Community-based data for a new taxonomy of abandoned places[1]

Emanuele Garda[1], Stefano Saloriani,[2] Daniele Villa[3]

[1] *Università degli Studi di Bergamo, emanuele.garda@unibg.it*
[2] *Politecnico di Milano, stefano.saloriani@polimi.it*
[3]*Politecnico di Milano, daniele.villa@polimi.it*

Abstract: Abandoned places are common "everyday" landscape elements whose characteristics are not always adequately known. It is necessary to activate innovative knowledge-making tools to understand the complexity of these places in order to fill the lack of information concerning their characteristics and the relationship between their fragility and the repercussions on physical space. Open data represent a great opportunity to produce new knowledge both for the preservation of a vulnerable heritage and to support urban regeneration processes. Through open-data participatory mapping actions, the community knowledge can easily emerge in a structured way. Official digital sources are often unable to adapt and upgrade processes of place knowledge making. For this reason, a set of digital infrastructural facilities must be conceived and implemented, adopting the most advanced information technologies, in order to produce open-source, interoperable and interactive Dataset. The digital infrastructure requires a wide variety of heterogeneous data sets, collected and managed to remain open both for endless sharing and for technical verification actions. Openstreetmap is an emblematic example of a re-adaptable tool for mapping abandoned places: the modular depth of its geodatabase allows it to be customized with great ease. Using this tool, the information is made accessible to a large community to be used and shared.

Keywords: Abandoned places, Spatial analysis, Big data, Open data

Introduction

The fragilities of the Italian territory are characterized by a multiplicity of 'minor' aspects that are difficult to detect, map and interpret. Abandoned places are very common 'everyday' landscapes elements which are not always characterized by widely evident phenomena of environmental and physical degradation. It is necessary to activate innovative knowledge-making tools to read and to understand the complexity of this places, filling the lack of information concerning their characteristics (i.e. taxonomy, localization, etc.) and the relationship between their fragility and the repercussions on physical space. Open data and citizen science represent a great opportunity to produce new knowledge both for the preservation of vulnerable urban landscapes and to support urban regeneration projects and policy decisions. Through open-data participatory mapping actions,

[1] Sections 1, 2 by Emanuele Garda; section 3 by Stefano Saloriani; section 4, 5 by Daniele Villa.

the local and community knowledge can easily emerge in a structured and organized way. Official digital sources are often unable to adapt and upgrade processes of place knowledge making. For this reason, a set of digital infrastructural facilities must be conceived and implemented, adopting the most advanced information technologies, in order to produce open-source, interoperable and interactive Dataset (i.e. Landscape Digital and Geographical Models). The digital infrastructure requires a wide variety of heterogeneous (qualitative and quantitative) data sets, collected and managed to remain open both for endless sharing and for control and technical verification actions. Openstreetmap is an emblematic example of a re-adaptable tool for mapping fragile and abandoned places: the modular depth of its geodatabase allows it to be customized with great ease. Using a tool like OSM, the risk of making the information inaccessible and non-reusable is avoided ensuring that a very large community (i.e. citizen, policy makers, stakeholders, etc.) can use and share. In this way, the raw material of territorial research becomes a common ground without complicated steps that may ease further subsequent interpretations and actions.

In the following sections, this paper describes some characteristics of the abandoned places phenomenon and the mapping of buildings or areas made by different actors (public institutions, universities, local associations). It is to be taken in consideration that there are many taxonomies and ways to define the abandoned places and that the mapping case studies are responding to an increasing need of information. In those experiences, the authors set limits to build the last sections of this paper in which is underlined the importance of the new typologies of data collection and re-use in a more updated and open methodology.

Neglected spaces and territory

Quiet villages, rural settlements, huge factories, neighborhood shops, interrupted construction sites: in recent years the abandonment of places has generated a massive variety of examples. This kaleidoscope of materials, geometries and memories is shifting the debate to the description and interpretation topics starting from the deep and extended changing in the territory (Merlini, 2009)
The universe of non-used spaces is composed by different places and vocabulary studied by many authors: keywords like Terrain vague (Solà-Morales, 1996), Vacant land (Pagano and Bowman, 2000), Shrinking city (Oswalt, 2005), Junk space (Koolhaas, 2006) and Terzo paesaggio (Clément, 2004) are the most explicit demonstration of this fertile debate. As mentioned, the recent economic, financial and social mutations are changing and increasing the new examples of abandonment in addition to what is present already namely a past situation in which for the society was common the alternance between use, disuse and reuse of the territory.
After the “dismessal brownfield” era a huge need of knowledge and interpretation update is emerging within a radical and profound renewal phase of urban planning discipline (Di Giovanni, 2014), is emerging a huge need of knowledge and interpretation update. At the same time, some central expressions appear in an increasingly plural debate: for example, some recent re-use oriented research have placed emphasis on the concept of recycling whose importance has increased adding new

significance at the social and economic means (Viganò, 2011) of re-use[2].
The "Re-cycle–strategie per l'architettura, la città e il pianeta"[3] exhibition at MAXXI in Rome or the "Re-cycle Italy" [4] national research need to be read in their capacity of activate a new research (and project) path.
There are some characteristics that are causing a variety of the abandoned place that could be used as a guide, individually or combined, for the analysis and project objectives.
The structure and the ways in which the various buildings are composed and characterized in the spatial asset represent one important condition. In the urban space it is possible to find single abandoned buildings with different volumes and functions or complex structures of many buildings. Another important interpretation is the moment of construction that, combined with the original function, allow the definition of specific historical phases.
For a better understating of these places, a crucial role is played by the causes of abandonment that may led them to a slow and progressive agony or rapidly occur after an unexpected event (landslides, earthquakes or floods). In the first case, the elements of a long decline are usually stratified (Marini, 2016) and combined in the so called "ghost town" as for example (Civita di Bagnoregio, Balestrino, Craco, Pentedattilo etc.). Here, the voluntary emigration, the decline of vital traditional economic sectors, the political events, the different forms of environmental risk and marginality (Teti, 2017) led to a radical decline.
From a geographical point of view, the abandonment is a multi-level phenomenon that combine different "spatial orders (Bolocan, 2014). There are at least five levels of extension:

- "Micro-abandonment"[5] that may affect individual units such as dwellings, shops or small businesses located in the same architectural volume or in the same block[6].
- A second level is composed by entire buildings with any kind of functional distinction, for example rural settlements, industrial buildings, commercial buildings, shopping malls, etc.
- A third situation is defined by abandonment processes that affect wide parts of the city. This happens in urban settlements with huge productive platforms whose decline follows constantly the traditional industry decline.
- A situation in which an entire city is abandoned, such as the already mentioned "ghost town"
- The last case is the abandonment of large geographical areas including buildings and open spaces such as the so called "inner areas" in Italy. These contexts had experienced a steady decline in population and in economic activities that is leading to a complete emptiness.

Atlas and abandoned places

The archipelago of mute rubble and ancient ruins (Tarpino, 2012), described in the previous paragraphs, ensues the increasing need of knowledge about abandoned places. As mentioned, it is a plural and continuously in mutation geography affected by nonstop re-colonization and new abandonment processes that needs to be understood (quantity, localization, morphology, function etc.). For these reasons, recently we have assisted to an increasing number of initiatives aimed to grow

[2] Recycling is "non è semplicemente riusare, ma, seguendo l'analogia con il mondo organico, proporre un nuovo ciclo di vita, assumendo che di vita e di cicli si tratti e che l'analogia contenga ancora qualche utilità" (Viganò, 2011).
[3] The exhibitions materials are reported in Ciorra, Marini (2011).
[4] It is a Project of National Interest (PRIN) funded by the Department of Instruction in 2011.
[5] To better understand the micro-abandonment concept see Garda, Gambazza (2016).
[6] There are smilar examples in Antwerp where inside the XIX century "urban belt" there are many abandoned places that gives space and porosity to the city (VIGANÒ 2010, p.197).

the awareness regarding the abandonment spaces. More than 90 cases can be found on the "Osservatorio del riuso"[7] website and we group them in three different categories: (i) Observations promoted by public institutions of local or regional importance (ii) Research and exploration promoted and produced in/by the universities (iii) Bottom-up experiences promoted at local level by associations or informal groups of citizens. The first category must include the census of the abandoned places made by Lombardy Region, Assimpredil, Ance and Provinces in 2008-2010. It is a partial mapping of the entire regional territory that leads to the recognition of 745 brownfield sites. This first project led to the creation of a free database[8] and an accessible web portal that didn't received any updates since the opening. It has an accurate scale of details despite the extent of the census, and it is possible to find information about the perimeters of the areas, the buildings, the urban destination and their constraints. A second example is the "Degraded and abandoned areas and buildings" database of the Milano Municipality, available on its Opendata web-portal[9]. This case was started in 2014 and finished in 2019 with the adoption of the new planning document (PGT) of the city. Compared to the previous case this census has a local scale and it is focused on the need to recognize a plural geography identifying different situations especially at the functional level (dwellings, shops, businesses, production, etc.). The third case is the "Census of the public real estate". The Department of the Treasury annually updates it and allows the users to download all the information available in a .csv format. It has a good detail scale with a quite complete set of information but there is not the possibility to visualize the database on a webmap directly on the Department of the Treasury website (in the previous cases was possible). In order to visualize the information, an expert user should geo-locate the address of each space or combine the data with some dataset of the cadastre. This is a limitation in the possible use of such an important dataset. Another institutional case was made by the *Diathesis Lab*[10]of the University of Bergamo between 2013 and 2014. This research found 805 abandoned areas using both quantitative and qualitative criteria. The results are online on a web platform[11] but the data are not available for the download. The scale of this contribution is vast and the information are divided by the municipal boundaries without the spatial location of the abandoned places. There are not registered update since the project conclusion.
A second University experience is the "Atlas of abandonment" made by the University Statale di Milano and the PIM[12] in 2016. In a two years process, 580 unused areas in 38 Municipalities of the Metropolitan City of Milan for a total of 776 hectars have been analysed. This case recalls the taxonomy mentioned above finding many examples of abandoned places. As for the previous research, data download it's not possible and the updating of the information seems interrupted.

Moving to the association levels and citizen groups,many examples can be found. The first one is *[im]possible living*[13], an abandoned spaces re-activation experience based on community knowledge as a first source of information. They had created some call for ideas to find new functions for some

[7] http://www.osservatorioriuso.it/ (last access in May 2019).
[8] *https://bit.ly/2JAD4pC* / (last access in May 2019).
[9] *http://www.comune.milano.it/wps/portal/ist/it/servizi/territorio/Immobili_degradati* (last access in May 2019).
[10] It is the "Rifo/it rigenerazione urbana e restituzione del suolo. Aree dismesse e obsolete i Lombardia" project, done by Bergamo University coordinated by prof. Emanuela Casti
[11] http://rifoit.unibg.it/rifomap/ (last access in May 2019).
[12] http://www.pim.mi.it/atlante-abbandono/ (last access in May 2019).
[13] http://blog.impossibleliving.com/ (last access in May 2019).

empty space. Nowadays this case is not active anymore, but their approach remains crucial and replicable.
Moreover, there is the project of *Triesteabbandonata,* a story-telling project composed of photographies and abandoned places descriptions. In this blog the download of the dataset is not allowed, and the places are not located in a map. This experience deserves to be mentioned for the use of a tool such as the photography to describe the phenomenon in a qualitative way and thus renouncing to the comprehensiveness but underling the complexity of the abandonment. The *Coalizione Civica* association has started a census of un-used buildings in Bologna [14] with the aim to sustain social and cultural operators that are involved in the temporary re-use of abandoned places. The most important goal of the association is a web maps (produced using MyMaps by Google) that allows the download of the data related to more than 400 un-used mapped spaces. Even it is not an "official" dataset and sometimes is unformalized or incomplete, it remains a huge support for the citizens.
The last case is related to the discontinued railways that are a particular category in the galaxy of the abandonment. We are referring to a specific case composed by built materials, open spaces and the physical infrastructure. In particular, the example of *Ferrovie Abbandonate*[15] collects in a non-public or open database the information related to more than 7.500 km of abandoned railways. Since it is a peculiar abandonment category subjected to slow changing or conversion processes there is no need to guarantee a constant updating of this database. After the first collection of information the project is focused on the organization and promotion of cultural events to strengthen the sensitivity for the disused railways enhancement. This case is emblematic both for the multifaceted nature of these spaces and the reasons of the abandonment and for their geographical location. Unlike the previous cases associated with places in large urban areas (Bologna, Trieste and Milan), the abandoned railways concern peri-urban or extra-urban situations.

Observing all the cases mentioned, this contribution developed a comparison that reveals some common points between the experiences. Specifically, the public initiative projects suffer from the lack of a constant update of the information collected. This is the case of the Lombardy Region database but also of similar initiatives such as the regional Umbrian database whose information dates back to 2012 (http://geo.umbriaterritorio.it). Sometimes the problem lies in the structure of the data which cannot always be reported on the map easily (i.e. the case of Department of the Treasury), or the data are not enough complete because the surface or the function of the places are missing. This very last point is related to the scale of the project that when is broad could lead to a loss of the detailed information.

For the research and exploration promoted and produced in/by the universities the biggest problem is the impossibility of data reuse by third parties. This has to be added to the lack of information updating as for the institutional projects. Further, the research are characterized by a certain degree of sectoriality so the information are often concerning only one building typology or a single function. It is important to underline that these experiences are able to combine several research methodologies ranging from surveying, to photographic stories, to infographics up to written stories. This means that the contributions made by this researchers and universities are dealing in a correct way the taxonomy of the abandoned places using many tools to understand it.

[14] https://www.coalizionecivica.it/mappare-territorio-vuoti-urbani-bologna/ (last access in May 2019).
[15] www.ferrovieabbandonate.it/index.php (last access in May 2019).

The temporality seems to be the major characteristic of the bottom-up experiences promoted at local level by associations or informal groups of citizens. Cases like [im]possible living are closed because the association or the promoter of the project fails to build a solid base formed by other citizens who continue in the activities of census and updating (end of funding, closure of associations, etc.). These initiatives are mainly characterized by the precision in the identification of information, as it is the result of a direct knowledge of the cases. Another feature is the scale of analysis usually limited to some areas of specific interest (municipal boundaries, neighborhoods, etc.) since the objective of the project is to reveal problems or giving a voice to citizens who perceive little interest by the institutions. As mentioned, the most important aspect of this category of projects is their collaboration and involvement with the citizens and their knowledge of the places.

So far, the phenomenon of the place abandonment is multiscale and composed by a huge taxonomy of materials. This complexity must be included in the forms of representation and census that need to have a wide degree of flexibility accomplished by using many tools (maps, storytelling, photos, different scales, different actors, etc.). The possibility of updating the data is a crucial issue because the phenomenon is in continuous changing and the possibilities to obtain founds to do the analysis are decreasing. In conclusion, it is important to underline that having an open dataset or a platform that can be flexible, modifiable and adaptable becomes fundamental for this type of project. Moreover, it is essential to promote initiatives to be shared with the citizens and their knowledge in order to involve and empower them.

Open Data and VGI as enabling infrastructure

As mentioned, a key factor, especially for the mapping projects of abandoned places, is the possibility to (re)use and update the information. Unfortunately, many datasets are based on old survey even if their structure and level of detail is complete, complex and rich. An approach that could help in solving this problem is the paradigm of OpenData production: “an information that can be freely accessed, used, modified and shared by anyone and for any purpose, subject to the requirements of origin (attribution request) and opening (sharing in the same way) (Open Knowledge Foundation 2016). Recently, it’s becoming clear the importance of this kind of approach because we are witnessing to a great revolution that involves the territorial information systems. The access to geographic information has drastically changed in the last ten years with the introduction of terms such as Neogeography (Turner 2006), Volunteered Geographic Information (Goodchild 2007) and web-mapping (Plewe 2007). Particularly interesting for this contribution are the Volunteered Geographic Information (VGI). These are georeferenced information coming from collaborative mapping projects that represent the set of geographic information generated and shared by a community of users (Goodchild 2007). Between the most known project we found OpenStreetMap[16] (OSM;http://www.openstreetmap.org/) and Wikimapia (http://wikimapia.org/) inspired by the Wikipedia approach, Google Map Maker ((https://www.google.com/mapmaker) and Mapillary

[16] OpenStreetMap is the most widely used collaborative mapping project in the world. It was founded in 2004 with the aim of creating a world-wide map constructed and editable directly by users, freely shared and usable by anyone with an ODbL license (Open Database License).

(https://www.mapillary.com/).
The VGI represent an innovation in the panorama of geographic data especially as a potential tool for solving the previously mentioned problem of cartographic material update involving the citizens knowledge. This is important for the public bodies mostly when the official cartography is lacking (Haklay et al. 2014). The constantly modifiable nature of the information characterizes the VGI as a new concept of knowledge: a cartographic representation that puts the "absolute power of the map, which admits neither criticism nor correction" into crisis. (Farinelli, 2003, p. 37). More and more open data-VGI hybrid systems are proving to be the most effective enabling technologies vectors for innovative methods of mapping and enhancement of fragile and abandoned areas. This depends on many different factors but, first of all, on the possibility of interpolating extremely diversified data families coming from sources closely linked to the territory: this allows to make visible parts of that kind of local embedded knowledge that is often hidden or partially forgotten. In other cases the use of local information sources is able to detect elements of the cultural landscape that are abandoned only because they are no longer part of the collective memory or have ended up unused due to an inability to enhance the stratified and lesser-known weave of our territories. The following case study is a very suitable example to understand the need to identify new tools that allow to better identify those 'minor aspects' discussed at the beginning: sometimes 'making visible' is the first concrete step to activate and make possible collective re-use and boost policies.

The case of the Sabbioneta embankment: making fragility visible.

In many cases, territorial fragility is not strongly evident, above all when the texture of the landscape is rich in anthropic, urban and cultural places of great relevance, as in the case of most of the Italian territory. Building awareness and looking in deep at latent fragility also means to focus the great variety of non-outstanding landscapes, according to the interpretation coming from European Landscape Convention, including the so-called everyday landscapes, recognizing them as rich grounds of potential resilience for positive transformations aiming first of all at the quality of life for people.
In order to mitigate weaknesses, while first of all making visible and then boosting non-outstanding landscapes' partially hidden potentials, the importance of open-data based knowledge and awareness actions is increasingly evident both for enhancing and supporting decision-making processes and to promote good practices in the management of the cultural landscape.

A possible example can be represented by the pilot action "Cerchio d'Acqua" (http://www.amiciambientesabbioneta.it/cerchiodacqua/), which focused on a network of hydraulic and landscape elements partially abandoned and hidden in the agricultural area around the well-known small city of Sabbioneta. Sabbioneta is a very rare example of walled newly founded renaissance town designed in the late 16th century by duke Vespasiano Gonzaga in northern Italy on a sandy bank of the Po river. Sabbioneta was inscribed in the UNESCO World Heritage List in 2008 also because of its uniqueness in representing the concept of ideal city planning, maintaining a structural relationship with the agricultural and water landscape. The main idea of "Cerchio d'Acqua" action (a 2y. research activity founded by local and regional authorities) is to push the gaze of its citizens outside the superb renaissance walls to recognize and enhance the tiny but important specific elements of the landscape connected to water management as a significant part of the original project of the city. To realize new landscape knowledge and tools designed to map and improve citizens involvement, the project developed an approach aimed at the interaction between different geospatial FOSS (free and open source software): a digital ecosystem that allows to map, visualize, share,

participate.
The first approach involved a detailed OpenStreetMap-based cultural landscape re-mapping. The geo data uploaded to the OpenSreetMap DB enabled the implementation of a brand-new tailored FOSS geo-blogging app designed for the local community use to start shared maintenance processes, landscape self-protection, and achievement of effective recovery and improvement of the water small embankments (arginelli fluviali). The shared boost of the cultural landscape has developed also through collective meetings and walks outside the walls along the huge water embankments system: this is why it was necessary to think about the use of a free web-based tool able of stratifying the 'ways of looking at the landscape' that citizens have experienced during the project: the result is a massive visual survey, inside and outside the town, developed through Mapillary and integrated into the communication channels of the project.

This sort of approach, in addition to making easier and more efficient the integration of very different digital tools may represent a step forward for overcoming some recurring critical issues in local projects of fragile landscape enhancement:

- very often the territorial information sources are ancient, analogical and difficult to find: the digitalization is therefore a primary necessity that cannot be postponed;
- digitize to then re-hide information in closed and proprietary systems generates the same future inconveniences;
- the growing social demand of sustainable cultural tourism around non-outstanding landscapes requires a growing availability of functional, open and updatable datasets;
- the creation of FOSS and open source digital hubs makes it possible to keep local projects alive even after they have ended through an incremental storage of data that can be reused at any time;
- we need to rethink the potential of ICT in a more inclusive perspective in order to better support the bottom up processes of awareness and collective participation, also for this reason the crowd based Wiki-like model continues to be a winning reference.

References

Bolocan, M., 2014, Scala geografica. Spazialità urbana. In: Terra Mobile. Atlante della società globale, edited by P. Perulli (Milan: Italy: Einaudi), pp. 147-168.

Bonfantini, B., 2016, Attivare risorse latenti. Metodi sperimentali per l'analisi, la mappatura e la gestione informativa integrata delle trasformazioni di territori e manufatti del patrimonio culturale diffuso (Rome-Milan, Italy: Planum Publisher).

Clément, G., 2004, *Manifeste du tiers paysage* (Paris, France: Sens & Tonka).

Ciorra, P., Marini, S., 2011, *Re-Cycle. Strategie per l'architettura, la città e il pianeta* (Milan, Italy: Electa).

Di Giovanni, A., 2014, Lessico dell'abbandono. Concetti per descrivere e progettare gli spazi residuali della città contemporanea, Proceedings of the XVII Conferenza Nazionale SIU, Milan, June, pp. 1262-1267.

Farinelli, F., 2003, Geografia. Un'introduzione ai modelli del mondo (Torino, Italy: Einaudi).

Garda, E., Gambazza, G., 2016, Il progetto del microabbandono nella città molecolare. *Territorio*, 79, pp. 99-108.

Ghisalberti, A., 2018, *Rigenerazione urbana e restituzione di territorio. Metodi e mapping di intervento in Lombardia* (Sesto S. Giovanni, Italy: Mimesis).

Goodchild, M.F., 2007, Citizens as sensors: the world of volunteered geography. *Geo-Journal*, 69/4, pp. 211-221.

Koolhaas R., 2006, Junkspace (Macerata, Italy: Quodlibet).

Limonta, G., Saloriani, S, 2016, Mappare il patrimonio culturale: il ruolo dell'Informazione Geografica Volontaria. Una riflessione sulle potenzialità e criticità di OpenSteetMap nella costruzione di un database informativo georeferenziato 'open'. In: Attivare risorse latenti. Metodi sperimentali per l'analisi, la mappatura e la gestione informativa integrata delle trasformazioni di territori e manufatti del patrimonio culturale diffuso, edited by B. Bonfantini (Rome-Milan, Italy: Planum Publisher), pp. 00-00.

Oswalt, P., 2005*, Shrinking Cities: International research, Volume 1* (Berlin, Germany: Hatje Cantz Publishers).

Pagano, M.A., Bowman, A. O'M., 2000, Vacant Land in Cities: An Urban Resource. *The Brookings Institution*, Survey Series, december, pp. 1-8.

Plewe, B., 2007, Web cartography in the United States. *Cartography and Geographic Information Science*, 34, pp. 133-136.

Solà-Morales, I. de, 1996, Terrain Vague. *Quaderns d'Arquitectura i Urbanisme*, 212, pp. 36-43.

Tarpino, A., 2012, Spaesati. Luoghi dell'Italia in abbandono tra memoria e futuro (Torino, Italy: Einaudi).

Teti, V., 2017, Quel che resta. L'Italia dei paesi, tra abbandono e ritorni (Rome, Italy: Donzelli Editore).

Turner, A., 2006, Introduction to neogeography (Sebastopol, USA: O'Reilly Media).

Viganò, P., 2010, I territori dell'urbanistica. Il progetto urbano come produttore di conoscenza (Rome, Italy: Officina Edizioni).

Viganò, P., 2011, Riciclare città. In: Re-Cycle. Strategie per l'architettura, la città e il pianeta, edited by P. Ciorra P., Marini S. (Milan, Italy: Electa), pp. 102-118.