and subtractive, allows a small-scale production based on rapid prototyping. For example, an additive technology is 3D printing, able to print a physical object starting from a three-dimensional image of such object. An example of a machine based on subtractive technology is laser cutting, which allows the operator to cut flat sheet materials such as wood, plastic, fabric or paper. These transformations have led some observers to envisage a new industrial revolution that will change the way people and firms design and produce objects and consumer goods and allow the shifting of production from enterprises to individuals (Micelli, 2011). As underlined by Rifkin (2014), such technologies reduce dramatically the marginal costs of production and that they do not follow the economic rules of scale economies. On the contrary, digital fabrication machines enable the shift from an economy of scale towards an economy of scope,[1] allowing single individuals to prototype and produce even a single object at a low cost.

The aim of our analysis is not to prove that there are many successful cases,

such as Arduino, in the collaborative economy; the issue at stake is to understand whether these cases can continue to develop and remain independent; in other words, if they can become economically sustainable and eventually form an alternative economy of relevance. To do so, we investigate the formation and impact of the makers in the city of Milan. In the following we focus on makers in "maker-spaces" and exclude from our analysis those makers who create and share objects from home; these latter are primarily hobbyists and have a very limited impact on the sharing production. As the focus of our analysis is the social and economic impact of the sharing economy in the urban economy, it is important to include in the analysis only actors and sites of relevant productive activities.

[1] This new form of production is driven by the logic of economy of scope, instead of economy of scale, creating meaningful products with real value of use. An economy of scope exists between the production of two goods when two goods which share a common cost are produced together such that the common cost is reduced. The effect of an economy of scope is to increase the efficiency of production as a result of increasing the number of different but related products offered. In common-based peer production, this is mainly achieved by mutualizing infrastructures, both immaterial (open source knowledge, code, design) and material (co-working, fablabs, carsharing) and using distributed machinery in distributed workplace to allow local production in micro-factories, through the process of manufacturing on demand, while achieving scope through the global immaterial cooperation on both the design of the products, the design of the machinery to produce them, and even the processes through which to two processes are carried out (Bauwens, 2015).

3. Maker movement and maker-spaces

In recent times the urban landscape of major urban areas has been dotted by labs and collective spaces where a broad range of objects are produced thanks to fast prototyping technologies; these spaces are usually called fablabs or maker-spaces. The global Fab Lab/maker space network spans over 220 laboratories on five continents.

Originally the first term was used to identify places primarily with an educational scope, as the first FabLab was born at MIT; the second term had a more definitive production function and denoted places where technological experimentation was associated with open-source [*software*] and a sharing approach to technology. Today the borders between the two types of spaces have blurred (Colegrove, 2013). Maker-spaces are also sites of the materialization of practices that were born in the digital world (Benkler, 2006); at the early stages of the maker movement, makers were mainly members of virtual communities, connected only through the web. The development and spread of rapid prototyping machines permitted the opening of a large number of maker-spaces that quickly became local nodes of a global network; maker-spaces are the physical location of local makers' communities.

The literature has focused on two crucial aspects of the maker movement: first, the new organizational forms adopted by makers, and second, the motivations that lead people to participate. With regard to the first aspect, new forms have emerged because in the last two decades, thanks to the Internet, the creative energy of a large number of people could be coordinated into large, meaningful projects without relying on traditional hierarchical organizations or monetary exchanges and rewards; the maker-spaces have become the physical locations of these projects. These projects take the organizational

forms of Commons-Based Peer Production (CBPP) as defined by Benkler (2006) following up the work on the traditional commons developed by Ostrom (1990). Commons-based peer production is a new and increasingly significant model of social innovation based on collaborative production through the Internet. This new model of production is based on distributed, non-proprietary and self-organized cooperative networks. This production is commons-based because it is not built around the asymmetric exclusion typical of property, rather, the inputs and outputs of the process are shared, freely or conditionally, in an institutional form that leaves them equally available for all to use as they choose, at their individual discretion (Benkler, 2006). The common goods are produced through collective innovation processes, which are based on cooperation instead of competition among projects and individuals. The production of goods is the result of voluntary acts of individuals who freely cooperate, who organize without monetary rewards as primary incentive. Given the strong impact of voluntary participation, the traditional hierarchical structure is replaced by new mechanisms of horizontal, participatory governance (Bauwens, 2005).

The maker-space can thus be observed as a particular form of common-based peer production, as it is meant to be collaborative spaces, where user can collaboratively create together. Often the products emerging from maker-spaces are "open and shared", meaning that, once the product is completed, all the information necessary to reproduce it is shared through internet platforms. The fact that the output of collaborative production is open and can be shared also with traditional economic actors has the effect of reinvigorating the local economic system. Hence, these knowledge sharing practices and the resulting openness of their products, have the important effect of allowing the diffusion of innovation and ideas, which in turn acts as a stimulus to local entrepreneurship and as a powerful driver of economic growth.

Given the self-organized nature of these spaces/communities, a second crucial question relates to the motivations that lead people to participate and work together on common projects. Kuznetsov (2006) has investigated the

motivations of Wikipedia's contributors. He found that people contribute primarily for altruistic reasons and for the possibility of increasing their knowledge that being a contributor provides. However, other authors, such as Lerner e Tirole (2002) have shown that the participation in open-communities is rational and oriented to the maximization of the economic interest of the participants; by contributing to an open project, such as in free software, developers have the opportunity to show their competencies and build a reputation in the field, which also functions as a signal sent to companies. The "intrinsic enjoyment", as defined by Jarkko and Vaden (2013), is also a prominent motivation for many maker (Gauntlett, 2011), who enjoy the craft work behind the maker projects. This resonates with the work of Sennett (2008) who has recently emphasized the intrinsic need of *homo faber* to shape the world around by creating artefacts; the satisfaction of this spontaneous need by the actual artisan is also a vital way of connecting to others.

Motivations come also from shared values and ideology, as already mentioned. A common feature of the makers' culture is the idea of invigorating from the bottom up, and also taking back from large, market-driven organizations, a type of technical knowledge linked to materiality, to the physical production of objects, a renewed craft-focused knowledge. As Bauwens (2005) and Benkler (2006) stress, makers value their ability to contribute to a movement which takes back the production of services and objects from market forces into the hands of individuals or communities.

To summarize, maker-spaces have two main functions: a relational/cultural and an economic function. On the one hand they offer the opportunity to individuals to establish collaborative social relationships based on shared ideas and knowledge and a vision alternative to one governed uniquely by the logic of the market; on the other hand, they are new sites of production in the urban economy and, in particular, in its knowledge-based industries.

4. Local roots of maker-spaces in the city

In this paper, we analyse the local roots of the maker-spaces in their social and economic environment with the aim of understanding if and to what extent the economy generated by maker-spaces represents a potential local driver in terms of economic growth. To this end, we investigated to what extent maker-spaces are connected to the urban fabric, so to have both a picture of the local relations unfolding around maker-spaces that are functional to their development, and an assessment of their contribution to the economic and social development of the urban region.

We follow this approach for two reasons. Firstly, we rely on the literature that, since the seminal work of Polanyi and Granovetter, has emphasised the social aspect of economic processes and their manifestation in space. The "local embeddedness" of actors, it has been argued, leads to an "institutional thickness" that is thought to be a crucial factor for the success of urban regions in a continuously globalizing economy (Hess, 2004). Secondly, it is the specific nature of makers and maker-spaces that requires such lenses, as their work is based on local knowledge, rooted in local traditions, know-how, skills and working culture (Bathelt *et al.*, 2004; Krätke, 2012).

A well-established tradition of research and theorizing on Italian industrial districts has shown that the economic strength of the so-called *Third Italy* was the effect of the strong embeddedness of the economy in the local society and polity; the cooperation among local institutions, which regulate the local productive system, but also the face-to-face interaction in networks of personal relationships where trust, recognition and reputation among actors are built, have proven to be the basis of the local socio-economic development. Storper (2013) points to four key elements that have to be considered as preconditions

necessary for such development; these "keys" unlock the potential of new clusters of economic activities to invigorate the local economic system. Following Storper's approach we investigated the embeddedness of these new sites of economic activity in the local economy, the extent of the presence of thick networks of relations among workers in the city, the establishment of new institutions and intermediate bodies, and the relationship with the local political sphere.

Being strongly linked with the local society is crucial for the economic strength of maker-spaces, whose work is centred on innovation, creativity and knowledge: all are elements that develop best when these factors circulate and are exchanged within social networks of professionals. Moreover, makers produce material objects, and their work has many elements in common with traditional craftsmanship: makers reconnect with local handicraft traditions and know-how. Furthermore, maker-spaces represent a very interesting case to be observed from this perspective, as they have distinct characteristics linked to their double nature of physical – and virtual embeddedness. In the sharing communities aimed at producing free software, for instance, members coordinate mainly through digital platforms; differently, makers meet in physical spaces within the city: indeed, maker-spaces are material realities and not digital ones, where communities are formed and take shape thanks to physical spaces of frequent if not daily interaction. Moreover, makers mix digital elements with material ones: when they "make" something, they do not necessarily use their own hands, as they use the technologies of the digital manufactory; nevertheless they make physical objects. Similarly, they interact with other makers, and such interactions are often ICT mediated; nevertheless they gather in physical spaces where the machines are located (3D printers, laser cutters, milling machines).

The metropolitan area of Milan, Italy, represents an interesting context for the analysis of maker-spaces. Indeed, the Milanese metropolitan area is to be considered a mature post-fordist economy that, in line with the major European cities, is characterised by the central position given to knowledge

and creative industries. Like many other industrial cities in Europe, Milan has witnessed a strong decline in manufacturing activities, although the so-called "Made in Italy" sector and a number of manufacturing segments such as the textile and leather industries, furniture, but also machinery and bio-technology, are still present and in some cases expanding. Moreover, former industrial areas have been re-developed into cultural and leisure infrastructures, and research and education facilities, following the model of the knowledge city. It is within the scenario of a local economic system driven by innovation and creativity located in former industrial areas that maker-spaces are growing fast, as a result of both private and public initiatives.

5. Analysis[2]

In order to investigate the potential of maker-spaces in terms of socio-economic development in the Milanese metropolitan area, we explored the role of collaborative production in the local socio-economic environment. Our exploration moves along four dimensions, following Storper's four keys (2013), as explained above: embeddedness in the local economy, the creation of networks of social and professional relations, the creation of informal and formal institutions and the relationship with the political actors.

5.1. Embeddedness in the local economy

Embeddedness in the local economy refers to the historical accumulation of know-how and knowledge, of artistic styles and creative traditions, that is visible for instance in the existence of particular craft traditions or technical knowledge. The presence of such know-how encourages the growth of specific industries as well as the formation and reproduction of specific skills. The makers actively engaging in the maker-spaces can be divided in two categories: the hobbyist, whose income is not related to the maker activity, and the entrepreneur, whose income is related to the projects developed within the maker-spaces. In the following, we will focus on the latter. The entrepreneurial type of maker has, for the most part, prior experience in creative and innovation sectors, in particular design, fashion, software and electronics. The decision to quit the previous work is driven firstly by the desire to improve their skills and find new exciting jobs. As argued by one of the interviewees:

> I have worked as a graphic-designer for several years. At certain point, I felt I could learn nothing new anymore. My job was becoming routine. So, I have decided to change my life. I have joined

> this maker-space to learn new things. (*Interviewee n. 1.*)

Secondly it is driven by the ethical need to use knowledge and skills for a more sustainable purpose. As claimed by one of the interviewees:

> I was working for a prestigious design studio. My job consisted of integrating new technologies with traditional design methods. The goal was of course to maximize the profit and therefore we were targeting the luxury sector. Applying the potential of new technologies only to create luxury products, instead of designing for social issues was unbearable. So I quit. (*Interviewee n. 5.*)

Therefore, these workers are well-connected and integrated in the labor market of the creative and knowledge segment of the economy.

Our interviewees show a strong interest in building relationships with local economic actors. Firstly, they have built fruitful collaborations with other groups of free-lancers, located nearby the maker-spaces, such as co-working spaces or small studios of design, software development and IT, fashion and all the sectors linked to the cognitive-cultural economy. Secondly, they have established connections with small enterprises, local artisans with whom to explore opportunities for new products using the potential of digital manufacturing. The overall goal of the maker-spaces in the local area, according to their owners, is to become the R&D department for local enterprises. A place for small local businesses to create new ideas, products and technologies with the support of high-skilled workers. For instance, several maker-spaces together with companies have organized *hackatons,* events in which teams of makers, including graphic designers, developers, collaborate to develop innovative solutions for specific products by working together no-stop for several days:

> We hosted a six-day hackathon for a furniture company. At the end of the hackathon, seven prototypes of kitchens were presented. Not projects, prototypes. They were only a proof of concept, but the main point was established: it is possible to innovate in ways alternative to the traditional R&D within firms. (*Interviewee n. 5.*)

Even if strongly advocated, maker-spaces are rarely used for R&D at present. More often, makers provide medium and large local companies with a quick and customized prototyping service. In this sense, thanks to the maker-

spaces, companies have more control over the design process, by experimenting different product designs at a low cost. Maker-spaces are also often involved in the design of objects for cultural events, such as exhibitions in cultural institutions.

In sum, the makers seem to be embedded only partially in the local economic environment, as they maintain professional relationships with large, small and medium companies, local artisans and cultural institutions, although to date these relationships remain soft collaborations, still predominantly oriented toward assessing possibilities of future partnerships.

5.2. The establishment of thick networks

In the literature, thick networks of relations are the results of stable interactions among workers and free-lancers around a specific field. Through thick networks, workers share innovation and knowledge and learn to solve problems. Networks among workers emerge in different ways from economies of agglomeration and can foster socio-economic development at the local level. Firstly, through these networks a general know-how is distributed; secondly, the local network of interactions provides workers with the essential reputation and the contacts needed, allowing the creation of local labour markets; thirdly, it allows a social control over the behaviours of the professionals within the network, fostering the creation of trust, which in turn enables collaborations.

What is the situation of our makers in this respect? From the interviews it emerges that makers have established stable relations over time. These relations mainly occur within maker-spaces, where makers gather to use the machineries needed for their projects; they are primarily built for mutual aid and exchange of knowledge: makers constantly help each other with issues related to the usage of new digital manufacturing machineries. A more intense exchange of knowledge happens during training courses that are promoted by

makers, usually within the maker-space. In this case, the knowledge shared is more technical and specific to the field of expertise of the makers. The reciprocal aid and the sharing of knowledge perform two key functions: the creation of trust and the building of reputation in the community. Reputation is a mix of relational and technical skills emerging during training sections and informal meetings. A good reputation is the necessary condition for the relationships between makers to move from simple friendship to a professional relationship: it is only after mutual recognition of one's abilities and attitudes that makers start sharing not only basic and technical knowledge but also ideas that eventually result in the creation of shared projects and even new start-ups. Thus, maker-spaces can be also seen as local hubs of innovation and entrepreneurship emerging from the dynamics of thick networks based on them.

> I am willing to share my work and my files with the members of the maker-space with no hesitation. I am less incline to share my work with others, with strangers online. For instance, Facebook is not the right place to share my work. It is difficult to share with people who just want you to share everything with no respect for the work you are doing. Once, people complained because I was sharing only pictures of my work and not the source code. Everybody was accusing me of not following the spirit of the community. So, I stopped sharing online. (*Interviewee n. 3.)*

Finally, the shift from social to professional relationships among makers occurring in maker-spaces is public by nature, as it happens openly in the laboratory. This aspect of public-ness has the advantage of allowing for a collective form of control over the projects, ensuring the appropriate behaviours of the contributors. Thanks to this collective control, trust, which represents the necessary resource for the sharing not only of personal skills but also of projects and ideas, is built within the maker-space.

According to our interviews, makers are also very keen on establishing relationships with the residents in the neighbourhood: makers establish social networks but with the idea of possible future collaborations. For instance, one of the maker-spaces in one year of activity created 3D-printed stage scenery for the local theatre, developed potential courses to train young people, participated in local events and established relationships with the nearby

bicycle repair lab. The presence of the makers and the maker-spaces thus seems to have an impact on the local activities of the neighbourhood.

5.3. Maker Institutions

We investigated whether makers have been able to create institutions and collective bodies representing their interests. There is evidence that, in the Milanese metropolitan area, makers are institutionalizing their presence through the creation of a number of collective actors and intermediate bodies. In particular, a group of Milanese maker-spaces are creating high-level education entities such as the Fab-Academy with the goal of formally training a new generation of makers.

> Training for a maker is crucial. We have created Fab-Academy, an international Master for makers all over Europe. People attend this Master because they want to learn, not to get a formal diploma. The diploma of the Fab-Academy has no formal value. But it does have an informal value, within the Community. If you have attended this course, and you have online documentation of your projects, people know your value as maker. (*Interviewee n. 5.*)

Furthermore, Milanese makers have been particularly active in the creation of a national agency, the Make In Italy Foundation, with the aim of building a more professional image of the makers, establishing more stable relations with companies and giving visibility and recognition to the movement. Finally, most of the interviewees are active in different universities with the twofold goal of strengthening relations with local companies and of harnessing the innovative "spirit" that such a mode of production brings with it.

> We are now in the process of creating a national organization to ensure coordination among the maker-spaces. Riccardo Luna, the director of Italian Wired, Massimo Banzi, the inventor of Arduino, are also involved. We are trying to group the maker-spaces by specialization to organize more coordinated activities at the national level, but also to have a national organization to represents our interests. (*Interviewee n. 6.*)

These institutions have several functions in ensuring the growth of the makers in the future: firstly, they can represent their interests acting as lobby

organizations; secondly, they can guarantee the reproduction and the diffusion of knowledge in the local environment; thirdly, they can represent a source of economic support.

5.4. Embeddedness in the political sphere

The fourth key looks at makers' presence in the political sphere, enquiring whether and to what extent local governments support makers' development.

The municipal local government has been fostering the development of maker-spaces in two main ways. Firstly, in Milan and in the metropolitan area, a budget has been allocated for the opening of maker-spaces (through both the granting of the space and the provision of machines) and for a number of projects to be developed by the maker-spaces. Secondly, municipalities in the Milan metropolitan area have implemented policies aimed at fostering cultural project around the maker-spaces. Public libraries in several Municipalities reserved space for makers activities and encourage young people to experiment with the use of digital fabrications. Moreover, specific educational schemes have been funded in order not only to popularize the use of digital fabrication but also, and especially, the ideology of making and sharing.

We thus observe that local administrators recognise the potential of the maker-spaces in two ways: maker-spaces are seen as drivers of economic growth for the area, and their mode of production (sharing, open and experimental) is perceived as very innovative and worthy of public support. In particular, the Milan City Councillor for Socio-economic Development explicitly assesses maker-spaces as important economic drivers and hubs for the establishment of a new generation of high-tech craftsmen:

> We need to increase awareness of individuals and companies that they can use knowledge and tools coming from maker-spaces to develop new innovative skills and products. (*Counsellor Cristina Tajani, Milan 2014.*)

This interest in a potential new generation of artisans must be

contextualised in light of Italian industrial districts, which based their economic success on the local know-how and craftsman tradition. Moreover, local politicians consider the maker-spaces as powerful elements to revitalize urban areas by sharing spaces, tools and knowledge, but also by generating new jobs and new professional skills.

[2] In Milan eight maker-spaces are active. In-depth interviews were carried out with the twelve founders of these sites. The interview covered different areas, organized around three main levels: a micro, a meso and a macro level. The micro level refers to the characteristics of the individuals involved in the project; in particular, the socio-economic background characteristics of the founders, such as the educational attainment, family background, and their social and professional networks. The meso level refers to the way maker-spaces are organized and governed internally. The macro level refers to the social and economic relationship built overtime by the maker-spaces, within and outside the city, with different organizations.

Conclusion

Our analysis has explored the maker-spaces potential in terms of socio-economic growth in the metropolitan area of Milan. In this exploration, we have tried to answer questions such as: Are maker-spaces new sites for the economic development for the city? Are they hubs for the generation of enterprises and projects?

By applying Storper's perspective, four different types of makers' embeddedness have been analysed: the economic, the social, the institutional and the political space. Our findings show that the makers in the Milanese maker-spaces have been able to build strong networks with both economic actors (makers, workers and companies) and the local milieu; such networks have proved to be conducive to the development of projects and collaborations, in particular they offer companies services like consultancy or prototyping. Maker-spaces fulfil two complementary functions: they enable the development of relationships with other economic agents and they represent important hubs for the gathering of makers, for the sharing of knowledge, projects and, eventually, for the development of entrepreneurial ideas.

Secondly, it is through these wide and thick networks of relationships that the ideology and culture of the maker movement have developed and been consolidated. Sometimes these networks overlap with non-profit organizations with which the makers share some principles and an alternative orientation vis-à-vis market values. Thirdly, makers are formally organized into collective bodies aimed at raising their visibility, representing their interests and disseminating their vision. Lastly, makers proved to be a vital force in the local political sphere as they were able to find support from the local government: they are recognized as social innovators and as a potential contributor to the

social and economic development of the city.

We can therefore conclude that makers are well embedded in the local environment, having built thick networks, well-functioning institutions and been recognised by the local administration. However, they are not completely integrated into the local economic system. Their collaboration with local firms is more often than not limited to short-time consultancy or to the building of prototypes. Makers are still not able to develop large projects, with companies, nor maker-spaces are recognised as hubs for the externalisation of research and development department. As presented above, in the mind of the owners of maker-spaces, research and development in the maker-spaces should produce open and shared knowledge, designed to be used by anyone; on the other hand, companies wish to maintain complete control over the research and development process and, especially, over the outcomes, which are not to be shared. Two opposite views of knowledge in society come into conflict: the makers' viewpoint, which is based on the idea of open knowledge and aims at producing common goods, and that of the companies, based on the maximisation of profit, ownership and control over processes and products.

It can be argued, then, that a crucial role could be played by institutions, which can promote a better understanding of the economic opportunities of this new collaborative mode of production and act as trusted connectors between companies and makers.

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The Milan Charter

> *To safeguard the future of the planet and the right of future generations everywhere to live healthy and fulfilling lives. This is the great development challenge of the 21st century. Understanding the links between environmental sustainability and equity is critical if we are to expand human freedoms for current and future generations.*
>
> Human Development Report 2011

We, women and men, citizens of this planet, endorse this document, entitled the Milan Charter. In so doing, we make clear commitments concerning the right to food, which we believe should be treated as a fundamental human right.

We consider a lack of access to sufficient, safe and nutritious food, clean water and energy to be a violation of human dignity.

We believe that only our collective action as citizens, together with civil society, businesses and local, national and international institutions, will make it possible to overcome the major challenges related to food: combating undernutrition, malnutrition and waste, promoting equitable access to natural resources and ensuring sustainable mSanagement of production processes.

In signing the Milan Charter

- we affirm the responsibility of the present generation to take action and implement practices and choices that also guarantee the right to food for future generations;
- we commit to advocating political decisions that will enable achievement

of the fundamental goal of equitable access to food for all.

We believe that:

- everyone has the right to have access to a sufficient quantity of safe, healthy and nutritious food, that satisfies life-long personal nutritional requirements and enables them to lead an active life;
- food has a strong social and cultural value, and should never be used as an instrument of political or economic pressure;
- the planet's resources should be managed in an equitable, rational and efficient manner, so that they are not excessively exploited or used to benefit some people at the expense of others;
- access to sources of clean energy is a universal right, for present and future generations;
- investment in natural resources, particularly in land, should be regulated, so as to ensure and maintain access to these resources for local communities, as well as access to their sustainable use;
- sound management of water resources, namely management that takes account of the relationship between water, food and energy, is fundamental to ensure the right to food for all;
- agriculture is fundamental, not just for food production, but also for landscape design, environmental and territorial protection and conserving biodiversity.

We consider it unacceptable that:

- there are unjustifiable inequalities in the possibilities, capabilities and opportunities of individuals and peoples;
- there is still no universal recognition for the fundamental role of women, especially in agricultural production and nutrition;
- some 800 million people suffer chronic hunger, more than two billion people are malnourished or suffer deficiencies in vitamins and minerals;

nearly two billion people are overweight or suffer from obesity; 160 million children suffer from malnutrition and stunted growth;

- each year, 1.3 billion tonnes of food produced for human consumption is wasted or lost in the food supply chain;
- more than 5 million hectares of forest disappear each year, resulting in grave damage to biodiversity and local communities, and serious impact on the climate;
- marine resources are excessively exploited: more than 30% of what is commercially fished is exploited beyond any capacity for regeneration;
- natural resources, including land, are used with disregard to the needs and expectations of local communities;
- energy poverty continues, specifically in the form of lack of or inadequate access to efficient energy services and cooking facilities that are affordable, and that neither pollute nor damage health.

We are aware that:

- one of the greatest challenges to humanity is that of feeding a constantly growing population without harming the environment, so as to preserve resources for future generations;
- food plays an important role in defining each person's identity and is a cultural component that describes and gives value to a territory and its inhabitants;
- farmers, livestock keepers and fishers all play a crucial role in nutrition; they have equal rights and duties in their work, whether they are small-scale enterprises or large-scale businesses;
- we are all inter-related and all responsible as guardians of the Earth, for protecting territory and its environmental value;
- it is possible to promote improved conditions of access to adequate healthy food in an urban setting, through inclusive and participatory processes that harness new technologies;

- correct dietary education from childhood is crucial for a healthy lifestyle and a better quality of life;
- knowledge and practical experience of both traditional and advanced production methods is critical to the efficiency of agricultural systems, from family farms to industrial farms;
- the seas play a fundamental role in ensuring the equilibrium of the planet and therefore require supranational policies; an integral, healthy marine ecosystem is crucial for collective well-being, not least because fisheries provide jobs for millions of people and for many, fish offers the only source of high-quality nutrients;
- a sustainable strategy for addressing future food challenges must take a systemic approach, paying close attention to social, cultural, economic and environmental problems and involving all social and institutional actors.

Since we know we are responsible for leaving a healthier, fairer, more sustainable world to future generations, as citizens, we commit to:

- taking care with and being aware of the kind of food we eat, informing ourselves about its ingredients, their origin and about how and where it is produced, so that we can make responsible choices;
- only consuming the quantity of food necessary for our requirements, ensuring that food is consumed before it perishes, donating any food that is in excess and conserving it so that it does not spoil;
- avoiding water wastage in all daily, domestic and productive activities;
- understanding and protecting the environment through responsible behaviour and sound practices, such as recycling, regenerating and reusing consumer goods;
- promoting dietary and environmental education in the family, so as to foster a responsible development for new generations;
- make responsible choices when buying food, considering the environmental impact of their production;

- playing an active role in building a sustainable world, including through innovative solutions, developed by our work, creativity and skills.

As members of civil society, we commit to:

- making our voices heard at all decision-making levels, so as to define projects for a more just and sustainable future;
- representing civil society bodies in debates and processes for shaping public policy;
- strengthening and supplementing the international network of projects, actions and initiatives that constitute a significant collective resource;
- promoting environmental and dietary education in order to achieve collective awareness on their importance;
- identifying and reporting the critical issues in legislation governing the donation of unsold food, so that we can actively commit to salvaging and redistributing the surplus;
- promoting instruments that defend and support the incomes of farmers, livestock keepers and fishers, strengthening tools for organization and cooperation, including those for small-scale producers;
- giving value to local small-scale producers as protagonists of an advanced form of development, and promoting direct relationships between producers, consumers and territories of origin.

As businesses, we commit to:

- applying environmental and social standards and international conventions and encouraging forms of work that contribute to the personal fulfilment of staff, both men and women;
- investing in research, promoting a wider sharing of the results and developing it for the collective good, without distinction between the public and the private sector;
- promoting the diversification of agricultural production and livestock

keeping so as to safeguard biodiversity and animal welfare;

- improving production, conservation and logistics, so as to avoid (or eliminate) contamination and to minimize waste, including that of water, in all phases of the productive chain;
- producing and marketing healthy, safe food, informing consumers about the nutritional content, environmental impact and social implications of the product;
- promoting adequate packaging techniques, so as to reduce wastage and facilitate the disposal and recovery of used materials;
- promoting innovations that inform consumers of consumption times that are compatible with the nature, quality, and means of preservation of food;
- recognizing the positive contribution of cooperation and structural agreements in the sector, especially the food supply chain between farmers, producers and distributors, so as to allow more accurate forecasts of demand;
- contributing to the sustainable development goals, by using innovative processes, products and services, and by adopting and practising codes of social responsibility.

Therefore in signing this Milan Charter, we women and men, citizens of this planet, strongly urge governments, institutions and international organizations to commit to:

- adopting regulations that guarantee the right to food and food sovereignty and make them effective;
- strengthening legislation to promote the safeguarding of agricultural land, so as to regulate investments in natural resources, thereby protecting local communities;
- promoting the theme of nutrition in international government forums, ensuring effective and concrete implementation of the undertakings at

national level and coordination among specialized international organizations;

- developing a system of open international trade, based on shared rules that are not discriminatory, and which can remove the distortions that restrict the availability of food, thereby creating the conditions for improved global food security;
- considering food as a cultural patrimony, and as such, defending it from counterfeiting and fraud, protecting it from deceptive and improper business practices, highlighting the value of its origin and originality with transparent regulatory processes;
- formulating and implementing legal rules and regulations regarding food and environmental safety that are easy to understand and apply;
- promoting and disseminating the culture of healthy diet as a global health tool;
- combating and eliminating child and unregulated labour in the agrifood sector;
- working to build a supranational structure that gathers together the information activities of, and crime studies related to, the agrifood sector and which strengthens cooperation in countering criminal offences;
- identifying best practices in public policy and development aid that are in keeping with local requirements, rather than designed to address emergency situations, and which seek to foster the development of sustainable food systems;
- promoting international agreements for urban and rural food strategies for access to healthy and nutritious food, which involves both the planet's main metropolitan areas and the countryside;
- increasing resources for research and transferring its results, training, and communication;
- introducing or strengthening in schools and in school meal services, dietary, physical, and environmental education programmes as

instruments of health and prevention and highlighting the value of knowledge and the exchange of different food cultures, starting with typical, local and organic products;

- developing national health service measures and policies that promote a healthy and sustainable diet and reduce unbalanced diets, paying particular attention to people with special nutritional requirements, and those needing proper hydration and hygiene, especially the elderly, pregnant women, babies, children and the sick;
- promoting equal access to food, land, credit, training, energy and technology, especially for women, small-scale producers and disadvantaged social groups;
- creating support tools for the weaker sectors of the population, including coordination between actors working to collect and organize free distribution of surplus food;
- including the problem of food and water loss and waste in the international and national agenda through public and private investment in more effective production systems;
- highlighting the value of biodiversity at local and global level, using strategies that include indicators which attest to both its biological and to its economic value;
- considering the link between energy, water, air and food in a comprehensive and dynamic way, underscoring their fundamental relationship, so as to be able to manage these resources with a strategic long-term approach that can combat climate change.

Given that we believe in the possibility of a world without hunger, and consider this a matter of human dignity, in the European Year for Development and on the occasion of Expo Milano 2015, we commit to adopting the principles and practices outlined in this Milan Charter, in line with the strategy that the member states of the United Nations have developed to eradicate the problem of hunger by 2030. By signing this Milan Charter, we declare our concrete and active support for the Sustainable Development Goals promoted by the United

Nations.

A fair and sustainable future is our responsibility too.

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