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Proximity-based urban planning models as the interface between governments and makers, designers, and citizens towards distributed economies

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Abstract: Standard urban planning models are nowadays being redefined with a renewed focus on reducing mobility times: proximity, walkability, self-sufficiency. Reconfiguring how cities, their flows, and services are organized also requires designers and citizens, with a potential role for the Maker Movement and Distributed Economies. We focus here on how urban creative communities and maker laboratories could become public empowerment services by, for and with citizens within proximity of urban planning models. We propose a framework for such Proximity-based Making and Community Services based on 1) defining them as connecting makers, designers, citizens, and maker laboratories, 2) via digital technologies network into Distributed Economies, 3) interacting with Governments through the interface of proximity-based urban models, governances, and policies. The framework has a descriptive model and an assessment indicator based on people, organizations, and policies for a) understanding current urban making, b) planning new services or c) developing new policies for them.

Keywords: Maker Movement, Distributed Economies, 15-Minute City, Proximity, Governance

1. Introduction

The promotion of urban economies is considered one of the main strategies for reaching sustainable urbanization and for improving overall performances at national scale (UN-Habitat, 2020). The various dependencies we have developed have become our urban planning legacy, in which deep-rooted inequalities, especially in the social and economic spheres, have been recognized as unsustainable practices (Jacobs, 1961). Policy makers are reviewing urban policies, starting from reconfiguring mobility around proximity-based models and turning recent ad-hoc and temporary interventions into permanent infrastructures (Alberti

& Radicchi, 2022). Many ongoing attempts now focus on strengthening social cohesion and interaction, opening sustainable urban ecosystems where the quality of urban life is inversely proportional to the time spent in the traffic (Brown et al., 2009). Cities are called into action to repair their social fabrics that during modernist approaches were disrupted from human-scale to car-scale, developing new urban planning models focused on re-organizing cities according to the timing of walking mobility (chrono-urbanism) based on the concept of proximity of interactions (Moreno et al., 2021) and self-sufficiency of resources (Guallart, 2012). Reconfiguring the organization of cities and their flows and services requires collaborative and multidisciplinary interventions which involve professional figures such as urban planners, architects, and designers, among many others. Indeed, reflections on the role of designers in this transition have started only very recently (Manzini, 2021), especially within the framework of Distributed Economies (dos Santos et al., 2021). Designers already have a recognized role in such economies, especially within the Maker Movement, as both a way for re-organizing supply chains and manufacturing processes into accessible maker laboratories such as Fab Labs and Makerspaces and as a way for the democratization of design tools and practices towards empowering citizens (Browder et al., 2019; Gershenfeld, 2005).

We focus here on how urban creative communities and maker laboratories could become public empowerment services for and with citizens within proximity of urban planning models. We call these services 'Proximity-based Making Services': they generate and expand starting from a maker laboratory and its 15-minute City reachability area that connects citizens, makers, designers, and other labs locally, and with other labs globally, and locally with local policy makers, policies, and governance. The research question underlying this paper is: *How can we model, design, and assess Proximity-based Making Services by, for and with citizens, designers, and makers within chrono-urbanism and proximity-urban planning models?* Following this research question, we reflected on chrono-urbanism models and the practice and research of designers within Distributed Economies. Considering the extensive involvement of the authors in both research and practice of the Maker Movement for many years, we adopted an integrative review approach (Snyder, 2019) to systematically explore and consolidate the contributions, models, and concepts we have encountered throughout our research and practical engagement into a framework. After explaining the methodology (Section 2), we propose our framework (Section 3, Figure 1) as a) a model (Section 3) and b) an assessment indicator (Section 4) for measuring it. Consequently, a test of this framework is carried out with two case studies in the metropolitan area of Rome (Section 5). Finally, the paper (Section 6) ends with a recap of the overall framework (Figure 1) while pointing to future research for overcoming limitations.

2. Methodology

We propose in this paper a framework composed of a) a model and b) an assessment indicator, a further step in the evolution of a previous framework that lacked an assessment indicator (D'Elia & Menichinelli, 2023). We elaborated it to investigate and foster the relation-

ship between cities and urban manufacturing spaces in a network of services aimed at empowering citizens to reshape their daily lives by creating local artefacts and sharing knowledge on a global scale. Ultimately, we hope that this framework contributes to the understanding of the reciprocal interactions between Proximity-based Making Services and urban environments (as people, organizations, labs, and policies), thus contributing to the design of proximity-based products, services, and policies within urban contexts. The paper aims to identify the potential factors that could enable Maker and Design-led practices at the city proximity level with the support and collaboration of local governments. To address this, we conducted an integrative literature review: its goal is to evaluate, critique, and synthesize the literature on a research subject in a way that encourages the emergence of new theoretical frameworks (Snyder, 2019). Instead of merely providing an overview or account of a field of study, an integrative review technique results in the advancement of knowledge and theoretical frameworks. Ideally, it produces a novel conceptual structure or theory rather than being descriptive or historical. Therefore, it helps in assessing new urban creative movements like the Maker Movement, supporting the elaboration of an integrated model that can be adopted both in research and practice. A related assessment indicator was built on its three-layer structure and focused on the labs, people, organizations, and policies at all layers. Finally, the assessment indicator was tested with two maker laboratories in the metropolitan area of Rome, chosen as representative of the different scales of Proximity-based Making Services observed there.

3. The model

The model proposed in this paper (Figure 1) is based on an intersection of three critical layers, from the bottom-up to the top-down: 1) Proximity-based Making Services, 2) Distributed Economies, and 3) Local Government. We envision the convergence of these elements as a paradigm shift in how design researchers and practitioners can contribute to how cities are designed, operated, and economically sustained. Proximity-based Making Services, driven by the Maker Movement and digital technologies, foster creativity and innovation, while Distributed Economies usher in decentralized, resilient networks of production and service provision. Local governments, recognizing the increasing importance of proximity, are adapting governance models and policies to promote sustainable practices and responsive services. The model is structured in three macro layers: the first (3.1) considers the collective practices of makers, designers, and citizens in maker laboratories (Figure 2). The second one (3.2) identifies those ICT-networked distributed economies slowly reconfiguring production systems towards proximity (ICT, Information and Communication Technology) (Figure 3). The third one (3.3) elaborates on how Local Governments develop governance and policies for proximity-based urban planning models and, thus, indirectly services as encounters with distributed economies (Figure 4).

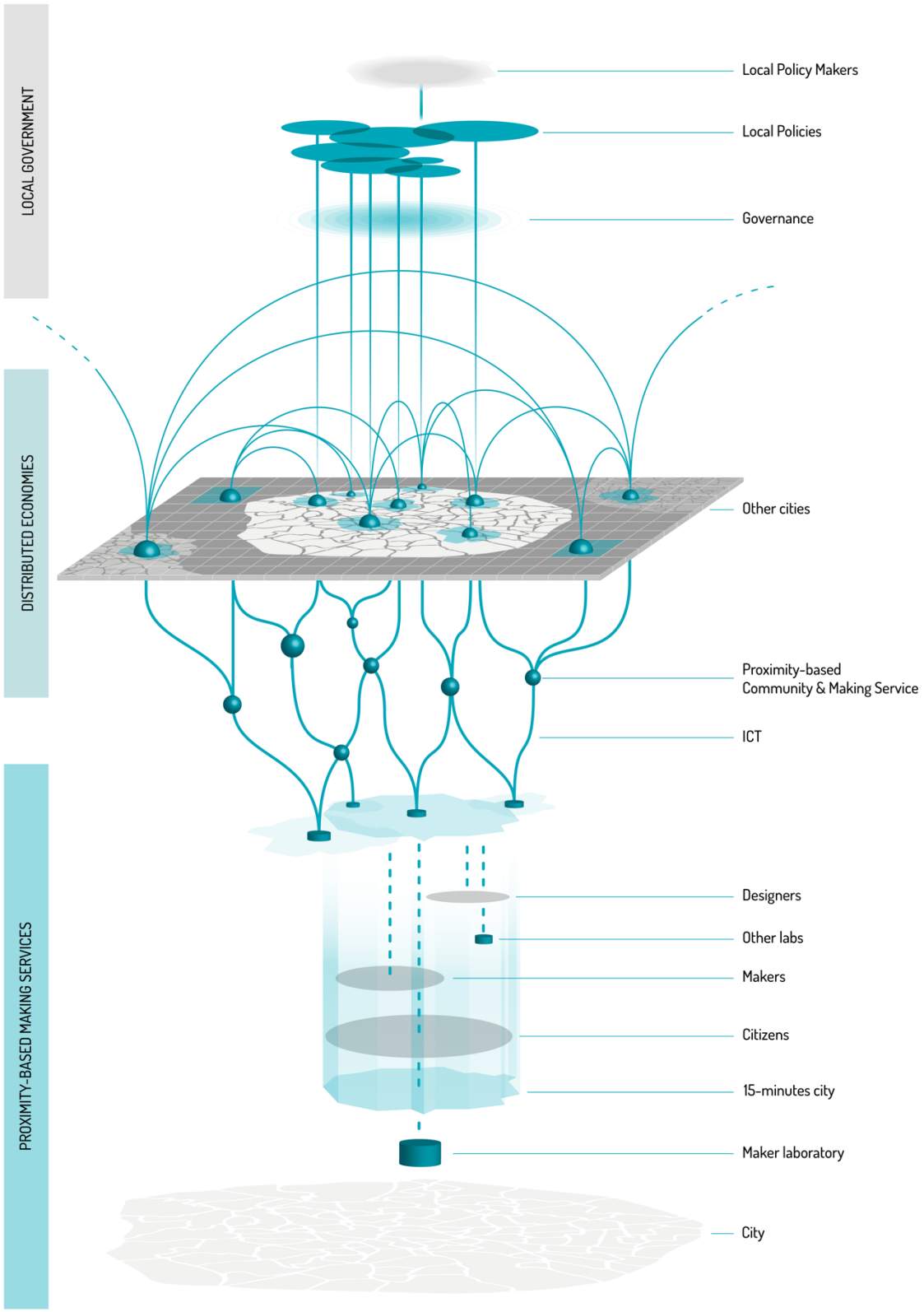

Figure 1 A preliminary framework for the role of design in enabling Proximity-based Making Services by, for and with citizens, designers, and makers within chrono-urbanism and proximity-urban planning models.

3.1 Proximity-based making services

After almost 20 years of the Maker Movement, maker practices have already had a relevant development, diffusion, and impact. However, they could still be considered marginal because their economic model is still recent and clearly in contrast with current dominant economic models (Holman, 2015). Maker practices should expand their focus from solely on technologies to design, develop and adopt them to influence social, cultural, and political processes in novel ways (Greenfield, 2017). In this direction, we consider that maker laboratories could expand their practice becoming Proximity-based Making Services by merging and facilitating the encounter of professional designers with non-professionally trained citizens, makers, and other professionals with a strong focus on building local communities while empowering them and connecting them with other similar communities.

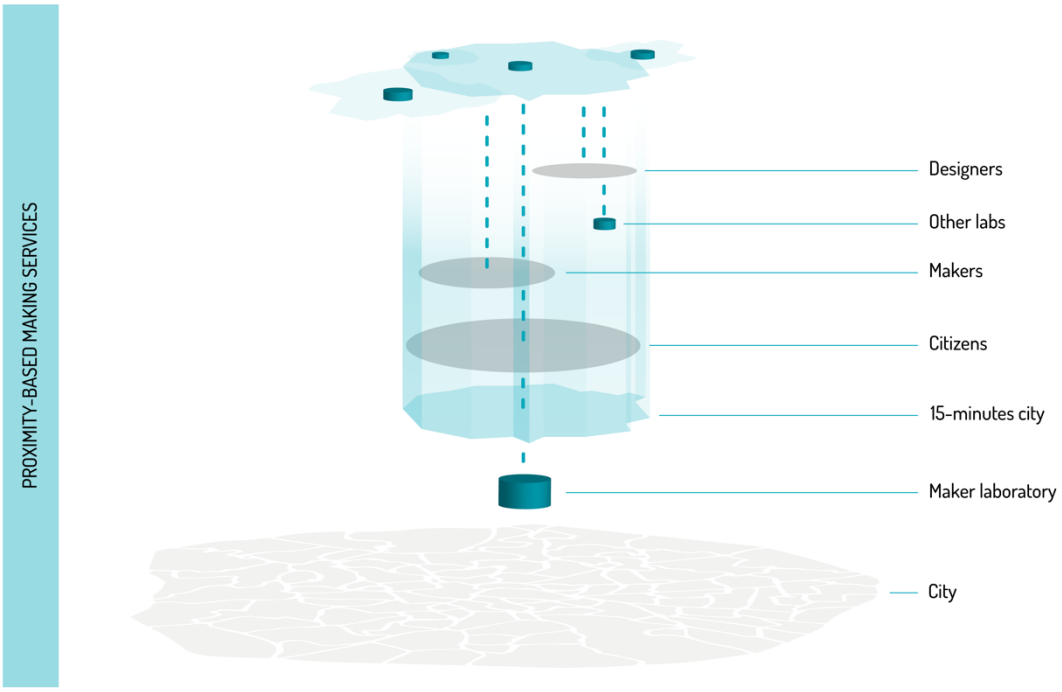

Figure 2 A maker laboratory as the focal point for the 15-minute City area generating a Proximity-based Making Service that connects citizens, makers, designers and other laboratories

The Maker term is very generic and universal and disputed (Menichinelli, 2017), broadly referring to people who design and manufacture artifacts with both digital and physical dimensions in collaborative places and processes. We follow here Chris Anderson's initial definition (2012) of makers as people taking the DIY movement to online communities and global networks, with three main important features: a) use of digital desktop tools for designing and prototyping projects; b) a culture of sharing design projects and of collaborating with others in online communities; c) the use of common design file standards that allow anyone to manufacture the projects. We add that makers are also people working in online communities and in maker laboratories, working with both analog and digital technologies, with open

source and peer-to-peer practices but also few times with proprietary and traditional business attitudes. This distinguishes them from professionally employed and professionally trained designers (although some individuals might fit into both categories) and citizens (i.e., citizens who do not professionally engage in the design and production of artifact). By becoming more conscious and focused on services at the proximity level, laboratories, makers, and designers can improve their role as active participants in cities. As a result of these interactions, Proximity-based Making Services could be considered not only bottom-up services but also as promising strategies for top-down interactions from the Local Government in reaching citizens and improving neighborhoods with an increasing role of autonomous, diffuse, and self-organized communities (Manzini, 2015). The framework starts from one single maker lab as the focal point for the 15-minute City area generating a Proximity-based Making Service that connects citizens, makers, designers, and other maker labs in the same city it works with. Maker labs always strive for creating local communities of creative individuals (Figure 1) that are connected to larger global communities of individuals and labs (Figure 2) (Menichinelli, 2020b, pp. 52–54).

3.2 Distributed economies

The Maker Movement and its initiatives have evolved, differentiated, and spread globally through the years thanks to the implementation of ICT and digital fabrication technologies that have allowed a continuous and constant strengthening of networks of locally distributed and globally connected initiatives, generating new Distributed Economies (Figure 3).Thanks to digital technologies, several concepts emerging from digital culture, such as openness, peer-to-peer, and distributed systems, have been integrated into the design discipline, giving birth to phenomena such as Open Design and Distributed Manufacturing among several different possibilities (Bakırlıoğlu & Kohtala, 2019). The mix of digital technologies and digital culture has created the path for developing different approaches that integrate the local and the global - an open and ongoing foundational political process (Latour, 2017). Within the Design discipline, such reconfiguration has been addressed over the last two decades with at least three concepts that build on each other: 1) Cosmopolitan Localism, 2) Distributed Economies and 3) Hybrid Communities.

Cosmopolitan Localism considers how design can contribute to local short-distance networks connecting with global long-distance ones, supporting localities and territories while connecting them as single nodes to the rest of the world (Manzini & M'Rithaa, 2016). A similar approach, Cosmo-localism, focuses on the dynamic relationship among people who can design within a global infrastructure and project which are shared globally and served locally (Kostakis et al., 2015). We should note that Cosmo-localism aims at a single universal community, while Cosmopolitan Localism aims at valorizing the diversities of local communities and connecting them globally (Menichinelli, 2020b). Cosmopolitan Localism foresees the networking of existing local communities with larger global networks. Within this scenario, the next evolution would be in establishing locally focused but globally coordinated inte-

grated economies as a way for redistributing centralized activities to more localities. For example, production and service distribution are connected and distributed in small-scale production units within a larger network, forming more resilient networks. Those small-scaled connections cover a relevant role in participatory systems, where actors can handle complex socio-technical systems, enabling individuals to carry out their activities (Manzini & M'Rithaa, 2016) within a system of Distributed Economies where the control is shifted towards the user/client (dos Santos et al., 2021). Networks of Proximity-based Making Services, therefore, provide the potential to promote locally based sustainable solutions, sharing various forms of local resources, including skills, knowledge, and manufacturing/service capabilities such as good design practices.

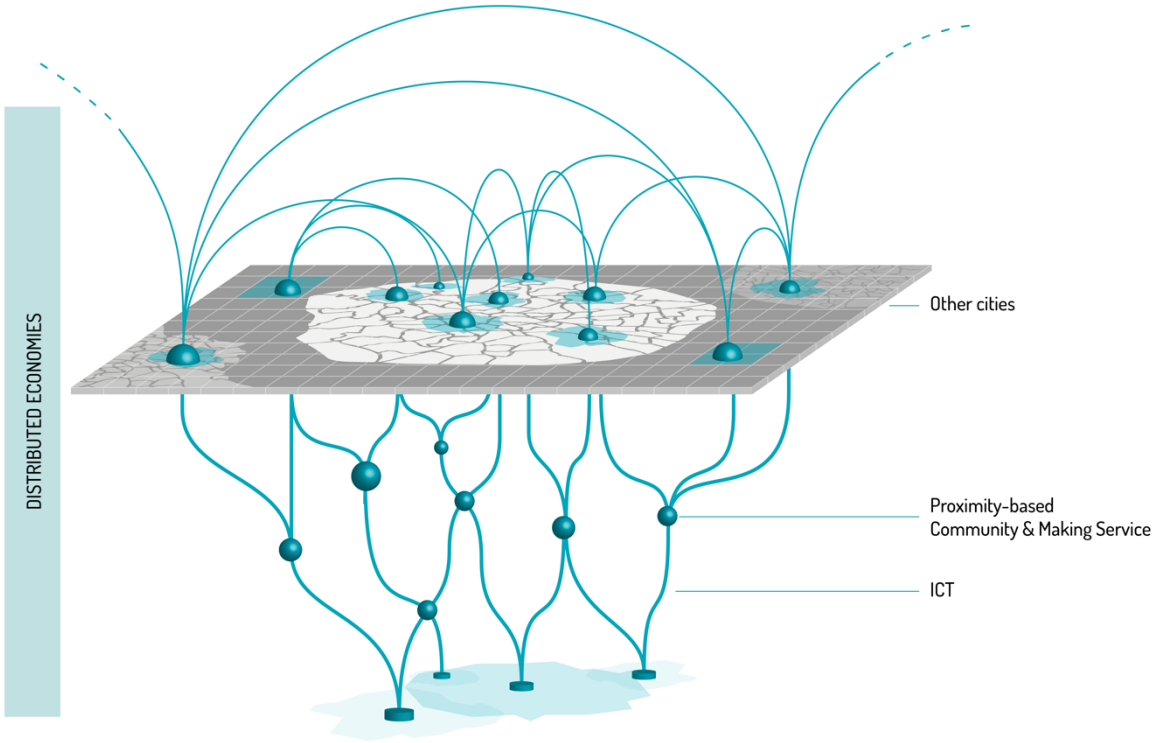

Figure 3 Distributed Economies: zoom-out of Proximity-Based Making & Community Services from local to global territories through the support of new digital technologies.

Finally, the focus now is on the increasing integration of local and digital technologies in becoming indistinguishable in everyday life. The Design for Social Innovation (DSI) approach (Manzini, 2015), together with the integration of digital technologies in social innovation of DSI – Digital Social Innovation (Bria et al., 2015), have increasingly promoted the focus on the social role of technology, especially after the COVID-19 lockdown experience by supporting the birth and the thriving of Hybrid Communities in the physical spaces (Manzini, 2021). By inventing and enhancing new socio-cultural and economic activities, creative communities (Meroni, 2007) are generating a new sense of place and a new idea of locality, where the role of technology becomes more relevant in strengthening communities within cities more than conventional Smart City frameworks (Manzini, 2021).

The emergence of Distributed Economies can represent a more sustainable approach to social and economic activities in the direction of reinforcing local communities. The COVID-19 pandemic crisis confirmed the relevance of the geographical location of processes, including public services and how it affects our behaviors, moving governments towards proximity-based values and strategies. This has already been noticed over time by Local Governments, which, we argue, through proximity-based governance models and policies, can interact with Distributed Economies of Proximity-based Making Services (Figure 4). From cities planned around the 'economy of scale' concept, with specialized and concentrated production areas, now 'chrono-urbanism' approaches such as the '15-Minute City' concept (Manzini, 2021; Moreno et al., 2021) are being taken into consideration to enable citizens to achieve better standards of life more sustainably. Within this view, communities generate and regenerate the local socio-economic fabric as a node and expand through a wider network that connects communities and places to the rest of the world, merging the Cosmopolitan Localism, Distributed Economies and Hybrid Communities concepts.

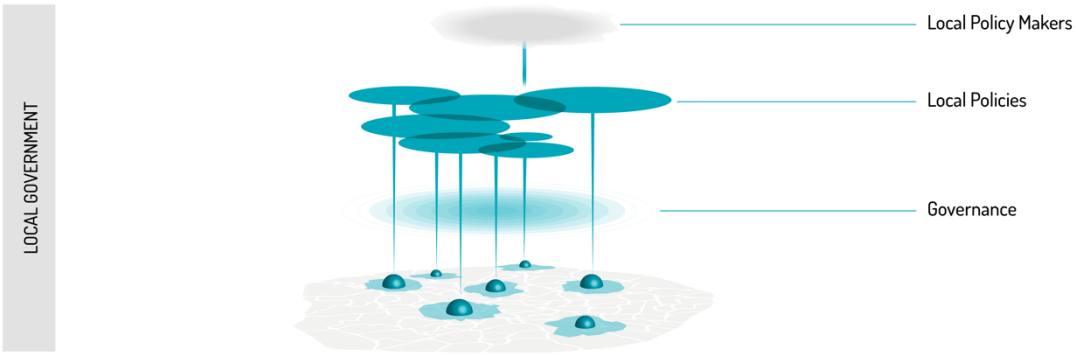

Figure 3 Local Government: Proximity-based policies and governances as the interface between Distributed Economies and Local Policy Makers

Several new models for cities are thus appearing. For example, in making self-sufficient cities (Guallart, 2012) with an interconnected, interrelated, and open environment to advocate the dynamics of urban production and development. Within the Maker Culture, different approaches are forecasting scenarios of cities as an open lab to share experiences and make free experiments. One example is the reinvented urban life in Maker City (Hirshberg et al., 2016), where attention is paid to traditional practices to empower an educated generation of modern artisans with a renewed interest in a hands-on approach to urban matters. Another example is the Fab City initiative (Diez Ladera et al., 2022), which proposes the 'full stack' software development metaphor: multiple layers of activities for developing a strategic framework that integrates several different Fab Lab initiatives in cities with a focus on urban manufacturing while networking such cities to exchange experiences within a global network. Maker initiatives, because of their small scale and still low impact, could focus more

on improving their social impact with economies of scope rather than of scale of urban manufacturing, for example, by focusing on the concept of well-being (OECD, 2011, 2014) to evaluate the impact of the Maker Movement on cities and regions as a proxy for the impact on overall society, environment, and the economy (Menichinelli, 2020a). All these models contribute to redefining how makers can work at the city scale by a) moving from the individual to the community to the city scale, b) redefining proximity-based planning models, and c) creating an interface of negotiation with the government for the development of data, services and policies that enable proximity-based strategies.

4. The assessment indicator

The model introduced here is a descriptive model that can be used for making sense of all the actors, technologies, spaces, processes, organizations, and policies between Proximity-based Making Services, Distributed Economies, cities, and local governments. As such, it can be useful for a) understanding the current making and designing phenomena at urban levels, b) planning new services for them, or c) developing new policies supporting and with them. But we also consider that it would be incomplete without any indication about how to evaluate current phenomena (*ex-post* or *in itinere*) and assess emerging ones (*ex-ante*), i.e., without any ways of checking, measuring, and understanding the status of each system. In this section, we add criteria for an assessment indicator as part of our preliminary framework, which then also becomes a way for evaluating and assessing how bottom-up initiatives respond to specific needs and help develop new economies combined with top-down initiatives from local governments. We consider these as the main criteria behind this assessment indicator:

1. **Assessing the interactions between bottom-up to top-down initiatives:** Each layer of the model should be assessed or evaluated, also considering that the model looks at the evolution from 1) Proximity-based Making Services to 2) Distributed Economies and 3) Local Government, that is, the model has a direction from bottom-up to top-down, with Proximity-Based Urban Planning Models and Governances as the interface between bottom-up and top-down initiatives.
2. **Defining Proximity-Based boundaries with Isochrone Maps:** As we focus on proximity-based urban planning models, the context of the application of the model and the indicator should be clearly defined in terms of the territorial area accessible in terms of proximity. For example, Isochrone maps (Galton, 1881) can quickly and easily define the 15-Minute City (or another time measurement) areas where the model can be applied, thus providing a simple starting point for calculating all the other metrics.
3. **Evaluating Proximity-based Making Services within 15-Minute Isochrone Maps:** We consider that, if not all, a selection of making and designing projects inside the 15-Minute isochrone maps should be considered. Proximity-based

Making Services should be centered around a maker lab and the citizens, makers, designers, and laboratories it serves and connects as a starting point.

4. **Quantifying the Impact of Citizens, Makers, Designers, and Policy Makers:** We consider that, broadly speaking and without elaborating on issues related to citizenship, each actor of the model is a citizen, be they makers, designers, policy makers or more. We thus suggest starting with the overall number of citizens living or directly influencing the proximity-defined territorial context (15-Minute City, …), with quantitative data about them, which can also be acquired via isochrone maps (Nolde, 2018). Considering that there is no clear data about the number of makers and designers, several methods could be adopted (Menichinelli et al., 2019) and for the sake of simplicity, we suggest beginning with asking the starting maker laboratory and, if not possible, elaborating expected percentages.
5. **Assessing through an integrated multi-layer perspective:** Our model is based on three layers, each of which can be assessed with specific indicators.

Following these criteria, we suggest that the three layers of our model could be evaluated and assessed starting from these indicators, which are also the building blocks for the main composite indicator (Table 1), to be adopted with a simple research protocol (Table 2), at first as an ex-post evaluation of current practices, but increasingly as an ex-ante design tool in the future.

1. **Proximity-based Making Services.** These elements should always be elaborated only within the boundaries of the 15-Minute City isochrone area of the starting maker laboratory:
    1.1. **Citizens:** number of the citizen population that can ideally be reached.
    1.2. **Designers:** the ratio of designers effectively reached over the citizen population that can be ideally reached.
    1.3. **Makers:** the ratio of makers effectively reached over the citizen population that can be ideally reached.
    1.4. **Other Maker Laboratories:** ratio of laboratories, services and spaces effectively adopted and engaged over the ones that can be ideally reached.
2. **From Proximity-based Making Services to Distributed Economies.** Each of these elements should always be elaborated only within the boundaries of the 15-Minute City isochrone area of each maker laboratory of 1.1 - it is the same analysis of the previous section but applied to each collaborating lab (snowball sampling):
    2.1. **Citizens:** number of the citizen population that can ideally be reached.
    2.2. **Designers:** the ratio of designers effectively reached over the designers that can be ideally reached.

2.3. **Makers:** the ratio of makers effectively reached over the citizen population that can be ideally reached.

2.4. Other Maker Laboratories: ratio of laboratories, services and spaces effectively adopted and engaged over the ones that can be ideally reached**.**

3. **From Distributed Economies to Local Governments.** Each of these elements should always be elaborated within the tension between the boundaries of the 15-Minute City isochrone area of the starting maker laboratory and the whole city or metropolitan area administrative boundaries:

3.1. **Local Policy Makers:** the ratio of policy makers effectively reached by the selected laboratory over the number of policy makers influencing it.

3.2. **Local Policies**: the ratio of policies influenced by the selected laboratory over the number of policies influencing it.

Table 1 The Proximity-based Making Services Assessment indicator

			Total impacted	**Engaged**	%
	Local Government	Local Policies	N1	N2	N2/N1 (%)
Proximity Governance Interface		Local Policy Makers	N1	N2	N2/N1 (%)
	Distributed Economies	Other Maker Labs	N1	N2	N2/N1 (%)
		Makers	N1	N2	N2/N1 (%)
		Designers	N1	N2	N2/N1 (%)
		Citizens	N1	N2	N2/N1 (%)
	Proximity-based Making & Community Service	Other Maker Labs	N1	N2	N2/N1 (%)
		Makers	N1	N2	N2/N1 (%)
		Designers	N1	N2	N2/N1 (%)
		Citizens	N1	N2	N2/N1 (%)

Table 2 The research protocol for the Proximity-based Making Services Assessment indicator

Steps	Actions
01	Choose the Maker Laboratory of the Proximity-based Making Service to analyze.
02	Identify its 15-Minute City isochrone area and related population (e.g., with Open-RouteService).
03	Identify the designers working in the 15-Minute City isochrone area.
04	Contact the laboratory and ask these questions:
	04a *Question: How many makers have you engaged?*
	04b *Question: With which other maker laboratories have you been collaborating?*
	04c *Question: How many local policy makers have you interacted with, influencing them?*
	04d *Question: How many local policies affect your activities?*
	04e *Question: How many local policies have you influenced?*
07	For each laboratory identified in step 04b:
	07a Identify its 15-Minute City isochrone area and related population.
	07b Identify the designers working in the 15-Minute City isochrone area.
	07c Contact the laboratory and ask the questions 04a-04e

5. Case Study: Proximity-based making services in the metropolitan area of rome

We did a first test of the assessment indicator on two maker laboratories identified in the metropolitan area of Rome: its overall maker ecosystem (Figure 5) consists of: a) 23 privately owned labs, including one large production factory utilizing these technologies; b) 11 open labs, with 5 directly provided by the Lazio Region, 4 established as co-working spaces, and only 2 exclusively associated with the Fab Lab network; c) the remaining cluster of 8 labs, most of which are affiliated with the Fab Lab network, is distinguished by their integration within schools and universities, therefore their access policies are defined by institutional regulations that necessitate their clientele to be either students or staff. For the calculation of the isochrones areas and related population we applied a software that the main author had previously developed with a collaborator and released as open source (Menichinelli & Napolitano, 2023).

As it could be expected, access to digital fabrication laboratories remains limited in many urban areas, especially in disadvantaged neighborhoods. We addressed this issue by mapping the location and accessibility of digital fabrication laboratories in the metropolitan area of Rome. Most of these laboratories were in the city center and in the more affluent areas of the metropolitan area. However, some laboratories were also located in less privileged areas, indicating efforts towards equitable access. This phase has proven to be productive in obtaining a clear understanding of the distinct characteristics associated with each laboratory, primarily based on their geographical location (Figure 5).

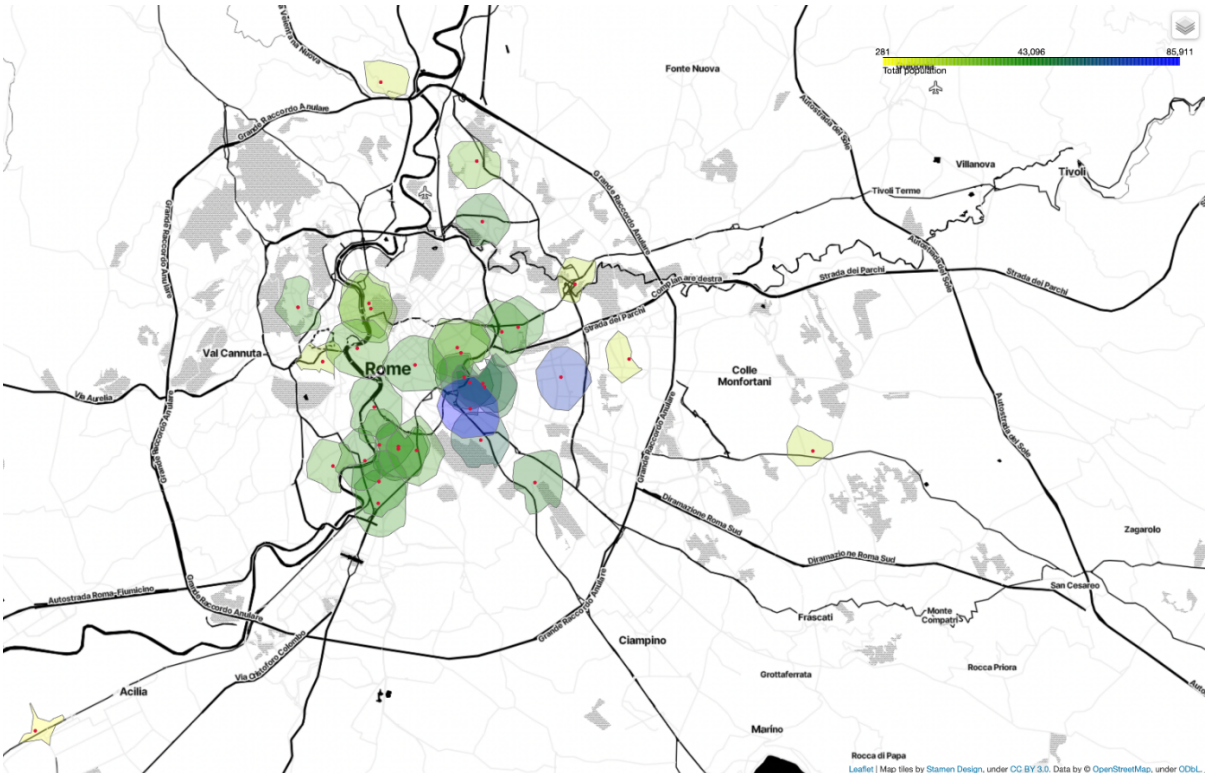

Figure 5 The distribution of maker labs and their isochrones in the metropolitan area of Rome

This distribution of the labs provides an overview of the current status of the 15-Minute City concept regarding urban manufacturing in Rome (Figure 5), outlining also the population reached and density of each lab (Figure 5) and of the whole metropolitan area (Figure 6). This, in turn, sheds light on the potential customers or user base that each laboratory could target by employing a horizontal proximity approach. Other relevant considerations could be derived from the isochrone map (Figure 5), such as the extension of the 15-Minute City areas reached (Figure 7), which finds interesting insights when considering the population reached (Figure 8). In the next two sections we applied the assessment indicator to 2 different labs, in order to do a first test: this is also useful for understanding which data the maker labs don't have access to or are not aware of, and that could be addressed for further research. For example, we have to highlight that each lab doesn't know how many makers they could potentially reach locally, they know only the ones they have already reached.

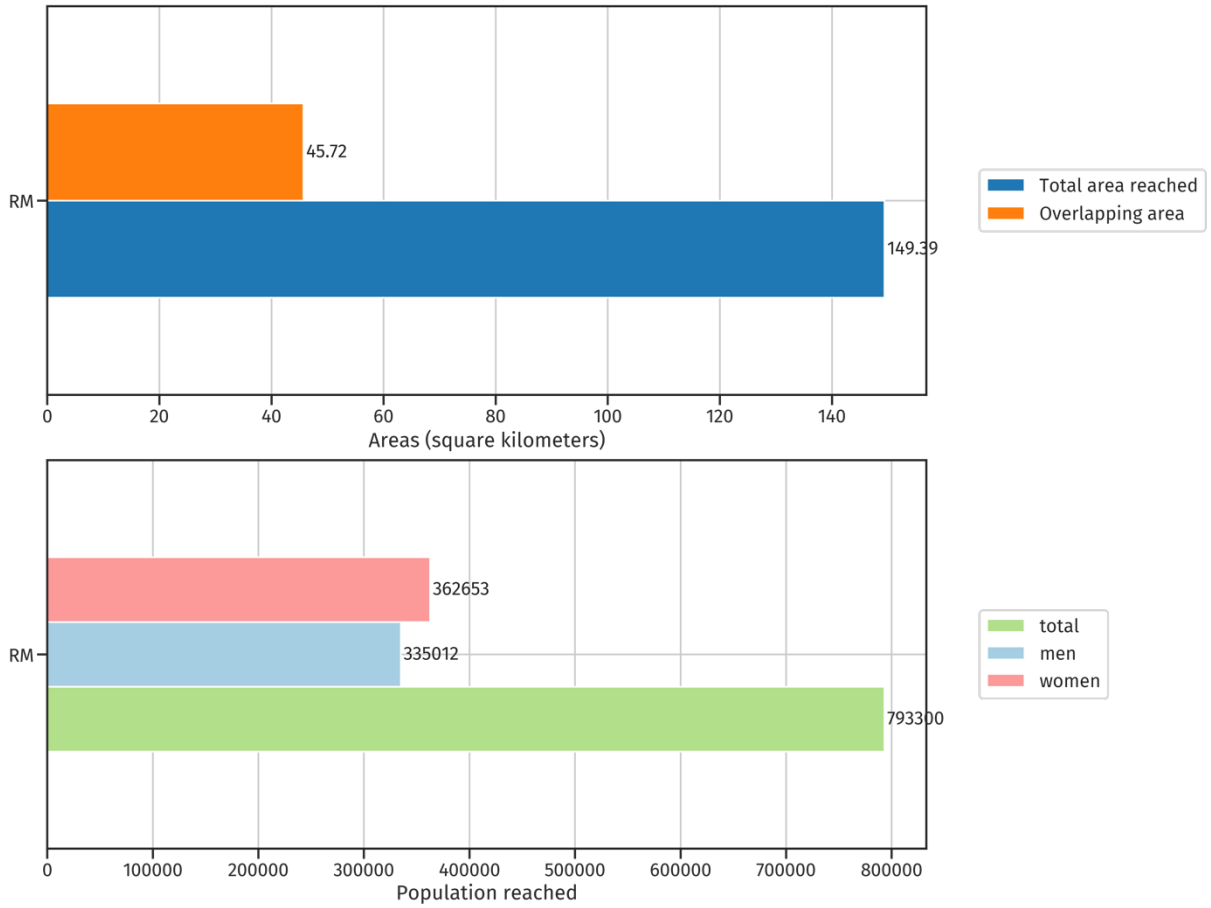

Figure 4 Overview of population and area reached by the maker labs

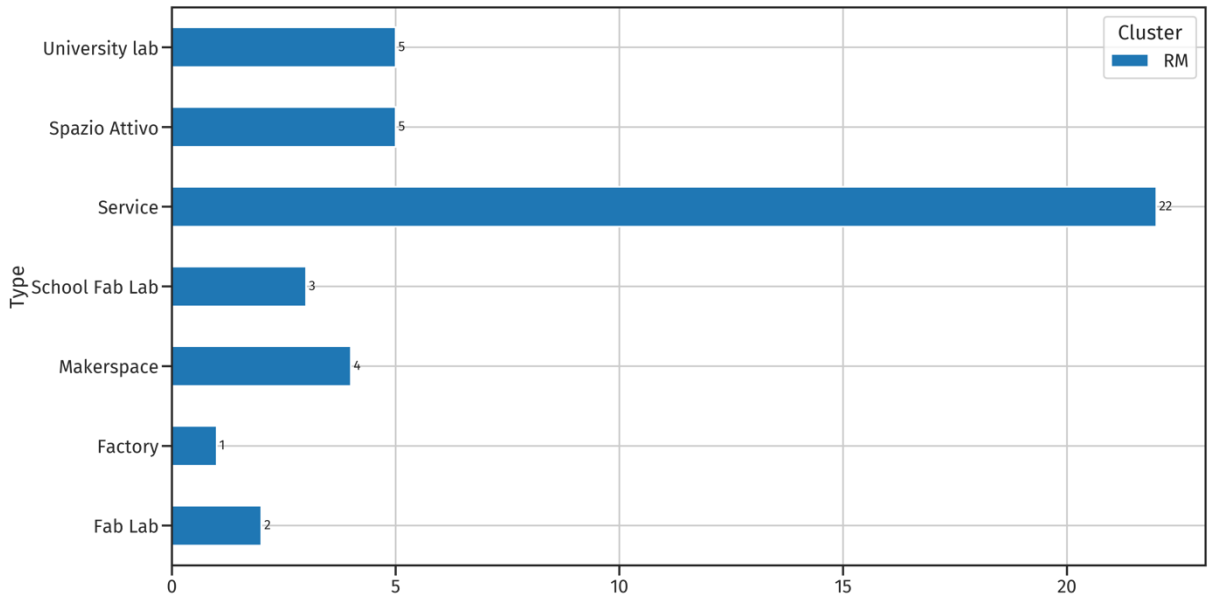

Figure 7 Types of maker labs

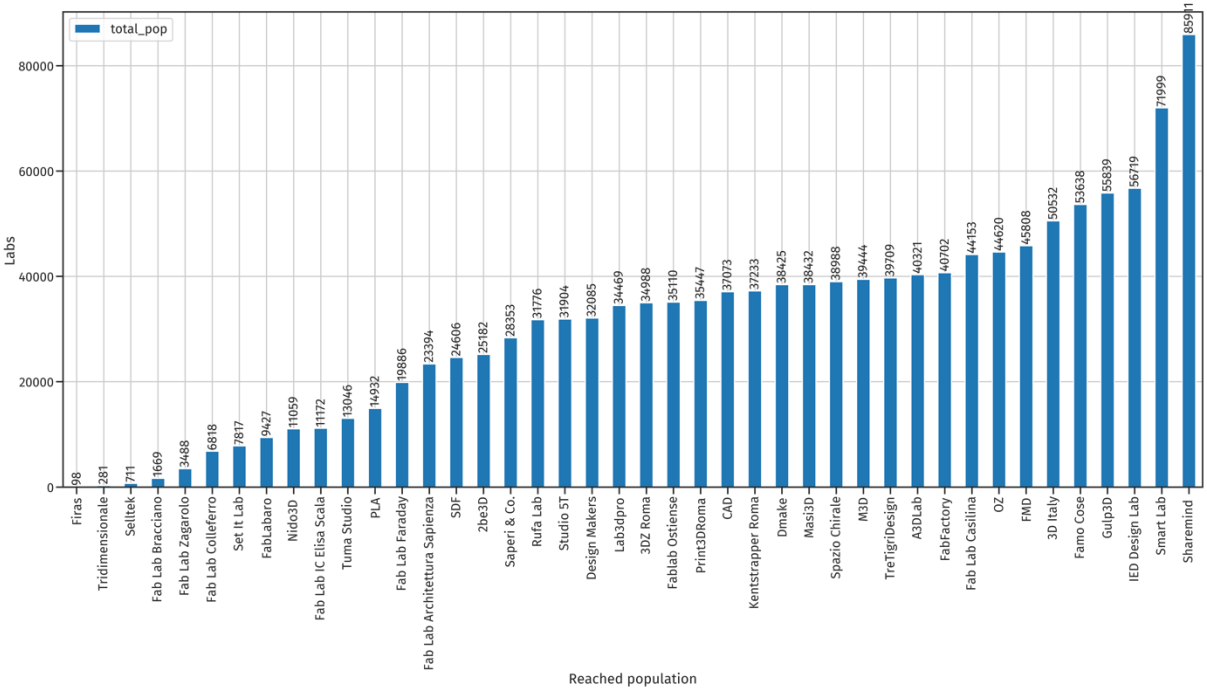

Figure 5 Reached population by each maker lab

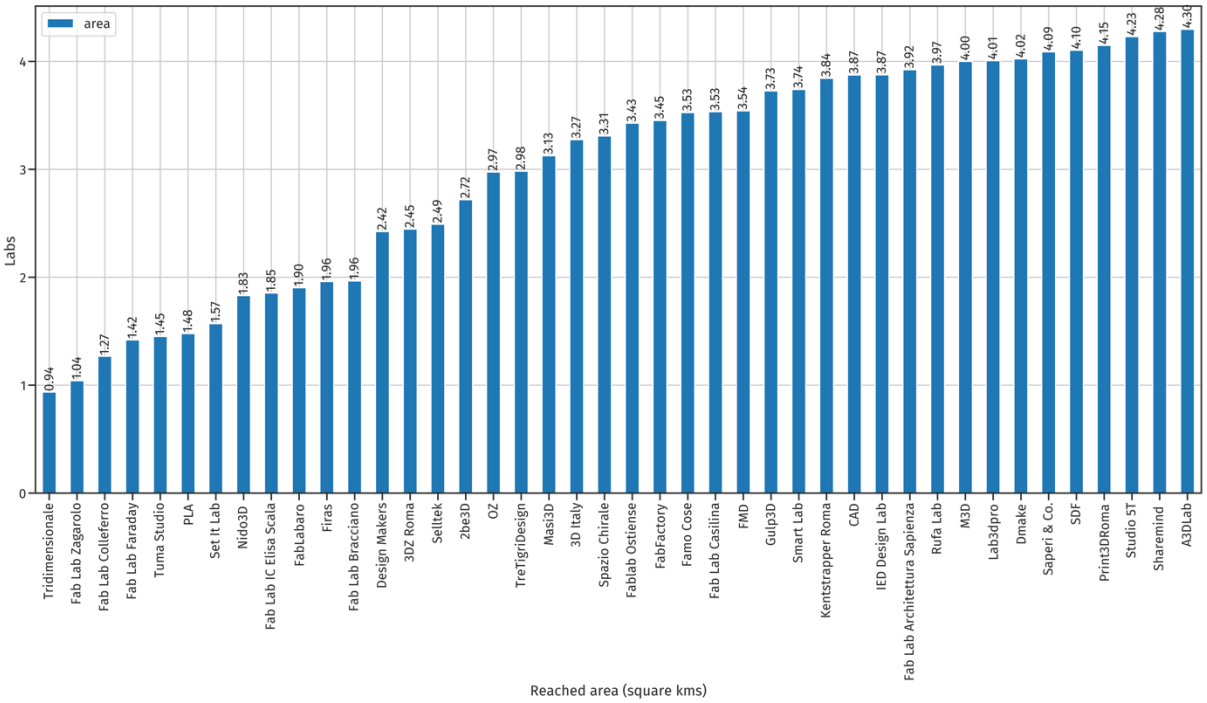

Figure 6 Reached area (km^2) by each maker lab

The two laboratories in this section were selected because of the heterogeneity of their traits: 1) *FamoCose* is a co-working based in a suburban and artistic district of Rome that supports small creative initiatives and businesses, mainly focusing on digital product development (including digital manufactured products); 2) *Spazio Chirale*, based in a working-

class district, is one of the most popular labs in Rome and it is a private business which support businesses and other initiatives through a series of educational and development programs. We chose the FamoCose for its peculiar geographical position in the city and for its asset as co-working mainly focused on local initiatives development; we chose Spazio Chirale due to the range of its initiatives, focusing also on network and policy directions, which extends even at international level.

5.1 Case study: Famo Cose

Famo Cose, by VIVO Studio, is a coworking space funded and managed by the designer Luca Magarò to meet the needs of startups and small-scale productions. Its primary goal is cultivating a collaborative environment that nurtures creative ideation and fosters experience sharing. The space provides workstations - fully equipped with both additive and subtractive manufacturing machinery, enabling activities such as laser cutting, CNC milling, and heavy material processing – and offers support to startups and small enterprises through design consultancy, technical courses, and workshops covering essential topics like technology development, access to funding, and business expansion strategies, empowering members with the tools necessary to nurture their projects.

Table 3 Report of the investigation activity on the Famo Cose laboratory through the Proximity-based Making Services Assessment indicator

FamoCose		**Total impacted**	**Engaged**	**%**
Local Government	Local Policies	0	0	0
	Local Policy Makers	27	0	0
Distributed Economies	Other Maker Labs	39	1	2.564%
	Makers	0	5	0
	Designers	120	0	0
	Citizens	79,330	160	0.201%
Proximity-based Making & Community Service	Other Maker Labs	3	1	33.333 %
	Makers	0	160	
	Designers	16	0	0

	Citizens	40,721	0	0

Following the interview, considering the protocol outlined in Table 2, it became feasible to ascertain the actual percentage of impact these laboratories exerted in the local area and the city. The assessment revealed a more pronounced inclination towards building a network with nearby entities rather than those distributed across the urban territory.

5.2 Case study: Spazio Chirale

Spazio Chirale, although not currently particularly involved in maker-related projects as during its early years, focuses its activity on supporting project development for business and students from principal universities and academia in Rome. This includes mentoring young designers in creating their products and tightening collaborations among various entities while strengthening connections with all Fab Labs in the Lazio region. Over the last ten years, the organization has engaged with several political figures and partnered with CNA (the Italian Confederation of Craft Trades and Small-and-Medium-Sized Enterprises), a key association for small and medium-sized Italian enterprises, to maintain regulatory compliance.

Table 4 Report of the investigation activity on the Spazio Chirale laboratory through the Proximity-based Making Services Assessment indicator

Spazio Chirale		**Total impacted**	**Engaged**	**%**
Local Government	Local Policies	0	1	
	Local Policy Makers	27	5	18.519%
Distributed Economies	Other Maker Labs	39	24	61.538%
	Makers	0	0	0
	Designers	120	4	3.333%
	Citizens	79,330	0	0
Proximity-based Making & Community Service	Other Maker Labs	3	1	33.333%
	Makers	0	0	0
	Designers	23	0	0

	Citizens	43,290	0	0

As in the previous case, the same protocol was followed, revealing a stronger inclination to consider a broader and dispersed network beyond the local urban context (albeit not entirely indifferent), accompanied by more dedication to proximity and to local political actors.

6. Conclusions

In this paper we propose a framework for the role of design in enabling Proximity-based Making Services by, for and with citizens, designers, and makers within chrono-urbanism and proximity-urban planning models at the interface with policy makers. Our aim is to propose a framework that could serve as a foundational guide for shaping forthcoming studies and practices related to the role of design in shaping making services that empower creative urban manufacturing communities of makers, designers, and citizens. We argue that to enable creative communities to produce and expand their potential, it is necessary to establish a dialogue between distributed bottom-up practices and proximity-based top-down enabling frameworks. In this way, local governments and communities could collaborate in facing social issues through proximity-based design, production, distribution, and management supported initiatives. Our framework offers substantial opportunities for urban planning and design since it serves a platform for design education, providing students with practical, hands-on experience in understanding how services, bottom-up initiatives and policies shape their local environments. Furthermore, the framework holds significant research potential, particularly in understanding distributed economies, integrating digital technologies, and government-citizen interactions within urban contexts. Moreover, the framework has the potential to facilitate meaningful dialogues between makers, designers, citizens, and governmental bodies, leading to the development of policies aligned with the goals of proximity-based urban planning, thereby fostering sustainable and resilient urban communities. Furthermore, such approach would contribute to the increasing democratization and governance of technology development not only to the participation of citizens, but also by adding a strong focus on the local dimension of design, development, testing and production of artifacts. More specifically, it would contribute to the discussion on the governance of technology development, urban manufacturing, proximity-based services, and citizen participation.

Further research is required to unpack all these topics and their interactions. As this is a preliminary framework, future research should engage in 1) evaluating and describing existing phenomena with it; 2) further in-depth validation of the framework and its application with stakeholders and experts; 3) further extension of the indicators of the framework for example improving the description of social impact; 4) its application or extension to other dimensions, from the people/organization/policies one to flow of materials or financial resources; 5) further extension of the framework from an urban perspective to other ones, for example for rural areas or for a bioregional, regional and national scale. Furthermore, 6) the research

tools could be developed into interactive tools that could directly enable maker labs to explore their assessment and validate it towards understanding their own 15-Minute City dimension or in a yearly research-driven survey of labs. This could also improve the measurements of engaged stakeholders and their effective location inside or outside the isochrone areas. Furthermore, 7) besides isochrone maps (part of contour or opportunity measures), several other indicators of urban accessibility and proximity can be considered (gravity-based and utility-based, for example), although they are more complex (Guida & Caglioni, 2020). Finally, 8) our assessment indicator is based on three layers, each of which can be assessed with specific indicators. These are currently assessed separately, but could be weighted and combined in a composite indicator (OECD & JRC, 2008) that can provide a simple overall 0 to 10 score.

It is important to stress the framework's applicability may vary across diverse urban contexts, influenced by cultural, economic, and social conditions. The authors are from the same European country (Italy) and considered the Italian and European urban context, so the framework should be studied, validated, discussed, and modified for other contexts with very different urban realities such as Latin America, Africa and Asia, for example. Thus, further research is needed to adapt the framework to specific geographic and demographic circumstances. Additionally, ensuring the alignment of stakeholders involved in proximity-based urban planning with the framework's principles is vital, as conflicting interests or values may arise, posing a key challenge in practical implementation. While the framework is by now already a solid starting point, its preliminary nature necessitates ongoing refinement to adapt to the evolving urban condition.

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