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**Publication date**

2018

**Document Version**

Final published version

**Published in**

Proceedings of the International Conference EGOV-CeDEM-ePart 2018

**Citation (APA)**

Zhilin, S., Klievink, B., & De Jong, M. (2018). Open Source Urbanism: Requirements for an Open Design Platform to Support an Emerging Concept. In *Proceedings of the International Conference EGOV-CeDEM-ePart 2018* (pp. 173-180)

**Important note**

To cite this publication, please use the final published version (if applicable). Please check the document version above.

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# Open Source Urbanism: Requirements for an Open Design Platform to Support an Emerging Concept

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*Abstract: Citizens interested in the democratization of urban development processes experiment with the co-creation of public spaces. Some of them collect, improve, and share design blueprints and manuals of their projects on the internet with help of free and open source tools. As a result, they produce open source design manuals that can be used freely, modified, and developed further. However, such attempts at opening urban design are still uncoordinated, atomized, and dispersed, and therefore fail to create the value that a more concerted effort might. We argue that open source urbanism practices would benefit from open design platforms that are purposefully designed for the complex domain of urbanism. As a first step, this paper identifies the requirements that such platform should meet. As there are currently no examples of such a platform, we analyze the platforms that are there and partially satisfy the demand to extract the shared underlying requirements.*

*Keywords: open source, urban design, commons, co-production, open design platforms*

## 1. Introduction

Who has the right to decide upon shape and functions of our cities? The increasingly popular answer among municipality officials, urban professionals, and citizens is: 'citizens do'. Theoretical proclamations, however, still have to meet the reality through technologies, policies, and methods of citizen participation and co-creation. Urban professionals, however, rarely or only selectively seek public involvement and are regularly ineffective in collaborating with local communities (Gunder, 2011).

The use of ICT in smart cities changes the role of citizens, allowing them to be more active in urban design, planning, and management (Gagliardi et al., 2015). Nevertheless, a purely technological approach that seems to dominate many current smart city visions, has been criticized as a 'neoliberal agenda' of corporations aiming to take future of cities under control (Meijer & Thaens, 2016). Recently, the interest of tech-industry giants in urban innovation developed from purely technological smart city solutions, such as IoT and ICTs, to urban design and planning (see e.g., <https://sidewalktoronto.ca/>).

As Zhilin, Klievink, and De Jong (2018) argue, some cities focus on governments or businesses and a technology-driven strategy for smart city innovations whereas others focus on the importance of the 'human touch' in urban innovation. The latter encourage urban activism, a 'maker culture', and other community self-governance practices. The phenomenon of *open source urbanism* (OSU) combines both socially and technologically driven citizen-led innovations, e.g., Do-It-Yourself (DIY) urban design and commons-based peer production. The term 'urban commons' refers to spaces that are designed and governed by citizens in order to satisfy needs and desires of the local community. Bradley (2015) argues these are often experiments in the public space by citizens interested in the democratization of urban development processes. Some activists collect, improve, and share design blueprints and manuals of their projects on the Internet using free and open source tools, e.g., Wiki and GitHub. As a result, they produce *open source urban commons* - urban design manuals that can be freely used, modified, and developed anywhere by anyone.

There are many initiatives to open-up urban design. However, they are atomized and dispersed, therefore unable to scale-up to create more or more wide-spread public value. Open source urbanism initiatives might be more successful if they were organized on a bigger scale as with a social movement. Baibarac and Petrescu (2017) propose a platform for 'open source resilience' to 're-appropriate and re-frame' ICT solutions to satisfy the needs of the local activists. Inspired by that debate, we argue that OSU-practices require an open, collaborative platform that is purposefully designed for a complex domain such as urbanism, in an attempt for OSU to repeat the success of Open Source Software movement. This study aims to identify requirements for an online Open Source Urbanism platform. To achieve this, we observe open design platforms that contain urban design projects and we discuss their features in order to elaborate functional requirements of an OSU-platform.

The paper is organized as follows. In the second section, we conceptualize open source urbanism by describing three aspects that co-occur in OSU: Urban design, Open Source Innovation, and Commons. In the third section, we briefly describe the research approach and the observed platforms. In section four, we present the results of the study in the form of requirements for a potential online OSU-platform. In section five, we present findings and conclusions.

## 2. Background

Technological innovations, such as open source innovation (OSI) along with the notion of the commons, have recently redrawn scholarly attention and led to tools for web-based decentralized self-organization and peer production (Benkler, 2016). Open source design of both tangible and intangible goods is gaining popularity due to a reinvented 'maker culture', with a new flavor of co-production (Raasch, Herstatt, & Balka, 2009). Open Source Urban design (or Open Source Urbanism), however, is still in the emerging phase. We conceptualize the phenomenon at the intersection of three topics that we discuss here: Do-It-Yourself (DIY) urban design, open source innovation, and the commons.

## 2.1. DIY Urban Design

Gunder (2011) summarizes that current urban design practices, despite a widely accepted discourse of citizen engagement, rarely seeks public participation, consultation, or any other form of public involvement, and moreover are regularly ineffective in 'addressing underlying social issues' in collaboration with communities. He identifies an inattentiveness to citizen opinion. In combination with e.g., gentrification, commodification, and uneven community investment, this forces citizens to resolve their urban environment issues without professional support and, sometimes, even without permission (Douglas, 2014).

DIY sidewalk furniture or illegal bike lanes, - all these civic-minded public space alterations exemplify Do-It-Yourself (DIY) Urbanism. This refers to typically small-scale, unauthorized yet functional improvements of public spaces (Douglas, 2014). They challenge the existing planning paradigms by exploring and developing a collaborative urban design approach. Furthermore, it demands that citizens be equal partners in an urban development process. According to Douglas (2014), a significant number of DIY-urbanism activists display noticeable knowledge of urban planning mechanisms. Moreover, some of them contribute towards specific city goals.

## 2.2. The Commons

The term 'commons' was popularized by Elinor Ostrom (1990) in the light of studying natural common pool resources. Hess (2008) defines a commons as "a resource shared by a group where the resource is vulnerable to enclosure, overuse and social dilemmas. Unlike a public good, it requires management and protection in order to sustain it" (Hess, 2008, p. 37). By this definition, Hess stresses the primary importance of resource governance and its protection from a possible enclosure, which is also relevant for urban commons, e.g., as public space.

Some argue that more important than a shared resource is the social practice of commoning. Commoning is a flexible and sensitive social relation between a self-organized community and aspects of their urban environment (existing or required) that crucial for their well-being. A commoning practice should be both collective and not a subject of market logic where any resource is commodified off-limits. Scholars highlight the importance of the process of commoning as a claim of the 'right to the city' and accentuate ongoing sociospatial transformation accompanying that process (Harvey, 2014).

## 2.3. Open Source Innovation

Open source is increasingly popular, not only in the software industry but also in other domains, where opening-up using the internet leads to a trend of 'open everything' (Tooze et al., 2014). The basic organizing principle of open source is that the 'source code' is open or free in terms of use and ownership, for example, via open source licenses such as the Creative Commons licenses (Hansen & Howard, 2013). Raasch et al. (2009) propose the term Open Source Innovation (OSI) in order to generalize the OS model: "OSI is characterized by the free revealing of information on a new design with the intention of collaborative development of a single design or a limited number of related designs for market or non- market exploitation" (p. 383). It then applies to both tangible and intangible objects: respectively open content and open design. Open content deals with digital

realm and its objects (e.g., GitHub), while open design describes hardware and other physical objects (e.g., WikiHouse). In case of open design, a significant part of the design process can be performed digitally, but the main goal is physical object production (Raasch et al., 2009). Bonvoisin & Boujut (2015) claim that such projects do not match conventional design approaches but call for new types of digital platforms in order to further develop open design paradigm. Benkler (2003) argues that open source projects indicate the beginning of a social, technological, organizational, and economic transformation of society towards a new mode of value creation: commons-based peer production.

## 2.4. Open Source Urbanism

Bradley (2015) perceives Open Source Urbanism as the open source co-production of urban commons. She argues that “open source urbanism embodies a critique of both government and privately led urban development and is advancing a form of post-capitalist urban development that may, however, be supported by the public sector” (p. 6). The results of this practice are ‘spatial commons’ that are designed and managed collaboratively by citizens in order to satisfy their needs, not to produce profits. She summarizes characteristics of open source urban commons, namely a) based on contributions, b) transparent code, c) motivated by fulfilling needs or desires, d) conducted as peers, and e) based on an ethic of sharing. By using Open Source Innovation, designs could be re-used and further developed in other places. Similar, Baibarac and Petrescu (Baibarac & Petrescu, 2017, p. 230) argue that application of open source technologies and commoning in community-driven urban design may help to achieve a radical urban transformation so that “new civic, cultural and economic practices, involving ethical, ecological and equitable uses of urban resources, can emerge”.

For the purpose of this study, we define Open Source Urbanism as citizen-driven commons-based peer production of open source urban design, aimed at urban transformation and innovation. The concept of Open Source Urbanism is a grassroots community practice that can be assisted by a web-based platform for urban design co-production. Online platforms play a crucial role in such relations by offering tools for communication, collaboration, and knowledge sharing for the geographically distributed members of a community. While there are several open design platforms that seem partially suitable for OSU-projects, none of them are fully designed for this specific domain.

## 3. Research Approach and Observed Platforms

To find open design platforms that are partially suitable for an OSU-practice, we used following search term in Scopus: ( TITLE-ABS-KEY ( open ) OR TITLE-ABS-KEY ( "open source" ) AND TITLE-ABS-KEY ( "design platform" ) ). Among 115 resulting academic journal papers, we have selected five web-based open design platforms that contain projects matching the definition and characteristics of open source urbanism stated in section 2.4. For each platform, we considered the following questions: How does the platform work? (i.e., who shares; what shared; the level of usage) What the licenses and Free/Open Source Software (F/OSS) have been used for platform development?

Does the platform able to support OSU-practice? Finally, we discuss the observations in order to elaborate features required for an OSU-platform.

**Open Source Ecology** aims to develop set of open source industrial machines allowing to build ‘small sustainable civilization with modern comforts’. The platform is open for contribution from specialists (i.e., engineers, architects, designers). The website serves as a display that contains project vision, description, and showcases. Wiki-engine is used for specifications of products, and design logbooks. Latest activities (i.e., news, workshops) are dated November 2017 and the platform seems inactive since then.

**WikiHouse** is dedicated to building comprehensive and modular blueprints of affordable and energy-efficient homes under Creative Commons license. The community consists of professional architects and engineers. The website is an interface to a GitHub repository to disseminates blueprints. Co-creation is assisted by GitHub and chat app Slack. The project is in active development.

**Wevolver** is a platform dedicated to DIY-hardware enthusiasts and contains mostly blueprints of robots and computer hardware. Licenses might vary and are set by project owners. It has the basic functionality of Github i.e., version control, collaborative work, and showcasing. The platform itself is not for urban design, yet some of the projects might be. For example, ‘FarmBot’ is a project that fully automatizes urban farming on a small piece of land. The platform is active but contains a few projects most of which are not related to the urban topic.

**Instructables** is an online platform for the community of DIY-makers that has no specific domain of use: food, costumes, furniture, electronics, for example. Instructions are step-by-step texts with free format graphical and video-content. One is free to set a production workflow and no meta-information (i.e., materials, tools) are required. The content is licensed as Creative Commons for non-commercial use. The platform is active and has a great number of DIY-urbanism projects, mostly related to urban farming and public art. Found urban design projects mostly created by communities of urban activists and their profiles often contain only one project. Moreover, no or little communication happens on the platform. Basically, Instructables serves as a channel of sharing, not co-creation, of design manuals.

**Intelligencia Collectiva** is a group of architects and designers based in Spain. Since 2011 until 2016, they co-designed, with local communities, several blueprints of urban hardware and furniture. Their knowledge is stored on the website powered by blog engine WordPress in a free format of entries containing text, pictures and some meta-information (purpose, location, materials needed). The stated license is Creative Commons. The shared projects can be used rather as a source of inspiration than full manuals due to the inconsistent structure of design knowledge and lack of details.

Neither of observed platforms could fully support OSU-practice. WikiHouse and Open Source Ecology communities focus on specific products and provide no possibility to add new projects. Wevolver allows to freely add projects but specialized in hardware projects. Intelligencia Collectiva is a collective blog of a local community of urban designers. Instructables represents a

warehouse of all kinds of DIY-projects and searching for projects specifically related to urban design is difficult. Besides that, all observed platforms provide little or no mechanisms for collaborative production; therefore, no cross-fertilization of ideas and no further project improvements are made. Basically, the design manuals are published for possible consumption while co-creation processes take place 'backstage'. Finally, the observed platforms have no emphasis on urban topic; therefore, their features not suitable for urban design communities.

#### 4. Requirements for OSU Platform

Bonvoisin and Boujut (2015) claim that an open design platform has to provide features in four crucial dimensions in order to fulfill requirements of user communities, namely community management, product development process, knowledge management, and supporting co-creation. We discuss requirements for an OSU-platform according to the dimensions along with its core aspect i.e., openness. This gives directions for possible platform designs as a specific implementation depends on the plethora of factors including but not limited to design team's competencies, timeframe, and budget.

**Openness.** Licensing urban design knowledge as Creative Commons can protect it from a possible enclosure. Observed platforms show that is possible to make a well-functioning platform based on F/OSS. This is advantageous because the platform itself would be digital commons and might be remixed and repurposed according to needs of various design communities.

**Community management.** The social network functionality (e.g., user profiles and groups, private messages, calendars) is desirable for networking and community building purposes. Project showcasing is useful to draw attention and engage users in platform activity. Unification of showcasing interface is challenging due to the variety of possible urban design projects; however, it is possible to standardize project meta-information, such as objectives, required materials, and team competencies.

**Product development.** The platform must provide various project roles and tasks according to participant competencies in order to achieve a better design quality. DIY-projects designed by citizens are often low in quality due to lacking professional design skills. More complex projects developed by or with help of urban practitioners. Thus, an OSU-platform must facilitate the participation of peers of different level qualification while keeping acceptable design quality.

**Knowledge management** and **Supporting co-creation** features are crucial for commons-based peer production, therefore they must be well elaborated. For instance, GitHub repositories and Wiki-engine might facilitate version control of designs, documents, and logbooks. Channels for communication (e.g., commenting, forums, chats) would support communication of geographically distributed peers.

## 5. Conclusion and Discussion

Open source urbanism explores and develops community-driven urban design approach in which citizens are to be equal partners in city development. It is a promising practice that democratizes urban development by including citizens in co-production of their urban habitat. By using Open Source Innovation, such initiatives may be copied, enhanced and developed in different locales, as urban commons. Although many (anecdotal) examples are available in the literature, most initiatives do not scale due to a lack of tools allowing coordination and sharing of the plethora of bottom-up projects.

An online platform purposefully designed to facilitate open source urbanism can bring together disperse urban initiatives into a movement that spreads the ideas of the urban commons and claims more open and democratic approach in urban development. It requires fewer 'hardware-oriented' features (e.g., workflows, support of design tools, testing) than other open design platforms as the complexity and city context-specificity of urban initiatives make it hard to generalize these into a standardized workflow. However, it does call for a differentiation of roles based on the skills and competencies of citizens involved in project implementation. Finally, a platform that is partially or fully developed on the basis of existing F/OSS might have a bigger social impact due to open source nature of the platform, allowing activists freely modify and enhance it for the specific needs of a community.

Initial requirements elaborated in this study do not represent an exhaustive list of features that should be implemented in an open source urbanism platform; they may serve as a starting point for a design science research approach and should be refined and validated during the design science process. As an open source urbanism implies citizen-driven approach, the platform could be co-created with urban activists using Living Lab method or Action Design Research in order to satisfy actual needs and desires of the community. The further design of a platform, as well as the testing thereof for real urbanism communities, are on our research agenda.

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