

ARCHITECTURE AND RESILIENCE

Interdisciplinary Dialogues

*Edited by Kim Trogal, Irena Bauman, Randal
Lawrence and Doina Petrescu*

First published 2019

ISBN: 978-1-138-06580-2 (hbk)

ISBN: 978-1-138-06581-9 (pbk)

ISBN: 978-1-315-15947-8 (ebk)

Chapter 16

The organic Internet as a resilient practice

Panayotis Antoniadis

(CC-BY-NC-ND 3.0)



ROUTLEDGE

Routledge
Taylor & Francis Group

LONDON AND NEW YORK

16

THE ORGANIC INTERNET AS A RESILIENT PRACTICE

Panayotis Antoniadis

Introduction

The idea that digital and physical space are increasingly interconnected, and that architecture and urban design should be conceptualised beyond buildings, streets and so on, is rather old and well understood. What is less clear is the fact that digital space is socially and politically 'produced' in similarly complex ways to the physical. It is thus subject to power structures, manipulation tactics, fundamental rights, borders and constraints, despite its perceived 'infiniteness'.

The Internet, the Cloud, and the various digital platforms that mediate our everyday interactions are not 'neutral' spaces that simply facilitate communication or offer services. They are designed spaces which, exactly like architecture in physical space, deeply influence our online (and offline) behaviour, and thus all aspects of our social, economic and political life. Thus, the right to resilience, the right to the city and other emancipating social projects should include 'high levels of participation', 'continuous learning and experimentation' and other resilient practices (Petcou & Petrescu 2015), for digital space as well as physical ones.

A key requirement for such resilient practices to be collectively developed, is the existence of locally owned and managed information and communication technology (ICT) infrastructure and services. These can prove critical during natural disasters (an earthquake), economic disasters (a global economic crisis) or even political disasters (a coup d'état). They can also illustrate the way towards more participatory, ecological and resilient ways to build and use technology in our everyday life through the transfer of power from big corporations to local formal or informal institutions.

Unlike housing or food, however, we do not have the experience of 'how things were made in the past'. The Internet was created as an organic yet global network from an early stage, and the percentage of people connected to it in a

specific area was, until very recently, rather limited, with a few exceptions (Schuler 1996). In other words, ‘doing things locally’ is an element of the Internet’s future, not its past, and this poses both challenges and opportunities. On one hand, there is no tangible example of how to build an Internet from the grassroots, and we do not know what the possible roles of the different local actors should be in this process. It is difficult even to imagine this possibility, although the required technology is already available and there are good reasons to use it in this way (Antoniadis 2016b). On the other hand, the ‘local Internet’ could be perceived as an advanced form of communication in cities, and not as a backwards approach to development, as sustainable and resilient solutions in other domains are, often mistakenly, perceived (Kallis 2017).

In a resilient city, how would the underlying ICT infrastructure look? Would it be owned and managed through local cooperatives, as in the cases of housing and agriculture? Would every neighbourhood have its own servers, platforms, wired and wireless connections? Or would ICTs belong in the ‘global sphere’ – a centrally managed infrastructure meant to interconnect different regions and cities across the world? Or perhaps the reality would be somewhere in the middle, with points of centralisation at the district or city level. Whatever the case, would it look like today’s commercial industrialised Internet, or would it be more ‘organic’?

The answers to those questions need to take into account the energy requirements of digital communications, their design and governance, and their corresponding social, economic and political implications (Fuchs 2017). This is essential, since the Internet and ICTs more generally are much more than ‘dump pipes’, transferring digital information from point A to point B. They include data collection, management and filtering services, as well as user interfaces that prioritise certain actions over others, and include many other design decisions that significantly affect the way they are used and their corresponding outcome (e.g. Tufekci 2014).

The more ownership and control citizens have over the underlying network infrastructure and software, the more opportunities are offered for developing sustainable solutions and resilient practices according to the local environment. DIY networking is an umbrella term for different types of grassroots networking technologies that today allow various forms of experimentation in this direction. It offers an example of another, more organic, way to build communications networks that promotes self-expression, face-to-face interactions and diversity. A resilient city needs the option of an organic Internet, one whose infrastructure is built, owned, designed, controlled and maintained by local communities, and one that satisfies our basic needs for knowledge, information and communication. Consumption and geographic limits should be also considered to promote a healthy lifestyle that encourages physical contact and conviviality, and allows for intimacy and local governance.

This objective is more challenging than it sounds. An important reason is that the popular Internet platforms that mediate a significant portion of our everyday

communications are becoming more and more efficient at managing vast amounts of information. They are becoming more and more knowledgeable about user interaction design that increases dependency and addiction (or ‘stickiness’ when described as a performance metric). This renders their users more and more addicted and dependent on them, subject to manipulation and exploitation for commercial and political objectives.

This situation could be characterised as the ‘second watershed’ of the Internet in the context of Illich’s analysis of the lifecycle of tools, such as medicine and education. Here, those ‘tools’, which were initially very useful, after a certain point come to dominate society for its own benefit and survival as institutions. Like the institutions Illich discusses, the Internet in its early stages was extremely useful. It dramatically increased our access to knowledge and to people all over the world. However, to achieve this, it came to rely on big organisations offering efficient and reliable services at a global scale. The survival of these services and platforms now depend increasingly on the participation of people and on the exploitation of the data they produce. This creates a vicious cycle between addictive design practices and unfair competition which breach the principle of Net neutrality, and unethical uses of privately owned knowledge of human behaviour, generated through analyses of the data produced from our everyday online activities.

Today, the main aim of online platforms is to maximise the total time spent online as much as possible and to maximise the amount of information exchanged – not only between people, but also between ‘things’! Their profitability depends on the processing of huge amounts of information that produces knowledge which can be sold to advertisers and politicians. Like the pharmaceutical companies and schools described by Illich, they create and maintain a world in which they are very much needed. This also explains why corporations like Facebook, Google and Microsoft are at the forefront of the efforts to provide ‘Internet access to all’, and why at the same time local communities face so many economic, political and legal hurdles to building, maintaining and controlling their own infrastructures.

It is important to state that the argument of this chapter is not motivated by a romantic ‘small is beautiful’ or ‘local is better’ ideal, but by an urgent need to diversify the ways that ICTs mediate our everyday life. Just as living organisms can be threatened by the lack of bio-diversity, our digital sovereignty and self-determination will be more and more endangered the less Net-diversity exists. Moreover, Net-diversity is not only important for reasons of democratic governance and independence – it is a matter of social, economic and ecological sustainability.

To this end, DIY networking could be seen as a ‘tool for conviviality’ as defined by Illich (1973), who used the term ‘conviviality’ to ‘designate the opposite of industrial productivity’, meaning the ‘autonomous and creative intercourse among persons, and the intercourse of persons with their environment’ and ‘individual freedom realised in personal interdependence and, as such, an intrinsic ethical value’.¹ Indeed, DIY networking operates according to certain

limits, stimulates collective action and creativity, and guarantees access to all members of the community. Understanding in depth the key technical and social aspects that need to be addressed in this context will help citizens and communities to imagine and put in place such novel uses of ICT.

Do-it-yourself networking

Wired communications are more energy-efficient than wireless, but they have increased deployment costs and limited flexibility. So, although a truly organic and sustainable Internet built from scratch should heavily depend on a wired infrastructure, it is through wireless technology and grassroots movements that today local communities can actually claim their rights to the Internet and develop organic alternatives to privatised infrastructures and commercial services.

In comparison, considering the implied analogy between communication and food, organic urban gardens might not be able to cover the nutrition needs of a city in a sustainable way, but they do provide a means for building awareness and stimulating citizen motivation and engagement. Similarly, wireless DIY networks might not provide the optimal solution in terms of resource and energy usage for certain communication needs, but they are very effective tools for the emancipation and appropriation of ICT technology by people (Antoniadis & Apostol 2014).

Even in cases where local authorities do participate in the deployment and management of network infrastructures for the common good, wireless solutions offer a means of experimentation and divergence from the status quo, which helps to sustain diversity and adaptability to change. From a practical perspective, they also offer a non-intrusive and privacy-preserving way to allow for more 'intimate', anonymous yet de facto local, communications between those in physical proximity by connecting users to each other on the same subnetwork, without need to record their GPS location. But let's explore in more detail how DIY, or community, networks work.

A wireless router, which is a special-purpose computer, can do more than just connect a device to the Internet. It can also host a server: a virtual announcement board for a block of apartments, an online guestbook for an urban garden, a file-sharing platform for a workshop, and many more 'self-hosted' Web applications like WordPress, Nextcloud and Etherpad, which anyone can host on a private Web server and address with a local (free of charge) URL. They can also appear automatically on a splash page or captive portal when one opens one's browser or connects to the network (as is often the case in airports, cafes and hotels). If the router is equipped with a second antenna, it can easily connect to a similar router residing in the coverage area, the size of which depends on the type of antenna and other environmental factors. The first antenna can then be used to allow people with their personal devices to connect to the network, and the second to exchange information with the neighbouring router. Each router then becomes a 'node' in a small network. Anyone who connects to one of them can access the

people and services offered by the others. As more nodes get connected, larger areas are covered and a community can be formed – initially by the owners of the nodes, and eventually by everyone in the area.

Of course, one cannot easily build a whole network like this by oneself, but it is not difficult to build a single network node using cheap hardware (such as a Raspberry Pi computer) and free self-hosted software (see <http://mazizone.eu/toolkit> – Accessed 9 September 2018) to deploy the set of local services and applications that fits a specific context (Antoniadis 2016b). Community wireless networks have been under development since the late 1990s by tech enthusiasts and activists advocating for a more open, neutral and democratic Internet (Antoniadis 2016a; Medosch 2014). They include a mix of local services, such as file sharing and livestreaming (AWMN.net and Ninux.org) and the provision of Internet connectivity. Freifunk.net, WlanSlovenja, Sarantaporo.gr and many more focus on this aspect in particular.

There are important differences between various models of governance and the concept of the community itself (Antoniadis 2016b; Navarro et al. 2016). Freifunk follows the ‘free Internet for all’ approach and depends mostly on voluntary contributions from its members to offer Internet connectivity. On the other hand, Guifi.net places significant focus on the concept of the ‘commons’, implying concrete boundaries and resource management rules. It has developed a unique model (Baig et al. 2015) in which the network infrastructure, including fibre cables, is treated as separate from the services it is involved with providing.

Community networks like Freifunk.net and Guifi.net take advantage of the unlicensed Wi-Fi spectrum to create wireless backbone links without the need to access expensive infrastructure. An antenna on a roof can offer Internet access if it connects to anywhere within (typically) 50km² of its line of sight that has connectivity. Of course, solutions for a community or municipality may also include the deployment of locally owned wired infrastructures, like the case of B4RN in the UK. Although there are numerous stories of successful community networks around the world, these infrastructures face significant hurdles through legislation that favours big commercial Internet Service Providers (Dulong de Rosnay et al. 2016). Similar to the legal fights against farmers that keep their own seeds, the deployment of local broadband solutions is often being considered an illegal or prohibitively expensive option for local authorities or non-profit organisations’ activity.

Why do-it-yourself?

Despite the critical role of community networks in providing affordable Internet access to underprivileged populations, it is important to realise that DIY networking³ is a good idea even if the Internet is ubiquitous and free for everyone – a position that may appear extreme. For example, DIY networking enables the creation of network infrastructures offering alternative options in case of natural disasters, as proved to be the case during Hurricane Sandy, when

people relied on the RedHook Wi-Fi initiative in Brooklyn (Baldwin 2011). There are also many political reasons why one should consider the use of local networks for supporting local online interactions related to privacy, surveillance and self-determination (Antoniadis 2016b). Despite their significance, these reasons alone cannot easily motivate people to engage in the creation of DIY networks in their neighbourhoods. And even if someone might trust Facebook and Google to store and analyse their private information for their own commercial purposes, there is still an important social threat created by the domination of these global platforms – namely, social alienation and the lack of location-based collective awareness.

Focusing on this social dimension, DIY networking has some characteristics that could help designers resolve the tension between anonymity that allows for freedom of expression, and identity that helps to build trust and community in more desirable ways than the corresponding mega-platform-based solutions. In other words, they can use DIY networking solutions to create a balance between the anonymity offered by modern cities and the social control in traditional local communities by generating ICT-mediated location-based collective awareness with low costs in terms of time invested and privacy. The most relevant metaphor here is the sidewalk which Jane Jacobs (1961) praised as a place for essential informal interactions between strangers that can achieve a very delicate balance between privacy and public exposure. If carefully designed, hybrid ICT applications that enable spontaneous information sharing between strangers can offer new ways to support the capacity of the sidewalk in contemporary cities to generate local knowledge and a sense of belonging. But instead of relying on private ICT platforms managed by commercial companies, DIY networking offers the option to stimulate and empower citizens to use their creativity for setting up local, freely accessible networks hosting context-specific collective awareness applications.

Still, one could always ask, ‘Why not host all these nice applications on a server accessible through the Internet or local wired solutions?’ The answer typically depends on the specific environment, but there are four important characteristics of wireless technology that make it an interesting candidate for building an organic Internet from the bottom up:

- All potential users of a local wireless network are in de facto physical proximity.⁴ The option of anonymity, in addition to being technically feasible, is also much less intimidating than in the case of global online platforms. This can facilitate playful and open interactions between people who enjoy exchanging information with those in proximity, but with ‘no private commitments’ (Jacobs 1961).
- A DIY network needs to be set up and deployed by someone who has access to the built environment, such as a resident with a well-located balcony, an owner of a central store, or a local institution with the authority to install street-side infrastructure. This can ensure that the local network is designed

and customised by members of the community, ideally in an inclusive and convivial manner.

- Wireless networks are much easier to deploy than wired, as they don't require the laying of cables that can be very costly both in terms of human resources and accessibility of public infrastructure. They are also inherently mobile, allowing for creative and flexible uses, but also for provocations challenging the status quo that are less intrusive than graffiti, for example, but much richer as a means of expression.
- Being tangible infrastructure themselves, wireless networks can be naturally embedded in other artifacts 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 digital and physical, spaces that encourage temporary participation and playful engagement. This also enables the inclusion of non-users, as in the case of the Berlin Design Research Lab's Hybrid Letterbox (Unteidig, Herlo, & Reiter 2015) and Polyloge (see www.design-research-lab.org/projects/polyloge-1/, Accessed 9 September 2018).

Finally, a local ICT infrastructure which facilitates communication exclusively between those who can easily meet face to face could be designed exactly for this purpose. Thus, energy efficiency would not only be the result of the lower energy required when communication takes place through local wireless networks instead of transatlantic links and huge data centres that waste a significant amount of energy for processing and manipulating data for commercial or political objectives. It would also be the product of people's ability to spend more time meeting their social and psychological needs away from their computers and mobile devices – an effect that a local-only communications network cannot guarantee, but could be (better) designed for (see also Antoniadis 2016b).

Despite the many good reasons why local DIY networks make sense, there is still little understanding of their potential value and little willingness to invest in their infrastructure and specialised services. The good news is that such local networks do not need to be introduced as a replacement for the Internet, but as alternative local solutions which allow for experimentation and Net-diversity and which can be complementary to global services. Net-diversity could be indeed the ultimate argument which may be effective amidst current economic, social and political crises, because people realise they can no longer assume things will always remain the same, and they need alternatives for the exceptional times ahead.

Concluding notes

Like money, food, medicine, education and transport, there are places in the world where people have too much Internet, not only in terms of energy consumption, but also more than needed for a healthy and balanced life. On the other hand, there are many people (more than 50% of the world's population)

who are practically disconnected and thus deprived of basic knowledge and communication services. Most worryingly, the promise of connecting the world comes from big corporations which see in the disconnected more data and more power, while the connected are getting more and more alienated and addicted by the practices of the same corporations.

If one wants to be pragmatic, one needs to realise that during the transition to the organic Internet, we will not be alone in the world. Most importantly, we will not be able to afford losing global services offered by the Internet today which cannot be provided at the local level. A global infrastructure is therefore required, and corporations will always exist to compete with local solutions in providing local services. So, in addition to a global vision, we also need a plan for the transition, for scaling up, and for the formation of potential synergies with similar initiatives around other common resources such as food, housing, water, education, healthcare and the economy.

The concept of ‘virality’ is relevant here: in a world where communication is so easy, both good and bad ideas can travel incredibly fast and all that is needed perhaps is the right twist, a good and easily replicable idea that can turn things around even in moments when everything seems to go from bad to worse. This brings to mind the ‘think global, act local’ concept, with the subtle difference that the global thinking is not about the ‘system’ itself, but about its ‘seeds’, and this is again an important concept in agriculture that needs to be introduced also in the Internet domain.

Similar forms of local action or better tools for conviviality have been gaining a lot of attention. These include, for example, complementary currencies, cooperative housing models, and grassroots education and healthcare. Those and other examples of commoning activities will need sophisticated ICT tools to help make efficient use of human resources and improve accounting, trust-building and collaboration. The vision of local DIY networks might be promoted by such complementary local commoning activities as a compatible way to build the ICT solutions required for their successful operation. In the other direction, treating network infrastructure as a commons can also provide inspiration for the management of other common resources, and act as a triangulator for stimulating social contact and community-building.

Acknowledgements

This chapter is an edited re-publication of the chapter ‘The organic Internet: Building communications networks from the grassroots’, in Giorgino, V. and Walsh, Z. (eds), *Co-Designing Economies in Transition* (Basingstoke, UK: Palgrave Macmillan). Compared to the original version, it has been significantly reduced in length and includes improvements according to suggestions from the editors of this book and the Spanish translator of the original chapter, Patricio Gibbs. The original chapter appeared initially in German for the book project ‘*Die andere Stadt*’, *Paranoia City*, edited by Hans Widmer and translated by Thomas Raoseta.

The research leading to this work has been partially supported by the EU Horizon2020 projects MAZI, H2020-ICT-2015, no. 687983, <http://mazizone.eu>, and netCommons, H2020-ICT-2015, no. 688768, <http://netcommons.eu>.

Notes

- 1 For a similar treatment of the concept of conviviality in the context of the Internet, see (Ippolita 2015)
- 2 The longest wireless link with Wi-Fi is currently 382km (www.cnet.com/news/new-wi-fi-distance-record-382-kilometers/; Accessed 9 September 2018), but such links require ideal conditions to achieve
- 3 DIY networking is a term that emphasises the importance of local applications and services, ranging from simple single-node networks to city-scale community networks. See https://en.wikipedia.org/wiki/DiY_networking (Accessed 9 September 2018) for the history of the term and alternative formulations like ‘do-it-together’, ‘do-it-with-others’ etc.
- 4 Technically speaking, it is possible to have access to a local-only network from a distance through devices that are connected both to the Internet and the local network. But in the context of an explicitly framed ‘local-only’ service, I would consider this an ‘attack’ which is always possible technically.

References

- Antoniadis, P. (2016a) DIY networking: The path to a more democratic internet. *The Conversation Global*, 8 November. Available at: <https://theconversation.com/diy-net-working-the-path-to-a-more-democratic-internet-67216> [Accessed 9 September 2018].
- Antoniadis, P. (2016b) Local networks for local interactions: Four reasons why and a way forward. *First Monday*, 21(12). Available at: <http://firstmonday.org/ojs/index.php/fm/article/view/7123/5661> [Accessed 9 September 2018].
- Antoniadis, P. and Apostol, I. (2014) The right(s) to the hybrid city and the role of DIY networking. *Journal of Community Informatics*, special issue, *Community Informatics and Urban Planning*, 10. Available at: <http://ci-journal.net/index.php/ciej/article/view/1092/> [Accessed 9 September 2018].
- Baig, R. et al. (2015) guifi.net, a crowdsourced network infrastructure held in common. *Computer Networks*, 90(C): 150–165.
- Baldwin, J. (2011) *TidePools: Social WiFi*. Masters Thesis in design and technology. New York: Parsons School of Design, Available at: www.scribd.com/doc/94601219/TidePools-Social-WiFi-Thesis [Accessed 9 September 2018].
- Dulong de Rosnay, M. et al. (2016) European legal framework for CNs (v1). *netCommons*. Available at: <http://netcommons.eu/?q=content/european-legal-framework-cns-v1> [Accessed 9 September 2018].
- Fuchs, C. (2017) Sustainability and community networks. *Telematics and Informatics*, 34(2): 628–639.
- Illich, I. (1973) *Tools for Conviviality*. New York: Harper & Row.
- Ippolita. (2015) *The Facebook Aquarium: The Resistible Rise of Anarcho-Capitalism*. Amsterdam: Institute of Network Cultures.
- Jacobs, J. (1961) *The Death and Life of Great American Cities*. New York: Random House.
- Kallis, G. (2017) *27 Essays and Thoughts on Degrowth*. Available at: <https://indefenseofdegrowth.com/> [Accessed 9 September 2018].

- Medosch, A. (2014) The rise of the Network Commons. Available at: www.thenextlayer.org/NetworkCommons [Accessed 9 September 2018].
- Navarro, L. et al. (2016) Report on Existing CNs and Their Organization (v2). *netCommons*. Available at: <http://netcommons.eu/?q=content/report-existing-cn-and-their-organization-v2> [Accessed 9 September 2018].
- Petcou, C. and Petrescu, D. (2015) R-URBAN or how to co-produce a resilient city. *Ephemera*, 15(1): 249–262.
- Schuler, D. (1996) *New Community Networks: Wired for Change*. Boston, MA: ACM Press/Addison-Wesley.
- Tufekci, Z. (2014) Engineering the public: Big data, surveillance, and computational politics. *First Monday*, 19(7). Available at: <http://firstmonday.org/article/view/4901/4097> [Accessed 9 September 2018].
- Unteidig, A., Herlo, B., and Reiter, L. (2015) The hybrid meeting point: An urban infrastructure for interacting across boundaries of difference. In: *Proceedings of Hybrid City 2015: Data to the People*. Athens, Greece: University Research Institute of Applied Communication, pp. 87–94.