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# Mapping Informal Settlements in Kenya: Implications of new technological approaches

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## INTRODUCTION

The mapping of informal settlements is often presented as an essential exercise, often positively presented as rendering the invisible visible. Indeed, maps construct reality by helping local residents to think spatially about their environment. They provide actors of development with key strategic geographic knowledge to orient their programming. In the contexts of informal settlements where mapping is otherwise forsaken by the State, the creation of maps by non-governmental organizations can potentially transform the relationships between the actors involved.

In Kenya, the Map Kibera Project allowed Kibera, one of the biggest informal settlements of Nairobi, to be "put on the map''. This interactive community information project enables young Kiberans to create a free and open digital map of their own community. Over the past decades, the use of technology, particularly cellphone-use, has become the cornerstone of the relationship between different actors involved in the mapping of informal settlements in Africa. While it is mostly presented as a means to integrate development efforts, it can also bring about processes of marginalization for individuals who have greater interests in remaining *invisible*. Moreover, the use of information and communication technologies (ICTs) needs to be thoroughly analyzed and well understood in order to clearly discern the possible shifts between the roles and responsibilities of the different actors involved, and their repercussions. This research will explore in what ways technology-enabled mapping projects in informal settlements, attempt to alter relationships between key actors in ungoverned spaces. The analysis of the Map Kibera case study will unpack the different interactions/collaborations between actors, focusing on the relationships between state

actors, local residents, NGOs etc. Most importantly, this research will seek to define the possible shifts that could be present in the traditional understanding of roles for each actor. This paper will be divided into five sections, starting with the description of the case study itself, Map Kibera Project. Some historic and contextual background information about the informal settlement will also be developed to unpack the project itself -what was done, how and with whom. The second section is the literature review which aims to describe two main themes related to ICTs and geographic information systems (GIS). The first one being the rise of civic participation enabled by these technologies and on the other hand, the inequalities that can also be created by them. The conceptual framework will be the third section, unpacking Michel Foucault's conceptual framework of governmentality. The fourth section is going to touch on the methodology that will be used in this research, describing this research's limitations and challenges. Then the discussion section will analyse the Map Kibera Project drawing from the above-mentioned conceptual framework. This section will bring forward an analysis divided into three main segments. The first one will touch on the concepts of agency and empowerment that are promoted by the project, explaining how these concepts can potentially be eclipsed by the desired creation of an entrepreneurial subject. The second segment will develop on the dyad between visibility and invisibility and on how being visible is not necessarily always what should be wished for. A critical reinterpretation of the Panopticon will be developed in the last section of the discussion, and finally a conclusion will close off this research paper, summarizing the main arguments of the paper.

## CONTEXT & CASE STUDY

"Web developer Mikel Maron and I launched […] The Map Kibera project, in 2010. Its aim [was] to provide residents of Kibera, a 2.5 sq km slum in southwest Nairobi, with the digital tools necessary for self-empowerment" (Hagen, 2012). This is what Map Kibera is, in a nutshell. Erica Hagen and Mikel Maron wanted to research more on how technology can be used to influence development (ibid). With that in mind, they landed in Kibera ten years ago, wanting to do just that: empower citizens and generate change with the help of technologies.

Unpacking the project that took place in Kibera is relevant because Kenya, most generally, is considered a Sub-Saharan leader in digital entrepreneurship, including in mapping efforts (Chéneau-Loquay 2007). Chéneau-Loquay elaborates that the Kenyan government has been focusing on data infrastructure initiatives and e-government services, most precisely, focusing on an Open Data Initiative. Moreover, according to Graesholm (2012), one of the possible political economy factors that could have propelled Kenya's digital growth is the high rate of mobile phone penetration among its population.

The Map Kibera project was not the first mapping initiative in the country. Mwathane et al. (2012) explain that the state-managed Land Information for Informal Settlements (LIIS) project, which started in 2005, made use of geospatial technologies to map informal settlements. However, its insufficient use of the existing data was strongly criticized, along with its failure to identify systematic forms of data collection that could be coordinated with the pre-existing formal land tenure database structure.

The emergence of a project such as Map Kibera makes sense, in wanting to change its focus to a more optimal citizen-based geo-spatial approach. Information about Kibera territory has already been mapped before the Map Kibera project started. For example, data on residence and housing structures had been collected and identified. This information was gathered in order to conduct negotiations with state actors (Karanja, 2010). Nevertheless, the main challenges were found in data accessibility issues and in the inability of this data to be converted into digital or visual forms.

**Context and History**

Kibera is considered one of the largest slums in Africa with estimates of its population ranging from 200,000 to 1 million people (Graesholm, 2012; Neuwirth, 2005). Most of its citizens live in extreme poverty, earning less than a dollar a day (Kibera UK, 2019). It is strategically located to provide labour to Nairobi's industrial area and city center (Panek & Sobotova, 2015). Panek and Sobotova describe this settlement as an unplanned territory with crowded houses and a high density, all this together with an evident lack of infrastructure. Yet, also containing many assets such as private schools, private clinics, and community centers, etc.

Even though it is situated very close to the central business district of Nairobi, the separation between these two territories is clear. As explained by Swart (2017), once you cross these porous borders, you immediately feel this complex intersection of colonialism and dereliction. "Indeed, the founding of Kibera has its very roots in colonialism and the complexities of domination" (Ibid, p. 79).

It is during the last quarter of the 19th century that British's penetration started, more precisely in Zanzibar (Britannica, 2020). It was in 1888 that the Imperial British East Africa Company claimed territory in what is now known as Kenya. In 1890 and 1894, the British protectorates were established over the sultanate of Zanzibar and what is now known as Uganda. One year later, the company's territory in Kenya was ceded to the crown as the East Africa Protectorate and that is when Kenya was colonized by the British Empire, in 1920 (BBC, 2018).

In order to thank some 300 Sudanese soldiers that had served the crown during World War I, the Empire offered them permanent residency permits to Kibera. Later on, these ex-Sudanese soldiers started to rent the land to more settlers (Parsons, 1997 in Swart, 2017). After Kenya's independence, in 1964, the local government was facing a dilemma: vacillating between destroying this urban settlement or hoping that the withholding of municipal services would be an incentive for its local population to relocate somewhere else (Swart, 2017). Consequently, to this heritage Huggins and Frosina (2016) state that nowadays, it is mostly politically connected bureaucrats and business people, living outside Kibera, who became slum landlords. The land is owned by the Kenyan government and only approximately 10% of the people are shack owners; of these, many own multiple shacks which they rent out to tenants. The 90% of residents left are thus tenants with no rights (Kibera UK, 2019).

A survey even found that more than 80% of landlords lived outside the slum and that 57% were public officials (Syagga et al. 2002 in Huggins and Frosina, 2016). This leads to some tensions between landlords and tenants. The original settlers were the Nubian people from the Kenyan/Sudanese border, a Muslim population. They are mostly the shack owners,

along with the Kikuyu (the majority tribe in Nairobi). On the other hand, the Luo, Luyha and some Kamba are the majority of tenants (Kibera UK, 2019). This tribal diversity is a potential source of ethnic tensions and conflicts that can erupt on the territory.

This informal settlement saw its population booming because of various external factors such as rural droughts, climate change, ethnic conflict and wars in bordering countries, creating refugee populations (Swart, 2017). Therefore, Kenyans had no other choice but to come to the city and settle down on this land, although it had not been zoned for residential purposes. Because it was zoned mostly for industry purposes, it has not been properly surveyed or mapped (Huggins and Frosina 2016). It is important to specify that the size and the population density of informal settlements in Kenya can be the result of economic inequalities, but more precisely, it results from the lack of comprehensive urban planning policies (Otiso, 2005 in Huggins and Frosina 2016), weak municipal governments and problematic land tenure systems (Otiso and Owusu, 2008 in Huggins and Frosina 2016) and corruption in the land sector.

The repercussions of settling in a non-residential zoned territory largely explain why, amongst other reasons, its inhabitants do not have formal land rights, which consequently, prevent them from having adequate provision of services like water, sanitation and electricity (Tannerffeldt and Ljung. 2006 in Huggins and Frosina, 2016; Neuwirth, 2005). For example, only 20% of Kibera is provided with electricity (Kibera UK, 2019). Access to water is also problematic as Kibera has until recently had no running water and its citizens need to collect it from the Nairobi dam. This unclean dam water is the cause of a lot of diseases such as typhoid and cholera (ibid). Although, now, there are two mains water pipes running through the settlement, one from the municipal council and one from the

World Bank. Kibera still needs to develop a lot of infrastructure and services such as land/tenancy rights, housing, water, electricity, health clinics and much more. Many organizations including Churches, UN-Habitat and others are addressing these issues, to a lesser or greater extent (Kibera UK, 2019). The Map Kibera Project also tried, by mapping the settlement, to address these issues, assuming that by mapping the community, the citizens would have proof of their lack of services.

**Case Study: The Map Kibera Project**

Knowing that the municipal services which should be provided to a city are absent in Kibera, it is not surprising to learn that there is no reliable map of Kibera available.

Inhabitants of informal settlements more often than not navigate their communities by using informal landmarks such as bars, gas stations, or convenience stores, all places not represented on standard maps (Swart, 2017). When the project started, Google Maps represented these slums, most precisely Kibera, as a blank space, promoting its reputation as a shady, marginal space (ibid). Taking a look at Kibera's settlement on Google Maps revealed only part of the story. Due to the constant changes and transformation of the settlement, buildings, roads, amenities can be torn down literally overnight. On the ground, things get very confusing, packed with villages and communities with constant morphing borders (Blakemore, 2016).

Swart (2017) adds that the slum's layout constantly changes, and that there are no paved streets in this informal settlement. Consequently, defining what Kibera is, depends on where you are in the slum, at a specific time. Underhill (2010) underscores the fact that maps produced by the Kenyan authorities or aid agencies did exist but were, most of the

time, outdated or unavailable to the public. There is an evident lack of reliable data about these urban settlements because their existence is often, for political and economic reasons, only unofficially recognized by local authorities and national governments (Panek & Sobotova, 2015). They explain that therefore, independent research projects appear to be the paramount necessity if trying to achieve a deeper understanding of these realities. Kovacic (2016) in Blakemore (2016), a geographic information system (GIS) and surveying specialist, adds that these marginalized communities are missing from the maps and that the government does not recognize these areas. He states that most of the time, it is not economically interesting for companies to map these settlements.

Motivated by the desire to unite this inaccessible and chaotic data, with the development of GIS technologies and access to sophisticated cellphone apps, Map Kibera was created. It has been 10 years since a small group of expatriates with strong geo-spatial ICT skills started to work with local tech specialists, local organizations and Kibera's community to 'make visible the invisible' (Huggins and Frosina, 2016; Map Kibera, 2019; Panek &Sobotova, 2015; Tavaana, 2019). Map Kibera started with a small grant allocated by Jumpstart International, a community-based mapping NGO (Berdou, 2017). The money was focused on facilitating the creation of Kibera's first public, digital map and also to help train local youth to develop knowledge and skills on how to use global positioning system (GPS) and open-source GIS (ibid).

Map Kibera works with OpenStreetMap, a citizen-created world map, produced and made available to everyone, and the mapping part initiative concretely includes surveying with GPS and the digitalisation of satellite imagery and paper-based annotation (Panek & Sobotova, 2015). Maps were produced for various different sectors of activities, including

health, education and security. Not only were they made available online, but they were also distributed as printed flyers and painted on walls in central locations.

From October-December 2009, a basic map of Kibera was created and made available through the project's website (Berdou, 2017). The second round of funding was supplied by UNICEF, which permitted more training and further mapping related to water and sanitation, security, education and health (ibid). The second phase of the project, which took place from February-August 2010, was based on organizing community meetings in order to engage Kiberans in mapping efforts and to refine an understanding of their needs and the map's potential uses (ibid).

The project opted for a very localized approach, by choosing to train Kibera's citizens to use these GPS technologies to collect data, and to identify problems (Tavaana, 2019). Kovacic in Blakemore (2016) explains that people were not only turned into 'data scientists' but these amateur cartographers were turned into activists. Maps become useful in these underserved areas and can facilitate exposing the lack of services like water, power services, trash collection etc. Citizens gain the power to advocate for what they need. By overlaying that information on maps, it allows officials to target the greatest need for services and provide them in a way that reflects the real makeup of these formerly invisible communities (Blakemore, 2016). That being said, it all depends of their political will to do so.

Berdou (2017) explains that the project's founders worked with local partners to better underscore the community's needs and priorities and also to help assisting with youth recruitment. Partners included a local organization called Carolina for Kibera (CFK) and others, both inside and outside the slum.

The ultimate goal of collecting this data and information was to influence policy and development by standing up for their needs. Hagen (2011) explains precisely that it all started by recruiting 13 young participants, five women and eight men. These participants were all from different villages of Kibera and their motivation to learn and support community development were the most important selection criteria. These people surveyed their neighborhoods, collecting waypoints and road tracks with the GPS devices, to then edit the map online in a computer lab (Hagen, 2017). The author also specifies that familiarity with computers was a prerequisite, but they did not need advanced skills and experience. Technical training in mapping, filming and editing technology was also provided by the project.

Community involvement was the cornerstone of this project, and the initiators of Map Kibera strongly stressed that building community ownership is everything. The project's founders expected participants to partake out of a sense of civic duty and a desire to improve their technological skills. But an important point to mention is that pure volunteerism is not sustainable in a slum-based information work. Hagen (2017) describes the fact that members eventually needed to get paid because working for free in Kibera is a luxury. Indeed, Kiberans' time use is important, especially in poorer settings because time is a limited resource. As Bardasi and Wodon (2006) explain, time poverty is understood as the fact that some individuals do not have enough time for rest and leisure after considering the time spent working, either in the labor market, for domestic work, or other physical activities. They highlight that the more time is spent working in paid or unpaid work-related activities, it means less leisure, and by consequence, higher time poverty.

Coming back to the project, Hagen (2017) explains that it can rapidly become an extractive process, just like traditional surveying. She writes that for her team, it was mandatory that the work was done to create something that does not just layer on top of a community but actually serves them. Young mappers were taught how to map, but not what to map. With that in mind, it was clear that it gave them the opportunity to create a personalized representation of their community, as seen by residents themselves. Hagen (2017) stresses that engaging people in a data process can turn out being more effective and useful than to present them with the final results. Although, issues of bias can impact and influence the accuracy of what is mapped. By having human beings initializing mapping projects, it is possible they cover their personal agendas onto these maps.

This project might have helped bridges to be created between different actors in the community, but important dynamics are to be kept in mind when dealing with mapping. Mapmaking can transform into an inherently political project (Nelson, 2011). As Nelson explains, maps are not neutral tools; their creation has started wars, displaced populations, and facilitated the theft of natural resources. Nelson points out that the ability to make a map has more often than not rested in the hands of the few with access to the technology necessary to create them, but most importantly, to disseminate them. Map Kibera is no exception. The territory has been ‘’overmapped’’ by the traditional aid actors and its community is saturated with NGOs. The aim, this time, with Map Kibera, was to facilitate self-representation and get Kiberans away from the objectified foreign gaze.

In order to be able to analyze the case study and to be able to grasp every nuance present in such an initiative, these objective facts will be put in context by using the proposed literature review below.

## LITERATURE REVIEW

### The new era of GIS and its transformations

During the last decade, people have actively changed and developed geoscience, and the technological boom that took place impacted significantly this science (Panek & Netek, 2019). The process of democratization of cartography as well as GIS were part of the observable change that occurred, bringing a more social dimension into cartography and GIS (ibid). Collaborative mapping more specifically, plays an important role in community building initiatives. The maps' content is provided by users themselves. These new approaches also came with new labels such as critical cartography, collaborative mapping, digital citizenship or even bottom-up GIS… (ibid). Castells (2010) characterizes all major social changes as transformation of space and time in human experiences. Obermeyer (1998) explains that institutional and societal issues have become important subjects of GIS research. Most precisely, it has been noted that all voices should be heard, which had sparked interest for "public participation GIS''. This term was coined in the '90s to point out the new role of GIS as tools to broaden public involvement in decision-making processes, while promoting the goals of non-government organizations and grassroots groups (Sieber, 2006). Sheppard (1995) states that GIS is more than just a tool designed to solve one aspect of a problem - that of transforming spatially referenced empirical information into a spatial language to make possible cartographic representation of patterns of relationships, and of analyzing the nature of these relationships. For him, the development of GIS, or any similar technology, is instead a social process. It is not only the way mapping is done that has been transformed, but the ways actors communicate

between each other has also been altered. Web 2.0 tools have also been recognized as crucial for facilitating public participation. It is important to understand Web 2.0 as

> a collection of open-source, interactive and user-controlled online applications expanding the experiences, knowledge and market power of the users as participants in business and social processes. Web 2.0 applications support the creation of informal users' networks facilitating the flow of ideas and knowledge by allowing the efficient generation, dissemination, sharing and editing/refining of informational content (Constantinides & Foutain, 2007)

Berra (2003) proposes that these innovative systems enable new modes of communication between citizen and public administrators, where citizens have bigger roles to play and are more active and informed in their civic duties. They thus become more involved in the presentation and discussion of local issues. Graesholm (2012) also supports this idea by adding that communication technologies can lower the barriers to participation in public life, increase the intensity and the range of communication and potentially alter the link between citizens and government. This creates an alternative and disseminated form of governance. On the other hand, some authors, such as Banda, Mudhai and Tettey (2009) bring forward a more skeptical position, explaining that technology does not necessarily change and alter power relations. For them, issues of access, control and power remain unchanged.

**The potential democratization of GIS use**

Panek and Sobotova (2015) explain that with increased access to the internet world-wide, the possibility of creating multimedia community web-maps is now available to communities previously excluded from this sector. It opens up a world of possibilities as to what can be done with these technologies, from archiving local spatial knowledge to

supporting eco-tourism in a region. Bertot, Jaeger & Grimes (2010) state that the wider access to ICTs in a community, the greater the connections between different actors, and parts of the society. Former Kenyan Permanent Secretary of Information and Communication Dr. Bitange Ndemo, argues that ICT fosters economic development and is a great way to integrate Kenyans into a political community. The former Permanent Secretary suggests the need to reappraise the understanding of the influence of technology on state-society relations in development contexts (Interviewed in Graesholm, 2012). On the other hand, Castells (2010) contends that while everything and everyone is feeling the effects of this new social structure, these new global networks can possibly also exclude populations and territories, developing this geography of social, economic and technological inequality. He conceptualizes the social structure as the network society

> because it is made of networks in all the key dimensions of social organization and social practice. Moreover, while networks are an old form of organization in the human experience, digital networking technologies, characteristic of the Information Age, powered social and organizational networks in ways that allowed their endless expansion and reconfiguration, overcoming the traditional limitations of networking forms of organization to manage complexity beyond a certain size of the network (Castells, 2010, p. xviii).

As also mentioned by Ferguson (2006), more generally, Africa's participation in these new global networks has not only allowed for certain forms of global connections to take place, but it has also pushed and permitted for some widespread disconnection and exclusion.

**Mapping; or who is excluded while including 'everyone'?**

Mapping, more precisely collaborative mapping and community engagement, have become new trends in the development discourse that allow local communities to become more involved in the power structures and allow them to influence what is mapped and what/who is on the map (Panek & Netek, 2019). Collaborative mapping is the combination of web maps and user-generated content, in order to provide application-specific information (Sajja and Akerkar, 2016). Other terms can also be used such as crowdsourcing or volunteered geographic information (VGI) (Gartner, 2009).

It is often claimed that maps can have an empowering effect on communities -creating maps can help people think spatially about their environment. It literally puts their community on the map, and therefore, allows them to "exist" in the digital world (Vlok and Panke, 2012; Panek, 2011). On the other hand, the literature on collaborative mapping, or VGI is nuanced. Some authors state that there are many expectations about how VGI could possibly facilitate greater civic engagement. It is assumed that citizens delivering information could help to challenge existing power distribution between the state and the citizen, and also contribute to more socially inclusive policy design and decision making, allow the more vulnerable individuals and communities to raise their voices and enable them access to greater social benefits (Jones et al., 2015; Kleinhans et al, 2015; Miller and Goodchild 2015). As stressed by Peluso (1995) and Wood (2010), whilst this more egalitarian access to cartography certainly empowers some local groups, allowing them to articulate counter-mapping against planning proposals by state authorities, one must also consider that not all groups are equally able to access and utilize VGI, and moreover, not all groups have a platform through which they can present their counter-proposals, or just

contribute their local views to the public consultations. Indeed, VGI platforms can offer exciting opportunities for more frequent citizen engagement with the state and the local authorities (Güiza and Stuart, 2018). As stated by these authors, the inclusion of more local knowledge into public decision-making can trickle down from the more frequent use of VGI. They allow for low cost data collection of large volumes of information. But, if this technology is solely used for collecting data, and does not encourage higher levels of e-participation, such as a two-way dialogue with authorities, then it can be seen as lacking credibility as a method of engagement. If the views gathered are discounted and overlooked, then VGI becomes irrelevant. Güiza and Stuart (2018) suggest that greater transparency is essential for those who make VGI deployments. They should be able to know how their objections, concerns, counter-proposals will be used by the state, and whether, or if, they can expect to be identified in this process.

Collaborative mapping, or VGI, has its list of advantages such as fast updates, up-to-date content, low-cost solutions, the quick elimination of errors or bugs etc. But on the other side, it also has some problematic issues such as the quality assurance and reliability, some copyright and privacy issues etc. (Rouse, Bergeron and Harriss, 2007; Balram, Dragicevic, 2008). These collaborative mapping initiatives have indeed their loads of opportunities and benefits, and also their risks and issues, but generally speaking, the gathering and sharing of spatial information is more beneficial than its absence.

Some scholars have also commented on a gap present in the collaborative mapping literature. Reasons for participation and/or for non-participation in collaborative mapping seem to be under studied (Güiza and Stuart, 2018). Indeed, as explained by Güiza and Stuart, (2018), VGI can be considered effective technological approaches to allow citizen

participation. It can simultaneously capture both local features to improve information for authorities and at the same time, provide a platform for unheard voices. But the concept of civic participation is a contested one and some discussions are necessary to truly understand who benefits from the use of collaborative mapping, and to understand if participation supported by VGI platform is able to effect social or political change in an inclusive manner. In practice, it is important to keep in mind the different factors that influence citizen participation. Güiza and Stuart (2018) stress that usually the main challenge for VGI is the lack of interest from citizens in participating. Nuijten (2002) emphasizes that when developing such systems, one needs to carefully consider participatory approaches, more precisely those that do not understand or ignore the nature of the different fields of power linked to the issues that harm communities. A telling example is one of a slum clearance in India, which occurred after a participatory mapping project took place with the intention to improve services for slum residents. Negative outcomes can sometime result from either an uncritical use of VGI or also when power relationships are not well understood (Sanchez et al., 2013; Bunch et al., 2012).

**Civic engagement**

The nature of civic participation has been undergoing a lot of changes, in the urban centers of some countries, mostly with the arrival of the internet era accompanied with technological change (Guiza & Stuart, 2018). For Dahl (1994), civic participation is the ability of citizens to exercise control over the decisions of the *Polis*, as opposed to the capacity of the political to reasonably respond to the collective preferences of its citizens. The *Polis* here needs to be understood as the site where human history develops. Heidegger,

in Elden (2000) suggests that the *Polis* is the site of history being different from the Greek idea. In modern terms, it is the place where human beings belong in spatial and social terms, and its concept is useful to rethink the notion of politics.

Civic engagement can be understood as taking a variety of forms – connecting existing forms to imagined future possibilities for citizen's involvement in politics and governance. These forms can range from street protests and referenda to sports activities, to neighborhood barbecues, in the context of which the embodied experience of physical co-presence turns out to play an important role (Zanbergem & Jaffe, 2014). In this context, a fundamental contribution in the field of citizen participation is the suggestion by Verba and Nie (1972) that citizen participation is not limited to voting or elections. Rather, they argue that civic engagement should be much more multi-dimensional and extra-institutional, extending to and being expressed in activities such as strikes and demonstrations. Moreover, for Putnam (1995), civic engagement can possibly mean any kind of external activity that gets people come out of their domestic sphere to contribute more into the collective sphere. This brings into view the idea that citizens are central to practices of participation. Not necessarily the politically minded protester or the politician, but actually the average citizen who can become a broker, mediating between citizens and the state (Zandbergen & Jaffe, 2014).

Civic participation has become a buzzword in contemporary governmental discussions, considered an important and legitimized regime of knowledge and action (Zandbergen and Jaffe, 2014). They explain that for many actors, such as politicians, policymakers and NGO's, they all promote civic participation as a means of achieving citizens' democratic

empowerment. But this call for democratization has nonetheless proven to be something of a double-edged sword.

For Panek and Netek (2019), the mapping of uncharted areas allows local communities to improve their economic situation, and literally put themselves on the map. They state that collaborative mapping projects (such as OpenStreetMap OSM) are enabling community empowerment as well as ensuring that high-quality bias-free data are available to everyone, regardless of their origin, social status and most importantly, their position within the power structure.

The presence of a 'community' is always what is needed to start the mapping process and also some technical knowledge and equipment (Panek and Netek, 2019). But on the other hand, it is important to keep in mind that transformations in models of participation have been related to the rise of neoliberalism as a dominant governmental ideology, with civic engagement having turned into a method for legitimizing both governmental intervention and withdrawal (Zandbergen & Jaffe, 2014).

Zandbergen & Jaffe, (2014) contend that early initiatives towards civic participation emerged from social and civil rights movements in the 1960s and 1970s, which sought to democratize existing systems of governance. This coincided to a large extent with a shift away from the state-led models of economic development. It is specified that, development scholars as well as international financial institutions such as the World Bank and the International Monetary Fund (IMF) increasingly encouraged recognition of the popular agency of local communities in achieving development (Hickey & Mohan, 2004). This situation suggests the key paradox that has come to characterize recent calls for citizen participation.

> On one hand, it is premised on the ideology of spontaneous bottom-up participation of citizens. At the same time, institutional authorities, varying from states to business to non-profit organizations, apply it as a top-down model that can be captured in 'best practices' believed to be applicable to other contexts and settings (Zandbergen & Jaffe, 2014).

But with this power of democracy comes huge responsibility for the citizens. Indeed, civic participation is related to civic responsibility at different levels, and commitments with the *Polis* and the welfare of human and non-human (Nature) communities (Güiza & Stuart, 2018). Citizen participation theory has been developing to explain the role of the citizens and the role of administrative institutions facilitating citizen participation, most precisely in the internet era. Gibson & Cantijoch (2013) consider that these practical, direct and offline types of political engagement re-emerge online, because individuals use tools that are available to facilitate and co-ordinate action.

**Youth participation**

The Map Kibera project, mentioned above, was a volunteer-based initiative. In short, this meant that anyone could decide to offer their support to help map their community. Because technological knowledge was a prerequisite for participants to join the project, the vast majority of people surveying Kibera were younger citizens. The literature drawing on GIS and online mapping platforms involving the youth develops mostly on the fact that it helps young people engage their civic agency (Elwood and Mitchell, 2016). This is not new -since the mid-1990s, geographers and other researchers have studied connections between civic engagement and digital geospatial technologies (ibid). Other scholars have shown that collaborative mapping processes can help ensure that youth's knowledge, experiences and needs are included in civic problem solving (ibid). For some scholars,

youth civic engagement means they are able to develop a sense of awareness of societal issues or problems, a recognition of themselves as citizens and moreover, the ability to engage the structures and forums that influence these issue (ibid). Most importantly Santo, Ferguson and Trippel (2010), stress that it is crucial to keep in mind that young people have the potential to act as accumulators and distributors of knowledge in a way that other members of a community cannot. It is for them important to involve youth in planning processes in order to gain access to the unique insights that only this group can offer. Young people, as future stakeholders, will inherit the outcomes of the decisions regarding physical development patterns. In other words, it is important to have the youth's well-being in mind, by allowing them access to civic engagement.

Nevertheless, some scholars bring forward an interesting question regarding citizen participation, and mostly youth's participation. Banaji (2008) highlights the fact that in much of the literature about youth, politics and civic action, there is this assumption that citizen participation, whether technological or otherwise, is better than no action and that civic engagement is better than no engagement at all. Banaji questions if this can be categorically the case; and if we can call for civic action and engagement on the part of young people as a certain good.

**Technologies and marginalization: the digital divide**

New technologies enabling the mapping of informal settlements can possibly be understood and analyzed as potential solutions, but also as problems. Indeed, as argued above, technological inequalities are to be kept in mind and well understood. Not every group has the same access to these technologies, which means one needs to keep in mind

who is excluded when thinking of including everyone. As a matter of fact, Souter (2018) explains that a digital divide can develop where technologies can be advantageous for certain users or exacerbate inequalities for others.

Going back in time, Rillet (2007) explains that the discourse on the Digital Divide started in the early nineties. The main discussions were evolving around what the author calls the 'information haves' and 'information have-nots'. American studies on the Digital Divide, 30 years ago, were already focusing on the risks linked to excluding certain populations from the ICTs (Rillet, 2007). Lechman (2010) highlights the same idea by stating that technologies themselves are not value-neutral and that adopting them can lead to the creation of certain consequences that are not necessarily perceived positively.

The Digital Divide can be applied in multiple different ways but the terminology refers to the fact that a potential irreversible division between two groups can be generated. This is when we see the separation between the groups of *the haves*, the one who can benefit from this digital economy, and the groups of the *have-nots,* the ones excluded from this economy (Rillet, 2007; Cunningham, 2019). This is why "paving the information highway" (Baker, 2001) did not happen without some challenges and obstacles. According to Cunningham (2019), developed countries are more and more opting for a new type of economy –a knowledge-based economy. This means that the economy is based on quick and reliable access to information, at the touch of a button. The challenge is to try and rectify the situation and give access, quickly and reliably to the populations that do not have access to it.

GIS and ICTs such as social media, smartphones and the Web 2.0 are not only changing the way our economies are organized, they also alter the ways that activists collaborate and

engage in political action (Nemer, Tsikerdekis, 2017). As mentioned above, the accessibility, reliability or capacities to use these technologies are not spread out equally. Marginalized communities who face these digital inequalities have to deal with two challenges. As highlighted by Nemer and Tsikerdekis (2017), not only are these populations deprived from benefitting from this so-called 'Information Society' but they also suffer from a lack of representation in the literature.

This literature review will be useful to understand the nuances that are to be acknowledged in a technology-enabled mapping project, in an informal settlement. Understanding the issues that technologies can bring upon certain populations will be helpful to unpack the case study -Map Kibera Project. This background information about the ongoing debates related to these kinds of projects will allow this research to take a critical approach while analyzing the Map Kibera Project. Civic partition and collaborative mapping are essential concepts to help comprehend and analyze technological-enabled project, such as Map Kibera, given that this kind of project has many layers to examine. Since the literature on the above-mentioned concepts is mixed, it will allow the further discussion to be deeper and more complex.

## CONCEPTUAL FRAMEWORK

The theoretical framework employed for this study draws on Foucault's theory of governmentality. Unfolding from this framework are also the concepts of agency and power, which will be developed and used to analyze the case study.

Governmentality is derived from the notion of 'government' and encompasses the concept of power. Foucault explains that "individuals are always in the position of simultaneously undergoing and exercising this power […] in other words, individuals are the vehicles of power, not its points of application'' (1980, p. 98). Hindess (1996) highlights that Foucault refers to power as strategic games between liberties, which suggests that in his view, there is an intimate relationship between power and liberty. Heller (1996) adds on to this idea by explaining that power can also be understood as the medium of change, the fact that individuals have the ability to influence the actions of others in order to achieve certain tactical goals. Although power might be everywhere, the fact remains that it is not distributed equally.

For Foucault, power is manifested in the instruments, techniques and procedures that may be brought to bear on the actions of actors (Hindess, 1996). Forms of power are therefore heterogeneous; for example, they can be concentrated and hierarchically organized or can also be socially dispersed.

As Dean (1999) states, the notion of governmentality reflects a dominant set of power relations. Within these relations, the "conduct of conduct'' is explained as that it attempting to shape human conduct, calculated by means. It is an activity that shapes the field of actions and attempt to shape freedom within neoliberal societies (Dean, 1999; Hindess, 1996). Resistance is what makes power relations possible, and without resistance, these relations cannot exist (Hindess, 1996). In some ways, Neoliberalism can be seen as a shift from the nation-state as the sole unit of power, to the precedence of the market to which the nation-state is accountable (Pollack & Rossiter, 2010). For Foucault (1991), with such a change comes new forms of governmentality.

There is a fine line between government and discipline which is that government is the concern of the well-being of population at large, rather than a focus on disciplining individual bodies. As Li (2007) quotes Foucault (1991), the purpose of the governmentality concept is to ensure the "welfare of the population, the improvement of its conditions, the increase of its wealth, longevity, etc.''.

Governmentality concerns the exercise of power and authority in ways that are not self-evident (Dean, 1999). It concerns the shaping of human conduct, but that 'shaping' is not done in an obvious matter. It is by educating desires and configuring habits, aspirations and beliefs that people will act a certain way, because they think it is the only way and the correct way. (Li, 2007). Hindess (1996) adds that the government's main purpose is to influence, alter, impact people's conduct, and that government "must operate through [subjects'] capacity to regulate their own behaviour'' (p. 105). This production or constitution of particular kinds of 'subjects' is subjectification. Capitalism requires the production of subjects who imagines themselves to be autonomous, self-possessed, abounded agentive individuals (Rose, O'Malley, Valverde, 2009). It can also be explained that these individuals take themselves to be autonomous subjects, who can enact their subjection as if it were a matter of their free will (ibid).

Heller (1996) explains that for Foucault, a subject's ability to speak is ontologically limited by the discourse through which his/her subjectivity is constructed. The process is therefore determined by the subject's location within this "institutional topography" of a particular social formation (ibid). Heller also puts forward the question of intentionality. He highlights that the subject's intentionality is never completely their own because their actions and behaviour are dictated by regimes of truths, drawn from these discourses. The

subjects can make use of tactics, only the ones they are discursively able to formulate. Heller (1996) adds on by saying that consequently, subjects do differ in the kinds of tactics they choose, depending on the different discourses enable.

In the same vein, Dean (1999) says that this is as a form of self-direction, or self-regulation, appropriate to a certain context. It could be a different conduct depending if at home, at school, or at work, for example. The best way to do it is to fit this self-regulation under these norms and standards. The objective is to make these norms and standards seem natural and normal so individuals strive to achieve and reach them (Dean, 1999; Li, 2007). This is closely related to the concept of ideology, unpacked by Hall (1990) as something that is not made up of isolated or separate concepts, but rather a sum of different elements articulated into a distinctive chain of meaning or understanding. With the power of ideologies, individuals get the impression that they make or have an authentic and personal opinion of something. But as a matter of fact, the opinion is only subconsciously motivated by a bigger structure and or system. According to Hall (1990), individuals should always be aware of this inescapable framework. By being aware that something bigger is influencing ours or others behaviours, it can become possible to reverse the power relations.

Closely related to the idea of power, is the concept of agency. It also draws upon the idea of intentionality and subjectification, mentioned above. This concept has been included in debates over relationships between the individual and the social structures. Rapport and Overing (2000) state that agency is linked to the capability, the power to be the source, the originator of acts. Agents are therefore, subjects of action. Bilge (2010) also explains that there is a strong correlation between the individual and the system. She explains that ever

since academics started to study and reflect upon sociology, the concept of agency has been referred to as sociological dilemma between structure and action. Through this thinking, individuals are referred to as being in relation to something that is bigger than themselves such as a system/structure/society. Rapport and Overing (2000) specifies two possible ways to unpack this relation. They explain that, firstly, there is the structural-model (e.g. Durkheim) which explains that individuals are determined by the system. Secondly, the action-model (i.e. Simmel, Weber) proposes that individuals can, on the contrary, act upon the system, the structure. More precisely

> the structural-model argues that structures self-generate and determine the very nature of individual consciousness, whereas the more individualistic/liberal-oriented action-model claims that structures are abstractions created by individuals and cannot determine the action of their makers (Bilge, 2010, p. 12).

Mack (2003) in Bilge (2010) states that agency is more precisely an exercise of self-willed behavior. And going back to a more philosophical sense of the term, agency is considered a deeply liberal concept (ibid). As argued by Asad (1996), the concept of agency is also linked to capitalism, most precisely invoking ‘‘the mutually dependent figures of the entrepreneur and the consumer, or, more abstractly, the functions of initiating and choosing (p, 271).

We govern ourselves and/or others according to what we take to be true about who we are, according to various truths about our existence (Dean, 1999). According to these regimes of practices or regimes of government, we govern ourselves and/or others based on various truths of our existence. With that logic, Dean (1999) highlights that government encompasses not only power relations and authority but also issues of self and identity.

As stated by Hindess (1996), the ability to successfully govern others, "often depends on the ability of those others to govern themselves, and it must therefore aim to secure the conditions under which they are enabled to do so'' (p.105). The element of calculation is therefore central because government requires that the "right manner be defined, distinct finalities prioritized, and tactics finely tuned to achieve optimal results (Li, 2007).

In order to make individuals follow these standards, morality and rationality come in handy. Dean (1999) argues that it is by having a sense of morality that oneself becomes accountable for one's actions. He adds on that government is therefore an intensely moral activity. It affects and shapes who and what we are, concerned to modify a certain space.

By using this framework, this paper approaches the already known and raised critiques of the Map Kibera Project from a fresh and new perspective. These critiques and issues linked to the project have been raised by some authors, but the lens through which they had been analysed was different from the one proposed in this research paper. The value added will come from the use of this specific framework to understand this mapping initiative in different ways. It is intended to permit me to revisit the existing problems, using an innovative approach to unpack the project. It will allow the analysis to be thorough and to go beyond what seems to be evident and obvious, forsaking the 'normative' statements and standards.

## METHODOLOGY

In order to analyze this case study and answer the above-motioned research question, I used qualitative data obtained from secondary sources. The secondary data was collected from

academic literature, interviews, blog posts and journal articles, describing reactions from the different actors engaged in the Map Kibera project (i.e. government officials, NGO's members, citizens etc.). Videos and clips have also been used to analyse and understand the different actors' implications.

I read, listened or watched every piece I could find that mentioned the mapping initiative. To guide my research, I used key words such as 'Map Kibera', 'Map Kibera Project' 'slum mapping', 'Kibera', 'Mapping technologies', 'Mapping of Kibera' etc. This secondary data is understood and examined through the proposed framework described above. Using Foucault's governmentality as a lens to analyse the case study allows me to unpack the power relations and the shifts occurring in the community, enabled by mapping technologies. It also allows me to problematize the mapping project and to dig deeper in between the superficial layers of the initiative. The project has been generally praised and applauded in most of the secondary sources I've stumbled upon. The objective was thus to bring in a critical perspective to this initiative to try and problematize what seemed to be perfect and totally successful. With the help of the theoretical framework and the literature review, the Map Kibera initiative can be analysed from a new angle, which helps to bring forward issues that could have been bypassed otherwise. Although, an important aspect to mention is the fact that this paper is not meant to deliberately critique and undermine the mapping project. The idea here is to look at it with a critical perspective, being able to problematize it and to look beyond the superficial layers that are promoted in the articles describing the initiative. By using theories and a specific conceptual framework to analyse the already existing issues of the project, it allows for a fresh position towards the Map Kibera Projects and its outcomes.

It is also important to explain and describe the challenges faced during the writing of this major research paper. Since this research was done with no actual access to the field, the only information I had in order to analyse and discuss the Map Kibera Project was the information gathered by other authors, writers, academics etc. I was not able to go ask my own questions and interrogations when something needed clarification or more detail. I had to work with what I found online, and trust that this information was accurate and authentic to Kibera's reality. That of course, generated important limitations to my research.

Another limitation was to try understanding and representing Kibera's ambiguous realities, having never been in such a complex settlement. As explained by England (1994), a research represents a shared space, shaped by both researchers and participants. Even though I did not interact with 'participants' per say, these different identities have the potential to impact the research process. So, being here in Canada, and having never traveled to Kenya, impacts my perspective and the stance I am taking as a researcher. The complexity of a place like Kibera is hard to understand, even for people in Kenya. Trying to translate and comprehend this reality, when the only access to Kibera I have are the video clips, photos and article, is difficult. Additionally, being a graduate international development student, I have taken two years of classes on the topic, shaping my thoughts and ideas on the field of international development. Some courses and readings were more critical than others on subject, and some were more enthusiastic and optimistic, bringing different ways and perspective to think development. Having been in contact with these different postures, and by being who I am, a white cisgender woman, my own biases can shape the research process, but which served as checkpoints along the way (England,

1994). My positionality remained at the forefront of my mind throughout my whole research, of these vulnerable people, living in basic conditions, in this African slum. It was important for me to be aware of my assumptions throughout my research, but most importantly while writing my analysis. I was, and still am, an outsider trying to unpack this mapping project, which took place in an informal settlement, in Africa. I am using the collected data to critique and problematize the fact that these people were asked to collect data. It brings an interesting perspective to this research since I will later bring up the issue of audience, questioning who benefits and makes use of the data collected by the Map Kibera Project. Part of the answer is me. I benefit from this information, being able to analyse it and reflect upon it in this research paper. I have instant access to their lives, their territories, their reality, only one click away.

## DISCUSSION

This section will explore some discussion elements that can be drawn from the case-study and the above-mentioned framework.

To begin with, the overall goal of the Map Kibera project is emphasised as *making visible the invisible*. The objective was to do this through empowering Kibera's citizens, most precisely by training them to use GPS units to record some aspects of their environment, which they would afterwards upload on OpenStreetMap.

It was assumed that it would benefit this community by helping them to be on the map and allow them to *exist* in the digital world. It is also stressed by some scholars, such as Vlok & Panek, 2012, Panek, 2011 and Panek & Netek, 2019, amongst others, that maps can have empowering effects on communities, by helping citizens think spatially about their

environment. Indeed, collaborative mapping allows for fast updates and up-to-date content. Not only is it a low-cost solution but it permits the quick elimination of errors or bugs. On the other hand, it needs to be considered as something that can lack quality insurance and reliability. Some copyright and privacy issues can also be raised.

With this in mind, not surprisingly, the project managers of Map Kibera assumed and pushed forward the idea that by making the invisible visible, it would help the community to advocate for improved governance and provision of public and private services (Huggins and Frosina, 2016). It was also suggested that by making this data 'visible', it would prevent evictions and property destruction (ibid). By having citizens delivering information about their environment to higher authorities, it is implied that this could challenge existing power distribution between the different actors - the state and its citizens. As part of the project, they were indeed given the tools and the capacities to represent their previously 'invisible' community. It was stressed and assumed that by surveying their community and by recording aspects of their environment, the residents would feel empowered and it would help them develop their sense of civic study, of participation, and of agency. But that would also mean that all the responsibility would fall back on these citizen's shoulders. These data-collectors spent time recording the location of paths, roads, toilets, schools, water kiosks, particularly 'risky' places and then translated their findings into maps. Technically speaking, if the data collector did not do his 'job' correctly, that meant that the map could potentially not be accurate. Overall, the data-collector's findings were produced for many different uses. They were maps that were made available online, some distributed as printed flyers and others even painted on walls in central locations. Users were also able to disaggregate the maps to only use a security focused map, or a health focused map, for

example. Concretely, that meant that a disaggregated security map contained the outline of where security lighting were, where the facilities that offer gender-based violence support are located, HIV testing locations, or even the location of 'black spots', in order to pinpoint on the map where criminal activities are predominant. For inhabitants of Kibera, seeing that what was reported was actually taken in consideration and taken seriously enough to be put on maps might translate into a sense of relevancy and a sense of accomplishment.

By following the logic that what is made visible is made relevant, the community's residents had some encouraging incentives to partake into this initiative. Perhaps the issue here is to look more deeply into who else, apart from the community's citizens, is benefiting from the information reported by them.

It might be the state who is profiting from these maps. It can become a passive spectator watching over its own citizens report and survey their own community, allowing a possible lack of accountability and responsibility. This can potentially create new dynamics as to who is responsible for the desired changes and retarget the 'promised' expectations that the state would help and take actions if Kibera was made visible. It is assumed and implied that if the citizens map their territory they would be the beneficiaries of this exercise, but has it really been the case?

**Rethinking agency**

With this this in mind, it can be discussed that the Map Kibera project is giving the community's residents a superficial sense of agency. Agency is linked to the idea of capability, of the power to the source. But it is argued that there is also a bigger structure, a bigger system to be taken into account when thinking about agency. As mentioned in the

previous section, individuals exist in relation to something that is bigger than themselves, such as a system, a society, a structure. They can have the impression that they make objective decisions, or that they have authentic and personal opinions about an issue, but from a Foucauldian perspective, their opinions are subconsciously motivated by something greater. These structures and systems are influencing people's behaviours, as a result of manipulating people's agency, which can also shape the field of action. Their behaviours are oriented to specific objectives.

For example, it was described above that the project was not based on a completely voluntary and unmediated crowdsourcing basis but that it was actually relying mostly on trained individuals who received -modest- monetary incentives. The citizens who volunteered to report and map Kibera might have been motivated by a sense of morality, that oneself becomes accountable for one's action. The technologies of agency, or what can also be understood as the technologies of citizenship for Barbara Cruikshank (1993; 1994 in Dean, 1999), are the multiple techniques of self-esteem and of empowerment. This term is a seductive one, though. As stated by Pollack and Rossiter (2010), within a neoliberal context, notions of empowerment are stripped of socio-economic and political resonances and are instead focusing on the self and subjectivity of those who are disempowered. The key element here is the present link that can be made between empowerment, autonomy and agency. Rose (2000, p. 334) explains that "autonomy is now represented in terms of personal power and the capacity to accept responsibility- not to blame others but to recognize your own collusion in that which prevents you from being yourself". It adds on a level of responsibilization to Kibera's data-collectors to not only survey their community, but to do it well and efficiently, because the project cannot reach

its objectives without their participation. Being part of this Neoliberal context, where market rationality prevails, the social is collapsed into the economic, letting the individual pursue freely his rationally calculated best interests (Pollack, Rossiter, 2010). If the data-collectors were not participating or contributing to the Map Kibera project, through a Foucauldian perspective, it could be understood as if they are misusing their 'freedom'. It is the individual's responsibility to engage in personal self-care, or where the entrepreneurial self is encouraged, or governed, to 'freely' and 'rationally' conduct themselves in a certain way. The entrepreneurial subject can thus be described as this responsible subject – responsible to map its settlement to get better living conditions etc.

As explained by Dean (1999), the targeted populations, the most vulnerable people in society, are subject to what are called techniques of agency. They are being encouraged to transform their status, in order to become active citizens, capable individually or as a community, to manage their own risk. It is also important to note that it is not only the vulnerable groups that are targeted in society, to be autonomous and to accept responsibility. All individuals are subjects to these techniques of agency, we are all targeted, as a population. However, the issue here is that it might be more problematic for the most vulnerable, as they have the fewest resources and 'safety-nets' to fall back on. Being part of a group of vulnerable citizens, such as Kibera's inhabitants, means having less opportunities to succeed in a market economy and fit into this neoliberal subjectification.

Linked to these technologies of agency are the technologies of performance that are utilized from above, as an indirect means of regulation agencies (ibid). This can be understood, as proposed by Rose (1990) and Miller (1992) as government at a distance. Or that is to say,

acting from a center of calculation such as a government office or the headquarters of a nongovernmental organization, on the desires and activities of others who were spatially and organizationally distinct (ibid). So, what is really encouraging Kibera's citizens to map their community? Their sense of accountability, their motivation for civic duty, the monetary bonus that comes with the project, the technological skills they can gain, all the above? Whatever it is, these technologies of agency and of performance are pushing toward a specific conduct, to reach specific ends. It links to the idea of the government of the self, or what can also be called the technologies of the self. These technologies were formed so subjects would produce the ends of government by fulfilling themselves rather than being merely obedient (Rose, O'Malley, Valverde, 2009). They explain the intrinsic relation between government and ethics linking it to the questions of the subject. It is stated that the constitution of subjectivity is a key political issue, since market-led governance requires the production of subjects who imagine themselves to be autonomous, self-possessed and bounded agentive individuals (ibid).

Map Kibera Project needs Kibera's citizens to map their community, without them, there is no map, no project. A whole variety of authorities govern in different sites, in relation to different objectives. So instead of seeing one single body, such as the state, as responsible for managing the conduct of citizens, we need to recognize that this range of techniques would enable the state to divest itself of many of its obligations, devolving those to quasi-autonomous entities that would be governed at a distance by means of budgets, audits, standards and other technologies that were both autonomizing and responsibilizing (Rose, O'Malley, Valverde, 2009).

Agency is understood as something that is a self-willed behaviour, but by unpacking and analyzing the underlying components of the project, it can be concluded that the participants did not freely and willingly participate to the mapping process of their community. In fact, they were influenced by a dominant set of power relations, the 'conduct of conduct', which attempts to shape human actions, seeking to do so by working through people's desires, aspirations, interests etc. The 'control' of actions, or of behaviour is calculated, but it is important to mention that this shaping of human conduct is not done in an obvious manner. The targeted populations, through the technologies of agency can be empowered by, or enter into partnership with services providers and then become enjoined to manage their own community (Dean, 1999). Human conduct can be regulated, shaped, controlled and finally turned to specific ends.

Kibera's citizens can then have the impression that they took the decision to participate in the Map Kibera Project by themselves, independently of any kind of exterior influence. But intentionality is never completely neutral, because the subject's actions and behaviour are dictated by regimes of truths, trying to influence actions in ways that seems to be natural and normal. But the overall goal here is to become able to transform these targeted, or high-risk groups into active citizens, who can become self-managing, in order to be able to demand action from the state (ibid).

The individuals become agents, and they thus become originators of acts, of actions. They have the power to be the source of these actions. The citizens themselves become the data collectors, participating in this project, making a difference, and hopefully getting the government's attention. Coming back to the technologies of the self, this is when we can observe Kibera's citizens coming to understand and act upon themselves within certain

regimes of authority and knowledge, and by means of certain techniques directed to self-improvement (Rose, O'Malley, Valverde, 2009). Individuals should conduct their lives as an enterprise, more precisely, should become entrepreneurs of themselves. As explained by Rose (1992), subjects are still free, but are required to conduct themselves responsibly, in order to account for their own lives. Kibera's dwellers were yes 'free' to participate or not to the mapping project, but their decision making process is influenced. Here, freedom is seen as a choice, as self-responsibility. It is the linked to the idea of maximizing one's life as a kind of enterprise, or as what Rose calls advanced liberal government.

By having their own findings added to maps, the first ones ever made about their neighbourhood, is indeed empowering for these dwellers that have been neglected by state actors. As explained by Huggins and Frosina (2016), the Kenyan state has denied basic services to this population because much of the land is state-owned, and not zoned for housing. Therefore, citizens had no other choice but to create these basic services themselves in a very rudimentary fashion.

It can be understood that these techniques of agency and performance are regimes of practices. They are trying to push toward a specific type of subject, seeking to obtain a certain identity. Regimes of government do not specifically determine forms of subjectivity but instead, "they elicit, promote, facilitate, foster and attribute various capacities, qualities and statuses to particular agents'' (Dean, 1999, p.32). This is what can be witnessed with the Map Kibera's participants. The project need specific kinds of subject, that are going to act a certain way, based on some technologies of agency and performance.

The project can be understood as influencing people to becoming a specific kind of subject. -performing subjects. It then becomes possible to rethink the idea of empowerment and the

creation of acting agents, or subjects of actions. Knowing that Map Kibera's participants have been influenced by monetary incentives and that they were mostly chosen because they had a technological background, changes the perspective and undermines the power of being agents of change, of using one's agency. Technical skills are key in mapping, so the Map Kibera Project was looking for participants who were technically able and who could provide assistance. Again, this connects to the idea of performativity that is key for participating in this Neoliberal project, which promotes the behaviour of active and entrepreneurial participants, with this ambition to better themselves. The data-collectors are bound to a moral responsibility to self-direct their life, where in a Neoliberal context, the notion of public good is represented by individual good as a civic responsibility (Pollack & Rossiter, 2009).

The Map Kibera Project promotes this idea of empowerment. This idea that if one partakes in this mapping initiative, by their own will, they would benefit from positive outcomes and changes. But as argued above, one's agency is never neutral, and is always influenced and shaped. Human conduct is governable. Map Kibera did not force or oblige anyone to participate in the project, but rather used this notion of one's agency and empowerment to deliberately direct one's conduct and to push the entrepreneurial subject to act accordingly, to use his 'freedom' to self-govern. The creation of a neoliberal subject was possible, influenced by a variety of authorities that lead the slum's dwellers to partake 'willingly' to the mapping initiative. This allows individuals "to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, or ways of beings, as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality" (Foucault, 1998, 18).

**Visibility versus invisibility**

Based on certain 'regimes of truths', individuals have learned that being visible is what should be aimed for and that to speak up and be heard can facilitate advocating for justice and rights. But on the other hand, it is also possible to unpack the idea of visibility as something that can potentially be analysed as damaging or not absolutely wished for. Foucault (1995) explains that visibility can be a trap. He states that on the contrary, invisibility can potentially give you some sort of power and resistance.

A telling example puts Map Kibera's argument about empowerment and visibility in perspective. As a matter of fact, in August 2018, Kibera saw parts of its neighborhood demolished because of a road project. The latter has put around 2000 Kibera families on the streets, without any compensation (The Guardian, 2018). It was also reported by the newspaper that Kibera's citizens witnessed bulldozers tearing down their neighborhood, including their churches, schools, businesses and other landmarks that had been marked and recorded online by the Map Kibera project. The facts remain that even by having that data available and visible on maps, thousands of families were evicted following the demolitions. This is a flagrant injustice, especially knowing that more than half of Kenyans mostly walk to go where they need to go. Kibera's dwellers are absolutely not the beneficiaries of this road passing through their territory.

A citizen was quoted in the article, asking if Kenya was actually a free country. Elijah Musembi, a Kibera citizen asks "Why are they chasing away their citizen without telling them where they should go? Of what use am I to this country?" (ibid). Another individual stated that the construction of this road is not considered as progress but is seen as if Kibera's population is being taken advantages of. This road will not benefit Kibera's

population since they don't have cars. Bryan Matisa states that this road will benefit the rich men, most precisely (ibid).

If Map Kibera Project had the intention of empowering citizens, helping them advocate for their rights, and protecting them from demolition and eviction, Musembi poses a legitimate question. Of what use are Kibera's citizens to this country, to their community, if their voices are still unheard, despite of all the available platforms there to help raise their concerns (example of Voice of Kibera, a citizen reporting project aiming to give collective global voice to Kibera residents by aggregating local citizen reports, Kibera community media and other relevant news and information, Voice of Kibera, 2020). It connects to what has been discussed about agency, and subjects of action. It seems like what trickles down from the case study is a superficial sense of agency promised and sold to the population. The project can be seen as suggesting this illusion, this assumption that mapping landmarks will be beneficial for the population and rebalance certain power relations, by advocating for their rights. Nelson (2011) adds that Kibera's citizens had been lead to believe that the project would enable them to hold their leaders accountable for state services. Overall, can this just mean readjusting all the actors' responsibilities and expectations? It questions the responsibility of the different actors here; the government, the community members, the project managers etc. Would it translate into the state or the project itself giving Kibera's dwellers the burden of the responsibility to map their territory, or else they would not obtain their desired outcomes?

Based on the analysis above, it can be argued that keeping something invisible can also be beneficial. As a matter of fact, this 'burden' that is attached to invisibility can perhaps be unpacked as positive. By remaining invisible, it allows for resistance, for more control and

power. As discussed above, if Kibera's citizens expose their whole community online, they can start to lose control as to whom can access this information and how will this data be used. Most precisely, mapping technologies can recreate dynamics of uneven power relations because by making visible the invisible, power is allocated to the ones that can now 'see' what was previously the hidden, invisible.

For that matter, the assumption that making visible the invisible is the solution to a lot of problems in Kibera lacks nuances. As argued above, putting information on a map, or rendering something visible does not necessarily help achieve a specific desired outcome. The question to ask here is to evaluate if exposing everything and making everything visible is worth it. Is it worth any consequences and any unintended outcomes?

This section will bring forward a counter idea to the common knowledge that if something is seen, it means it is given relevancy and is deemed more important.

The connection between the concepts of power/knowledge/visibility is strong. This section argues that it is through the ability of seeing and watching that power is created, gained and kept. By making the invisible visible, these mapping technologies are helping making more things noticeable; from vulnerable populations, to racism, to prejudices. Arguably, by applying this logic to the Map Kibera Project, it can show how it permits anyone, well intentioned or not, to use the data gathered by this mapping project. The data-collectors are gathering all the information, making it visible to the powerful (police men, government officials, NGOs…) who are seeing without being seen. Consequently, it makes sense to question wanted to be visible, but to what cost.

It is not to be forgotten that all the information collected by the inhabitants is made available online, for everyone to use and see. Some maps are also made available

physically. But by promoting this information, such as, which road to take in order to go safely to the latrine at night, what happens if some bad-intentioned people stumble upon the map? Swart (2017) stresses the dangers and anxieties that some women are experiencing when going to the latrines at night. Kibera is known for its lack of sanitation facilities, with only one toilet per 150 people, in some parts (Amnesty International, 2010; Davis 2006, in Swart, 2017). This lack of accessible toilets contributes to sexual violence because, like revealed by an Amnesty International report, women are targeted when walking long distances to reach the toilets at night. Swart (2017) adds on that this phenomenon increases the incidence or rape and gang rape for these vulnerable women. So, thanks to the mapping of these 'risky spots' women can alter their itinerary and change route in order to be safer. But how safe is it if, with mapping technologies, everyone can access this new shared knowledge? In short, by advertising which road is safer, women are losing their 'power of invisibility'. Aggressors can then become aware of the new paths used by these women. The Map Kibera project wants to make services, roads, schools, available for their own population, but it is clear that the access to this information is not only restricted for the use of Kibera citizens. It was shown that certain aggressors are part of the police and security personal of Kibera. These men, who are in positions of power and authority, are, at the same time, threats to women and girls of the informal settlement (Swart, 2017). As Foucault (1995) puts it, you need to have some power to look and consequently, being looked at can mean being vulnerable, exposing yourself to more risks, which is exactly what is happening to these vulnerable women and girls.

This brings on an extra layer of reporting to the Map Kibera project. The data-collectors are reporting information to be added to their maps, for a good and fair use of it, but at the

same time, other actors could use this information for their own advantages. The Map Kibera project does not publicize the fact that the information put forward by its citizens can be used for other reasons than the ones pushed forward by the project. The power of seeing, of scrutinizing, and of watching belongs to people who have power. The Kibera citizens, living in very precarious circumstances, are trying to monitor their community in order to push for better state implications and interventions. But, it can be understood that they are surveying themselves, mapping their surroundings, so the state can better monitor and govern Kibera, by using the gathered data if it decides, one day, to pay attention to this community. As explained by Dean (1999), a map, amongst other things in the field of visibility, is a way of visualizing fields to be governed. A map makes it "possible to 'picture' who and what is to be governed, how relations of authority and obedience are constituted in space, how different locales and agents are to be connected with one another, what problems are to be solved and what objectives are to be sought" (p. 30).

**The Fall of The Panopticon: A Critical Reinterpretation**

The example of the Panopticon can be used to demonstrate that it can be considered empowering to be unseen. Moreover, it will support the idea that by making visible the invisible, it implies some loss of power.

Browne (2015) cites Bentham, creator of the Panopticon, this 'seeing machine', and explains that "the unverified few could watch the many and the more constantly the persons to be inspected are under the eyes of the persons who should inspect them, the more perfectly will the purpose of the establishment have been attained" (p. 33). Foucault (1995) explains the Panopticon as this circular tower, this "machine for dissociating the see/being

seen dyad: [where] in the peripheric ring, one is totally seen, without ever seeing; in the central tower, one sees everything without ever being seen'' (p.200). Freedom is also obtained by not being seen, since some actions can be done without anyone knowing about it. In fact, it links back to the idea, developed above, that being visible is to fall into a trap (Foucault, 2000).

For example, these safer paths, developed by the Kibera's women in order to avoid being raped, should remain invisible in order to remain safe. By 'promoting' them on these maps, they are making themselves vulnerable again.

The interesting point here has more to do with this inverted Panopticon logic that can be applied to the Map Kibera Project. As explained by Browne (2015), some surveillance studies theorists have stated that this overreliance on the Panopticon makes the role of visibility overstated. Even though is it true that this analytical tool is useful to analyze how social control operates on certain bodies, and in certain spaces, she reports that some scholars think it is no longer useful, especially when thinking of surveillance within social media and cellphone usage. As a matter of fact, Boyne (2000) proposes a critique of the Panopticon concept saying that "post-Panoptical subjects reliably watch over themselves without need of the physical structure of the Panopticon" (p. 299). He also suggests that panopticism has been "transcended by the emergent practice of previsualization" (p.299) where simulation, profiling, and prevention occur, rather than only observation. He also proposes the reversal of the Panopticon polarity where people are now so afraid of not being watched and are being afraid that no one would care what they're up to. So, by living with this fear of going unnoticed, Gilliom and Monahan (2013) explain that Web 2.0 users, for example, "discipline themselves in a different way by divulging as much as possible

about their lives and thoughts" (p. 59). This desire to be watched, read or heard is fundamental and it drives societies to voluntarily disclosure and desensitizes them to outside scrutiny. Gilliom and Monahan (2013) explain that many people want so much to be seen and watched because this can help them be part of something. It creates this sentiment of community and can counter the fear of being socially excluded and left out.

As described above, Kibera's slum has been ignored and abandoned by the government. The lack of state intervention in the slum is flagrant, where its population needs to provide for itself, coming up with ingenious ways to respond to their basic needs. Kibera is extremely marginalized and tends to be ignored by its national officials. The blank spot that was on Google map representing the Kibera territory reflected well this reality. As stated above, the Map Kibera project started as wanted to make a map, but afterwards, it also became more the building of a community. As Mikel Maron explains it, "mapping is an important component in generating data, but then we saw a need to add a richer story context to that data" (technology for transparency network, 2010). They wanted to add legitimacy to the data, give it more relevancy. With the inverted Panopticon logic, the point here is not just to be visible, but to obtain pertinence and legitimacy in exposing everything, because of the fear that no one is watching, that no one is paying attention. Users of the Web 2.0 know they can be watched and observed by people who are not physically present, who are unknown to them, whose motives are unclear, diverse and changing (Gilliom and Monahan, 2013). The Map Kibera project promoted the making visible of the invisible in order to get the state's attention, but at what cost? It was argued above that making oneself visible can make one more vulnerable. By completely exposing Kibera in order to make the government more accountable for the basic services that are missing in the community,

the project managers did not know for a fact how would the government act upon this new map. How would they know if the government would really have answered the way they were expecting? It was developed above that some mapping projects have led to unintended negative outcomes, such as evictions, taxation from the state, electricity bills etc. State interventions do not necessarily translate into social benefits (Sanchez et al., 2013; Bunch et al., 2012; Graesholm, 2012).

Because Kibera is so hard to understand and to navigate for outsiders, the creation of a map can help make it legible, and thus more governable. It can yes, potentially, help its citizens to advocate for their rights and demands, but it can also mean that the state could decide otherwise, and not answer their needs, as explained above.

Perhaps the correlation between visibility and legitimacy is to be thought of here. It might be an incorrect association to think that if something is exposed and made visible it means it is relevant and legitimate. As explained by Gilliom and Monahan (2013), people perform in these online mediums in very symbolic ways. They want to stay connected and feel they're part of something even if the content they are putting forward is shallow or trivial. These users are seeking relevancy and approval through the content they are exposing online, not knowing who is really watching, but hoping someone will. The Map Kibera Project can interestingly be analyzed through this inverted Panopticon logic. The slum's residents were pushed and encouraged to expose themselves completely, wishing to get their government's attention, which reverts the original Panopticon logic. The apparent fear of going unnoticed is a driver and a motivation to map their community and catch their officials' attention. Perhaps the project should have started to seek legitimacy and discuss

what they were expecting from the state before making visible the invisible. By doing so, it can potentially help prevent the community from being a victim of negative outcomes.

Another issue that is linked to this inverted Panopticon logic is the question of audience. What if this fear of being ignored and not watched, of going unnoticed has been revealed to be true? It has been reported by Graesholm (2012) that only people outside Kibera and Kenya use services like Map Kibera and that it is not useful for the people living there. It has also been developed that the state is giving zero to little attention to Kibera's community and is mostly ignoring it. Mikel states that yes, the Map Kibera Project has a good relationship with the government but that their most direct contact has been through local government. He states that the project has not had as much contact on the national level, even though national officials are aware of what is going on (Technology for Transparency Network, 2010). So, if Kibera's residents and the Kenyan government are not using such mapping initiatives, who is- and why put together such a project if yes, the capacity was there to do so, but not the intrinsic need and appetite. Perhaps, by creating such maps it helps these territories become more legible and thus governable. Places like Kibera are, as was discussed, in the margins and represented as an unknown territory, hard to understand for outsiders. For that matter, these slums cannot easily be molded and structured. They lack *governability,* which would entail standardization and rationalization of their social and natural realities (Graesholm, 2012). Kibera is hard to navigate and understand if one does not live there. Not only can Kibera be seen as lacking governability, but also *legibility*. For Graesholm (2012), this refers to "the ability of a government to obtain and construct crucial information about subjects' social and natural environment in

order to exercise power" (p.220). Technological-enabled projects using ICTs can then become a good tool to obtain legibility of these uncharted territories.

## CONCLUSION

The Map Kibera Project, a promising mapping project who aimed to make visible the invisible was analyzed using a critical approach. As mentioned, the purpose and the value added of this paper was not to bring down the project, but to unpack it, using a Foucauldian framework allowing the audience to read in between the lines, and see past what can seem obvious. More often than not, development projects are not all black and white, all good or all bad. This is why problematizing them and studying them is important and useful in order to bring nuances and questions around these initiatives. That was the approach kept in mind throughout the elaboration of this research.

It was described above that the project has indeed accomplished certain of its objectives but has also been unable to prevent certain things from happening. For instance, demolitions are still taking place in Kibera, even after mapping landmarks. The initiative was mostly basing its approaches on assumptions to promote the effectiveness of mapping a community, for its development and its good functioning. Drawing from the proposed conceptual framework, it was possible to discuss and review these assumptions and argue that the relationships between the different actors involved in the Map Kibera Project were altered. It was raised that the mapping project, keeping in mind the conceptual framework, had an impact on individuals' conducts and more precisely on the idea of agency that one has about his or herself. Based on a neoliberal logic described above, the project needed the community's participation for it to be a success. The Map Kibera Project helped craft

a certain individual to partake in their initiative, a specific kind of subject. The creation of the entrepreneurial subject, who had a moral consciences that only him or her is responsible for their wellbeing. Drawing from this section, it was then discussed that by participating in this mapping initiative and by making everything visible, this was not necessarily effective and should not have necessarily be wished for. The demolition example was described to demonstrate that the government did not necessarily respond as expected by the slum's dwellers because their houses, churches, schools were mapped. Visibility and empowerment can be linked together too rapidly. When unpacking concepts of visibility and invisibility, the latter can actually be understood as being the most empowering one. Lastly, the third section touched more precisely on this dyad. It was argued that the ones who can 'see' have the power, and that to be seen implies a loss of power. The original idea of the Panopticon is briefly mentioned, but the relevant point in this section is the reverse logic of this surveillance technique that can be applied to the Map Kibera data collectors. It is a post-Panopticon logic, where the subjects instead of seeking invisibility, are, on the contrary, exposing themselves as much as they can. As explained above, Kibera's community has not been receiving very much government assistance, and to counter that, the mapping initiative has encouraged Kibera's dwellers to map their territory, assuming it would make the state more accountable. Overall, it made Kibera more legible for whom ever who would have interest in knowing more about this settlement. Navigating this maze is now doable, thanks to the help of these maps provided online.

Drawing from that last point, a possible question to deepen for further research could be linked to this idea of audience. Digging more into who is actually interested in such data could help unpacking the relevancy and the need for such mapping initiatives. As

mentioned above, some Kiberans expressed that the maps enabled by the Map Kibera Project were not used internally. This statement resonated with the need to question who actually does use these maps, and for what purposes. By bringing this reflection a bit further, questioning data interpretation itself could also be another interesting track to explore.

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