

Suitability and accessibility of bikesharing in Africa

Authors:

Philipp Preuner, HafenCity University Hamburg, Spaldingstraße 41, 20097 Hamburg

Marie-Ève Assunção-Denis, McGill University Montreal

Abstract:

In line with the New Urbanism paradigm, bikesharing has become popular in many European cities. The supply of bikes to the public is municipally subsidized in many cases and used both by local residents and tourists. By making cycling more user-friendly and accessible, it contributes to a more balanced modal split and to improved air quality in complementing public transportation. Issues like road congestion and air pollution are growing challenges in rapidly urbanising world regions. Through a global best-practise culture in urban planning, interventions like bikesharing systems are considered to tackle such challenges alike. However, interventions that prove effective in Europe are not de facto suitable to any urban metabolism per se. Weak institutions, lack of bike infrastructure and low social status and awareness of biking practice determine the context for cycling in many African cities. This does not necessarily mean that there is no potential for biking. However, policy makers should rather prioritise the basic infrastructure to advance urban interventions, like bikesharing programs. In the long term, the potential not only lies in less traffic and better air, but could also improve social equity and fight segregation due to the affordability of bikes compared to cars for the majority of the population. Based on the findings of a research project in 2016 and along the example of an app-based bikesharing pilot at the University of Nairobi the paper aims to illustrate socio-technical aspects of biking in an African city. It will demonstrate the daily challenges for residents in terms of transportation, be it congestion or safety concerns in public transit, as well as the potential major outcomes of a public bike-sharing system in Nairobi, for a social, planning and transportation point of view. The paper will as well look into

the innovative processes used to start that bike-sharing project at the University of Nairobi, and how such processes could have repercussions in other African contexts.

Keywords:

bikesharing, best-practice culture, New Urbanism, Urban Metabolism, Nairobi

1. Introduction

The concept of bikesharing is to provide bicycles for short-term trips in an urban environment, ideally in an user-friendly way. It aims at improving accessibility to destinations and to a mode of transport that favours social justice and environmental protection. The idea of New Urbanism to cope without motorized transport in daily life has been a supportive planning context for bikesharing in many cities around the world. It has been realized by public and private institutions in Europe, America, Asia and now Africa through various different governance principles. The supply of bikes to the public is subsidized in many cases and used both by local residents and tourists. By making cycling more user-friendly and accessible, it complements public transportation in decreasing number of cars in the city, and thus to an improved air quality, lower heat island effect and less noise pollution. While bikesharing usually complements or substitutes public transportation, it is mainly an alternative for short distances within the city (UNDESA 2011).

When it comes to bikesharing systems in developing countries, the urban contexts in many of these seem suitable for it. The launch of Medina Bike in November 2016, in Marrakesh, Morocco, confirmed this tendency by introducing the first bikesharing system on the African continent (Bryce 2016). From a socioeconomic perspective, the accessibility to bikes by citizens who cannot afford upfront cost could be improved. From an environmental perspective, issues like road congestion and air pollution are of growing challenges in rapidly urbanising world regions. Also, the narrow streets of informal settlements are better accessible by bike. This was the starting point for a pilot project of a makerthon, a design competition of the startup¹ community, at the 2016 Innovation Week in Nairobi, Kenya. The startup sector is

booming in Nairobi and has become ever more relevant for tackling challenges related to urban infrastructure.

Although biking in general and bikesharing in particular could potentially contribute to solve unsustainable transportation practises, the initiative in Nairobi² illustrates the importance of considering the local context. Besides missing bike infrastructure, the lack of social status of cycling should be considered during the implementation of innovative bikesharing systems in African cities. However, international circulation of planning practices tends to neglect the local context. Institutionally focused on startups, we examine their common practices of design thinking, gamification and entrepreneurialism as critical with regards to the useful adaptation of global best-practices. We use the makerthon in Nairobi as an example to discuss innovative design processes and its relation to the suitability of bikesharing in African cities.

Building on socio-technical scholarship within urban studies (Kitchin 2017; Moore 2013), we ask how a best-practice culture affects urban innovation practices. The starting point for the discussed case study is the question whether bikesharing systems could potentially contribute to more sustainable transportation in African cities. While we agree with the majority of the literature that bikesharing improves the accessibility to non-motorized transportation with all its social and environmental effects (UNDESA 2011), we question the suitability of conventional bikesharing schemes in the East African urban context. In order to answer this question, we used participant observations and semi-structured interviews and examined the role of bikesharing as an international best-practices of urban planning within the startup sector in Nairobi.

We think of best-practices as discursive truth claims, that are disseminated cross-sectoral within urban planning. They tend to decontextualise “forms, ideas and processes from the cultural conditions that give rise to it” (Moore 2013). The global era in which New Urbanism evolved has made it a specific medium of dissemination and adaptation of urban innovation, such as bikesharing. Rather than the abstracted idea of urbanism principles, specific solutions to certain problems are even more decontextualized. This has little been examined on a global level, although the transplantation of ideas has already long been global, while the technology and policy takes place on a local level. Municipalities and local entrepreneurs interpret and utilise globally circulating solutions. At iHub Nairobi, a local startup incubator, we observed a pitch by a French transportation firm, seeking explicitly for innovative ideas and people in order to accomplish more suitable investments and solutions to mobility in Kenya. Hence, besides corporations of the IT sector interested in Smart Urbanism as a potential field of investment, there are infrastructure firms interested in Information and Communication Technology (ICT)

and startups to engage indirectly in urban digitization in Africa. This happens through the global startup culture, including makerthons and design-thinking. The startup sector in particular uses passionate and imitative practices as sites for social learning to develop the so-called Smart Urbanism, the use of ICT in urban planning (Kitchin 2017). This means that the trend of competitions (makerthons or hackathons) and the practices coming along with it can lead to technocratic approaches that do not consider the local context sufficiently. The paper discusses this critical aspect of New urbanism using the case of bikesharing in Africa, along the practices of design thinking, gamification and entrepreneurialism.

Before we discuss the impact of circulation of best-practices on bikesharing in Africa, the following section describes the urban mobility situation and the context of cycling and bikesharing in Nairobi.

2. Background

In contrast to other urban sectors, mobility is a problem for the majority of the population in Nairobi and across all income groups (Salon & Aligula 2012). Congested streets affect public buses, taxis and private cars, there is no urban transportation on rail and a lack of sidewalks and bike lanes. In addition, the road infrastructure does not suffice to accommodate traffic volumes, causing daily traffic jams and subsequent economic losses. However, mobility affects not everyone to the same extent. Income inequality and poverty are reflected in the spatial segregation of cities and in the affordability of transportation. Informal settlements that are home to 60 per cent of Nairobi's population are excluded from car and bus traffic due to their narrow, unpaved alleys. The long links between poor residential areas and central areas, where the jobs are located, are hampered due to high fares and congestion. More than a third of Nairobi's citizens cannot afford to use motorized modes of transportation and therefore depends on pedestrian infrastructure (NCCa 2016). Corruption is a problem in the minibus system, used by a third (NCCa 2016) of Nairobi's population. The drivers and conductors charge more than agreed with the owners of the buses, and passengers have no choice because buses are overcrowded and time is scarce. The minibuses, called Matatu, are part of a private and highly competitive system of corporations. These buses are what widely categorizes public transportation in Nairobi. These socio-economic consequences of weak transportation infrastructure come with several environmental effects. Air pollution is an ever bigger challenge in Nairobi. The main reason is that more than half of the modal split is run by fossil fuels, depending on which of the differing statistics one looks at (NCCb 2015). The large

share of motorised individual traffic and the reliance of public transportation on buses lead to a strong noise pollution as well.

By being a challenge for many, mobility is a well-discussed topic in various regards. The Metro 2030 master plan of Nairobi (MoNMED 2008) dedicates one of its focus areas to mobility at the same level as general themes like the urban economy and inclusion. Mobility enjoys significantly higher attention by startups, as well as other initiatives. For example, the project by MIT and the University of Nairobi (UoN) named Digital Matatus maps the informal and permanently changing transportation system in Nairobi. The project pioneers in the utilization of geo-informational systems and ICT in this area. Despite this attention from the public and the private, challenges like air pollution, accidents, congestion and high fares cause vast socio-economic losses. Transportation policies are so far responding to traffic congestion “by planning new systems of freeways and flyovers that carve their way through older and poorer urban areas. These cater directly for the still small, car-owning middle class, but are of little help to the majority of people who travel on foot” (Watson 2013). Metro 2030 lays down strategies to establish a mass rapid transport system or a car restricted central business district. Such policies would be necessary to decrease pollution and prevent a growing middle class from increasing private car ownership from the current 15 percent (of households), which would lead to more congestion (Salon & Aligula 2012). However, recent interventions clearly show the government's priorities. The construction of Thika highway was a large scale project to improve car access to the center, for example.

Study	Public Transport (%)	Walking (%)	Cycling (%)	Private car (%)	Train (%)	Institution bus (%)	Others
Ref. 1 ²	32.7	47.1	1.2	15.3	0.4	3.1	0.2
Ref. 2 ³	36	47		16.5	0.4		
Ref. 3 ⁴	51.5	41.2	3.0	7.0			
Ref. 4 ⁵	42	47	1	7		3	

Table 1. Modal split Nairobi, various sources collected by Nairobi County (NCCb 2015)

As demand for mobility increases due to urbanization, which exceeds current infrastructural and institutional capacities, there are calls for non-motorized alternatives, like better infrastructure for bikes. For example, the global movement advocating cycling called critical mass has founded a successful Nairobi branch. Biking could improve the accessibility to slums and affordability of faster transportation for the majority of the urban population. Thus, increased importance of biking in the modal split (currently at 1.3 to 3 per cent, depending on the source) could use transportation to reduce segregational and environmental effects.

According to Metro 2030, ICT is even supposed to play a central role in transport measures. With regards to cycling, the most common use of ICT is to create a platform for bike rentals, called bikesharing. Compared to the development of bikesharing schemes in Europe, the use of mobile applications would thus exemplify a leapfrog effect. This means that the implementation of such schemes in cities without prior projects alike can learn from the experience of development phases of bikesharing in Amsterdam, for example. Bikesharing schemes provide various advantages, like its quick implementation. Specialised companies provide bikesharing solutions to municipalities or private operators. Because dockless systems are cheaper to implement than dock-station systems, the latter could be interesting of the many smaller towns in East Africa with a lower budget. On the user's end, due to the low upfront cost for poor citizens, the affordability of urban transportation could be improved with its effect on accessibility of informal settlements, as mentioned above. A challenge in cities like Nairobi is that the social status of biking is very low because it is symbolic for poverty in contrast to car ownership (Pirie 2014). Bikesharing however is connoted with modernity, which could further increase the usage of cycling. Such advantages are rather theoretical however, because the experience of bikesharing in Sub-Saharan Africa is almost inexistant. In relation to the context and difficulties of urban mobility in Nairobi, described above, the question is how suitable bikesharing is for Nairobi. Theft has been an important barrier for bikesharing schemes around the world, for example. Such a challenge needs to be especially addressed in cities with high criminal rates. Also, the irregular topography of Nairobi could be a challenge for bike usage in general. Due to non-existent bike lanes and inadequately maintained sidewalks, biking is not safe.

Finding the balance between international best-practices of bikesharing and the local context of Nairobi was the focus of a qualitative research project in 2016. The following sections explain how this question was examined and what the results are with regards to the suitability of bikesharing in Africa.

3. Methods

Approaching the research question through socio-technical scholarship within urban studies in the field of Smart Urbanism (Greenfield 2013; Hollands 2008; Kitchin 2014; Luque-Ayala & Marvin 2015; Townsend 2013), we argue from a constructivist point of view. This has several implications for the conceptual arguments, but also for the methods used to approach the field. A constructivist stance enables the acknowledgement of the discursive claims made by Smart Urbanism (Luque-Ayala & Marvin 2015), that comprises applications such as bikesharing, and takes into account the social construction of technology in order to be able to discuss the issue

of efficiency not solely along a quantitative input-output analysis. It requires the consideration qualitative input and output too, which involves institutions, socio-economic inequality, cultural norms, externalities, etc. The ecological, social and cultural dynamics operate in systems which are interrelated and similarly structured. This comes from the paradigm of urban ecology (Eriksen 2001, 193) and is in line with the urban metabolism approach (Kennedy, Cuddihy & Engel-Yan 2007). In order to methodologically capture such dimensions, we analysed the urban context, combined with an ethnographic study. This combination of methods is to be envisioned as an anthropological triangle, which consists of comparison, contextualization and ethnography (Barnard & Spencer 2002, 193). The reason is that it is useful for a constructivist perspective, because it looks at the subjective reality rather than assuming an objective truth. Through the use of the method we can analyze the discourse and include meaning given to social and physical realities. We use is a discourse analysis approach, but we do not use discourse analysis methods.

Crucial for ethnography is that the researcher observes from the perspective of the subject of the study, the “aim of this method is to enter as deeply as possible into the social and cultural field one researches” (Eriksen 2001, 26). This method requires a continuous reflection process about the role of the researcher conducting fieldwork, which was semi-structured interviews and participant observation in this case. The access to tech-startups in Nairobi was possible through the interest and open-mindedness of people who either run, incubate or regulate startups. We met them at tech-events and they became gatekeepers and enabled me to get to the relevant persons to talk to and work with. Our role was characterized by being a white expatriate working for the United Nations Human Settlement Programme (UN-Habitat) and being about the same age as most people engaged in startups there. This made access easier and enabled me to meet people for interviews but also join certain startups in their work.

We conducted 15 semi-structured interviews and participant observations, which were basically us joining startups in their meetings and workshops, so-called makerthons. This improved the understanding of how people work and what methods they use in order to apply digital technology to urban problems. Being criticized as a “vaguely defined research technique, [participant observation] may serve as a convenient blanket term to conceal both ethical and methodological shortcomings in the actual research process” (Eriksen 2001, 26).

4. Results

The participant observation during the bikesharing makerthon at the Nairobi Innovation Week, a yearly congress for businesses and policy makers, and the interviews with major

stakeholders before and after have shown the following results on bikesharing in Nairobi. We will examine the ambivalence of global and local along the practices design thinking, gamification and entrepreneurialism. The idea of the bikesharing makerthon was to design an app-based system, which makes non-motorized mobility more accessible³.

4.1. Design Thinking

The startups at the bikesharing makerthon in Nairobi use the so-called approach “Consumer-centric Design” or “Design-thinking”, which is a set of problem-solving methods. According to Dorst (2011), design thinking aims at “framing” certain problems, which means to find out about their causes and context in order to develop suitable working principles, which can be used to find a (business-) solution. The term has been used in many different connotations and understandings, leading to confusion and diffuse meanings. “Nowadays, 'Design Thinking' is identified as an exciting new paradigm for dealing with problems in many professions, most notably Information Technology (IT) and Business. The eagerness to adopt and apply these design practices in other fields has created a sudden demand for clear and definite knowledge about design thinking (including a definition and a toolbox). That is quite problematic for a design research community that has been shy of oversimplifying its object of study, and cherishes multiple perspectives and rich pictures” (Dorst 2011, 521). In this sense, design-thinking is a discourse that is similar to Smart Urbanism in promising suitability which it lacks of many times. The declared goal is to develop the design process for context-specific solutions by doing surveys, brainstorm sessions and through interdisciplinarity. However, we observed that this process often lacks time, commitment and competence. Everything is being discussed from scratch, little research or existing data is used. The participants were a group of mainly local students (computational science, mechanical engineering, media design), facilitated by the leader of OpenIdeo as well as two persons from the United States, who had just arrived in Kenya and had no background in either IT or urban planning. Thus, the input was given by non-experienced design-thinkers who had a dominantly corporate understanding of public service provision. Bikesharing is not an immediate suitable solution to the local transportation sector; this initiative seemed more like a symbolic move of a hip tech-scene than a well-considered solution. Another criticism is the time constraint, as usually makerthons are held within a couple of weeks. This constrains methods or procedures that are usually key to a demand-based solution, like surveys or consultations. Urban service provision designed by startups causes suitability and accessibility to be inferior to profit, because profitability is the top priority. The main goal during makerthons is to win the competition. Accessibility and suitability might be indirectly useful to win, but it is not the objective of participants who would use any means to meet the objective. Referring back to the theoretical discussion about the

relation of global and local within the Smart Urbanism debate, design thinking is a well known practice which acts as a platform of common understanding and communication of startup actors. It accelerates global exchange and the use of best practices, which are sometimes suitable and sometimes not. Regarding accessibility different startups need to be differentiated, but according to our findings, they tend not to be accessible through design-thinking. Suitability is a declared goal of design thinking and sometimes materializes, but enabling access to services seems like falling through the profit-led method.

4.2. Gamification

It is common to organize competitions which are opportunities to present - or to “pitch” in the startup lingo - ideas for the solution to an urban problem. According to the leader of the OpenIdeo Nairobi Chapter⁴, this leads to participants not seeing the real value and the potential (societal) impact of initiatives, such as the bikesharing pilot. Many are interested in the technological solution and in being part of the startup community but tend to ignore the serious ends of their work. *“Developers are rationalistic and isolated, come up with ideas independent of context, do not think out of box, might fail, does not help anyone.”* (105) There are problematic implications of this feature for the suitability of urban digital technology. The technocratic approach, which is an issue in Smart Urbanism and not just within the startup sector, is linked to the practice of gamification because new technologies are perceived as experimental, without any context of application for urban infrastructure. According to a startup concerned with mapping informal settlements, this is particularly the case for sensors: *“I think sensors are a good tool in excluding the human factor in reporting, right. [...] You need to understand first how things are at this particular moment, before you judge or phase or whatever propose solutions.”* (119) The role of incubators in gamification is crucial, as they create an environment for startups. Incorporating game elements in workshops and competitions is important for creativity and serves as incentive to participate. However, the drawback of this is that a lot of work is being wasted because it is not suitable for the needs in the real Nairobi; there are many areas untapped by social entrepreneurs. According to the leader of the incubator iHub, 300.000 of the initiatives developed in Kenya are unused. For a critical discussion of the role of incubators and hubs see also Friederici (2015).

4.3. Entrepreneurialism

Entrepreneurialism, understood as a startup practice, influences their approach to public service provision with institutional and economic implications on suitability and accessibility of bikesharing. Both in the definition of startups and the Smart Urbanism discourse,

entrepreneurialism is a central component; a systems view requires the consideration of an economic stance. However, the entrepreneurial approach tends to be as isolated as the technocratic approach discussed above. The participants of the bikesharing makerthon focused so much on the success of the project as a business, which led to a lack of suitability considerations. An experienced member of the startup community in Nairobi even says: *“Most developers are selfish, they do it only for money.”* (105) Especially during our observations at iHub and the Nairobi Innovation Week, the dominance and isolation of the business concept was omnipresent. The relevance for suitability and accessibility is that the business component is not the end, but part of the means. Still, there is need for sustainable finance and compatibility with a competitive market, not least for the efficiency of the startup; private sector initiatives have more incentives to be efficient than public. In another way, startups can be flexible and agile when there is need for a targeted intervention (fit-for-purpose). Another aspect of entrepreneurialism is important in conjunction with the fact that urban mobility deals with the improvement of public services. This means that basic services should be accessible for everyone, independent of their purchase power. Entrepreneurialism comes along with a private sector orientation. This came up during a conversation with one of the facilitators at the bikesharing makerthon mentioned above, who said that startups could deal with a challenge like green transportation much more efficiently than the public sector. She must have either not been aware of or not linked the bikesharing initiative to the fact that it was co-financed by public funds from UN-Habitat or the assumption of the project to establish bike stations on municipal grounds for free (UN Habitat 2017). This illustrates the entanglement of startups with the public sector and the subsequent socialization of risk and privatization of reward (Lazonick & Mazzucato 2013).

5. Discussion

In this paper we questioned the suitability of bikesharing schemes in the urban context of Africa. In order to answer this question, we used participant observations and semi-structured interviews and examined the role of best-practises of urban planning within the startup sector in Nairobi. While best-practices and New Urbanism provide the medium that circulates globally, passionate and imitative practices lead to a lack of contextualisation when interpreting generic solutions to local problems.

Design thinking is a common approach used by the startup community to find appropriate solutions to urban problems. In practise, however, the approach leads to short term thinking and decontextualisation. Gamification during the design process of bikesharing showed that there is little identification with the societal effects of interventions that then tended to be technocratic. Entrepreneurialism has shown to be not fully suitable to the public service

character of mobility due to its focus on rentability rather than socioeconomic effects of bikesharing, for example.

The case study showed that an imported solution to the mobility challenges of an African city is prone to not consider the local context. For example, basic road infrastructure in order to enable cycling in Nairobi is more important than bikesharing schemes that depend on bike lanes. The low social status of biking is a major challenge of biking, which was not considered. The modern image of bikesharing however could be a potential to make biking more attractive in Nairobi. The potential of improved accessibility to cycling through bikesharing is projected to be an advantage for poor residents who can either not afford private and public transportation and live in settlements without road access. The pilot project we examined for this paper, however, was a pilot project for the university campus at the University of Nairobi, which is exclusively used by upper- and middle class Kenyans.

This paper combined two topics, one on the more theoretical/generic level, the other one on a sectoral/interventional level: Both the best-practise culture and bikesharing need more in-depth research (Pirie 2014). The meaning of the dissemination of New Urbanism to cities in developing countries is a field of research that has not yet drawn much attention. Within this topic, bikesharing in countries where biking is popular on the countryside but impossible or too dangerous in the city is another future topic with potential elaboration.

References

Barnard, Alan and Jonathan Spencer (2002), *Encyclopedia of Social and Cultural Anthropology*, New York: Routledge.

Baum, Matthias, Christian Schwens and Rüdiger Kabst (2011), 'A typology of international new ventures: Empirical evidence from high technology industries' *Journal of Small Business Management* 49: 305-330.

Bryce, Emma (2016), 'Medina bikes: Africa's first cycle-share scheme launches in Marrakech', *The Guardian*, <https://www.theguardian.com/environment/bike->

blog/2016/nov/15/medina-bikes-africas-first-cycle-share-scheme-launches-in-marrakech [30 June 2017].

Dorst, Kees (2011), 'The core of design thinking and its application' *Design Studies* 32: 521-532.

Eriksen, Thomas Hylland (2001), *Small Places, Large Issues*, New York: Pluto Press.

Friederici, Nicolas (2015), 'Hubs vs. incubators: What are the pain points for impact and efficiency?' Oxford Internet Institute, <http://cii.oii.ox.ac.uk/2015/12/28/hubs-vs-incubators-what-are-the-pain-points-for-impact-and-efficiency> [30 June 2017]

Greenfield, Adam (2013), *Against the Smart City*, New York: Do Projects.

Hollands, Robert (2008), 'Will the real smart city please stand up?' *City* 12: 303-320.

Kennedy, Christopher, John Cuddihy and Joshua Engel-Yan (2007), 'The changing metabolism of cities' *Journal of Industrial Ecology* 11(2): 43-59.

Kitchin, Rob and Sung-Yueh Perng (2017), 'Hackathons, entrepreneurship and the passionate making of smart cities', <https://osf.io/nu3ec/> [30 June 2017]

Lazonick, William and Mariana Mazzucato (2013), 'The risk-reward nexus in the innovation-inequality relationship: who takes the risks? Who gets the rewards?', *Industrial and Corporate Change*: 22(4):10-93.

Luque-Ayala, Andres and Simon Marvin (2015), 'Developing a critical understanding of smart urbanism?' *Urban Studies* 52: 1-12.

Moore, Susan (2013), 'What's wrong with best practise? Questioning the typification of New Urbanism', *Urban Studies* 50.

MoNMED (2008), 'Nairobi Metro 2030 - A World Class African Metropolis', Ministry of Nairobi Metropolitan Development, Government of the Republic of Kenya, Nairobi, Kenya.

NCCa (2016), 'Integrated Urban Development Master Plan for the City', Nairobi City County, <http://www.nairobi.go.ke/assets/Documents/EI-JR14112-Master-Plan-02-2-1.pdf> [30 June 2017]

NCCb (2015), 'Non Motorized Transport Policy, Nairobi City County, <http://www.kara.or.ke/Nairobi%20City%20County%20Non%20Motorized%20Transport%20Policy.pdf> [30 June 2017]

Pirie, Gordon (2014), 'Transport pressures in urban Africa: practices, policies, perspectives', in Susan Parnell and Edgar Pieterse (Eds.), *Africa's urban revolution*, London: Zed Books.

Salon, Deborah and Eric Aligula (2012), 'Urban travel in Nairobi, Kenya: analysis, insights, and opportunities', *Journal of Transport Geography* 22: 65-76.

UNDESA (2011), 'Bicycle-sharing schemes: enhancing sustainable mobility in urban areas', United Nations Department of Economic and Social Affairs, Commission on Sustainable Development, Background Paper 8, CSD19/2011/BP8.

UN Habitat (2017), 'UN-Habitat launches the bicycle sharing concept in Africa', UN Habitat, <https://unhabitat.org/un-habitat-launches-the-bicycle-sharing-concept-in-africa> [30 June 2017]

Watson, Vanessa (2013), 'African urban fantasies: dreams or nightmares?' *Environment and Urbanization* 26.

Notes

1. Terms for startups in the literature are Born Globals or New Internationals, describing small enterprises which are defined through the elements quickly growing, at hierarchy, flexible, globally oriented and technological or commercially innovative (Baum, Schwens & Kabst 2011).
2. <http://bikeshare.c4dlab.ac.ke>, accessed on 13th May 2017
3. While access to mobile phones is widespread in East Africa, the potential exclusive effects of the technology need to be considered too. A possibility to include citizens

with simple cell phones, not smart phones, is to decode the services for such devices.

4. Open Ideo is a startup platform that promotes design thinking; the platform was one of the stakeholders at the makerthon in Nairobi, mainly facilitating the process.