

## The Right(s) to the Hybrid City and the Role of DIY Networking

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### Abstract

We reconsider the concept of “the right to the city”, introduced by French philosopher Henri Lefebvre, in the light of the new information space that ICTs create in contemporary urban environments. Such spaces include the use of global online social networks, locative media, e-participation platforms, online neighbourhood communities and so forth. Unlike the physical urban space that it overlays, this new and rapidly emerging “virtual” space has practically no capacity constraints. However, it is subject to inequalities in terms of access, representation, participation, and ownership. In this research note—an interdisciplinary collaboration between a computer scientist and an urban planner—we wish to study the role of wireless technology, which enables the easy deployment of local networks operating outside the public Internet, and the role of the free and open source social software, which facilitates the easy development of customized local applications, allowing citizens to shape their emerging hybrid space. We suggest that this sort of do-it-yourself (DIY) networking can be realised according to citizens’ values, objectives and the particularities of the environment, and could ultimately enable them to compete with large ICT corporations such as Google and Facebook for their “right(s) to the hybrid city”. We employ the urban sidewalk metaphor as an application that is subject to hybrid design and can profit significantly from the special characteristics of DIY networks.

### Introduction

More and more urban space becomes inherently *hybrid* since information and communication technology (ICT) acts as a mediator for interactions between people residing in close physical proximity for varied time periods, from neighbours to passers by and strangers in public spaces. This hybrid realm has the capability to support novel types of communication between citizens and local authorities. For example, authorities can share rich data sets with citizens and application providers, and citizens are empowered to generate useful information for authorities during their everyday activities such as in the crowdsourcing and citizen science paradigms. Moreover, ICTs can also provide a virtual spatial framework for e-participation and online deliberations (e.g. Horelli, 2013; Houghton et al., 2013). Urban and community informatics are some of the emerging interdisciplinary fields that bring together knowledge from computer and social sciences and study the role of technology and its design in various urban settings (see Foth 2009; Foth et al., 2012; Gurstein, 2010).

Virtual space is increasingly becoming part of the physical material space in cities with a digital infrastructure. Signage in public spaces that points at specific virtual locations, using text (Internet *URL* addresses), *2D barcodes* and posters, or other physical artefacts may be permanent or mobile, as in the case of the yellowchair project<sup>i</sup>, an art installation by Arab Jain in San Jose, California, that encourages residents who are willing to share their private WiFi to place a yellow

chair on the public sidewalk to signal the presence of free access to the Internet, but also to stimulate playful interactions between strangers, such as recipe sharing. In more advanced scenarios the physical space for public life can become the container of virtual interactions—through the use of public interactive displays and the flexible embodied interactions that smartphones and location-based mobile applications enable (e.g. Farman, 2012).

However, technology can both further and hinder local communication. On the one hand, it allows efficient asynchronous information sharing and organization (Shirky, 2008); the creation and maintenance of multiple overlapping social networks (Rainie & Wellman, 2012); and a more flexible self-representation and engagement for individuals (Turkle, 1995). On the other hand, the capabilities that make it easier to browse and filter our physical environment are also rendering invisible “the different others”, even if they may be standing next to us (Turkle, 2012; Wilken, 2010; Crawford, 2008).

At the same time, the use of ICTs is subject to various types of digital divides and their design requires specialized knowledge, shifting the power balance in favour of the hosting companies—usually large corporations—and their programmers (Mansell, 2012). But most importantly, these corporations freely acquire tremendous amounts of data that generate invaluable knowledge regarding human behaviour in ICT-mediated communications, which is often used to achieve private, commercial objectives in ways that are not transparent to the rightful owners of this information (e.g. Tufekci 2014).

This means that the simple existence of ICTs is not sufficient to guarantee to citizens their rights to the hybrid city. It is the actual design of the evolving hybrid urban spaces, and the responsible use of generated digital information that will determine whether ICT's promises for increased civic engagement, participation, and community building will be materialized. In the following research note we make an initial effort to formulate an updated version of the “right to the city” concept that takes into account the complex hybrid urban environments created through the contemporary uses of ICTs. We then propose a specific application concept that would facilitate information sharing between strangers in the city and analyze the unique characteristics of wireless technology that render the possibility of DIY (do-it-yourself) networking a very attractive alternative for such local interactions. We posit that an appropriate combination of user-owned wireless networks and open source social software can make a difference in today's “globalized” Internet by enabling citizens to develop their own local solutions, and claim their right to access, representation, participation and ownership in the hybrid city.

### **The right(s) to the hybrid city**

The phrase “the right to the city”, coined by Henri Lefebvre in 1968, is subject today to various definitions and interpretations, and according to Christian Schmid (2012), “often serves just as a kind of conceptual umbrella for all types of political and social demands that generally address the problems arising in urban areas today” (42). Part of the confusion is due to the complexity of the “city” or urban concept itself, considering that in the last decades urban space has been the product of “planetary urbanization” processes (Lefebvre, 2003; Brenner & Schmid, 2011); at the confluence between the “space of places” and the “space of flows” (Castells, 2005); and manifesting in everyday life practices as an interplay between conceptual, material and lived space (Lefebvre, 1991).

Within this complexity in the understandings of urban space we identify the following important individual rights that are part of the “right to the city” concept, and will help us draw useful analogies between physical and virtual spaces:

- 1) The right to access the core resources of the city;

- 2) The right to be represented, to be part of the collective identity;
- 3) The right to participate in important decisions, such as urban policies and design;
- 4) The right to ownership of the urban commons, which refers to commonly held property, and use, stewardship and management in common of the available and produced resources.

This idea of a right to ownership of urban spaces, for instance, has been stressed by urban planning theorist John Friedmann (1993, 139), who has stated that “a city can truly be called a city only when its streets belong to the people” (cited by Schmid, 2012). How can this and our other fundamental rights be translated into more complex ones, such as the control of the urbanization process or the right to self-determination? To whom should these rights be granted, and under which political processes? These are challenging questions that are out of the scope of this paper (for a more in depth analysis about the “right to the city” concept, see Lefebvre, 1996; Friedmann, 1993; Harvey, 2008; Brenner et al., 2012). Instead we choose to focus on analyzing our set of four specific rights applied to the hybrid—digital and physical—space in the city.

A key objective at this early stage in our work is to highlight the fact that these different fundamental rights are also conveyed—explicitly or implicitly—to those participating at the overlaid virtual space of the hybrid city. Today it is mostly large corporations like Google, Facebook and Twitter that control the virtual social interactions at a global scale, but also at localities offering, among others, “geo-social” services<sup>ii</sup> that allow people to connect with friends and similar others while in physical proximity (see also Farman, 2012). Alas, to offer this service, these companies record over time the locations of all interested parties, and store them in servers located very far away from the actual place where these ICT-mediated “contacts” occur.

Note that even if these online social networks have been positively connected with recent urban uprisings and political struggles for the “right to the city” (e.g. Gezi Park in Istanbul), they are themselves highly privatized spaces. Their owners have significant power over the design of important software details and the management of all collected data, ranging from multimedia content (e.g. photos and videos) to private information (e.g. location and profile) and patterns of activity (e.g. reactions to stimulation and time spent online). This complete lack of ownership and control of these platforms on the users’ behalf poses significant threats related to privacy, surveillance, censorship, and manipulation, which should not be underestimated (e.g. Tufekci, 2014; Morozov, 2013).

Despite the increasing public awareness of the threats posed by the concentration of huge amounts of private information in the hands of a few corporations, the key questions remain open: What is a viable alternative in terms of hardware and software? And under which participatory processes and ownership structures can citizens appropriate the virtual space that overlays their physical environment? In other words, which are the “virtual” versions of participatory spatial design today and in the future?

Alternative technical solutions for the design of hybrid space do exist and can distribute differently the power between users, administrators, and owners of the platform; but they also have their own costs and limitations. For example, social engines, like *Ning* which is a popular solution for building local online communities, offer many options for customization and allow Internet users to build and manage their own online social networks either individually or in groups; but often subject to a yearly fee, especially for premium services, while all data generated are under the control of the hosting company. The options for participation in design are richer in the case of custom web sites either built from scratch or based on free and open source software like *Drupal*. But this flexibility comes at a cost. The complexity of implementation, deployment, and maintenance increases, in addition to the different issues of trust that arise. For instance, global platforms are less prone to failures and thus are better at ensuring the reliability and

security of shared information (within the system). Moreover, there are still various intermediaries with significant power as gatekeepers, like the Internet service and web hosting providers, the web designer, and the local administrator of the platform. Finally, Peer-to-Peer (P2P) online social networks like *Diaspora* aim to decrease the dependence on these intermediate actors, but they further increase the other associated costs, while their operation still depends on the public Internet.

So, although in terms of software these alternative solutions can provide support for citizens to claim their rights to the hybrid city, they suffer from an inherent difficulty in attracting the required critical mass of participants due to the aforementioned costs; especially when having to compete with global platforms that enjoy enormous financial support and can take advantage of the significant economies of scale.

A key objective of this research note is to draw attention to the capabilities of wireless (WiFi) technology to provide a complementary low-cost and local-only communication *infrastructure*, which can operate outside the public Internet (see Jungnickel, 2014; Antoniadis et al., 2014). This DIY networking option enables small organizations or even individuals to literally own the infrastructure that supports their hybrid space, and with it all generated digital information. In this circumstance the space for experimentation with different forms of common ownership and appropriation of the hybrid urban space opens significantly and allows the complete avoidance of the mediation of global corporations and other digital intermediaries. In this way the vision of supporting, and enhancing ownership as a “sense of belonging to a collective place, commitment to a collective issue, and willingness to share a private resource with the collective” (de Lange and de Waal, 2013) may be realized.<sup>iii</sup>

Moreover, in the case of local-only hybrid applications, participation in the virtual interactions requires actual physical presence, ensured without the disclosure of private information to third parties. We see this inherently limited accessibility to those in physical proximity as a desirable aspect of such technology that needs to be exploited by the corresponding software and urban interventions. The design goal is not to replace the existing global platforms, but rather to augment them when the envisioned communication is indeed local in nature. Before elaborating more on the advantages of using wireless technology to communicate in local urban contexts outside the public Internet, the section below will describe a local application that is practical and has both social and political implications, while illustrating a creative combination of wireless networks, open source social software and urban interaction design.

### **The hybrid sidewalk**

The urban street and its sidewalks may be seen as an extension of the personal space of city residents, analogous to the role that the vast natural landscape plays for the countryman (Sansot, 2004). In that sense, sidewalks are physical manifestations of a right to the city for its inhabitants, in terms of: a) providing access and possibilities for expression and representation, b) allowing to be present, to go about one's business freely in the midst of fellow citizens and to participate in social exchanges and activities, and nevertheless, c) granting ownership of the public space.

The context we discuss here is the example of social exchanges at the sidewalk level. The mingling of passers-by is evanescent, and opened to new possibilities. As Joseph (1984) notes, “in public spaces, the most important relationships are those that we don't have yet!” (130). The magical universe of the diverse and unexpected on the sidewalk creates through serendipity and spontaneous entertainment a temporary sense of community. Hence, following a long tradition of scholars (e.g. Simmel, 1903; Lynch, 1960; Jacobs 1961; Goffman, 1967; Sennett, 1977; De Certeau, 1984; Whyte, 1988; Debord, 1996) celebrating the importance of informal interactions, and for that the special role of strolling and drifting in the city, one of the premises of our work is

that the facilitation of information sharing between citizens in informal settings—without the intervention of mediating institutions—is of critical importance to fostering comprehensive understandings of the lived environment and toward the appropriation of urban space.

Therefore, the design and implementation of ICT applications in the hybrid city ought to include the benefits of traditional sidewalks, which Jane Jacobs praised as places for essential informal interactions between strangers that can achieve a very delicate balance between privacy and public exposure. In her own words:

“The sum of such casual, public contact at a local level - most of it fortuitous, most of it associated with errands, all of it metered by the person concerned and not thrust upon him by anyone - is a feeling for the public identity of people, a web of public respect and trust, and a resource in time of personal or neighborhood need. The absence of this trust is a disaster to a city street. Its cultivation cannot be institutionalized. And above all, *it implies no private commitments.*” (Jacobs, 1961, 56, emphasis in original).

If carefully designed, hybrid ICT applications that enable spontaneous information sharing between strangers can offer new ways to support the role of the sidewalk in contemporary cities, for generating local knowledge and a sense of belonging. This knowledge can then inform the participation of individuals in more explicit processes, as in e-planning and online deliberation systems. Currently in participatory processes, citizens are asked for either quantitative data, as in the crowd sourcing and citizen science paradigms, or for qualitative information, as in e-planning and online deliberation systems (see Foth et al., 2012; Horelli, 2013; DeCindio & Schuler, 2012). But in addition to asking citizens explicitly to provide information from their personal perspective, it is of critical importance that citizens exchange information *between them* in informal settings, and in ways that can increase their environment awareness and help them build some sort of shared public identity (see Apostol et al., 2013).

As public locations and urban neighborhoods bring strangers together, they have the capability to stimulate various degrees of awareness of the other's presence, condition, behavior, and actions. In many cases those in physical proximity do not necessarily share the same interests and background, and so their interaction and information exchanges can expose them to diversity. Yet exposure to diversity is controlled and limited by the broad range of privately owned spaces for public life, as well as by today's highly efficient and personalized online tools. The good news is that in the hybrid realm, the physical proximity offers opportunities for face-to-face encounters and common activities (that sometimes are stimulated, and extend the superficial or short-term online exchanges).

But how do our four aforementioned rights to the hybrid city influence the successful deployment of a hybrid ICT application to facilitate information sharing in the neighbourhood or in public spaces? And how can wireless technology play an important role in this direction? Before answering these questions we explore the concrete examples of two real life applications, which can be seen as two extremes in terms of the rights they offer to their participants. They are the social street movement in Italy and the RedHook WiFi initiative in Brooklyn, NY.

In September 2013, Federico Bastiani together with local journalists and residents of Via Fondazza, a street in the historic centre of Bologna, started *the social street movement*. This movement's purpose is:

“to promote socialization between neighbours in the same street in order to build relationships, to interchange needs, to share expertise and knowledge, to implement common interest projects, with common benefits from a closer social interaction. To reach this zero cost objective, without opening new

sites or platforms, Social Street makes use of the creation of Facebook closed groups.” (citation from website<sup>iv</sup>)

Arguably the perception of a “zero cost” by using the freely available and already popular Facebook platform is somewhat an illusion, since there are important associated costs with this platform choice, many of them directly related to our four rights.

First, participation through the social network requires access to the Internet, agreement to its terms of service, and feeling comfortable to reveal to neighbours private information, available through one’s Facebook profile. Therefore, the collective image produced in this localized Bologna online environment would be at best incomplete, by excluding those that do not have a Facebook account and/or Internet access; and it would be influenced or even manipulated by the numerous small but important design details externally decided by Facebook. Notice also that these details are exactly the same for all the social streets in Italy, and for all places in the world. They include, among many others, the presentation order of the various posts and the moderation rights of the administrator, the level of anonymity allowed, the permanence of the recorded information over time, and the user interface like wording, colours and menu items. Finally, all the information generated—both textual and visual—is recorded and owned by Facebook, and can be exploited for commercial or other purposes, raising serious threats related to privacy, surveillance, and censorship.

It is easy to see, of course, the important benefits of relying on popular social networks, due to their high usability and already acquired critical mass of users. However, there is no reason why one should not make an effort to provide tools for citizens to build easily, and customize their local networks and applications when these are meant to support local interactions. For example, Jonathan Baldwin a few years ago, while being a master student at Parsons The New School for Design in New York City, led the creation of a small-scale community wireless network in the Red Hook neighbourhood in Brooklyn, in collaboration with the Open Technology Institute<sup>v</sup> (Baldwin, 2011). The network is still in operation. In addition to shared Internet access, it facilitates local interactions for all residents and passers-by, requiring only access to a public or private computing device with a WiFi card and a web browser.

This can be achieved through the use of a *captive portal* or *splash page* hosted locally on the wireless network, a local web page visited by default by connected devices, when a web browser is launched. In airports, hotels, or coffee shops, such web pages welcome users before granting them access to the Internet, sometimes requiring the creation of an account. But in this wireless scenario, the local captive portal will in addition host interactions between potentially anonymous users within physical proximity.

In the Brooklyn case, a participatory design process with local residents preceded the design of all supported applications such as chatting; inquiries regarding local bus schedules; a custom designed mapping application called *Tidepools*—all of which are open source and thus subject to improvements. Finally, the infrastructure and stored information remains under the control of the local *Red Hook Initiative (RHI)*, a Brooklyn non-profit focused on creating social change through youth engagement (see: *rhicenter.org*). Similarly to collective barn-raising projects or the more ubiquitous nowadays, community gardens, these common activities offer spaces for personal encounters and interactions in physical proximity. So, instead of relying on private ICT platforms managed by commercial companies, there is the option to stimulate and empower citizens to use their creativity and become the “self-appointed public characters” (Jacobs, 1961), who can set up a local freely accessible network and invite people in a local community to participate in an “information sharing game” (Antoniadis & Apostol, 2013).

There are unlimited options for the design of such games that are more or less close to our sidewalk metaphor. The types of information to be shared and the exact framing would depend on

the context, but could include simple demographics (spoken languages, occupation, or gender); general preferences or location-based ones (favourite places, commerce or artistic activities, books, films, and music); multimedia material (audio, pictures, videos); opinions and thoughts on interesting perhaps controversial questions, even sensitive personal information since the wireless medium allows for purely anonymous interactions. The main motivation for participation could be the outcome, the display of the shared information which could take the form of playful or even statistically interesting visualizations as in today's popular life-logging (or quantified self) applications—though extended to a group of strangers in physical proximity. At the very least, these visualizations will satisfy feelings of curiosity about one's surroundings and could also form a basis for more advanced interactions and the creation of a temporary community (see Antoniadis et al, 2014). In addition to getting to know one's neighbours, we envision applications of the sort being particularly attractive in ephemeral situations where people co-exist with random strangers while passive or waiting, and/or when there is limited Internet connectivity. Examples of such situations are a long train or bus journey; a delayed or cancelled flight at the airport, time spent in ad-hoc gatherings on a beach, at a camping site or during public happenings like a cultural event at a public square; an intermission at a concert or a football match (see Antoniadis, Ott, & Passarella, 2014, 135-139).

Although the creation and maintenance of this type of local network currently requires a high level of expertise, there are on-going efforts by various free and open source software (FOSS) communities to make the deployment of such networks easier for non-savvy users using off-the-shelf hardware such as a Raspberry Pi (*piratebox.cc*<sup>vi</sup>) or a portable wireless router like the TP-link TL-MR3020 (*occupyhere.org*), which can cover confined public spaces like a square, a small park, or a train wagon. For larger areas, like the Red Hook neighbourhood, there are also efforts such as *commotion.net* or *libre-mesh.org*, which promise to make it easier for communities to build their own wireless mesh networks without relying on the expertise of motivated pioneers and tech-savvy members (see Jungnickel, 2014; Gaved & Mullholand, 2008). One of the objectives of our own *nethood.org* project is to extend these solutions to become more general and less politically charged, innovation platforms—a toolkit—, which will include a wide variety of hardware and software options to be customized according to the specific context (see Antoniadis & Apostol, 2013).

As a first step, in this note we argue why such an objective is important. For this, we analyze below some special characteristics of wireless technology that can play a key role in designing hybrid sidewalks that grant to citizens their “right to the hybrid city” and compete with similar Internet-based applications in terms of user experiences.

### **Do-It-Yourself networking (thinking outside the Internet)**

Wireless technology allows for the creation of low-cost communication networks, often called wireless mesh networks or community wireless networks. Depending on the number of their nodes they can cover geographic areas of various sizes, ranging from a small public square or a small urban neighbourhood (Gaved & Mullholand, 2008; Baldwin, 2011); to a small town like Leiden in the Netherlands (van Oost et al, 2009); or large city-regions such as Barcelona (*guifi.net*), Berlin (*freifunk.net*) and Athens (*awmn.net*). Most of the existing operational wireless community networks are built by groups of tech savvy users, and outsiders see them mainly as gateways to free Internet access (Powell, 2011; Forlano, 2008; Sandivig 2004). However, one of the most important qualities of these WiFi networks is that they can offer options for communication outside the public Internet as highlighted by Antoniadis et al. (2008). There are community wireless networks today that prioritize the importance of local communications as the Redhook WiFi example (discussed above); or the Air-stream wireless community in South Australia. As stressed by the ethnographer Kat Jungnickel (2014), one of its “unique features is

that it is not built for the purpose of sharing *the* internet. While many community wireless groups around the world use WiFi to provide free or low-cost access *to* the internet, Air-Stream are essentially making their own version *of* the internet, hence the description, 'Ournet, not the internet'". (26, emphasis in original). But even in such cases the core communities of highly motivated and tech savvy members hardly succeed to open up their local services beyond their close social circles (ibid, 51-2).

Indeed, to build communities of proximity over local wireless mesh networks, one needs to build applications of high quality that are both highly attractive and usable, but also easy to adjust to the specific local context (i.e. what Facebook and Twitter are not able to do given the nature of their construction). The Redhook WiFi initiative illustrates that this is an attainable objective, yet there is still a lot of room for improvement especially in the areas of usability and customization. Part of our research work aims to address the various technical, social, and scientific challenges, which currently hinder the creation of attractive 'plug and play' solutions in localized contexts. To achieve these objectives one needs to understand in depth the unique characteristics offered by local wireless networks in contrast with the public Internet. For example, the following are four such technical, and thus objective, characteristics of a local-only community wireless network that can be exploited by local social applications which give them a competitive advantage over Internet-based solutions:

**De facto physical proximity.** All potential members of a local wireless network are those that can see its network name, the service set identifier (SSID), in their list of accessible WiFi networks and are in *de facto* physical proximity. There is no need to disclose their physical location to a remote server (e.g., through GPS) or provide other proofs of proximity before using the system as in the case of rather privacy intrusive services like *NextDoor*, which "requires new members to prove that they actually live at their claimed residences, either by allowing a one-cent transaction to be processed on a credit card tied to the address, by having an existing neighborhood member vouch for their identity, or by other means." (Stross, 2012).

**Inclusiveness.** Local wireless networks are cheap to build, and they can be owned and maintained by local authorities, organizations, even individuals. They can provide free access to all, including visitors and tourists who might lack affordable access to the Internet. Moreover, local WiFi nets do not require the installation of any application beforehand or typing a web address on one's browser, thanks to the captive portal approach described above, and the fact that the SSID of the local wireless network is included by default in the list of all available SSIDs shown in one's device. This makes it very easy to join.

**Privacy and independence.** All communications that take place in a local wireless network stay in principle local. The only way for an external entity to have direct access is either by placing on site physical devices connected to a surveillance infrastructure, which is very costly at large scale and difficult to remain unnoticed for long. Information leakages through individual devices, either intentionally by malicious users or unintentionally through software and hardware backdoors, are nevertheless possible and can never be deterministically excluded. But depending on the level of perceived risk, local communities can take precautions by engaging only in anonymous interactions, deleting often the information stored, etc. In addition to the significant psychological benefits, such as feelings of independence and playfulness, this characteristic has become more and more important after the public awareness of the NSA surveillance programs, uncovered by Edward Snowden, and of the aggressive online profiling policies, more and more discussed in the popular press (e.g. Clemons, 2013). Unlike Internet-based platforms, access to an "offline" wireless network entails privacy threats that can be



limited by design, and which are by nature context-specific and localized, providing a space of intimacy and relative freedom for its members.

**Hybrid design.** Being tangible infrastructure themselves, wireless networks can be naturally embedded in other artefacts and urban interventions, such as a public display, a coloured bench, a phone booth, or even a mobile kiosk, and they can create naturally hybrid spaces that encourage ephemeral participation and playful engagement (see Antoniadis et al, 2014). This enables the inclusion of non-users, as in the case of the hybrid letterbox designed by the Berlin Design Research Lab (Unteidig et al., 2014). Moreover, public WiFi nets can be subject to various failures, intentional or not, and thus promote by design the need for more face-to-face rather than virtual interactions (e.g., the administrator of a local wireless access point can easily unplug it during an organized face-to-face gathering).

These technical characteristics of wireless networks influence directly the options available for granting citizens their rights to access and ownership of the virtual space that overlays their cities, but they also provide the appropriate environment for promoting the other two “qualitative” rights—those of representation and participation. For example, the quantity and quality of information exchanges, and the resulting representation of a collective identity, can significantly benefit from the feelings of intimacy and independence that local wireless networks offer, and from the possibility to communicate anonymously.

Moreover, since by construction local wireless networks are meant to be installed, customized, and maintained by local actors, they offer unlimited capabilities for participatory design processes, which are subject to the flexibility offered by the software, the technical competence of the programmers, and the motivation of the local administrators and/or local authorities (see also Horelli, 2013; Saad-Sulonen & Botero, 2010). The many challenges that this shift of power to local actors generates (e.g., trust issues, addressing network failures, etc.) can also be seen as opportunities for community building and social learning. In this sense, community-based wireless technology may be considered a first step in the democratization of the local “institutional” platform through specific forms of representation as well as through direct participation in collective actions.

## Discussion

Virtual layers of interactions that are anchored at a specific location create a complex rhizome-like public space. In this space, moments of individual isolation and social exchanges overlap in a variety of ways, within a process of spatial appropriation. This makes it impossible to draw clear boundaries between the private and the public, if considered in terms of spatial use. Within a paradigm of more flexible boundaries between the public and the private, in this research note we have introduced the following three ideas that capture the dynamic transformation of urban space:

- 1) The “right to the city” concept needs to be extended for the case of hybrid urban space in the digital age, where the special characteristics of wireless technology adds an interesting dimension.
- 2) The hybrid sidewalk serves as a metaphor, and a target scenario for developing and offering to the general public technologies that can help address urban isolation and alienation without sacrificing privacy and independence.
- 3) Wireless technology can play a critical role in building locally owned and participatory designed city networks that operate outside the public Internet, which can fulfil some important requirements of a hybrid sidewalk application.

Stemming from these three concepts the most challenging question to address in the future is the extent to which one can imagine tangible possibilities, urban interaction design fictions (Smyth & Helgason, 2013), and structure the available design options at different levels so that the individual efforts by local authorities, organizations, and individuals can generate shared knowledge and improve the usability and customization options of the corresponding tools. For this, the question of interdisciplinarity in the design of the *hybrid urban environment* becomes urgent. Social scientists need to become more aware of the capabilities of technology and they have to get involved in the design processes, while engineers need to get in touch with legitimate local social issues and their inherent complexity going beyond simple optimization techniques and data analysis (see Antoniadis, Ott, & Passarella, 2014).

Moreover, the size and complexity of the design space calls for a bottom-up design process consistent with the ideas developed in social learning (Friedmann, 1987); participatory design (Schuler & Namioka, 1993); and action research (Hearn et al., 2008) methodologies. At the same time, the development of a “hybrid” pattern language, which could combine the original ideas of Christopher Alexander (1979) with more recent approaches, ranging from high-level meta concepts (Schuler, 2008) to micro design details in software (Crumlish & Malone, 2009), might enhance the building of a new common language that will not only facilitate communications between researchers from different disciplines and practitioners, but also empower citizen-activists.

What is missing in our vision is not new ideas for applications, interfaces and artefacts, but an innovation platform, a toolkit, that will enable citizens to unleash their creativity and local knowledge toward building novel hybrid spaces serving their own values and objectives. The research community can contribute significantly by drawing attention and providing credibility to the existing efforts of the FOSS communities around the world—and by sharing knowledge and expertise as well as investing more in usability and integration rather than in scientific novelty and differentiation. If successful, the widespread use of a common toolkit, as the one we aim to build in the context of the *nethood.org* project, will make conceivable the creation of an open data repository, a massive collection of optionally shared, privacy preserving, and localized, “small” instead of “big” data. This in turn can generate significant scientific knowledge on ICT-mediated human behaviour that is currently privately retained by companies, such as Facebook and Google.

We see this note as part of a wider effort to join forces in building a common language of interdisciplinary studies around the design of DIY hybrid urban space, and to create a global network of researchers and practitioners who do not see technology as an end, but rather as a means to provide citizens with rights to the hybrid city.

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<sup>i</sup> <http://superflux.in/work/yellowchair-stories>

<sup>ii</sup> The latest survey by the Pew Research Center's Internet Project provides interesting statistics on the use of location-based services, including the so-called "geosocial services", in the US in the period 2011-2013: <http://www.pewinternet.org/2013/09/12/location-based-services/>

<sup>iii</sup> Note that de Waal & de Lange's definition of the concept of ownership is inspired by Henri Lefebvre's distinction between the right to appropriation and the right to property (Lefebvre, 1996). In our work, we would like to build on this interpretation of ownership, and understand the theoretical and practical implications of the fact that a local wireless network, and the digital information hosted on it, can be actually owned by small organizations, groups, even individuals. In other words, the "right to property" in the virtual space, can be less difficult to grant, if compared to the case of contested physical space. However, out of the practically unlimited parallel virtual spaces that could overlay a specific location, only a few will be really "inhabited" in practice: those that will manage to attract the most attention and a critical mass of local users. Then big corporations will always have a competitive advantage in terms of available resources and expertise, at least in places where Internet is easily accessible. But wireless technology provides the option for grassroots initiatives to peacefully propose their alternative, potentially more inclusive, (hybrid) designs drawing on local knowledge and their social, instead of commercial, objectives.

<sup>iv</sup> See: <http://www.socialstreet.it/international/info-english/>

<sup>v</sup> See: [http://oti.newamerica.net/blogposts/2013/case\\_study\\_red\\_hook\\_initiative\\_wifi\\_tidepools-78575](http://oti.newamerica.net/blogposts/2013/case_study_red_hook_initiative_wifi_tidepools-78575)

<sup>vi</sup> See: <http://arstechnica.com/tech-policy/2011/01/piratebox-an-artistic-provocation-in-lunchbox-form/>