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Making in Proximity: Design Policies for collaborative making cultures

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Abstract | The contribution reflects on how the proximity between the actors of originally bottom-up Making Culture and public administrations can stimulate a virtuous urban Culture of Making, that is economically sustainable and well distributed in the city. The article starts with an overview of the “economy of Making” today on a global and European scale, focusing then on the Italian context. In particular, making issues in the regional context was investigated with a general mapping and a series of interviews, highlighting misalignments between the makers’ initial objectives and the everyday reality of making. As a potential response, the contribution presents the partial findings of a European project that intervenes at the level of local policies to support the activities of design and distributed manufacturing manufacturing and proposes a format and toolkit that analyzes the ecosystem of makerspaces in a city / region, to then formulate operational proposals to support for innovative activities with an economic and social impact.

KEYWORDS | COLLABORATION, FAB LAB, POLICY, INNOVATION, WORKSHOP

1. Introduction

Building on a project currently underway within the Interreg Europe program, this contribution reflects on possible ways to improve activities in makerspaces, the virtuous places of doing where citizens connect to productive resources and to other citizens with the same willingness to create tangible projects - be they single objects or products destined for the market.

As extensive literature demonstrates (e. Anderson, 2012 and Gershenfeld, 2005), makerspaces have the potential to bring industrial processes back into urban areas and into the hands of citizens by making them independent of mass production. These spaces offer specialized equipment and skills, so as to allow the performance of innovative activities to a transversal audience, making them able to respond to the problems of their immediate habitat - potentially with design solutions of various usefulness and worldwide diffusion thanks to the online community of makers.

The Research project object of this article starts from the observation of a problem related to the management of makerspaces, which rarely reach the theorized potential. Today, after the "pioneer" phase of the maker movement, self-organization, enthusiasm and in many cases, voluntarism are giving way to the growing need to establish economically sustainable models, drawing the attention of both the scientific community and policy makers. In fact, the project focuses on policies intended both as internal policies necessary to guarantee effective functioning, and as external policies to be implemented at the level of local or regional administrations.

2. Economy of Making

The evolution of Hackerspaces, from places of diffusion of a technological culture to Makerspaces as potential places of widespread production in the territory (Menichinelli, 2016) has brought traditionally informal DIY spaces (in all their forms such as repair cafes, fablabs to name a few formats) at the center of a new debate on the resilient city.

Most of the scientific literature is concordant with recognizing in Making Practices, intended as the combination of digital fabrication technology and open design, a revolutionary potential to define more resilient models of development. Such potential was welcomed as a response to the 2009 financial crisis, and has been theorized in models of diffuse capitalism, such as the *third industrial revolution*, and *social innovation*. Such "revolutionary" models have been progressively substituted by re-mediation practices as in the case of industry 4.0 or redirected toward less open practices as urban living labs.

Significant example is Barcelona (Spain) model of productive city, that in response to youth unemployment exceed 50%, and the traditional idea of the city as a place of consumption "products-in thrash-out" prosed a paradigm shift based digital manufacturing of the "data-in

data-out" type, (Gershenfeld, Gershenfeld, Cutcher – Gershenfeld, 2017). Such a top-down model based on a new infrastructure of Living Labs as places of open innovation boosted by private-public partnerships, is balanced by Fab Lab, hacker spaces and makerspaces as bottom-up workshops of social innovation. Barcelona experiment is represented by Barcelona Laboratori initiative developed by the city council to encourage innovation through public and private collaboration between the arts, science, and technology; (Capdevila, Zarlenga 2015) with specific claim "For the first time, peer to peer relations between City council and citizens is the main principle that is helping to Barcelona Laboratori to involve users [...]" (Barcelona Laboratori, 2012)

This model of "self-sufficiency 4.0" promoted in the plan for the Barcelona Smart city in 2014, although it was superseded by subsequent city administrations, had two fundamental effects. On the one hand, the institutional recognition of digital manufacturing laboratories as places of culture is comparable to libraries in terms of representative role and type of use. The distribution of makerspaces (ateneu digital) in each district was, in fact, included ten years later in the current plan of "Barcelona Ciudad Digital" ^[1], integrating the informal network of self-managed spaces of bottom-up type into a new top-down cultural infrastructure (Capdevila, 2014)

From 2016 to 2018, it is possible to recognize a shift of the European perspective over the maker movement, from the civic role of commitment and engagement to a local economic booster role.

According to the Science for Policy JRC, stable policy and practical solutions to address new work challenges are more marginal in politics than in media coverage (Rosa, Guimarães Pereira, and Ferretti 2018). Regardless of the attention on EU and national levels, maker economies are relevant mainly on the metropolitan, urban and community scale, ranging from open innovation in manufacturing (as in North Italy example) to the innovation as cultural challenge (as in southern Europe cultural heritage applications).

Local and regional Public Administrations (PA) assume the role of fostering Maker economies with specific policies and programs to consolidate existing bottom-up communities or to seed them creating top-down public living labs of entire networks, thus elevating a new infrastructure model demonstrated in Barcelona to a European level. Among these there are notable examples: the French Fab lab network, the Italian MakeR network of bottom-up labs in the Emilia Romagna region (Cattabriga, 2020) or the Fab Lab Lazio network of laboratories.

Meanwhile a closer analysis of the most relevant digital platforms highlights the current state of difficulty facing makerspaces. Between 2005 and 2018 there was a trend that saw the global number of fablabs doubling every year and a half (Gershenfeld, Gershenfeld, Cutcher – Gershenfeld, 2017), while 2020 data shows a contraction in the absolute number of laboratories: 1027 active fablabs in 2020 (fablab.io ^[2], October 2020) compared to 1120 fablabs in 2017 (Fasoli, Tassinari, 2017) and only 991 active Hackerspaces in 2020

(Hackerspaces ^[3], October 2020) compared to 1331 active Hackerspaces in 2017 (Niaros, Kostakis, Drechsler, 2017). This crisis is confirmed by a report from the Joint Research Center (JRC) which, circumscribing the European context, highlights a reduction in the trend of increasing the number of Hackerspace and fablabs since 2015 (Rosa et al., 2017).

3. Making issues in the regional context

To understand the recent phenomenon of maker spaces' decreasing numbers, we have developed a field investigation on the territory of Lazio region. The study was developed on 2 steps:

- Static snapshot: obtain an overview of the "maker culture" in Lazio, showing number, localization, openness and specialization of fab labs, maker and hacker spaces, through their digital presence and activity.
- Dynamic image: in order to evaluate the evolution of each maker community, in relation with their local environment, human and skills capital and proximity relation ability, we have developed a data triangulation based on institutional documentation, web platform presences and interviews.

3.1 THE MAKER SPHERE SNAPSHOT

The first analysis has found 53 maker labs, in which has been recognized: 21 Public laboratories with open users (Pub-O), 3 Public laboratories with referenced users (Pub-R) and 23 Private laboratories with referenced users (Priv-R).

In order to obtain homogenous data, a survey campaign has been developed involving all entities by means of e-mail and phone call to complete missing data. This first level of investigation recognized six categories of investigation in the context of Making that they explored respectively; the technological system, the range of services, the inclusion or relationship with a specific business network, the level of openness and sharing of projects, the company setting in relation to customers and the type of involvement in the projects developed within of its own structure (Figure 1).

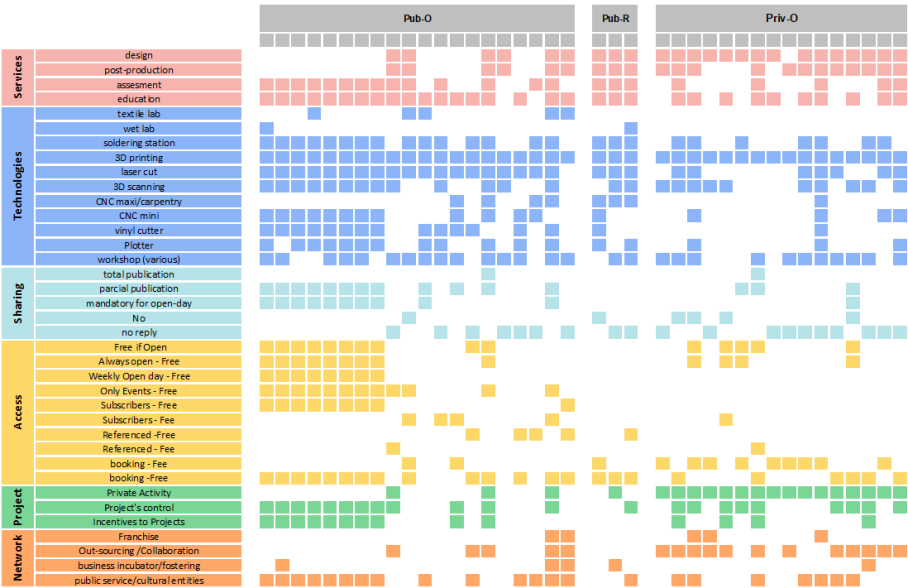


Figure 1. The table above shows the preliminary information retrieved from the internet and the feedback given to the specific questions made via phone calls by the laboratories which have been divided by their assets in three main columns (Pub-O, Pub-R and Priv-O). Coloured dots represent all positive answers given to the questions reported on the left side bar.

3.2 Maker COMMUNITY evolution

In order to evaluate social value and proximity impact of Lazio Maker Community, have been developed a interview campaign, to key person selected for their representativeness and relevant in cover special observation roles over maker realities in their environment.

The preliminary interviews have identified several realities with the most complete profile and in extremely heterogeneous relationship with each other. Among these, initiatives such as *FIRAS*, as an innovative startup that proposes itself as a real factory for the production of totally digitally produced components, and *Gulp 3D*, a small private business in close contact with the local community, have been investigated the most; the manufacturer of 3D printing materials *MakeAShape* as an activity between public and private as it is affiliated with the FabLab of Frosinone, followed by the association *FabLab Lazio*, whose coordinator and technical manager propose themselves as representatives of the entire network Regional FabLab, and the *Fondazione Mondo Digitale initiative*, for their open relationship and verticalized approach on digital manufacturing education. Those interviews were structured according to anthropological investigation methods, characterized by low structured

questions (the discourse flowing fluently through questions), long duration (always more than 45 min) and holistic evaluation (including non-explicit commented context).

Through an informal chat, the topics of which were prepared directly by the interviewees, the questions posed verticalized on the theme of the identity and role of the maker within the city (how it identifies as a service or service provider), and the contact o support of PAs (whether they are supported or not) and of project management when approaching a different clientele.

These interviews highlighted 3 main problematic areas:

- a widespread misalignment between digital and physical identities: community activity and face to face design development do not correspond to Open-Source design and sharing practices. In commercial relationships, many clients of the makers come from other regions, rather than from the same territory, even if initially they have established their lab after a local market study;
- regardless of the physical territory, there is a robust community characterised by strong, interdependent personal and professional relationships that do not correspond to a synergic vision of a new production/distribution model. In fact, digital craft is not considered as a relevant alternative for mass production among the interviewed labs;
- the FabLabs founded by public institutions are shifting their cultural objective: from spreading digital culture and open innovation to economy booster and project incubator, with an increased focus on intellectual property.

In order to pursue a resilient development model, new governance models are therefore necessary, capable of protecting makerspaces as places of physical materialization of the sharing and co-design practices of a consolidated digital community, in which sharing of technological tools and practices are concentrated. Incubators of new generations of urban entrepreneurs are active "for" and "with" the local community in order to collaboratively achieve common goals that are useful for society (Smith, 2016). In this scenario, the Urban Manufacturing (UM) project was born, funded by the Interreg Europe program, proposing a method to connect administrations and the maker world.

4. Urban Manufacturing Policy Toolkit

The goal of the UM project is to make both the shared creative space and the project and the adjoining innovative potential increasingly accessible and usable, overcoming those physical and social barriers that divide those who supply from those who use certain processes (Seravalli, 2014). To do this, it is necessary to consider in an increasingly precise and strategic way the needs of the local community to ensure better involvement and concreteness of the proposed solutions. To be truly effective, social innovation policies must

directly involve society, directly confronting the needs of citizens, so that the design and production activities can be identified as truly open and collaborative (Fleischmann, 2016).

UM through its network of 8 Universities, makerspaces and regional administrations, develops a format capable of guaranteeing public administrations a picture as clear as possible of the potential of the Maker economy, facilitating an entrepreneurship able to face the new ways of living and work in urban settings at the political level.

The format proposed by the UM project is structured in two phases. The first Investigation defines the necessary foundations to facilitate the work of makerspaces through three guided workshops: Policy Clinic, Makerspace's Ecosystem and Makerspace Design. In the second Evaluation phase, the results are reviewed in 5 sessions by another member of the partnership acting as external auditor, drawing on the skills and experience accumulated by the UM network.

Investigation Step 1: Policy Clinic

Framed as a thematic seminar, the first step strategically sets the initiatives that foster innovation, using best practices in their urban centers. The Policy Clinic suggests a limited time window, which allows different stakeholders and the Public Administration in different local contexts to approach under a specific agreed thematic topic. In this first step it is necessary to frame the actions undertaken by other neighboring and non-neighboring makerspaces (at least 3), in order to collect useful information according to pre-established templates. This allows you to work around 3 specific issues such as the type of challenge to be faced, the particularities of the case studies (makerspaces) visited, and the type of action one would like to undertake.

Investigation Step 2: Makerspace's Ecosystem

Therefore, assuming the inclusion of a project that looks to its audience, 4 fundamental phases follow in the development of the ecosystem:

Identification (emerging): by sharing different types of information, we identify the presence of measures to support the skills encountered, the presence of Makers in the local community, useful infrastructures and meeting events.

Growing: given the pre-existing situation, the survey shifts its lens to the Administration and its degree of openness to new technologies, to develop a vision of an "innovative city".

Support (sustaining): the quality of the infrastructure is questioned, what process the value chain follows within the city network and which other makerspaces collaborate on the initiative.

Exceeding: through the enabling technologies and the network thus developed, the new industrial policies of the city are developed together with the ecosystem of makerspaces together with the contribution of policy makers, defining thematic areas for making in the city.

Based on the involvement of the Administrations, the steps assume more or less relevance within the process, at the cost of considerable care in controlling the results and possible repetitions of the process.

Investigation Step 3: Makerspace Design

Through a template, the logistics of the available spaces are organized via a small group of space managers that guides the activity through 3 steps together with a member of the Administration, who will then be able to better understand the nature of the activities carried out and any support needs:

Empathy (empathise): participants identify with randomly generated profiles taking into account: social aspect, starting skills, availability and object of interest.

Definition: needs are defined on the basis of the following parameters: Accessibility, Atmosphere, Collaboration, Community, Creativity, Instrumentation, Experience, Innovation, Space.

Setting (create): based on the needs explored, the participants hypothesize the ideal organization for the space, as well as the most desired equipment.

Evaluation

The last phase involves one or more external figures from the 8 European cities that are partners of the UM project, who are able to contribute with experiences similar to those addressed. This confrontation phase is structured over two days. In the first, divided into two sessions of 2 hours each, external guests analyze the reports formalized during the previous steps and discuss useful information.

The second day the new policies are discussed, examining and refining in terms of feasibility the immediately following steps useful for their implementation. In order to address this work, in this 2-hour session at least three policy proposals are formalized which can then respond to the needs of the average user in a subsequent session, taking into account their perspective on the policy, the points of contact with the latter and the effects that the new policy will have on his experience.

In the last session, the roles of the participants are defined by appointing the coordinator, the approval process, the timing, and the origin of the funds (or budget allocated) that will support the project.

5. Establishment of new awareness of local production potential

As part of the UM project, which is still ongoing, only some of the activities (such as the Policy Clinic) have been completed by each partner at the present time. The Lazio Region,

the only Italian partner of the project, has identified problems regarding the commercialization of ideas: although the basic infrastructure has already been established and funding programs exist, so far, the transfer to the market has not been satisfactory. In response, the Policy Clinic workshop identified some possible strategies, for example facilitating the productive exchange of knowledge through “challenge workshops”; establish ways of sharing data and local issues, as input to work in makerspaces; differentiate innovation initiatives according to the gap between more and less urbanized areas; making the access of small businesses to regional makerspaces more fruitful through planning aid.

This last objective, particularly relevant for our discipline, refers to the ability to create a coherent and meaningful strategic vision (Design Driven Innovation, as described by (Verganti, 2009) for the company, in addition of course to the ability to improve quality of products and services already existing or designed by other figures. To put this policy into practice, a program of “Design Angels” has been established, i.e. young designers and researchers who will help a series of small and micro enterprises to achieve product innovations and process at makerspaces. The activity, scheduled for 2020, has been re-planned considering the health emergency.

In addition to a static mapping, the Research intended to initiate continuous monitoring of regional makerspaces, in order to be able to measure the impact of the policies implemented and to be able to establish new programs according to the needs expressed. The collection activity involves different types of spaces including FabLabs, Hackerspaces, Makerspaces, Coworking, but also company workshops, entrepreneurs and small artisans - dedicated to a more referenced audience. To understand who the users are, other questions investigate the degree of openness or audience selection and control, design assistance services, inclination to co-design, and consulting services.

After an initial analysis of the completed questionnaires, a second level of Research of a sociological type, investigated some issues through unstructured interviews. Various initiatives are facing a period of readjustment of their business models, reassigning machinery, however present and potentially active, to different uses and services. The picture obtained of maker entrepreneurship confirms the state of crisis already found in the study of global FabLab and hackerspace communities, highlighting a substantial parallelism between the fate of makerspaces as cultural places and digital manufacturing laboratories as professional spaces.

6. Conclusion

Although the European Urban Manufacturing project (basis of this article) is still in a work in progress state, the activities carried out have already led to some interesting observations. First of all, the extreme heterogeneity of makerspaces is evident both among the members of the partnership and within the examined regional territory; in fact, the workshops held suggest an equally heterogeneous variety of policy interventions. A recurring element is the

need to better connect technical knowledge - virtually spread by the global Makers community - to design knowledge, a field of Design, which will be introduced as a catalyst in a series of small and micro enterprises through a new regional program specifically established.

However, there is a further front inherent in makerspaces as places for the diffusion of technological culture, which overcoming the logic of DIY and referring to co-design models goes beyond mere production. Design education, which in this context becomes transversal and transgenerational, indirectly assumes the role of training more aware citizens, connected both to the creative resources and to the problems of the territory, transforming them from consumers to proactive agents able to propose new solutions.

Notes

[1]<https://ajuntament.barcelona.cat/digital/ca/apoderament-digital/educacio-i-capacitacio-digital/ateneus-de-fabricacio>

[2]<https://www.fablabs.io/>

[3]https://wiki.hackerspaces.org/List_of_ALL_Hacker_Spaces, ottobre 2020

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The article is a product of a concerted effort. L.M. and L.D. performed the interviews and analysis, while V.M. supervised the project. All authors contributed to the writing, with responsibilities as follows: Section 1 V.M., Section 2 L.M., Section 3 L.M. and L.D., Section 4 L.D., Section 5 and 6 all authors.

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