

BLURRING BOUNDARIES, RESHAPING TECHNOLOGIES, MERGING KNOW-HOWS: A REFLEXIVE APPROACH TO ICT4D IN DEVELOPING COUNTRIES

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Since the Millennium Development Goals first met digital media, initiatives harnessing ICTs to improve health services, empower civil society, enhance emergency response and increase the competitiveness of small producers have proliferated across the Global South. In particular, the widespread adoption of mobile telephony has been increasingly shaping aid policies and coalescing strategies of actors driven by diverse aims: Ngo's cultivating innovation for social change, businesspeople reaping profits at the bottom of the pyramid, activists seeking greater political accountability and governments (sometime) willing to concede it, but in their own terms. The emphasis on the transformational potential of the ICTs often conceals tensions arising from the encounter of different ways of knowing and of acting and from the emergence of new socio-technical arrangements in which deep-seated dichotomies are challenged: profit/no-profit; surveillance/sousveillance; civil society/uncivil society; formal economy/informal economy. Processes of appropriation and reshaping of technological innovations problematize linear views of technology transfer based on the North-South axis and call upon academics to elaborate new frameworks and methodologies to grasp the ongoing transformations.

The purpose of the panel was to promote a dialogue on the way ICTs are bridging and blurring the boundaries between opposed categories, on the expectations ICTs have spurred, and on the practices individuals and communities have already developed to make sense of the technologies that surround them. In doing so, it intended to bring to the fore approaches developed in different disciplines (from anthropology to economics, from cryptography to political science) and in different locations to understand how ICTs can be studied and understood both for the transformative potential, but without forgetting how old forms of power and domination learn to thrive in new scenarios and to appropriate new tools to support their agenda. Papers for the panel could include issues of design-implementation gaps; ICT between power and counterpower; technological gatekeeping in humanitarian spaces; controversial ICT driven social changes; hybridization of old and new technologies; changing forms of participation.

CHINA AND THE AFRICAN INTERNET: PERSPECTIVES FROM KENYA AND ETHIOPIA

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ABSTRACT

Through the lens of China in Africa, this paper explores the transformations in the relationship between the Internet and the state. China's economic success, impressive growth of Internet users and relative stability have quietly promoted an example of how the Internet can be deployed within the larger political and economic strategies of developing states, moving beyond the democratization paradigm promoted in the West. New evidence suggests that this model is becoming increasingly popular, but it is not clear why and how it is spreading.

Through a case study comparison of an emerging democracy, Kenya, and a semi-authoritarian country, Ethiopia, where China has recently increased its involvement in the communications sector, this paper investigates whether and how the ideas of state stability, development and community that characterize the strategies pursued by the Chinese government are influencing and legitimizing the development of a less open model of the Internet. It analyses how new ideas, technologies and norms integrate with existing ones and which factors influence their adoption or rejection. It is based on fieldwork conducted in Ethiopia and in Kenya between 2011 and 2013, where data was collected through mapping Internet related projects involving Chinese companies and authorities, analysing Internet policies and regulations, and interviewing officials in Ministries of Communication, media lawyers, Internet activists, and Chinese employed in the media and telecommunication sector in Kenya and Ethiopia.

Since the third Forum on China-Africa Cooperation (FOCAC), which took place in Beijing in 2006, the Chinese media have begun a steady march to get closer to Africa and to gain influence in its mediasphere. This process has displayed signs of continuity and discontinuity with China's previous attempts to influence ideas and perceptions on the continent. It has included both old and new communication technologies, and has developed through a mix of bold policy decisions as well as trials and errors.

The relocation of the Regional Editorial Office for Africa of the state controlled news agency Xinhua from Paris to Nairobi in 2006 represented the first symbolic step of this new strategy.¹ The same year, China Radio International also began to seek partnerships with national broadcasters in Africa to relay some of its content and make it more accessible to local audiences [3]. The expansion of traditional media has been followed by some unprecedented initiatives in the new media and telecommunication sector. In 2011, Xinhua launched what it labelled as the first "mobile newspaper" in Africa [20]. Developed in Kenya in partnership with Huawei, China's largest telecommunications and service company, and Safaricom, Kenya's leading mobile operator, it allowed mobile subscribers to receive news selected by Xinhua via Multimedia Messaging Service (MMS). The project was only partially successful and it was discontinued in 2012, but it signalled a willingness on the part of Chinese companies and media to experiment with new formats and find alternative ways to compete in an increasingly crowded "market for loyalties" [14]. Alongside these media initiatives, which have been aimed at reaching wider audiences in Africa through different channels, since 2006 the Chinese government and Chinese companies have also begun to play an increasingly important role in the continent's telecommunication sector, as symbolized by the multi-billion dollar loan from China's EXIM Bank to the Ethiopian government's Ethio-Telecom, the country's sole telecom operator, to increase access to the Internet and mobile phones, a project later undertaken by Chinese telecom giants ZTE and Huawei [8].

These initiatives present both signs of continuity and discontinuity with the past. China's diplomatic relations with Africa date back to the 1950s and have been characterized from the very beginning by the provision of aid and by attempts to communicate not just with elites but with African audiences at large [1] [2]. China's Prime Minister Chou En-lai first articulated China's strategy of engagement with Africa during his visit to the continent 1964, and, despite claims that today's China is transforming development practice in Africa, the modes of its engagement seems to have remained almost unchanged. As Chou's first two points indicate:

1. the Chinese Government always bases itself on the principle of equality and mutual benefit in providing

¹ Xinhua's correspondents had historically been China's eyes and ears on the continent, even before China had established embassies in Africa, but while Xinhua's had established numerous national bureaux (the first in Egypt in 1956), it had never had a regional office for Africa.

aid to other countries. It never regards such aid as a kind of unilateral alms but as something mutual and helpful to economic cooperation.

2. In providing aid to other countries, the Chinese Government strictly respects the sovereignty and independence of the recipient countries, and never attaches any conditions or asks for any privileges [9].

Together with the other six principles, which offer a more detailed indication of the financial instruments that China would employ when providing aid and of the lifestyle Chinese workers should adopt abroad, these continue to represent the pillars of China's engagement with the continent also in the new millennium [3].

Some important differences, however, do exist between China's past and present efforts in Africa. I focus on three here, which are particularly relevant for the media. The first is the disappearance of ideology from the language of China-Africa cooperation. In 1964, together with the eight principles regulating aid and cooperation highlighted above, Chou enunciated other five principles substantiating the type of political engagement China was concurrently seeking in the continent. The first principle declared that "China supports the Arab and African peoples in their struggle to oppose imperialism and old and new colonialism and to win and safeguard national independence" [9: 8]. China's efforts in Africa during de-colonization were closely linked to its efforts to export and strengthen the socialist revolution in the continent [2][19]. Today, these have largely been replaced by admissions of China's interest in Africa's resources and untapped potential. It is as if the deletion of the socialist cause as the goal of China-Africa engagement had promoted the principles of "mutual benefit" and "sovereignty and independence" to the rank of ideological guides of the new engagement.

A second major difference between China's earlier and current presence in Africa depends on the sheer scale of resources China is now able to deploy on the continent. While in the 1960s-1970s China had to partially disengage from Africa because of the damage the "great leap forward" and the "cultural revolution" were causing to its own economy [16], the 2000s-2010s belong to an era of plenty and Chinese actors, including Chinese media, have been able to invest and operate in spaces where others simply do not have the resources to act.

A final, closely connected, element characterizing contemporary China-Africa relations is the mix of interest and fear they are producing among traditional donor countries. While during the Cold-War China's presence in Africa was minimized by the competition between the USA and the USSR [2][16], today's China is acting as a game changer. In 2011, the then US Secretary of State Hillary Clinton in her visit to Tanzania made the USA's concerns clear about the possibilities of a "new colonialism" in Africa and a few months later, UK Prime Minister David Cameron's warned its audience in Lagos that new forms of "authoritarian capitalism" may take root in the continent. Similar concerns have been expressed also about the detrimental role China may have in the media sector in Africa, increasing authoritarianism and undermining Western efforts to promote openness and freedom of expression [4][11]. These concerns are largely based on the assumptions that, as Western countries have tried to promote their models in Africa, China will try to export its own. No studies to date, however, have proved this to be the case, and greater empirical evidence is needed to fully understand the nature, scope and implications of China's new role in the African mediasphere. This article aims at providing a contribution in this direction, adding to ongoing efforts to understand China's role in Africa in empirical rather than ideological terms that have characterized works in development studies and international relations (see for example [1][16]), but have so far had little application to the media.

PARTNER, PROTOTYPE OR PERSUADER?

China's increasing involvement in the media in Africa can represent a critical entry point to understand the broader political implications of China-Africa relationship. So far, however, similarly to what has been the case in other areas where China has stepped up its presence, there has been a tendency to frame its role in relation to what Western countries have done or are doing on the continent, rather than in its own terms. Hillary Clinton has warned Africans about risks of a "new colonialism", a concept that belongs to the history of Europe in Africa rather than of China, while David Cameron has spoken of "authoritarian capitalism", suggesting how China may be adding darker tones to ideas the West has tried to promote on the continent for decades.² In the case of the media, this tendency has been evident in the alarms raised about the possibility that China could act as a net exporter of authoritarianism [4], selling its own strategies of media development and media control abroad and countering the efforts of countries such as the US and the UK which, while stressing the role of the media in the democratization of Africa, have encouraged the adoption of aspects characterizing their own media models [14][15].

Elsewhere I have proposed a framework that can encourage understanding of Chinese engagement in the African mediasphere for its original contributions, and not simply as a negative of the impression left by the West [8]. This framework emerged as part of a collective effort among scholars from Africa, China and Europe who gathered in Oxford in 2010 to explore ways to approach the study of China's emerging role in the media in Africa, balancing out

² For Hillary Clinton's remarks see for example Flavia Krause-Jackson, 'Clinton Chastises China on Internet, African 'New Colonialism' <http://www.bloomberg.com/news/2011-06-11/clinton-chastises-china-on-internet-african-new-colonialism-.html>. And for David Cameron's see Jason Groves, 'Cameron warns Africans over the 'Chinese invasion' as they pour billions into continent' <http://www.dailymail.co.uk/news/article-2016677/Cameron-warns-Africans-Chinese-invasion-pour-billions-continent.html>. Last accessed 13 July.

different perspectives and building a shared research agenda. The framework was tested and further refined through fieldwork in Ghana, Kenya and Ethiopia.³ This framework breaks down China's actions on the continent according to China's ability to act as a *partner*, a *prototype*, and a *persuader*. These categories are meant to add greater nuance to the analysis of China's actions on the continent, questioning whether or not China's role as a partner sponsoring media and ICT projects on the continent is facilitating the diffusion of some aspects that characterise its domestic media system, rather than assuming this will be the case. They seek to de-ideologise the debate on Western versus Eastern developmental models, enabling research findings to show, for example, how the partnership between China and a given African country may enhance some aspects of the local media that fit within a Western liberal framework while they do not belong to China's media system. Finally, they allow research to highlight areas of collaboration between different development actors, where their relative strengths can enable common goals to be reached, but also common patterns of exploitation, where the interventions of different donors contribute to empower specific actors, such as government's, and disempower others. Each category is briefly described below.

China's role as a *partner* is apparent in the resources it provides to African countries to implement projects that are deemed important for social and economic development. China has provided substantial financial and technical inputs to the expansion of the ICT infrastructure in authoritarian regimes (as in the case of Ethiopia discussed below), but also in democratic countries such as Ghana, where its contribution of US\$ 180 million has helped realizing one of the most ambitious e-government projects in West Africa, reinforcing the ability of the central administration to communicate with the peripheries of the state and to provide more effective services to citizens [8]. China has similarly offered support to state broadcasters in selected countries: Kenya and Zambia are the most popular examples. Even if China has traditionally felt uncomfortable with the term 'donor', the activities it sponsors in this area are those usually funded by bilateral and multilateral donor agencies, and, in some cases, China has offered an alternative to traditional donors for African countries willing to develop projects in this area. But while the role of Western donors as partners has usually been conditional upon the acceptance of at least some of the elements characteristic of Western media systems, China has stressed its intention to maintain a separation between these two dimensions and its willingness to simply respond to the demands of its African partners. While this 'no strings attached' policy may be consistent, this does not mean that it is neutral or free of impact. For example, while Western donors have tended to favour media projects benefitting the private sector and the civil society, or projects creating incentives for the state to open a dialogue with other forces in society, China has displayed a tendency to privilege government actors, thus increasing governments' capacity vis-à-vis other critical components in the development of a media system. Within this dimension, assessing who benefits from China's increased role as a partner in the media sector becomes particularly important.

China is also increasingly perceived as a *prototype* by countries seeking to balance between investment in ICTs and containment of the risks of political instability new technologies may bring. In a Wikileaks cable reporting a meeting between Sebhat Nega, one of the Ethiopian government's ideologues, and the then US ambassador Donald Yamamoto, for example, Sebhat was reported to have openly declared his admiration for China and stressed that Ethiopia "needs the China model to inform the Ethiopian people".⁴ Some have called its mix of proactive and reactive measures aimed at facilitating a controlled expansion of the Internet while leaving the established power structure unchallenged, 'Chinese media model' [4]. China, however, has historically been reluctant to label its own as a model ready to be exported, preferring to refer to specific, but not necessarily cohesive, strategies it has adopted to face the problems it encountered throughout its own development. Some of these strategies may be copied and adapted by other countries but Chinese leaders and diplomats have tended to challenge the idea of China as an "active teacher", a term coined by Martha Finnemore (1993) [5] to describe international actors attempting to socialize other countries to new ideas and practices.

Finally, China's role in Africa can be assessed according to its modality and ability to act as a *persuader*, shaping opinions in ways that favour either its image abroad or a particular agenda it supports. This third dimension is in the realm of public diplomacy, which China has stepped up through expanding the reach and content of its international broadcasters, including China Central Television and China Radio International, and of its news agency, Xinhua. Furthermore, cultural diplomacy has grown through the continued establishment of Confucius institutes, and programs that offer scholarships for foreign students and journalists to study in China. Still within its role of persuader, China has concurrently pursued a strategy that has distinguished it from its Western competitors, maximising the symbolic value of some of the projects it sponsors in Africa, such as roads, theatres, libraries and hospitals, which can symbolize China's support to both literate and illiterate populations.

This paper adopts this framework to compare the influence of China on the development of telecommunications, and of the Internet more specifically, in two countries that have adopted very different approaches towards shaping their national information societies. One is Kenya, which is often referred to as Africa's information hub, because of its leading role in promoting local innovation, from mobile banking to crisis responses systems. The other is Ethiopia, the only country on the continent where Internet provision is still a state monopoly, whose government actively blocks opposition websites, but has also heavily invested in Information and Communication Technologies (ICTs) to improve service delivery, even in the most remote areas.

Since 2006, China has become an important player in both countries, at a diplomatic level, offering an alternative to

³ More information about the workshop's programme, participants and outcomes can be accessed at <http://pcmlp.socleg.ox.ac.uk/research/project/china-and-africa-media-policy>. Last accessed 10.09.2013.

⁴ Wikileaks cable: #09ADDISABABA149. Last accessed 13 July 2013.

traditional donors and allies, especially in moments of political crisis; and as new development actor, sponsoring projects that are deemed important by respective governments. This paper seeks to address some of the consequences China's renewed engagement is having on the development of the Internet and of national information societies in both countries. It first offers a brief overview of the development of the internet and of telecommunication in Kenya and in Ethiopia and then examines which impacts China has had on these countries' trajectories.

THE ETHIOPIAN INTERNET BEFORE CHINA

The development of the Internet in Ethiopia, while similar to the path taken by other authoritarian and semi-authoritarian regimes, has certain distinctive characteristics. Together with Djibouti, whose population is less than a million, Ethiopia is the only other country in Africa with a single, state controlled Internet Service Provider. As argued by Ethiopia's Minister of Information and Communication Technology when he was at the helm of Ethiopia's ICT Development Agency: "Monopoly is a crucial factor. It is exactly because ICTs are so important and they have the capacity to penetrate every aspect of our lives that we have to make sure that it is the state that is in charge of using and implementing them. In this phase we cannot leave it to the market. ICTs are too key for our development. They are a priority. Behind the decision of leaving the monopoly in the ICTs and telecommunication market there is big philosophical thinking. It is not just because we want to make money from the use of telecoms."⁵

The mix of commitment to using new technology and fear that the same technology could unsettle existing power structures is reflected in the government's massive efforts to use digital media in schools and government offices, and the neglect of providing reliable and affordable internet connections in the major towns, including the capital [6]. Ethiopia has historically had one of the lowest internet penetration rates in the world.⁶ Despite the very limited diffusion of the internet among Ethiopian citizens, in 2006 the government began to actively filter the websites of opposition groups and human rights organizations, specifically targeting those that gathered the voices of Ethiopians living abroad [13].

One reason for blocking these online spaces can be attributed to the composition of the Ethiopian diaspora and to the ability of the discourses it articulates to reach beyond the digital media. Similar to other national groups that migrated from the Horn, Ethiopians living abroad represent a large and powerful force that have historically been involved in wars and politics back home [12].

But, in sharp contrast to the cases of Kenya, Eritrea and Somaliland, the great majority of politically-minded Ethiopians in the diaspora have opposed the political agenda of the incumbent government led by the Ethiopian People's Revolutionary Democratic Front (EPRDF). Many posts hosted in online spaces such as Nazret.com or Ethiopianreview.com, two popular websites blocked in Ethiopia, aim at the very core of the EPRDF national project, refusing to recognize the current government as either legitimate or as the expression of the people's will. It is not uncommon to find a blog post labelling the prime minister as "crime minister" or describing the government as a dictatorship led by an ethnic minority. On the other hand, pro-government websites have responded by accusing opponents of chauvinism and of encouraging tensions within multi-ethnic Ethiopia similar to those that led to the Rwandan genocide in 1994 [7].

This vehemence and polarization are not exclusive to online spaces and are evident in the long history of engagement — or lack of engagement — between the EPRDF on one hand, and other political forces in Ethiopia and the diaspora on the other. Since coming to power the EPRDF has chosen not to negotiate with its adversaries, preferring to expand its influence and presence on the ground by delivering progress rather than enlarging its base by incorporating new forces and perspectives. This strategy has been applied to both old and new media. After coming to power, in response to internal and external pressures, the EPRDF allowed for unprecedented levels of freedom of expression, but they did not develop a strategy for reconciling or negotiating with the forces that were defeated or marginalized [7].

As a result, journalists who were fired from the Ministry of Information and sympathized with those opposed to the EPRDF were given the opportunity to set up independent newspapers and use them as platforms for criticizing the government. The decision of the EPRDF to ignore these voices, or attack them without engaging with their arguments, exacerbated the polarization over time. A few years later, when the first websites were created for an Ethiopian audience, the EPRDF took a similar approach and largely ignored them.

The divide between pro- and anti-government forces has widened over time, having consequences in the aftermath of the elections in 2005 when the EPRDF reacted to its substantial electoral losses by imprisoning opponents and firing on demonstrators. Prominent journalists were arrested, their papers closed, and, the following year, blogs were also blocked to silence all alternative voices. As a result, both old and new media in Ethiopia now carry pro-government information or criticism that can be easily managed by the ruling elite and does not challenge its fundamental political goals of retaining power and reinforcing its vision of ethnic federalism.

⁵ Interview: Debretsion Gebre Michael, Ministry of Communication and Information Technology, Addis Ababa, Ethiopia, 10 June 2008.

⁶ In 2000 Ethiopia had an internet penetration of 0,02%, which grew to only 1,48% in 2012. Source ITU http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2013/Individuals_Internet_2000-2012.xls. Last accessed 13 July 2013.

KENYA BEFORE CHINA

The history of the Internet in Kenya cannot be more different. Kenya has been one of the first countries in Africa to liberalize telecommunications and to develop a strategy that, while offering limited privileges to the former incumbent telecom (Telecom Kenya) such as the monopoly to operate the Internet gateway and backbone until 2004, allowed different companies to immediately enter the market, driving down prices and expanding access. As a result Kenya has now one of the most competitive Internet sectors in East Africa, with national and international companies offering both mobile and landline services. As of 2012 Safaricom had 69% of the Internet market, Aritel 14%, Orange 9% and Essar 8%. Of these subscriptions, 99% were through mobile [17].

The Kenyan government has also taken an innovative approach towards involving a variety of actors, from private companies to civil society organizations, in shaping the national internet. Kenya was the first country in Africa to create a national Internet Governance Forum after the creation of a Global Internet Governance Forum in 2007. Other initiatives, such as Vision 2030 which was set up to define the priorities for Kenya's development and has placed significant emphasis on the role ICT can play in national growth, included consultative processes that could allow a variety of actors to contribute shaping the future of the nation. As a result, the evolution of the Kenyan internet has been characterized by the inclusion of different interests at different stages, with the state acting both as a facilitator and as a driver of innovation.

ETHIOPIA AFTER CHINA

After the elections in 2005, which were considered the most democratic and contested in the country, but also led to violence and a crackdown on oppositional forces contesting the results, the Ethiopian government became the object of increased criticism from the International Community, especially from Western donors, and started looking more insistently at China for support. This led to an increasing number of agreements between the two countries and the telecommunication sector emerged as one of the most important to realize the EPRDF's goal to promote economic growth and maintaining control over the country. At an ideational level, China's ability to balance control of information and dramatic growth of Internet users started to be looked at as a model and source of legitimation for the restrictive practices the Ethiopian government had started employing in the aftermath of the elections. The conception of the information society that has progressively emerged in China appeared more in line with the EPRDF's ambition to make Ethiopia a developmental state that could pursue sustained growth and stability. But China has not supported Ethiopia only ideationally and indirectly. It has also offered technical and financial means to support the government's strategy. In the second half of the 2000s, as privatized telecommunication markets were booming in most of Africa providing cheaper and increasingly reliable access to mobile phones and the Internet, Ethiopia faced the challenge of having to balance between its decision to retain monopoly over telecommunication and the inability of expanding access without opening to competition. The EPRDF's stubbornness could not last for long, unless a new partner could provide enough resources to introduce a dramatic increase in access and quality of service in a regime of monopoly. China obliged by offering the largest loan in the history of telecommunication in Africa: 1.9\$ billion to overhaul Ethiopia's telecommunication system, expanding mobile service and Internet connectivity while keeping Ethio-Telecom as the only player in the market.⁷ Some of these resources also went to upgrading the infrastructure on which the e-government projects were based, allowing a system that many had considered unsustainable to become an even stronger component of the government communication strategy towards the periphery.

The role China had in Ethiopia was of paramount importance. Without China's support in extending the infrastructure and expanding the plan the EPRDF had devised, the government of Ethiopia would have been either forced to change its course and liberalize, or to condemn the country to suffer from lack of connectivity to the Internet and mobile communication on which many countries on the continent have been relying to support both economic growth and state operation.

KENYA AFTER CHINA

Given the different context in which the Internet developed in Kenya, the role China came to play was significantly different from Ethiopia, but also presented some elements of similarity. As in Ethiopia, China has been deeply involved in the extension of internet connectivity in different capacities. First, through telecom companies Huawei and ZTE.

Together with French company Sagem, they participated in the first National Optic Fibre Backbone Infrastructure (NOFBI) expansion, bringing fibre optic to the main urban centres and allowing a first series of e-government projects to be delivered regionally.⁸ The country was split into three sections namely Western Kenya, Coast and North Eastern, and

⁷ See Zhao Lili, 'Contributing to the Development of Ethiopia with Wisdom and Strength' http://www.zte.com.cn/endata/magazine/zte technologies/2009year/no6/articles/200906/t20090612_172517.html. Last accessed 13 July 2013.

⁸ See, for example, Okuttah Mark, 'Telkom Kenya set to run fibre network on behalf of government' <http://www.businessdailyafrica.com/Corporate-News/Telkom-Kenya-set-to-run-fibre-network-on-behalf-of-government/-/539550/929626/-/m96mry/-/index.html>. Last accessed 13 July 2013.

Central — each region handled by one company. Sagem has laid out cables in Coast and North Eastern, Huawei in Nairobi and Central, and ZTE in Western Kenya. Also investors such as internet service providers (ISPs) and telecommunication operators have benefited as NOFBI lowered the cost of entry to business. A second round of NOFBI (known as NOFBI II) was directly funded with Chinese resources. In 2012 China's EXIM Bank provided a \$71 million loan to support further extension to 36 administrative district centres across the country, with the objective of allowing also people in remote areas to access faster internet. A condition for the loan was that the implementing agency had to be Huawei, which is now in charge of the realization of the project.⁹ As in Ethiopia, the Chinese government and Chinese companies have thus supported the expansions of government led initiatives aimed at extending Internet connectivity and improving e-government services. In the Kenyan case, however, Chinese support has fitted in a much wider context, where a plurality of actors have been competing to offer better services at lower prices. For example, soon after the signing of the agreement for NOFBI II, Kenya's leading telecom operator, Safaricom, decided to invest additional \$95 million to build an additional 2,400 kilometre fibre optic cable to support its growing customer base. Interestingly, a large share of the contract has been assigned on a commercial basis to Huawei, which had already worked in collaboration with Safaricom to roll out the 4G network at a cost of \$143 million. A remaining share of Safaricom's expansion project was assigned to Ericsson.¹⁰

As it had been the case in Ethiopia, after Kenya's highly contested and violent elections, that took place in 2007 and led to numerous deaths and displacements and to condemnation from the international community, the relationship between the Kenyan government and the Chinese government increased both in quantity and in quality. This is mostly connected to the Chinese policy of providing aid and engaging in agreements without any strings attached. Therefore, as relations with governments such as the US and the UK reached a low point in the aftermath of the elections and later with the indictment of the two presidential candidates Uhuru Kenyatta and William Ruto by the International Criminal Court in relation to the alleged role they played in the incidents of 2007-08, China managed to keep a low profile, stressing its faith in the legitimacy of Kenyan institutions.

CONCLUSION: GLOBAL AND NATIONAL RHETORIC OF THE INTERNET

Both in the case of the Kenyan and of Ethiopian governments, the violence that followed their respective elections was employed as a reason to stress the potentially disruptive role that technology, including the Internet, could play in increasing divisiveness and harm peace. While in the case of Ethiopia this discourse had been used for a long time to justify state monopoly, Kenya, a country that had heavily invested in the idea of an open internet, woke up to a new reality and progressively developed a new discourse framing peace as the overarching goal each Kenyan, from media houses to bloggers to telecom operators, should give priority to in shaping the country's future. As one interviewer put it, "Kenya has been slowly sliding from democracy to a peaceocracy". This rhetoric was employed to justify for example the censoring of thousands of SMS considered harmful and inciting ethnic hatred or to ask media houses to downplay cases of ethnic violence still happening in the country.¹¹ In both the Ethiopian and the Kenyan case, however, it was not just incumbent governments, but also Western donors that stressed the importance of creating mechanisms that could lead to peaceful elections and prevent outbursts of violence. With regard to the media the idea that progressively emerged was that of a harmonious information space, where people could still be allowed to be critical and comment negatively on political actors, but could not incur in actions possibly leading to forms of mobilization considered harmful by public authorities. The idea of the internet that progressively emerged was not different from the one offered by the detailed study of the Chinese internet carried out by King, Pan, and Roberts (2012) [10], which showed how it was mostly posts leading to the organization of protests that were removed, rather than those attacking the government for misconduct, for example for corruption. And this idea progressively emerged and gained momentum without the Chinese government or Chinese companies engaging in any notable activity to support this particular model abroad. From the interviews carried out with Ethiopian and Kenyan members of the government, civil servants, but also with members of the civil society and private entrepreneurs in 2012 and 2013, none of them referred to Chinese authorities as trying to suggest that their model could be productively applied to the Ethiopian and Kenyan cases.

The conclusions are still highly tentative, but it seems that some of the strategies adopted by the Chinese government in China to control and contain the national internet are gaining popularity in both countries, despite no attempts from the side of China to promote them abroad. It can be argued that China's appeal as a *prototype* has increased, without its government necessarily having to engage in activities to *persuade* its African counterparts. In a

⁹ See, for example, Margaret Wahito, 'Kenya: China to Fund Kenya's Fibre Optic Project' <http://allafrica.com/stories/201206290024.html>. Last accessed 13 July 2013.

¹⁰ See, for example, Okuttah Mark, 'Safaricom loosens China's grip on local contracts with Sh14bn tender' <http://www.businessdailyafrica.com/Corporate-News/Safaricom-loosens-China-grip-on-local-contracts/-/539550/1638364/-/11xotu6z/-/index.html>. Last accessed 13 July 2013.

¹¹ See, for example, Lillian Onyango, 'PS now names blogs over hate messages' <http://mobile.nation.co.ke/News/PS-now-names-blogs-over-hate-messages/-/1290/1662804/-/format/xhtml/-/hk21w0/-/index.html>; Fred Mukinda, 'Phone firms block 300,000 hate texts daily, says Ndemo' <http://mobile.nation.co.ke/News/Phone-firms-block-300-000-hate-texts-daily-says-Ndemo/-/1290/1726172/-/format/xhtml/-/2e787c/-/index.html>; Njoroge Kaburo and Peter Mutai, 'Kenya decries use of social to spread hate speech' http://news.xinhuanet.com/english/africa/2013-03/15/c_132236743.htm Last accessed 13 July 2013.

climate where local actors, such as the Ethiopian and the Kenyan government, and in the case of Kenya also the local media, private operators, and international organizations, created a political context privileging peace and development over allowing a plurality of voices to compete in the marketplace of ideas, China had simply to act as a *partner*, offering unconditional help to governments, to put forward a concept of harmony that it supports. While there was satisfaction that the Kenyan elections were conducted peacefully, as peacefully were the elections that took place earlier in Ethiopia in 2010, privileging peace also meant downplaying critical voices, such as those of civil society organizations, lamenting that grave misconducts and violations of human rights had been marginalized in the name of a peaceful development that could benefit both countries.

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MAPPING MAP KIBERA: WHAT IS BEHIND THE MAP?

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ABSTRACT

The general purpose of this paper is to problematize the idea of map as a visual representation of a given territory. In fact, it is based on the assumption that what we see on a map is the outcome of an exploratory process that hides several social dynamics like political power, popular belief or traditions. This research is the result of three meetings with a group of mappers of Map Kibera Trust, a no profit organization based in Kibera slum. Mapping a particular territory like a slum requires indeed a good understanding of what are the steps, roads, secure and insecure places that allow people to easily perform the job. Moving along an informal settlement is quite complicated due to narrow streets interspersed with rivers carrying waste and contaminated water, but also to insecure places, especially as we penetrate into the slum. For this reason, all the mappers of the Map Kibera project live, or used to live, in Kibera.

The implications are significant in understanding the set of social, spatial and human values that connect people with their own space, going over the use of an ICT like an open source mapping software. What makes possible the realization of the map is not the technological tool itself, but the people who have the appropriate tool and use it in their own ground. And speaking about people who map a slum means to speak about relations between people themselves and between people and their networks. With this paper, there is a desire to find out what are the links between beneficiaries of the project and territory, territory and binding agents that led to the creation of the map, work that otherwise could be impossible or not leading to the same result. Simultaneously, a reflection about the sustainability of this project will be provided, as well as the efficacy and the effective participation in GIS activities like OSM related to the contest of Nairobi slums.

INTRODUCTION

This research inquiries into the creation of a participatory maps achieved by the young mappers of a non-profit organization based in Kibera: Map Kibera. Before Map Kibera's work, the slum was a black spot on the map and this mapping project was initiated in response to the lack of available public and open map data of the zone. The general idea is that behind the creation of a map, in the particular locations like the informal settlements, what allow to work and to create a map is the power of the human and social networks. This hypothesis was confirmed by following and observing the mapping processes of this group, conducting interviews and focus groups that gave me the instrument to analyze the concept of participatory mapping in a slum.

With my research I intend to make a contribution to the broader theme of ICT4D, reflecting on how the use of a technology increasingly underpins a series of links and social values that go well beyond the technological innovation itself.

Before to analyze the fieldwork, I need to define the framework that allowed me to place the facts I have observed on the ground. The analysis of the mapping process of Map Kibera can fit with the Actor-Network Theory (ANT), that focuses on the mechanisms of power and the concept of knowledge as they emerge from the interactions between human beings and artifacts [1]. Power is intended as the product of the interactions among elements of heterogeneous networks. Heterogeneous is the key term that drew my attention as it refers to the participation of different materials: human and no-human, people and machine. In ANT, there is no point in differentiating between the elements of a network because the relevance rests on the relations among the actors rather than in their nature. ANT is a theoretical approach that help re-conceptualize many of the issues behind the dilemmas of development theories and practices, highlighting "how people's actions and interactions are part of what stabilizes objects, processes, texts, and ideas to become things" [2]. ANT scholars claim that this theoretical perspective is particularly useful to analyze "situations where interactions of the social, technological and political are regarded as particularly important" [3].

Thanks to this theory, it is possible to overcome the distinction human/machine and thus consider social and technical networks as a continuum, bridging the networks of institutions, organizations and individuals which constitute Kibera's civil society and the technical networks revolving around participatory mapping processes. The actors implicated in development projects like citizens, community based organization (CBOs), local and international NGOs and institutions are powerful and affect the success of the same actions. However, even among the development professionals who act participatory approaches continue to face problems and this raises important challenges concerning the role that an actor holds in its community, obfuscating sometime the voice of marginalized groups

and the weak they are meant to serve [4].

What is behind a map built in a slum? What are the relationships between locals? What kind of influence the stakeholders have in Kibera community and its activities? I argue that what makes possible the creation of a map in a place like an informal settlement is the connection between the mappers and the social agents, redefining the bonds of power that affect the social activity in the community of Kibera.

THE PARTICIPATORY AND OPEN SOURCE MAPPING SOFTWARE: OPEN STREET MAP

Map Kibera was launched in response to the lack of available map data and other public, open, and shared information about Kibera, the second largest slum in Africa. Its mission is to increase the potential impact of the map data, making the final products available for the entire Kibera and Kenya community.

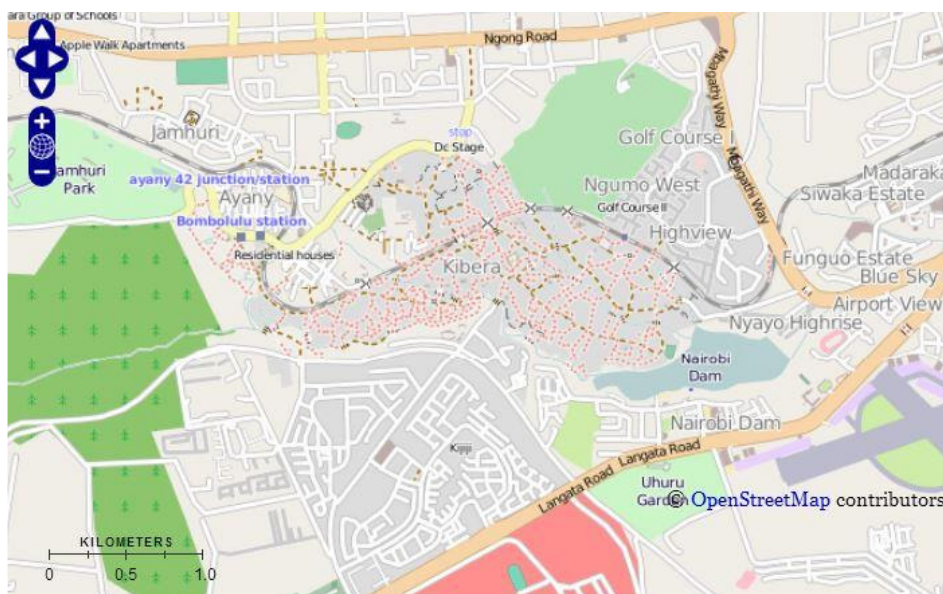
For the creation of the maps was chosen an open source GPS, Open Street Map, that allowed them to begin to focus on the mapping process in more detail in four areas, health, security, education, and, thanks to an UNICEF partnership, to undertake an issue-based mapping with a focus on mapping girls' security [5].

Created by Steve Coast in the UK in 2004, OSM was inspired by the success of Wikipedia and preponderance of proprietary map data in the UK and elsewhere [6] and provides free geographic data such as street maps to anyone who wants them, inviting people to view, contribute and use the map in collaborative and creative ways.

As Yu-ei Lin says:

“whereas the complexities of the world have long been simplified and reduced to a known geometric scale in their maps by professional cartographers, the advent of OpenStreetMap has transparentised and democratized cartography; non-cartographers are now provided with an opportunity to participate in the map-making process”. [7]

Fig. 1 - Map Kibera's map created by using Open Street Map.



Participatory GIS is, therefore, an attempt to utilize GIS technology in the context of the needs and capabilities of communities that will be involved with development program in the production of GIS data and spatial decision making, involving local people by integrating participatory mapping information, capturing local knowledge and combining it with more traditional spatial information. [8]

KIBERA: THE LARGEST INFORMAL SETTLEMENT OF NAIROBI

Kibera is the second Africa's largest, densest and poorest slum (the first is Soweto, South Africa) and the population depends on the source (one other estimation varies from 235,000 to a maximum of 270,000 people [9]) and on the period of the year. [10]

The exact number of people who live in this settlement was never been discovered, due to the constant displacement of people and the indifference of the government to a place considered informal.

Kibera is located at 7 km from the center of Nairobi and is at the core of the Kibra constituency. It extends on 256 hectares, with a population density of more than 2,000 people per hectare [11], and it is bisected by the railway to

Uganda. According to the figures available, only 17% of the adult population is permanently employed [12]; the rest are casual workers and migrants, mainly employed in Nairobi's industrial area. The official definition for Kibera is 'informal settlement', although the area has been occupied since 1912.

Nowadays, it is formed by 14 villages, mainly divided along ethnic lines. Almost all Kenyan tribes are represented in Kibera but Luos are the main ethnic group. The topography undulates with two heavily polluted streams running through the settlement and forming corresponding valleys; the railway line along its northern perimeter, the abandoned dam to its southern edge and infrastructure on its eastern side further add differentiating parameters to the fabric of a highly complex settlement.

The entire territory of Kibera is government property and, by a complicated set economic, political and social factors, who hold a right to occupation of the land often lack economic resources, generating interests of a circulation of capital linked to numerous rented properties.

Humanitarian NGOs are often one of the very few actors operating in these conditions of disadvantaged and, despite the lack of almost all public services, Kibera is a big recipient of international aid. Every international agency funds initiatives and projects in the slum, starting with UN-Habitat, the United Nations' body for human settlements, which is located, ironically enough, few kilometers away from one of biggest informal settlement in the world. There are an estimate 100 NGOs and over 400 Community based organizations (CBO's) in the slum, engaged in wide range of activities such as providing HIV information and advocacy, empowering groups of women and training kids and teenagers. These CBO's include also self-help groups, mainly women organizations which keep a fund and loan small amounts of money to members in need.

MAP KIBERA

Before the organization's idea, a research project led by an Italian researcher, Stefano Marras, was called with the same name, but the projects are two different entities, also if their intentions are really similar.

'Map Kibera project' was launched in May 2008 and was aimed to take a **census of the structures, infrastructures and population** of the entire shantytown, but the pilot project has focused just on the village of Kianda, situated on the northwestern end of the slum. [13]

'Map Kibera' was a project of GroundTruth Initiative and started in October 2009 with a small grant from Jumpstart International, a non-governmental organization specializing in community-based mapping, and the grant was meant to facilitate the creation of the **first public, digital map of Kibera**, through the training of the local youth in the use of GPS and open source GIS tools.

In November 2009, local young people motivated to work for Kibera community learned to create maps using OpenStreetMap techniques. Kibera was not actually unmapped but the problem was that none of the existing maps were shared with the public or used by Kibera's residents [14]. So, thanks to the Nairobi tech scene and some American start up help, the young Kibera volunteers created a group of mapper included surveying with GPS, digitization of satellite imagery and paper based annotation with Walking Papers. Map Kibera Trust is a project of Erica Hagen and Mikel Maron and the current executive director is Kepha Ngito. They worked in partnership with local and international organizations like Social Development Network (SODNET), Carolina for Kibera, an international NGO based in Kibera that seeks to promote leadership, women's empowerment and community development, and the Kibera Community Development Agenda (KCODA), a community media organization that publishes the Kibera Journal, the only local newspaper.

In 2010 Map Kibera became a Trust and the founders established two additional projects aiming to create an interactive community information platform. The first was Voice of Kibera (Vok), an SMS reporting project that uses the Ushahidi platform to enable residents to text in reports on events happening in Kibera. The reports are approved by an editorial team and integrated on the website with the digital map of Kibera. The second project that was introduced in this period was the Kibera News Network (KNN), a video journalism initiative where videographers create short documentaries and news stories about Kibera that are published on their YouTube channel.

Ushahidi is a non-profit software company that develops free and open-source software for information collection, visualization, and interactive mapping. Ushahidi (Swahili for "testimony" or "witness") was created in the aftermath of Kenya's disputed 2007 presidential elections to collect reports of violence reported by email and text message, placing them on a map.

The platform is built to collect information from the general public and citizen about events happening in near real-time. It is also, assisting areas that are not well covered in the mainstream media; for this reason it has been named crowdmap. The main concept of the crowdmap is crowdsourcing for social activism and public accountability, empowering citizen journalism activities in different part of the world. [15]

The reports can be submitted by using a mobile phones or internet and many countries from all over the world have benefit of the Ushahidi crowdmap for several emergency projects: Russian bloggers to co-ordinate a relief effort, Haiti to identify natural disaster locations and others in Chile, Pakistan, Congo, Philippines, Peru etc.. [16]

In 2013 Map Kibera Trust is integrating the use of different ICTs and tools to improve his work and to better interact with the slum communities, as the monitoring election project during the March presidential elections or a current project concerning accountability and transparency of community funds.

Map Kibera Trust works for the community and with the community, thanks to a participative approach used by the team in every project lead in the slums where the organization works: Kibera, Mathare and Mukuru. [17]

THE RESEARCH

Mapping a particular territory like a slum requires a good understanding of what are the steps, roads, secure and insecure places that allow people to easily perform the job. The implications are significant in understanding the set of social, spatial and human values that connect the mappers with their own space, going over the use of an ICT like mapping software. The methodology and approach used in this research are focus groups and interviews, carried out to discuss and identify those elements that led to the creation of the map using an open source technology. With this research, there is a desire to find out what are the links between people, territory and binding agents that led to the creation of the map, work that otherwise could be impossible or not leading to the same result.

According to Erica Hagen, in the implementation of the project:

“Equally important was the fact that the mapping experience validated the knowledge that participants already held: their intimate knowledge of the paths, businesses, and social relations of their own neighborhood. Now they were regarded as holders of important information rather than poorly educated slum dwellers”. [18]

As I explained in the introduction, the framework that supports my analysis is the conception of the social relations power and the role of the local actors in influencing development projects in a territory. In this case, the development program is a participatory mapping project and the actors are those groups and community leaders identified by the mapper team during the meetings and interviews. The focus groups were divided in three parts and were aimed to:

- Get the general understanding of the mapping process in a slum
- Know the implication of the mapping process in to the community and discover the background of the mappers
- Draft a map of the slum to underline the networks and relationship between them and the slum spots

First meeting with the mappers

The main purpose of this meeting was to get the general understanding of the mapping process.

There were submitted some general questions about the mapping phases and the interaction between the mappers and the community stakeholders, but the conversation was really free and people easily interacted and exchanged opinions. By analyzing observations and notes, I identified eight processes.

The main question was: “how do the mapping process works?”

1. Finding the point of interests for the entire community

First, they start to identify and understand the needs of the people living in a particular area of the slum and the final choice depends on several aspects that I deepen later.

2. Getting in touch with the community stakeholders

Secondly, after they have decided the point of interests, the mappers try to contact the community stakeholders using their personal contacts.

Then, they meet the stakeholders to discuss about their findings to proceed later to work with the stakeholders belonging to the matter they are considering. They need to meet stakeholders to get the permission to map a particular area, to take picture, to collect information from them and to share ideas about the needs of that place.

But my question was: “who are the stakeholders?” They really mention those actors but it was not clear who they are and what they do in Kibera community. During the meetings, we were able to identify a number of actors in Kibera, including:

- local administrators
- opinion leaders
- village elders
- service providers (the professional in different fields like water, education –like teachers, garbage etc....)
- religious institutions

Another goal of this focus group was to understand how the mappers get in touch with those stakeholders and they explained that it depends on the type of actor with whom they were dealing with.

If they want to interact with some public administration people, they just walk to the offices to explain the mapping

project, in order to get the permission to work and ask the institutions to provide the mappers security. With the other stakeholders, they use the mobile phones to contact them and to arrange a meeting.

The mobile phone is the most used technology between the organizations in Kibera. Many time internet connection does not work and most of these groups do not have a website or a social platform so that the mobile device becomes essential.

3. *Organizing general stakeholder meetings*

After the previous stage, they arrange meetings involving different stakeholders of the area they want to map to reflect and to compare the people needs. Sometime both the mappers and the local actor require several meetings before to agree about the problems concerning the mapping process.

4. *Participatory mapping: involving the community in the process*

During the meetings with stakeholders they look for some volunteer from the area they want to map, sharing their ideas and analysis with the Kibera actors and engaging young people with a strong motivation to learn and to support community development. Further, they select just people from the zone they want to map and people who know well the place and the number of people they involve depend on how the area is big. Then, after they have nominated a volunteer's coordinator, the mappers train the volunteer team, giving them technical skills to map.

5. *Editing data in the office*

In this step, the mapping team try to find out what kind of data they want to collect brainstorming together, creating a "data collection form", that is a paper to submit to the organization/CBOs/institutions to collect information about them. They speak about logistic issues like the money they need to buy lunch, airtime, printing, gum boot etc...Then, they check if every device is working well: GPS, software and internet connection.

6. *The practical work: to the field*

Once they have spoken with stakeholders and people from the slum they go to the field with GPS, notebook, cameras and the "data collection form", in order to register every structure they map and the people who work in these places. After being asked how long it takes to map an area they answer that it depends on how depth and specific should be their job and the size of the area to be mapped.

If the mappers did not have the questionnaire and the camera, it can take just three weeks, like the time they spent to map their first Kibera general map. When they started to use the questionnaire and the camera to take pictures of the place and create thematic maps, they spent three months to complete their work.

So, the time they take to map an area depends on the size of the area and on the tools that they want to use during the mapping process (if they take pictures or not, if they bring the questionnaire – the "data collection form"- or not).

7. *The sharing process: sharing the results with the community*

They organize a Community Forum, where they compare their work with the community opinions changing, if necessary, the map structure. Maybe they forget to map something and the stakeholder give them new inputs to add into the map . After that, the final map can be printed and distributed among the institutions, NGOs and CBOs offices and around the stakeholders like schools, churches and youth centers.

8. *Using the maps for a common interest*

According with our interviews and visits to the CBOs and Kibera organizations places, most of them have the map hanging on their office wall and they say that they use the map to locate and recognize other points of interest, otherwise impossible without a map. Further, the map undertake the role of identification with the community and therefore with the slum itself. As the mapper coordinator, Millicent, says, "is also a special way for the community and the people who visit the office to locate their house and their workplace into the map. They feel happy and excited".

Mapping a particular place like a slum with an high number of difficulties involves some challenges for the people who ride through the narrow streets of the shantytown, like Map Kibera mappers. By asking them "What kind of challenges you face in doing your job?", they identified two main areas where they sometime encounter a problem.

In the field

The mappers admitted that, at the beginning of their activity, many people did not trust them, especially in the health sector, where the employees that should have a specialization to work, did not have it; "they see the mappers like a spy", a mapper says. One other challenge is that in some not really safe areas they have to hide the GPS while they work, also if they can recognize "tricky people, thief or dangerous situations", one other mapper says, "and to map Kibera we have to be from Kibera".

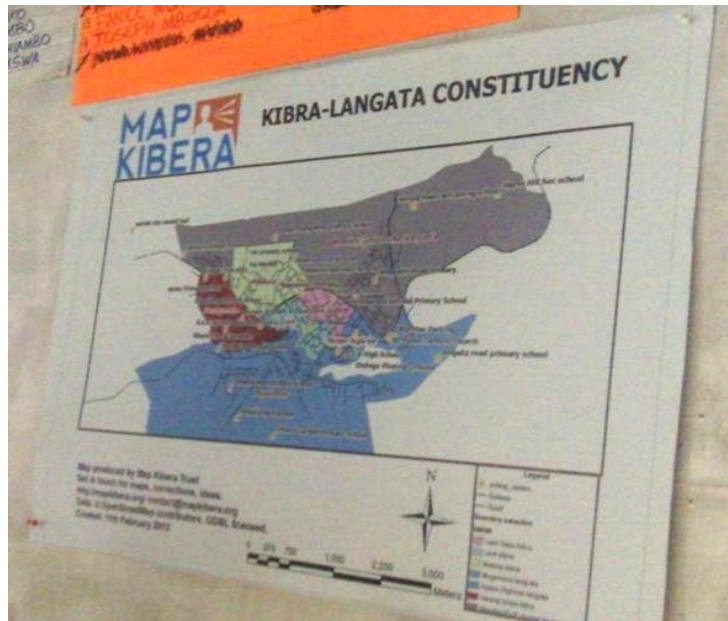
In using the equipment

Occasionally there are problems related to the weather conditions that can impede the mapper to bring the GPS to the field and sometime, in narrow and covered passages , can lacks the connection between the GPS and the satellite.

Second meeting with the mappers

The second meeting was aimed to focus on the mapper background and relationship with Kibera community and institutions. To learn more about those connections, I gave them a notebook for each and a pen and explained the exercise. They were told to write down every important connection they have in the slum as a community person and as a Map Kibera mappers. For example, the typology of link of a person living in a given territory (like the church environment, village elders, water vendors etc...) could be different from the personal links and contacts achieved in the work field. This meeting was used to collect data for the next stage and to make the mapper understand about the importance of their network in the slum area, a net of relationship that allows them to perform their job.

Fig. 2 - Map Kibera political map hanging on Langata District Peace Committee wall in Kibera.



Third meeting with the mappers

The final meeting was the last step of our focus groups and included the principal activity: the construction of a social relations map. First, they were told to copy what they previously wrote in the notebook in some stickers, divided for the two categories of social relations: people, stakeholders and institutions they know as a citizen of a slum and as a mapper. Then, the post-it were hanged on the wall and discussed all together, identifying the sectors and categories of stakeholders from a collective analysis.

Fig. 3 - A mapper hanging their social relationship stickers on the wall.



The categories found – each one identified with a different colour - were six and reproduced both the personal and professional relationships that the mappers have in Kibera slum:

- church
- CBOs
- NGOs
- school
- administrations
- health facilities

Fig. 4 - Some actor categories identified during the meeting.



Using the same colors the participants drew a map on a transparent sheet, tracing the profile of the Map Kibera paper map and allocating in the same map, one by one, structures and places forming part of the categories identified earlier and connected with the life of everyone.



Fig. 5 - The mappers drawing their personal relationships on Kibera map.

The final result is a map of social networks and personal relationships in the slum community, from the school to the health center, from the administrative institutions to the no profit organizations that work for the public interest.



Fig. 6 - The final map representing the mapper social relations in Kibera community.

CONCLUSION

Having a perfect knowledge of the zone to map is a necessary prerequisite for every person who want to do this job in Kibera and, I guess, in every informal settlement of the world. A key aspect of this case study is that all mappers who have mapped Kibera live, or used to live, in Kibera, revealing how being a resident of the slum was a basic prerequisite in facilitating the mapping process. In Map Kibera case behind the use of the ICTs and technology, there are a range of relationships between people, places, workplaces and institutions that are fundamental to maintaining confidence among the community and implement participatory mapping activities. Churches, CBOs, NGOs, schools, administrations and health facilities are the finding results of a learning process that allowed the realizations of these three meetings, reconstructing together what are the key steps of their mapping processes and the typology of relationship they have in Kibera community. Doing so, it has been possible to understand the main characters that represent the most influencing actors for Kibera citizens, denoting how there is a hidden power that affect social relations and also projects or actions involving the whole community of the slum.

This paper is the result of three days focus groups and the short time spent did not allow me to get to the bottom of many other important issues and in-depth analysis. My work aims to provide food for thought for a wider research that addresses the social role and power of certain realities inside the slum of Kibera and in any existing informal settlement. Who are the most influential stakeholders in the slums? What tribe and which political party they belong to? What relationships have with other local actors and with the same slum community?

Moreover, the representation of space is always a sensitive issue because of the different perceptions that a population can have of its own territory, which may not coincide with what should be circumscribed by a system of PGIS [19].

Is the knowledge of indigenous constructed through a “Western way” to do cartography and participatory mapping

processes or can a system like OSM be regarded as a suitable means of self-representation? The use of GPS in developing countries and, in this case, in a slum, is often externally driven and technocrats, despite seeking to make these technologies more and more inclusive, leave some outstanding issues that sometimes do not allow projects to get a positive result. As Rambaldi et. Al. argue, some important questions that should be addressed are:

“Who’s GIS is it? Whose questions are addressed? Who’s set the agenda? What will happen when experts leave or when donor funding dries up? What is left with those who generated the data and shared their knowledge?”. [20]

In order to make an ICT4D project succeed and pass to what Heek called ICT4D 2.0 [21] phase, a participation of beneficiaries in the design and construction phase of the project is required, as well as a construction of skills and capacity at the local and institutional level and a continuous learning phase. Despite Map Kibera activities have been led with a bottom up approach and the maps produced have been used by many Kibera organizations and seen as reference point for the slum inhabitants, mapping activities are concluded because of lack of funds and its efficacy and sustainability is compromised.

Furthermore the current availability of spatial data and the large choice of open source software and user interfaces could increase the gap between those who have the ability to access these tools and who is excluded, especially in a fragmented environment like that of Nairobi, where town and slums are two independent and non-communicating entities living in the same space.

These and other questions can be the beginning of a new research and reflection on the social dynamics embedded in a slums, which, according to Mike Davis, “are growing at twice the speed of the continent’s exploding cities” [22].

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NOMENCLATURE

ATN	Actor Network Theory
CBO	Community based organizations
GIS	Geographic information system
ICT4D	Innovation Communication Technologies for Development
NGOs	Non-governmental organizations
OSM	Open Street Map
PGIS	Participatory GIS

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M.U.S.I.C. - MEDITERRANEAN URBAN SOUNDS INTERACTIVE CULTURE

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ABSTRACT

Citizens are now able to produce cultural localized knowledge; ICT technologies can integrate data-sharing platforms into the spatial dynamics of cities. This can promote a sustainable enhancement of local communities through cooperative activities setting culture as growth-driver. The M.U.S.I.C. (Mediterranean Urban Sounds Interactive Culture) project promoted by the University of Tunis and Politecnico di Milano-DASStU (International Cooperation Lab and Measures and Scales of the Contemporary City Lab) aims at reinforcing the awareness of a shared regional culture in the Southern Mediterranean Region. The project gives structure to the relation among digital media as catalyst tools and urban regeneration as spatial rooting device, setting an innovative exportable cooperative strategy. The action plan applies sounds analysis to geo-localized user-generated content to extract patterns of perception of urban and rural spaces. A visualization platform archives and diffuses these data, working for synergies between formal and informal economies. The project helps to improve the responsiveness of urban systems to the cultural requests of citizens and customers. It reinforces the need of new professional figures and more structured relations among them. The digital platform, as engine of spatial regeneration for built heritage, fosters economies of scale determining a spatial rooting in specific urban or rural spaces suitable to host permanent or temporary, profitable or non-profit activities. The gathering of actors around specific nodes will transform them in Mediterranean antennas transmitting the sound of places for a cultural and economical exchange among people and countries. The economical balance is reached through an equilibrated management of profit and no-profit initiatives setting relations among stakeholders at various scales. A cultural sustainability framework could make the music industry able to sustain local emerging realities and to promote education.

M.U.S.I.C. (Mediterranean Urban Sounds Interactive Culture) is a project promoted by the University of Tunis and Politecnico di Milano-DASStU (International Cooperation Lab and Measures and Scales of the Contemporary City Lab) with the aim of reinforcing the awareness of a shared regional culture in the Southern Mediterranean Region. In the South Mediterranean countries the national analysis allowed us to identify some specific problems valuable at Regional level in the field of cultural economies: lack of structures offered by institutions and city administrations for cultural activities; lack of interest by the investors to enhance cultural spaces and activities; insufficient awareness of the value of local heritage; difficult relationship between the cultural institutions and single artists; people and local communities are not involved in documenting living heritage; the documentation of cultural heritage (tangible and intangible) is not spread by social network and new media; the relationship between tangible and intangible heritage is not well developed. The aim of the project is to contribute to solve these problems stimulating the local population to keep a direct role in finding right solutions and supporting the local and national authorities to improve their support to the creative and cultural field. In each country the situation is very different and in this framework all the actions implemented by the EU, Unesco, World bank give a real contribution to move different southern countries towards similar solutions. The international crisis and the specific situation of many Arab countries push the Governments to other directions considering culture as a privilege for few people. What is relevant is that the civil society growing its capacity to address the political decision and young generation are very interested in saving their heritage, in sharing their culture, and in creating job opportunities in their own country. The project will not refer to some specific governmental plan but it is strongly linked with a social plan produced every day by the civil society. The role of the Universities is fundamental to involve the students as well the intellectual people in this process. The M.U.S.I.C. project is an instrument to improve the application of two Unesco Conventions: the Convention on the Protection and Promotion of the Diversity of Cultural Expressions (2005) and the Convention for the Safeguarding of Intangible Cultural Heritage (2003). The project is also linked to the "Medina 2030" programme implemented by FEMIP, Unesco and Arab Town Organization and with the following projects: Athena (Euromed heritage IV) closed in 2012 and lead by the Department of Antiquities of Jordan. It concerns the Ancient Theatres in the Mediterranean and proposed innovative methodologies to produce management plan for the theatres and their clusters involving local communities; DOREMIHE (Enpi Italie – Tunisie), actually under negotiation, a project to create a common doctorate in the field of cultural heritage with the University of Palermo. Another link could be created with the Unesco Chair (Intangible Heritage) managed by Evora University and already involving Tunisia, Morocco, Egypt Palestine and Italy.

WEB 2.0 OPPORTUNITIES AND INTANGIBLE CULTURAL HERITAGES

The background of the project is the growing production and availability of cultural information with geo-references, generated by non professional web users and supported by technologies generally known as Web 2.0 [1][2]. Citizens are now capable to produce cultural localized knowledge and to contribute through local engagement and by the use of new, widely diffused technologies such as mobile phones [3] to sensing and monitoring aspects of the urban environment. Hence, ICT technologies can be deployed to integrate data-sharing platforms into the spatial dynamics of the city. As Mitchell noted, the spaces and places of twenty-first century cities provide contexts for communication serving not only to shelter and protect their inhabitants, but also to ground and sustain meaningful interaction among them, and to construct community. Emerging critical practices have proposed new models to describe the city that stress the collaborative, constructionist dynamics of the mapping processes. The underlying idea of this approach considers the geographic, urban experience through a network of multiple, fragmented and temporary data and information generated by human-place interactions and collaborative dynamics. Based on these theoretical premises, several experimental GIS focusing on cartography emerging from users' perceptions and activities have been produced. As Zook and Graham noticed [4], traditional methods used to register users' perceptions and activities about the cities and its fruition - like surveys and ethnographic reports - seem to be inadequate to meet the need of information of contemporary society both because they require a considerable amount of resources (in terms of time and money) and because they do not consider the temporal dimension.

Web 2.0 applications, the growth of online mapping tools and the development of networks of "sensors" capable of recording and geo-reference a variety of signals can transform human beings in potential "sensors" that not only have the intellectual ability to process and interpret what they "feel" but also to geo-localise the information (sometimes involuntarily) and spread it globally through the Internet. The combination of these factors produce and disseminate an immense amount of geographical information which can be: voluntary/conscious and involuntary/unconscious. The first type stems from web mapping activities, while the second type is generated by digital footprints left by web users in the cyberspace without being aware they are producing geographic information.

This user generated information, termed Volunteered Geographic Information (VGI; a controversial definition), differs from conventionally produced geographic information in several aspects: the source of the information, the technologies for acquiring it, the methods and techniques for working with it and the social processes that mediate its creation and impact. Traditionally geographic information has been produced by experts and institutions: so certain types of information have been privileged and other types ignored or marginalized [5]. VGI represents a powerful shift in sources, content, characteristics, modes of data production, mining, sharing, dissemination and use. This approach could support transfer of knowledge, exchange of expertise and best practices among cultural actors, support the structuring and strengthening of professional cultural associations and networks.

Can geo-tagged and user generated content be useful in the creation of meaningful, real time indicators of urban quality related to the cultural heritage? Is it possible to plot the very many and co-existing perceptions in cities and neighbourhoods, relying on User Generated Content? What kind of GIS-based spatial analysis techniques can be applied to geodata to produce real-time maps of citizens' cultural perceptions, sentiments and emotions related to them? How does an urban semantic layer - the meanings we attach to places - look like? How can this data be validated, in order to verify if they are significant and accurate proxies of common perceptions toward city spaces? How can user-generated information be applied to the design, implementation and evaluation of urban policies and spatial design and planning related to the cultural heritage? How can well-being and happiness related to the cultural issues be defined and observed from user generated content? And what use can we make of ubiquitously connected things and sensor data of various kinds towards the aims of the stakeholders? And how can we design such infrastructures to support human communication and cultural meaning-making?

Besides UGCs that are explicitly spatial and can be easily geo-localized, as long as they are made available through on-line mapping platforms, produced through GPS-integrated (mobile) devices, are geo-tagged or can be geo-referenced by using IP addresses, there is an enormous amount of web content that is merely textual and that is not possible to geolocalize directly. Moreover, the recognition of the geographical origin of contents, does not guarantee that they are actually referring to the places where they are produced, nor that they include information which is relevant for the purpose of the project. In order to overcome those limitations and to extract relevant and appropriate information, it's possible to apply entity recognition (NER) methods to assign geographical scopes, through automatic GeoReferencing, including GeoParsing (or GeoExtraction) and GeoCoding processes. Analysing geo-localized contents to explore emotional indicators and topics will result in a number of dynamic maps on perceived urban quality, using visual representation to enhance the detection of patterns, reducing the search for information and enabling perceptual inference operations. That fact produces huge audiences for cultural productions at local and regional levels and increases and represents a stronger incentive for possible investors.

M.U.S.I.C. focuses on the possibility to constantly extract quantitative and qualitative indications on how places and cities are perceived by inhabitants and city users. End users would be able to count on information which is relevant for their cultural purposes. The project aims at reinforcing the awareness of a shared regional culture and setting synergies between formal and informal cultural dynamics. This can be envisioned giving structure to the relation among digital media as catalyst tools and urban regeneration as spatial rooting device. M.U.S.I.C. aims at providing multi-dimensional and vivid experiences of physical space throughout the music and sound related to different times of city

inhabitants, tourists and visitors as well as a sophisticated and specialized data base for experts. Within this framework, the project aims at providing a wide range of stakeholders (which includes urban managers and public administrations as well as citizens) with meaningful cultural inquiry information about the city environment they live or work in. Starting from the historical physical manufacture and passing through instruments and sounds, the project focuses on the contextualization of cultural heritages within the so called “Intelligent Expert System of Digitalization”. So that, after a data mining through independent and flexible media, it will be possible to know if some archives already exist, or to create them. Through natural language and network analyses, the project will identify a cultural behavioural and semantic background for the entire city, related to the sound, rhythms, music of a place, making it possible to extract and depict specific patterns of subjective perception and use. This will allow the cultural economical energetic sustainability of the conservation through a project related with the music as a propeller for a cultural awareness.

FOSTERING CULTURAL AWARENESS TO ENHANCE CULTURAL POLICIES AND ECONOMIES

The project will develop a strategy to archive cultural data, - sounds music and rhythms in particular - extracted from different sources, such as independent social networks, web platforms, mainstream media, specific information by population, which will be delivered to Public Administrations involved, to implement through these a cultural awareness. The envisioned action plan applies sounds and places analysis to spatial and geo-localized user-generated content in order to extract patterns of perception of city and rural spaces. With the project’s focus on the operational level of the city the aim is to constantly extract indications on city cultural uses related to the sound of places. In particular the project platform will allow end-users to analyze users’ perceptions related to specific geographic areas, detect the lack of structures related to the culture offered by institutions and city administrations, discover possible emergent structures and bottom-up initiatives responding to uncovered needs and desire, discover meaningful relationships and connections between places, people and cultural uses. The data display and diffusion will be provided through a visualization engine, helpful to understand how the cultural heritage is perceived within a city and how it can be managed. The visualization engine, will provide both geographic and non-geographic features.

Geographic visualizations will be the main access point to information, showing the intensities and qualities of the captured data under the form of graphical layers which are stackable onto the map, allowing for comparative visualizations across times, information sources, themes and other parameters. Maps will be completely navigable and filterable, allowing Municipalities to visualize only the information they want to focus on, including the other data sources which will be provided in the platform, as gathered from databases coming from institutional, verified sources. The non-geographical visualizations will show classical statistical and analytical information about the data contained in the system and its subsets, including distributions, correlations, indexes and dissemination across time and subjects. Specific visualizations will provide insights on the interpretation of the harvested information, expressing it under the form of semantic graphs directly obtained by the processes which will use semantic classification techniques. From this set of visualizations users will be able to focus on specific subsets of data, and then visualize them geographically. All data and visualizations will be exportable using internationally recognized open formats, allowing for easy integration to other databases and documentation forms.

The project will also develop meaningful ways to represent spatial cultural heritage and sounds for an immediate reading, understanding and interpretation of the information to convey and to archive. Many practices rely on the act of ‘mapping’ the world in order to make decisions; in the case of Urban Design, mapping is an integral part of the design process. Maps are used to support and argue for specific design and development decisions even though they are often built from limited sources of data or even from the perspective of a single person (thereby greatly increasing the subjectivity of the artefact).

Geo-spatial data (the visualization of real-time feeds of data on maps), with regard to the resulting cultural heritage indicators and sounds, will be a central point: particular effort will be put in developing an effective representation and sound system, that will allow the user flexibility and the possibility to highlight data related to specific issues, with the aim of providing an easy to use tool for designers, cultural operators and decision makers. Unlike traditional maps, which are often static representations of distributed phenomena at a given moment in time, M.U.S.I.C. will provide tools for grasping the moving picture of citizens expressions, as they are constantly changing and evolving with the city itself. The result will be a map/archive of the geo localized territory sounds and cultural places.

Building a notion of time into computer-generated maps would definitely help urban planners, cultural operators and designers to present a more dynamic notion of what places and experiences in cities are and are fundamental to create an awareness of cultural identity. The graphic user interface will be specifically designed to meet final users' needs, and specifically to make complex data effectively accessible, easily searchable in a visual and “hearable” way, through a visual and sound language that will allow the users to intuitively catch a temporal understanding of people, places and sounds in the city.

The tool we wish to develop would help the whole range of cultural operators, stakeholders involved in decision-making processes that result in planning activities, in urban design, in the definition of urban policies related to the cultural heritage. It would be a monitoring tool, offering information interpreted and mapped in real-time to the cultural elements of the city and its citizens, deploying de facto a cybernetic feedback loop between them. It would be helpful in understanding how the cultural heritage is perceived within a city, but it could also give hints to central and local public

administrations who are willing to adopt a more human-centred approach toward our cities' transformations.

The awareness of the presence of renovated cultural opportunities related to the sound and music in the Mediterranean area, will reinforce the need of new professional figures as cultural private and public administrators, curators, and producers. Festivals and informal performing occasions in the north Africa context do not produce durable skills for cultural operators neither for Arab artists mobility. The relations between cultural operators, decision makers and citizens have to be enhanced in a more structured way. Only acting constantly, cultural operators will better influence their political, administrative and economic environment. The project platform will work as a catalyst in setting synergies between formal and informal cultural economies. Under a regional management setting the general framework, local stakeholders and cultural associations will operate as curators able to coordinate activities at the local and inter-regional scale of the network and to work on the formal-informal interactions. The possibility of finding meaningful ways to inquire citizens' patterns of use, cultural spatial experiences and related perceptions of the urban environment brings in fact many important promises to the fields of urban design, planning and management.

MAPPING SOUNDS, SPATIAL ROOTING AND URBAN REGENERATION

In every city, there are areas with strong character and identity. It's clear to everyone where and what a historical centre is, how to define an urban park or a hilly countryside. But how can we define and how people name areas in transition? For example the terrain vague of areas that used to be rural, areas of suburban fragmentation, areas characterized by enclosed technological infrastructures that often disappear from the mental representations the inhabitants build to navigate and communicate their environment. We think that sounds identify cultural places historical and not, which can define the identity of a place.

A domain where VGI (Volunteer Geographic Information) has been demonstrated to have considerable potential is in the identification and description of so-called vernacular place names – that is to say the often unofficial place names that people use in their everyday life, whose borders do not coincide with administrative regions. For example, Jones et al. (2008) investigated the use of web mining to identify place names associated with vernacular names and thus derive a “shared” idea of the definition of large vernacular regions such as Switzerland's Mittelland or the Midlands in the UK. Hollenstein and Purves explored how place names were used in Flickr, in particular with respect to the naming of city centre neighbourhoods. Edwardes and Purves [6] looked at the use of so-called basic levels, that is to say terms commonly used to describe place, in Geograph, a large collection of volunteered georeferenced images, and demonstrated that similar results could not be obtained from previous empirical studies, thus demonstrating that VGI has the potential to be used as an alternative means of gaining knowledge of shared concepts of space. We think that sound rhythms and music of a place could be a red line to define a new trans national space along the Mediterranean area.

Is it possible that cultural heritage makes people talk about an area? How many different cultural activities make people talk about an area? Is the sound theme possible in a district? How do cultural heritage awareness change over time (on a daily, weekly, monthly and yearly base)? What are the public's perception of a few central elements often associated with “good” cultural environment and thus increasing the liveability of a city: how accountable is its government (fiscally as well as in transparency); what is its accountability to the public in terms of this perceived performance which presume citizen interest. Thus different components of “access” and participation are key in stimulating both the elicited perceptions of liveability as well as prioritization of citizens in order to better target and special design and policy related to cultural issues and sounds, which satisfies their criteria for a “liveable” city. This could be done with an initial scoping or “digital emersion” phase where the research team identifies the appropriate mechanisms, places and ways to build relationships based on their sounds mapped, through networks of social hubs and focal points where further participation could be elicited. These links should be traced in order to see where a social change agent (or blocker) has been identified through an expression of values of what liveability in certain geographic areas means and what is needed as expressed by the inhabitants within the community, as issues, alternatives, and their position on the current status of the liveability.

Through the application of sentiment analysis techniques, a method first developed for businesses aiming to market their products, within the textual analysis of UGC, it will be possible to identify generic sentiments from citizens toward cities, specific neighbourhoods within cities or single urban infrastructures, landscape and urban projects. Sentiment analysis will allow to extract information about, on the one hand, users' judgement and evaluation, classified according to their polarity (positive, negative, or neutral) and, on the other hand, about the affective/emotional state of the writing author, e.g. happiness, fear, etc. While there is extensive research about sentiment analysis per se, and a growing interest for applying sentiment analysis to UGC and social networks (see Golder S.A. et al. in Science 333, 2011), the application of sentiment analysis to spatial and environment data has not been experimented yet. The integration of sentiment analysis, UGC, and spatial analysis techniques, can provide relevant information about urban perceptions and emotions through space, that would be otherwise impossible to obtain, to map and to visualize.

The Project platform would benefit from the explicit possibility to highlight emerging trends in how people declare their desires, wishes and visions on the city relating to cultural heritage, describing the possibility to identify opportunities for business, new models, new possibilities to create collaborations, groups, policies and infrastructures.

There are a lot of different software solutions already used for urban planning. The main issue is that they rely on

static data coming from governmental or manually surveyed data sets, or on data coming from users which are already aware of the possibility of contributing information using digital tools and networks. The use of a dynamic flow of social data is a huge advancement over this current practice as described in the following sections.

The Project assumption is that by conducting an analysis of data sets based on data extracted from UGC (User Generated Content) there is the possibility to recognize multiple stories, as they emerge, overlap and influence each other, unfolding from city users' mental representations and spatial experiences of city spaces.

Through the awareness derived from this knowledge the digital platform could empower public administrations, private stakeholders and citizens to foster economies of scale for the cultural sector that could determine a spatial rooting of the platform in specific urban or rural spaces suitable to host permanent or temporary, profitable or non-profit activities linked with the themes of the project. According to this dynamic the digital media initiatives can become engine of spatial regeneration. Urban or built heritage in need of regeneration could take advantage from the settlement of stakeholders from the cultural sectors. The economical balance can be reached through an equilibrated management of profit and no-profit initiatives mixing stakeholders at various scales, sponsors, investors, NGOs, producers, artists, beginners, amateurs. A cultural sustainability framework can make the music industry sustain the local emerging realities and promoting education.

CONCLUSION

M.U.S.I.C. aims at reinforcing the awareness of a shared regional culture and setting synergies between formal and informal dynamics to foster cultural economies. This means increasing audiences and access to markets and raising the interest for investment; fostering administrative skills to better influence their political and economical environment; creating new cultural and creative small and medium enterprises; enhancing cooperation synergies among public and private stakeholders and citizens. We can resume the main actions of the project in the following list:

- a harvesting engine that collects real-time cultural data streams from geolocalized UGC streams;
- a web interface that will allow users to perform specific searches within pre-defined domains (e.g. show all the content related to 'places' within the domain of 'a kind of music');
- a visualizing engine that will generate dynamic infoaesthetic representations on top of standard Google Maps visualizations;
- a mutually interactive set of sounds visualizations which allow operators to move between different analytical approaches, leveraging the benefits of each of them toward the creation of valuable interpretations of the expressions and behaviours of users in social networks;
- combination of user profiles information and geospatial data to generate several levels of analysis based on selected target groups (residents, tourists, age groups, ...) ensuring inclusion of minor groups;
- an approach focusing on the support of multilingualism at different levels;
- an urban monitoring tool to set policies and planning initiatives;
- an urban regeneration strategy to root the intangible aspects of the project into specific places in need of economical investments for regeneration.

The gathering of actors around specific nodes will transform them in Mediterranean antennas amplifying and transmitting the sound of places to the region and the world promoting cultural and economical exchange among scales and countries. The project proposes a global, regional, cross-countries expandable approach. The digital platform could become exchange tool among countries and populations, setting the basis for the strengthening of common identity, but also for the fostering of contamination and dialogue, protecting differences and minorities. The digital dimension allow a widespread access to the cultural contents from the countries involved, but effectively from everywhere, opening an unprecedented showcase to the cultural products of this part of the world.

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