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Exploring Geospatial Data Issues from the Global Souths Perspective. Approaches, Sources and Methodologies

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Exploring geospatial data issues from the Global Souths perspective. Approaches, sources and methodologies

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Introduction

The objects of this contribution are, broadly speaking, geospatial data and analyses, whether or not they are overtly geographic information, whether they have public or private origins, whether they are freely accessible – potentially anywhere and by anyone – or subject to various kinds of restrictions. Rather, of great relevance is the value attributed to such information by the different subjects (natural or legal, formal or informal, institutional or non-institutional) that collect, produce, validate, analyse, interpret, disseminate and use it. Equally important is obviously the cultural and geographical context, with its variables and peculiarities, within which geospatial data and analyses are originated and spread, just as their potential recipients, with their different competences and aspirations, are fundamental.

The reflection on geospatial data and analyses adopts here a point of view necessarily medi-

This contribution is the outcome of a joint effort by the four authors. However, F. Curci (francesco.curci@polimi.it) took primary responsibility for the introduction and wrote sections «Data and Global Souths, between capitalism imperatives and research Purposes», «Institutional geoportals and Open Data», and with S. Saloriani (stefano.saloriani@polimi.it) he wrote section «Photo-cartographic mosaics and assembled maps and datasets»; A. Frigerio (alessandro.frigerio@polimi.it) took primary responsibility for section «Volunteered Geographic Information (VGI) and Counter-Mapping» in collaboration with F. Manfredini (fabio.manfredini@polimi.it), who wrote section «Media & telecommunication data».

ated by the constructs and systems that characterize the countries of the Global North, but with a particular focus on those research activities that investigate the Global South environments and spaces. This means to put forward some clarifications about the way in which we approach, on a global scale, the controversial potentialities of urban and territorial data. The purpose to increase awareness about the multifaceted world of urban data moves from an overview of notional and terminological «realignment» even before being strictly methodological. In this sense, our contribution intends to provide stimuli and clues on how to navigate the vast and varied world of geospatial data.

The first section provides some considerations of general and theoretical nature, while the remainder is devoted to more practical examples about different «families» of data that could be useful to explore when carrying on different urban research activities. This classification, which cannot be exhaustive, is fundamentally based on the types of sources, scales, formats and work environments. Each paragraph tries to roughly return definitions, actors involved in the processes of innovation and application, methods of functioning, aims and possible recipients.

Data and Global Souths, between capitalism imperatives and research purposes

To begin with, we need to spend a few words on the different meanings the concept of *data* assumes depending on the geopolitical and sociocultural contexts to which it refers, and also and above all with respect to the economic and technological revolutions that occurred during the last decades. The starting point is to recognize in a broad sense that there is a profound link between the modern concept of *data* and the rationalism inherent in the scientific method – but also in modern capitalism – as theorized by Max Weber. As is known, both the scientific and the industrial revolutions took place in Europe, and even mediaeval proto-capitalism took shape in this precise geographical and cultural context. Both science and capitalism are therefore originally Western inventions. It is not a coin-

cidence that the first examples of geospatial data and analysis were developed in the heart of neo-industrial Europe thanks to positivist, scientific (and bourgeois) impulses present at the time in some important capital cities such as Paris and London. We expressly think of the pioneering maps by Charles Piquet and John Snow developed to study the cholera epidemies in Paris and London, but also of the subsequent London's poverty maps by Charles Booth[1].

Leaving aside the relationship between data and science, we reflect here more on the relationship between data and capitalism. This is because the same concept of the «South of the World» is strongly linked in a Weberian sense to this long-running phenomenon. Therefore, if it is true that the South of the World is the geopolitical and socio-cultural space in which modern capitalism has not yet become the only or prevalent mode of satisfying daily needs[2], it becomes fundamental to understand how diffusion and extensive use of data – even when dealing with experiences of anti-capitalist and/or de-colonialist *data activism* – are directly or indirectly connected to the way capitalism reproduces itself, expands its influence and impacts on contemporary spaces and societies.

To address these considerations, one cannot ignore the specifics of the current phase that capitalism is going through, i.e. *digital capitalism*[3] or *platform capitalism*[4]. According to some scholars working in the field of so-called

[1] C. Picquet, *Map Representing Cholera Outbreak across 48 Districts of Paris*, 1832, available online at https://www.crouchrarebooks.com/books/view/picquet-charles-and-chateuneuf-louis-francois-benoiston-de-rapport-sur-la-m; J. Snow, *Map Showing the Clusters of Cholera Cases in the London Epidemy*, 1854, available online at http://www.ph.ucla.edu/epi/snow.html; C. Booth, *Inquiry into Life and Labour in London*, 1886-1903, available in: Charles Booth's London Poverty maps and police notebooks (https://booth.lse.ac.uk/).

[2] M. Weber, *Wirtschaftsgeschichte. Abris der universalen Sozial und Wirtschaftsgeschichte*, ed. it. *Storia economica. Linee di una storia universale dell'economia e della società*, Roma, Donzelli, 1923/1997, pp. 195 ss.

[3] D. Schiller, *Digital Capitalism*, Cambridge, UK, MIT Press, 1999; C. Fuchs, *Capitalism or Information Society? The Fundamental Question of the Present Structure of Society*, in «European Journal of Social Theory», vol. 16, n. 4, 2013, pp. 413-434, available online at DOI:10.1177/1368431012461432.

[4] N. Srnicek, *Platform Capitalism*, Cambridge, Polity Press, 2017.

«critical data studies», «when we map Big Data, we map the contours of capital»[5]. This poses obvious problems relating to the growth of inequalities at all scales, since «a great variety of "software-sorting techniques" is now being widely applied in efforts to try to separate privileged and marginalized groups and places across a wide range of sectors and domains»[6]. It is interesting to note that according to these critical approaches the current differences in production, diffusion and access to data (in particular «big data», but not only) are not exclusively a consequence of the intrinsic structural differences between advanced contexts and backward contexts (such as the digital divide issue), but more likely they are also the sign of the absence of specific *profit imperatives* and market strategies[7]. Therefore, «digital exclusion confirms capitalism's selective interest in creating markets and exploiting labour [since], just like previous forms of capitalism, digital capitalism selectively targets publics while completely ignoring others»[8]. Studies that relate *dataification*[9] and *data justice* are increasingly numerous and in some cases they place a strong emphasis on cities of the Global South and their specificities to investigate above all the risks for urban populations that are already marginalized (especially those living in informal areas) and that risk being further marginalized and under-represented[10]. According to some scholars, the intrinsic power of knowledge structures and information flows have exacerbated existing divides and debased the Global South specific knowledge[11]. Milan and Treré argue

[5] C.M. Dalton, L. Taylor and J. Thatcher, *Critical Data Studies: A Dialog on Data and Space*, in «Big Data & Society», 2016, p. 6, available online at https://doi.org/10.1177/2053951716648346.

[6] S. Graham, *Software-sorted Geographies Progress*, in «Human Geography», vol. 29, n. 5, 2005, p. 562.

[7] C.M. Dalton, L. Taylor and J. Thatcher, *Critical Data Studies...*, cit.

[8] M.S. Segura and S. Waisbord, *Between Data Capitalism and Data Citizenship*, in «Television & New Media», vol. 20, n. 4, 2019, p. 416.

[9] J. Van Dijck, *Datafication, Dataism and Dataveillance: Big Data between Scientific Paradigm and Ideology*, in «Surveillance & Society», vol. 12, n. 2, 2014, pp. 197-208.

[10] Cf. *Urban Data, Inequality and Justice in the Global South*, a project by the Sustainable Consumption Institute (SCI) at The University of Manchester, available online at https://www.sci.manchester.ac.uk/research/projects/urban-data-inequality-global-south/.

[11] M. Andrejevic, *Big Data, Big Questions: The Big Data Divide*, in «International Journal of Communication», vol. 8, pp. 1673-1689, 2014; B. de Sousa Santos, *Epistemologies of the South: Justice against*

that there is a growing necessity to question *data universalism*, i.e. «the tendency to assimilate the cultural diversity of technological developments in the Global South to Silicon Valley's principles»[12] and to go beyond it to avoid or mitigate what de Sousa Santos specifically defines *epistemicide* of the South[13].

Therefore, given this inexorable capacity of profit-linked mechanisms to determine the fate of the territories and populations that inhabit them, does it really make sense to wonder about other possible data regimes as alternatives to capitalism-driven ones? If this is the case, as we believe, then what are or must be the ethical imperatives (beside the scientific ones, of course) to be placed at the base of alternative and complementary ways of collecting and disseminating data from subjects able to free themselves from capitalist domination[14]?

All these considerations and questions become crucial and urgent if we assume the thesis according to which, in the XXIst century, the countries of the South of the World will progressively complete their process of assimilation to the capitalist model regardless of the specific forms that it will take[15]. Accordingly, it becomes important to recognize the specificity of the current situation – evidently the result of a phase of geopolitical and socio-cultural transition – and also to consider apparently negative facts – such as the lack of data or the inability to produce them as can be done in the North of the World – in a possibilist, pluralist and anti-epistemic perspective. Perhaps also within the scope of urban and territorial studies, thanks to the techniques and methodologies typical of these disciplines, new practices and trajectories of production and use of data could be de-

Epistemicide, London, Routledge, 2014; S. Milan and E. Treré, *Big Data from the South(s): Beyond Data Universalism*, in «Television & New Media», vol. 20, n. 4, 2019, pp. 319-335.

[12] S. Milan and E. Treré, *Big Data from the South(s)*..., cit., p. 324.

[13] B. de Sousa Santos, *Epistemologies of the South*..., cit.

[14] C.M. Dalton, L. Taylor and J. Thatcher, *Critical Data Studies*..., cit.

[15] P. Perulli, *Alla ricerca del Sud Globale*, PhD Seminar held on 30th January 2019 at DiARC, University of Naples «Federico II».

veloped in the future, in an alternative manner to those of a strictly capitalistic matrix. We know that this is already happening in various forms, but we are not able to establish whether even the most virtuous experiences will be able, over time, to subvert the dominant logics already mentioned. However, insisting on the search for a new data ethic remains something desirable at least to try to push away the spectre of *data colonialism*, but also that, certainly more misunderstood, of academic and professional colonialism.

We can now introduce some practical issues. We must certainly begin by saying that the work we are called to do as urban and regional scholars is now completely performed within the field of digitalization of processes, communications and social relationships. These are processes that, in addition to expanding our possibilities of knowledge, hide various ethical pitfalls. Therefore, when referring to geospatial data issue we have to recognize the existence of «two contradictory forces in contemporary digital societies: 1) data extractivism and surveillance driven by corporations and states and 2) the possibilities for citizens' resistance and autonomy in late capitalism»[16]. Notwithstanding this evidence, since this contribution is strongly oriented to instructing concrete research activities, we do not intend to take sides with either one or the other force. We rather prefer to explore a wide range of sources and methodologies based on the actual availability and usability of information and tools, within a conceptual framework based on the awareness of what they are and represent.

Institutional geoportals and Open Data

Over the past two decades it has not only been private companies and institutions that have developed information systems and web platforms dedicated to the systematization and querying of geospatial data. Public institutions, at different levels, have also designed and implemented inno-

[16] M.S. Segura and S. Waisbord, *Between Data Capitalism...*, cit., p. 412.

vative platforms for managing and sharing their official data referring to a variety of administrative and functional geographies. Every institutional effort to detect and harmonize census and registry statistics, to make them accessible, searchable, downloadable, continues to be valuable even in an age in which big data seems to annihilate the effectiveness of more traditional databases, geo-statistical repositories and atlases. In recent years, interesting initiatives have been developed for the construction and management of homogeneous databases on a global or continental level, positively affecting the knowledge of the Global South countries. Some operations specifically addressed to these countries have led to Open Data portals managed by or in cooperation with some international institutions such as the World Bank, the United Nations and the OECD. Today more than almost 50 developed and developing countries have launched their Open Data initiatives at national, subnational and city levels[17]. Moreover, since informality is a distinctive trait for the Southern hemisphere, some countries are attempting to obviate its physiological statistical fleetingness, and to also include in their surveys data referable to the informal sector[18].

Unlike official statistics, which often make use of obsolete and therefore rigid portals and information technology, today there is a proliferation of geoportals that share geographic information, often with dedicated Web GIS clients. Even when developed within the US or Europe, new geoportals and data management standards produce positive impacts on other countries[19]. Furthermore, a great innovation in the field of geospatial data consultation and OpenGIS was the introduction of the so-called Consultation Service (Web Map Service and Web Feature Service). These types of web services have allowed forms of standardization and intersection between

[17] World Bank, Open Data Toolkit, available online at http://opendatatoolkit.worldbank.org/en/open-data-in-60-seconds.html.

[18] https://datahelpdesk.worldbank.org/knowledgebase/articles/114951-do-you-have-data-for-informal-sectors.

[19] E.g. see the ESRI ArcGiS Hub dedicated to Africa, the EU-JRC worldwide observatories and the Africapolis.org portal produced by the OECD Sahel and West Africa Club.

different geographic systems, offering the possibility to directly transfer, access, analyse and process spatial data coming from different sources. Additionally, these types of web services developed in Europe are gradually spreading to other parts of the world.

Photo-cartographic mosaics and assembled maps and datasets

The term «mosaic» in the field of geospatial data refers to assemblages of single or multiple images and cartographies from different sources. This can be the result of systematic activities or more sporadic and circumscribed technical, scientific, cultural or media operations. In particular, photo-cartographic mosaics can cover different families of information, themes and types of data. In most cases purely cartographic mosaics tend to recompose, homogenize and make usable fragmented information layers at national or sub-national level. Besides, the purely cartographic mosaics, photo satellite mosaics are available. These are extremely important because they are often at the origin of thematic cartographies.

Photo-cartographic mosaics play an important role in research for their use as maps of first (in remote) exploration and knowledge of the geographical contexts under study and for their use as basic layers for different sectorial analyses. Other equally important reasons concern the homogenization and construction of dedicated platforms that allow use by any type of user.

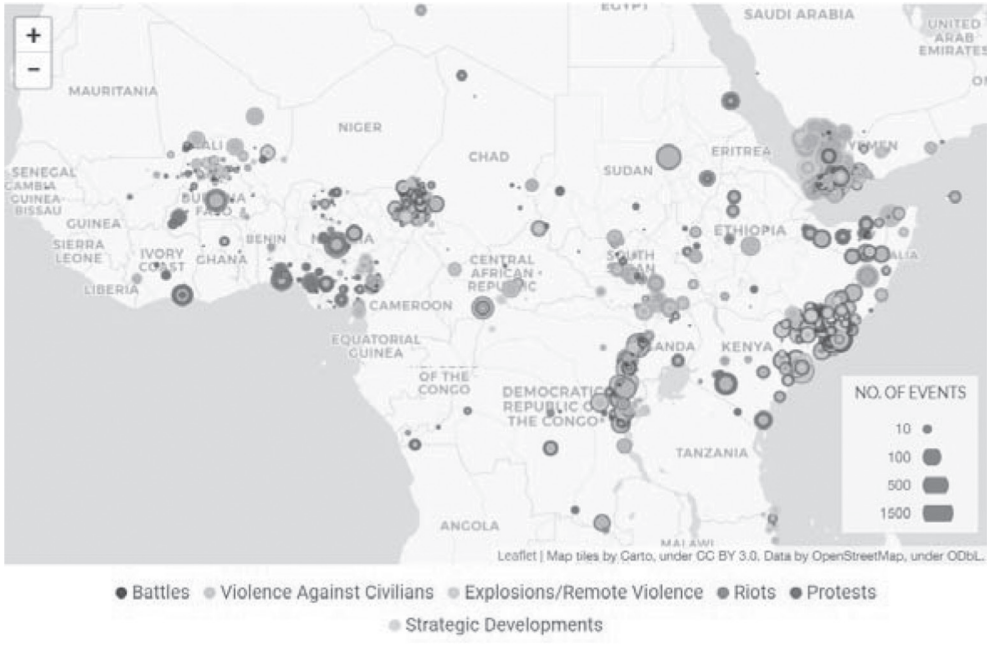
The assembled data are those examples in which the promoters bring together in a usually virtual space various information that can be of two types: *i*) scattered information coming from different databases that are globally combined; or *ii*) different information already present at a global level that are reworked with the construction of indicators between the different information layers realizing new information. The subjects that promote these kinds of actions are multiple but usually they are the result of the work of researchers, freelancers, private citizens or associations

Figure 1. The Africapolis.org portal produced by the OECD Sahel and West Africa Club is the «only comprehensive and standardised geospatial database on cities and urbanization dynamics in Africa. Combining demographic sources, satellite and aerial imagery and other cartographic sources, it is designed to enable comparative and long-term analyses of urban dynamics».

Source: https://africageoportal.maps.arcgis.com/home/gallery.html.

etc. The purposes are different and range from research objectives to reporting operations, or more simply pure sharing of information. These typologies of initiatives are very important because they increase the information and knowledge about the global phenomena grouping and spreading data that is otherwise difficult to recover. Clearly, this type of database is fundamental for those countries in the Souths of the world, which, sometimes, do not have internal databases able to provide precise information. The work of searching for alternative sources and data can really be fundamental for the studies and communities of those countries.

Figure 2. The *Armed Conflict Location & Event Data* Project (ACLED) is a data collection, analysis and crisis mapping project.



Source: https://www.acleddata.com/dashboard/#.

Volunteered Geographic Information (VGI) and Counter-Mapping

In 2007 Goodchild introduced the concept of Volunteered Geographic Information (VGI) as a novel source of geographic data coming from collaborative mapping projects that represent the set of geographic information generated and shared by a community of users through a data infrastructure[20]. The reason why people decide to map, and the level of accuracy of the results can be discussed, but this remains one of the biggest innovations in the world of data production.

[20] M.F. Goodchild, *Citizens as Sensors: The World of Volunteered Geography*, in «GeoJourna», vol. 69, n. 4, 2007, pp. 211-221.

The most prominent and useful VGI project for urban research is Openstreetmap, a collaborative project aimed at creating an open source and editable map of the world. It has active mapper communities in many locations and provides free and flexible contribution mechanisms for data, often producing even better maps than commercial ones thanks to the possibility of interpolating extremely diversified data families coming from sources closely linked to the territory.

This local production of data can also become a medium to fight spatial abuses in rights' claims. The grassroots political use of VGI to contrast hegemonic uses of maps and to democratize mapmaking has been defined as Counter-Mapping (CM)[21], intending it as a social process that will evolve from basic mapping and data collection for filling knowledge gaps, to building awareness on culturally-rooted spatial features in areas of limited statehood[22]. Thus, turning into a capacity development and empowering occasion, promoting active citizenship.

Sub-saharan Africa has provided, in the last decade, a fertile context for CM initiatives coping with the challenge of bringing invisible informal urbanities and citizens on a map to foster inclusive and sustainable urban plans, policies and projects. Map Kibera, started in 2009 by Erica Hagen and Mikel Maron, has been a groundbreaking experience[23], and has been followed by several other experimental projects[24].

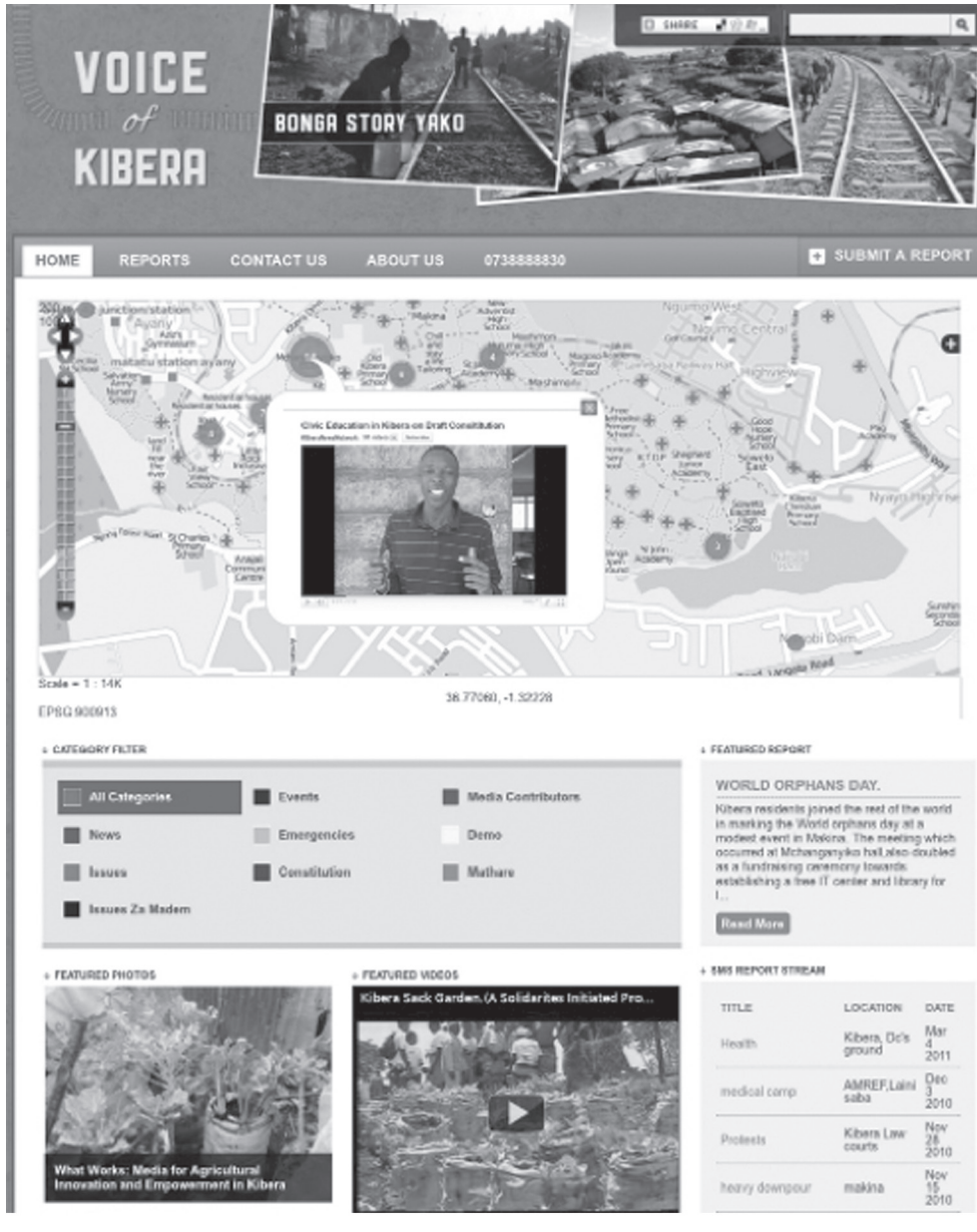
[21] N.L. Peluso, *Whose Woods Are These? Counter-Mapping Forest Territories in Kalimantan, Indonesia*, in «Antipode», vol. 27, n. 4, 1995, pp. 383-406.

[22] P. Kovačič and J. Lundine, *Mapping Kibera. Empowering Slum Residents by ICT*, in S. Livingston and G. Walter-Drop (eds.), *Bits and Atoms: Information and Communication Technology in Areas of Limited Statehood*, New York, Oxford University Press, 2014.

[23] E. Hagen, *Mapping Change. Community Information Empowerment*, in «Kibera, Innovations: Technology, Governance, Globalization», vol. 6, n. 1, Winter 2011, pp. 69-94.

[24] D. Ramani Huria, *The Atlas of Flood Resilience in Dar es Salaam*, Dar er Salaam, 2016; L.M. Nic Lochlainn, I. Gayton, G. Theocharopoulos, R. Edwards, K. Danis, R. Kremer *et al.*, *Improving Mapping for Ebola Response through Mobilising a Local Community with Self-owned Smartphones: Tonkolili District, Sierra Leone, January 2015*, in «PLoS ONE», vol. 13, n. 1, 2018; R. Allan, *Hyper-local Participatory Mapping of All Refugee Hosting Districts in Uganda. Openly Accessible Maps and Methodology for Protection and Multi-sector Operational Decision Making*, Proposal for Scaling Community/Partner Mapping across Uganda, 2018.

Figure 3. The *Voice of Kibera* is an online community information and news platform aimed at making informal settlements visible through cartography and digital media narratives.



Source: http://voiceofkibera.org.

Media & telecommunication data

In recent years more and more new sources of data, mainly based on media and telecommunication data, have become available for urban and regional research[25]. Thanks to its spatial and temporal resolution, such data showed a great potential for understanding urban transformations and for analysing and mapping spatial patterns of activities within cities. The widespread use of mobile phone devices guarantees that the potential available information is huge and distributed among all the countries of the world.

The idea is that mobile devices with location information leave digital traces when used. This implies to consider the phone traffic data as the effect of behaviours and individual habits that become indirect information on the characteristics of the territory and, somehow, an intrinsic and ever-changing feature of the territory itself.

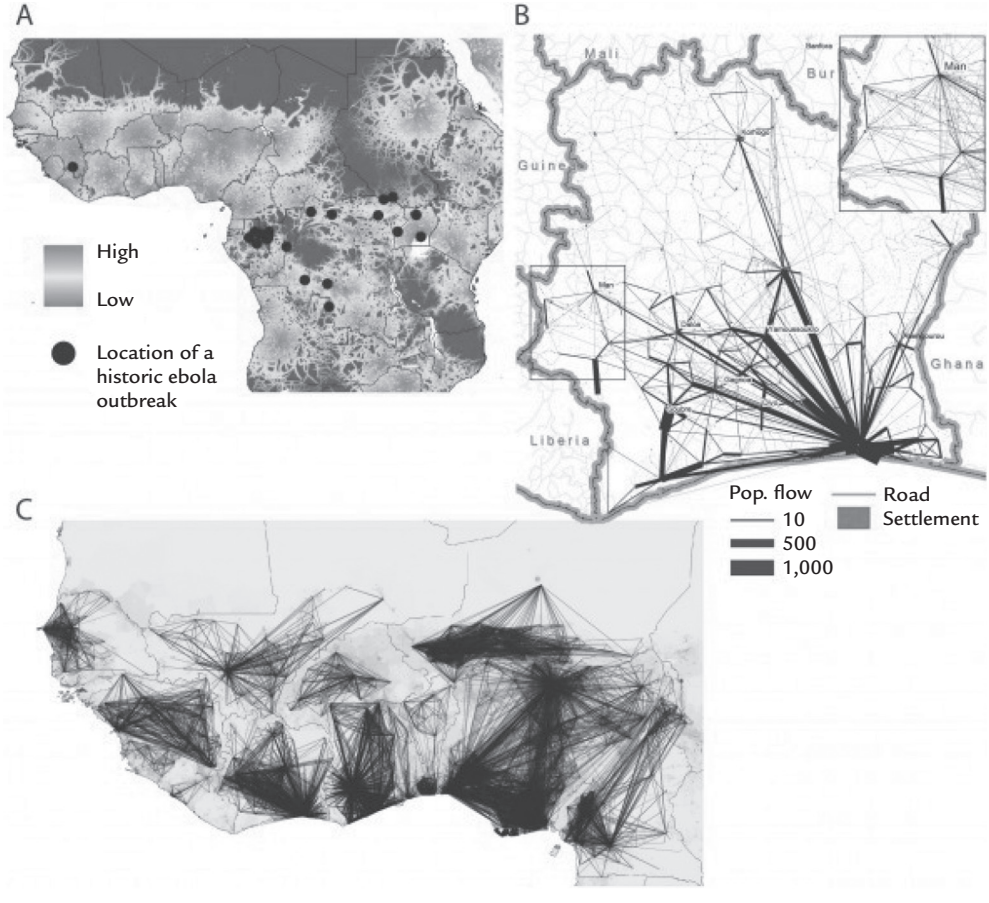
These phenomena are difficult to recognize through conventional data sources since they are rarely updated and since they are not able to intercept phenomena which change over time, such as – typically – mobility or the temporary presence of people in certain parts of the city, or the density of uses of territories or informal activities[26].

On the other hand, the real availability of mobile phone data is a relevant issue because of the huge fragmentation of providers in world countries, of the different commercial policies they undertake and their lack of willingness to cooperate for public interest purposes such as an improved understanding of territorial development. The identification of conditions for the acquisition of private data by public institutions is a topic that needs to

[25] V. Blondel, A. Decuyper and G. Krings, *A Survey of Results on Mobile Phone Datasets Analysis*, in «EPJ Data Science», vol. 4, n. 10, 2015, available on https://doi.org/10.1140/epjds/s13688-015-0046-0.

[26] P. Pucci, F. Manfredini and P. Tagliolato, *Mapping Urban Practices through Mobile Phone Data*, PoliMI SpringerBriefs, Heidelberg, New York, Dordrecht, London, Springer, 2015.

Figure 4. Mobility patterns and connectivity in West Africa.



Source: A. Wesolowski, C.O. Buckee, L. Bengtsson, E. Wetter, X. Lu and A.J. Tatem, *Commentary: Containing the Ebola Outbreak – The Potential and Challenge of Mobile Network Data*, in «PLoS Currents», vol. 6, 2014.

be fully addressed to define how this data source can contribute to a near real-time understanding of urban spatial processes. Providentially, some relevant initiatives have been undertaken in order to expand the use of new sources of data for development and to improve data awareness in the countries of the Souths of the world.

This concept is also promoted by several tech or telecommunication giants with ongoing programs and activities developed in the context of data for social good and international development initiatives. For example, the Facebook Data for Good program is aimed at using data collected by the company to address humanitarian issues[27]. Among the public dataset available, we cite the spatial data regarding the population movement or the population density that can be used for monitoring the crisis or for mapping the responses.

An interesting starting point for further analysis is a collection of projects and experiences based on the use of data provided mainly by private companies within the Data Collaboratives initiative[28]. Collaboratives are a new form of collaboration, beyond the public-private partnership model, in which participants from different sectors exchange their data to create public value.

[27] https://dataforgood.fb.com.
[28] https://datacollaboratives.org.

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Alessandro Frigerio, PhD, is Architect. He is an Adjunct Professor and Post-doc Researcher at Politecnico of Milan, Department of Architecture and Urban Studies, also teaching at the Master «Design for Development: Architecture, Urban Planning and Heritage in the Global South». His research investigates the processes and spatial correlations of sustainable development in its inter-scalar framework, with a focus on integrated planning, urban architecture, landscape and public space design, and with a special interest in African urbanism.

Fabio Manfredini is the responsible of the «Mapping and Urban Data Lab» (MAUD), Department of Architecture and Urban Studies, Politecnico of Milan. He is specialized in the development of methods for the analysis, visualization and interpretation of spatial dynamics. He is an expert in the use of innovative data source for urban studies and for mobility mapping.

Stefano Saloriani is a PhD candidate in Urban Planning Design and Policy at the Politecnico of Milan and his research focuses on the B2C e-commerce spatial effects, and in particular on the home delivery traffic flows volumes and externalities. Working in the private sector as a planner and as a consultant in different academic research projects he gained specific skills in the fields of Geographical Information System, mapping, urban and spatial analysis, planning, data visualization and social and economic research methodologies.