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## **The role of geographic data and Open geoData in the framework of Open Government in disaster management operations: 2016 Central Italy earthquake emergency**

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### **Abstract**

This paper focuses on the application of the Open Government principles and particularly on the activity of data releasing by Public Administrations, also as open data. Open Data is a measure that allows Open Government to contribute significantly to the implementation of the Government's transparency in its action. In addition to transparency, however, the degree of citizen participation in decision-making processes driven by data, as well as the capability of individual administrations to communicate with each other according to the data policies in place is given.

For the scope of conducting an analysis of the effective implementation of Open Government, a specific model of interpretation is applied in the context of emergency management caused by a catastrophe at national level. By analysing the large amount of data generated and the sharing and communication dynamics of the same data among the numerous actors involved in the emergency and the citizens themselves, we can assess the crucial value of their use in the decision-making process. The state of emergency selected is the very recent one arising from the sequence of earthquakes that hit central Italy starting from the event of 24 August 2016, followed by the subsequent ones of 26 and 30 October 2016. Among the data examined, special attention is given to geographical data, for their relevant role in decision-making processes.

The results achieved testify to the importance of adopting Open Government policies, nevertheless measuring the distance that still exists in the application of Open Government principles accounted for in this research (some aspects of transparency and collaboration), with regard to the bottom-up initiatives implemented by non- institutional bodies compared to the top-down ones operated by central and regional institutions.

**Keywords:** Central Italy, Earthquake, Emergency Management, Open Data, Story Maps

## 1. Introduction

The Open Government policy was launched during Obama's Presidency in the White House with the issuing of the Memorandum of Transparency and Open Government (Obama, 2009). After almost ten years, despite the questions and doubts regarding the future of this policy, there are widespread forms of access and adoption of Open Government throughout the world, which confirm its importance<sup>1</sup>.

Notwithstanding what has been briefly described above, up to now the application of the Open Government principles (Figure 1) has never been analysed during a state of emergency at national level.

The devastating and tragic earthquake that hit Central Italy in 2016 (Chiaraluce et al., 2017; Emergeo Working Group, 2017), is the event that provided the opportunity to conduct this research.

The choice of this particular case study was motivated by the fact that data exchange, even in its freest and most current open form, represented by Open Data, appears to be one of the key elements in decision-making and operational processes in the context of emergency management.

Among the numerous and diverse factors to deal with in an emergency context, which make the analysis conducted in this research particularly interesting, are the following:

- the collaboration of almost all subjects (public and private) operating in civil society, at all levels of decision-making and their involvement in complex and cross-cutting procedures, often never experienced before and sometimes innovative;
- the simultaneous coordination of a wide variety of issues: ranging from legal to scientific, from cultural and religious to information and communication, from health care to the supply of essential services and so forth;
- the rapid occurrence of events and their extraordinary intensity and scale demanding

<sup>1</sup> For example: for more information regarding this theme see <https://www.opengovpartnership.org/> and <http://open.gov.it/> for Italy.

fast decision-making, often requiring entirely new and unusual (not ordinary) approaches and instruments.

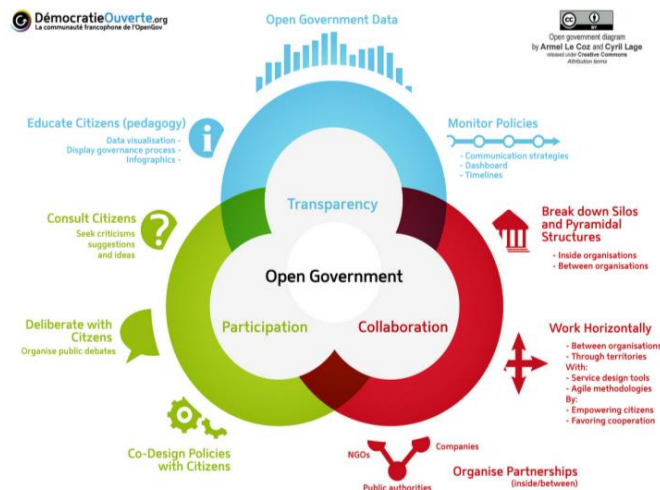


Figure 1. Description diagram of Open Government principles. Source: *DemocratieOuverte.org* (Mabi, 2015).

In this complex changing scenario, data and data flows become crucial, a formidable tool for making the most appropriate decisions and sharing them. Finally, among all the data in an emergency, geographical data (Open and non) is extremely important, as is effectively summarised, in the article by Carlucci et al. (2016) or by the detailed and skilled mapping activities conducted by the Open Street Map community through its Tasking Manager<sup>2</sup>.

In order to achieve the desired result, a comparative assessment of the various initiatives related to the data and implemented during the emergency phase was conducted by citizens and international organisations, research bodies and institutional actors at all government levels, through the adoption of a specific analysis model (De Blasio, 2016b; De Blasio and Sorice, 2016), adapted for the case under assessment. Through this methodology, the issue of open data is examined in the wider context of the application of those Open Government principles, which are more relevant to the production and exchange of open data.

<sup>2</sup> <http://osmit-tm.wmflabs.org/project/13>.

## 2. Analysis model adopted for the case study on the earthquake events that hit Central Italy in 2016

With particular regard to the diagram of Open Government variables and dimensions proposed by Sorice (2014) and further reiterated by De Blasio (2014, 2016a) (Table 1), as well as to the analysis model for democratic platforms developed by De Blasio (2016b; De Blasio and Sorice, 2016), for the purpose of this paper, a model of analysis of Open Data is introduced to be applied to a certain number of subjects who produced data in the framework of the study case examined<sup>3</sup>.

Open Government Variables	Specific Dimensions
Transparency	Open Data
	Training programs (Digital inclusion policies)
	Public policies monitoring
Participation	Consultations
	Deliberative arenas
	Co-decision of public policies
Collaboration	Horizontality
	Transversality
	Collaborative governance (Public-private-civic partnership, Shared decision-making)

Table 1. Variables and specific dimensions of Open Government. Source: Sorice, 2014; De Blasio, 2014, 2016a.

The application of the model allows a comparative assessment of the data produced during the emergency phase in view of the application of some of the principles of Open Government. Compared to the above diagrams and models, this analysis is not complete since only transparency and part of the collaboration variable are vertically assessed. However it is useful to define an objective and sufficiently adequate picture of the application of Open Government policies to the data produced during an emergency.

With regard to the Transparency variable, the indicators taken into account by De Blasio

(2016b; and De Blasio and Sorice, 2016), refer to the presence or absence of Open Data and its effectiveness as a tool to increase accountability. These two aspects are of fundamental importance to assess the presence of a policy of data opening and its effectiveness. Given the focus of this work on data, alongside the indicator of the presence or absence of Open Data, some of the specific features of Open Data have been added, as they are described both by OKI (Open Knowledge International, 2016) and from art.1 subparagraph 1, items 1 bis) and 1 ter) of the Digital Administration Code<sup>4</sup>. These are indicators relating to the data format, availability as a user license, quality intended as updating and documentation through metadata and accessibility intended as usability through information and communication technologies. This additional information allows for a more effective identification of the data characteristics so as to be able to attribute a first but significant level of quality of the data itself.

As far as concerns the Collaboration variable, among the numerous indicators foreseen in the De Blasio study (2016b; and De Blasio and Sorice, 2016), we selected those relating to the horizontality or symmetry of powers and others related to the institutionalisation variable. The former were selected because they are related to the accountability mechanisms, which as already mentioned are closely connected to the issue of transparency and help to understand whether or not citizens are actually directly involved in an empowerment process and take on an equal role with respect to the administration in decision-making processes. The latter were selected to analyse the degree of collaboration among all the actors involved in the data publication process, at all levels of legitimacy, including also non-traditional or even innovative standardisation tools, and to verify the status and capabilities of the administration to dialogue and open up to the outside.

<sup>3</sup> Copernicus EMS, Open Street Map, Terremoto-CentroItalia, Italian Regions (Lazio, Marche, Umbria and Abruzzo), Italian Revenue Agency (Cadastral Cartography), Italian National Institute of Statistics, National Institute of Geophysics and Vulcanology, Di.Coma.C. (Civil Protection National Service).

<sup>4</sup> D.Lgs. 07/03/2005, No. 82, *Codice dell'amministrazione digitale*. Published in the Official Gazzetta (G.U.) 16 May 2005, No. 112, S.O.

### Transparency

Variable	Indicator	Analysis	Value
Open Data	Open Dataset	Availability of the dataset according to classified and shared technical standards codified in international norms.	Presence(1), absence (0), hybrid situation (0,5)
	Format	Presence of open formats.	Presence(1), absence (0), hybrid situation (0,5)
	License	Presence of a license allowing anyone's use of dataset for commercial use also.	Presence(1), absence (0), hybrid situation (0,5)
	Update	Guarantee of updating of dataset.	Presence(1), absence (0), hybrid situation (0,5)
	Metadata	Presence of a codified documentation of <i>dataset</i> according to international standards.	Presence(1), absence (0), hybrid situation (0,5)
Monitoring public policies	Open Data reuse	Presence of contents, applications, instruments o procedures reusing dataset.	Presence(1), absence (0), hybrid situation (0,5)
	Communication policy objectives	Presence of instruments for sharing strategies to be implemented in the middle-long term period by the dataset owner.	Presence(1), absence (0), hybrid situation (0,5)
	Reports	Presence of instruments /tools to report (including geographic) defaults, problems, suggestions/recommendations on operations needed by the dataset owner.	Presence(1), absence (0), hybrid situation (0,5)

### Collaborative Governance

Variable	Indicator	Analysis	Value
Horizontality or balance of powers	Legitimacy output	Obligation of the dataset owner to motivate his decisions regarding proposals/requests on the <i>dataset</i> proposed by the citizens through participation and/or deliberative processes	Presence(1), absence (0), hybrid situation (0,5)
	Accountability	Possibility on behalf of the citizens to assess or monitor the implementation of co-decided policies regarding dataset.	Presence(1), absence (0), hybrid situation (0,5)
Institutionalization	Presence of legal/institutional device	Presence of a law/regulation related to making dataset available	Presence(1), absence (0), hybrid situation (0,5)
	Mutuality of legal/institutional device	Possibility for citizens to draft in collaboration with the dataset owner the law/regulations for opening the dataset.	Presence(1), absence (0), hybrid situation (0,5)

Table 2. Scheme of dimensions, variables and indicators used in the analysis per each data producer and the value assigned to each indicator. Source: De Blasio, 2016b and De Blasio and Sorice, 2016.

As already stated, all indicators have been declined with respect to the specific issue of production and opening of datasets during the

management of an emergency, which in fact constitutes the subject of this research. Finally, the analysis was applied to a variety of subjects

that are not all referable to public administrations, also to compare all the dynamics within the different components of society and the relationships of each with the citizens. In Table 2 the meaning assigned to each indicator for analysis is summarised in the Analysis column.

### 3. Emergency management operations following the 2016 earthquake events that struck Central Italy

On 24 August 2016, an earthquake of Richter scale magnitude 6.0 struck Central Italy with its epicentre in the Municipality of Accumoli in the Province of Rieti of the Lazio region at 3.32 am. A second earthquake of magnitude 5.4 occurred at 4.33 am in the same area (Figure 2). The effects were devastating.

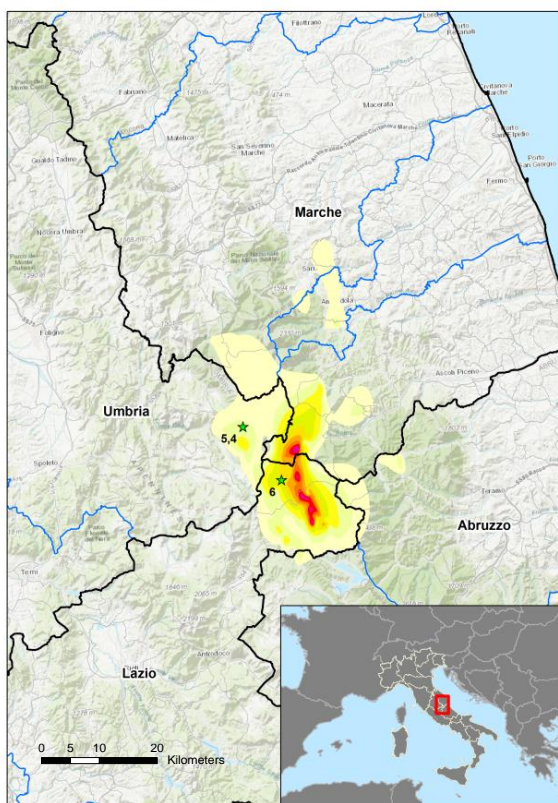


Figure 2. Area hit by the two seismic events of 24 August 2016, shows distribution of intensity according to MCS scale (5 to 11). Source: elaboration on Galli et al., 2017.

Following all the search and rescue operations the total number of victims reported was 299 with numerous injured<sup>5</sup>. Many roads were interrupted or heavily damaged, also due to concurrent landslides. There were also numerous heavily damaged towns, including Amatrice, Accumoli, Arquata del Tronto and Pescara del Tronto (Galli et al., 2016). The cultural heritage of the area concerned was also severely damaged, both in terms of the artistic and architectural heritage, and in the building fabric of the historical centres of the various areas affected.

The Government's response to the tragic events was immediate, and on 25 August 2016 the declaration of the state of emergency lasting 180 days was officially issued across the territory of the four Regions of Abruzzo, Lazio, Marche and Umbria. The epicentre of the seismic event was dramatically positioned in terms of local government management along the borders of the above-mentioned four regions.

On 26 October 2016 two more quakes occurred; the first one at 19.10 with a magnitude of 5.4 and the second one at 21.18 with a magnitude of 5.9. A few days later on 30 October 2016 a devastating earthquake of magnitude 6.5 hit at 7.40 am, destroying the building stock of the affected area. Fortunately, it caused no deaths, since the population involved had already been cautioned to leave their homes, but the number of people left without a home, as well as damage, grew exponentially. The events increased the damage to the cultural heritage of the area affected. As shown in Figure 3, the area hit by the seismic events spread from the initial 62 municipalities to an additional 69 municipalities, thus involving more distinctly the Marche and Umbria regions (Galli et al., 2017).

<sup>5</sup> [http://www.protezionecivile.gov.it/jcms/it/terremoto\\_centro\\_italia\\_2016.wp](http://www.protezionecivile.gov.it/jcms/it/terremoto_centro_italia_2016.wp).

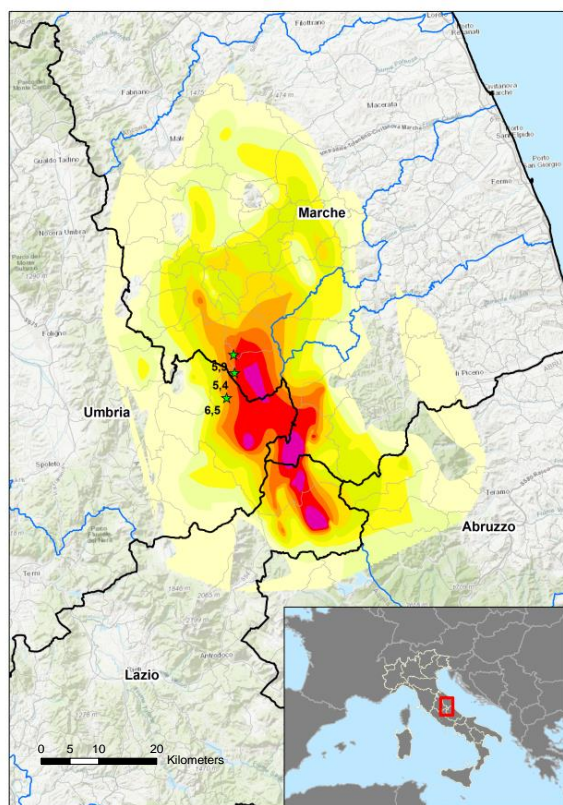


Figure 3. Area hit by the three seismic events that occurred on 26 October 2016 and 30 October 2016, registering the intensity according to the MCS scale (5 to 11). Source: elaboration on Galli et al., 2017.

The first official declaration of the state of emergency was issued by the Council of Ministers on 25 August 2016 and then further extended twice: the first time on 27 October 2016 and the second time on 31 October 2016.

### 3.1 Coordination model adopted in the course of the state of emergency

According to the powers conferred upon the Head of the Civil Protection Department (DPC) by the resolution of the Council of Ministers on 25 August 2016, the DPC Chief issued the first ordinance on 26 August 2016. The ordinance identifies the subjects who ensure the execution of response operations under the coordination of the Head of the Civil Protection Department: the Presidents of the Regions, the Prefects and the Mayors of the Municipalities involved in the

earthquake, together with the components and operational structures of the National Civil Protection Service<sup>6</sup>. The activities carried out in this first phase are those related to Search and Rescue operations, assistance and shelter of the population affected by the earthquake, the safety of the areas concerned and the urgent interventions aimed at avoiding dangerous situations or greater damage.

With regard to the coordination of all relief operations, the Head of the Civil Protection Department establishes the Command and Control Department (now Di.Coma.C.), a local, on-site, coordination structure divided into separate support functions. With subsequent Decree by the Head of the Civil Protection Department of 28 August 2016, the Di.Coma.C. was established in Rieti, in the region of Lazio and all the representatives of the components and operational structures of the National Civil Protection Service permanently ensured the presence of their own representatives in the personal structure of the Department itself and its Centres of Competence. The organizational model also provided for the establishment of coordination centres at the provincial or inter-municipal level, as well as operational centres established by the mayors at municipal level. The organisation of this complex network system requires a careful and accurate coordination that is guaranteed by the Head of the Di.Coma.C. by availing himself of a specific Coordination Unit within it, with the aim, among others, of managing relations with all the components and operational structures of the National Civil Protection Service and ensuring the flow of information.

For this purpose and with the implementation of the provisions of the Civil Protection Department (*Dipartimento della Protezione Civile*; DPC, 2014a, 2014b), with a Decree by the Coordinator of Di.Coma.C. of 12 September 2016, at the Coordination Unit, a specific component was also established for the management and implementation of the territorial/local information system to support the Di.Coma.C.

<sup>6</sup> Art. 13 of Lgs. Decree No. 2 of 2 January 2018, Civil Protection Code. Published in G.U. No.17 of 22 January 2018.

#### 4. Production and exchange of data reported during the 2016 earthquake emergency that hit Central Italy

The initiatives concerning data (generic, geo and Open) during the emergency relief operations implemented in the aftermath of the 2016 Central Italy earthquake were numerous and differentiated, both in terms of new production and sharing and exchange. This paper focuses on eight initiatives, selected as being particularly significant. The relevance of these initiatives comes from the role of the subjects that launched it and for their intrinsic value in the operating context. The paper evaluates the institutional initiative implemented by the central Government, carried out by the National Service of Civil Protection at first and by the Cadastral Cartography Service of Italian Revenue Agency. Local government activities by Regional Cartography Services are also taken into account. Furthermore, active citizenship initiatives like Open Street Map<sup>7</sup> and the TerremotoCentroItalia<sup>8</sup> project have been selected. The research and monitoring initiatives put in place by research institutions such as ISTAT (2016) and INGV<sup>9</sup>, including European services such as Copernicus EMS<sup>10</sup>, are then considered. Each of the above-mentioned initiatives provided data production, publication and exchange, many times in terms of geographic data, which is not always available as Open data but are kept in confined narrow contexts, thus only available to just a few “insiders” and in other cases freely available to all on the Web. This informative ecosystem has never been so accurately described in its complexity: it could become an extremely valuable asset for all categories of users in the reconstruction that will begin throughout the devastated territories and a model for the next emergency that nature has taught us to expect.

<sup>7</sup> <http://download.geofabrik.de/europe/italy.html>.

<sup>8</sup> <https://terremotocentroitalia.info/>.

<sup>9</sup> <http://cnt.rm.ingv.it>.

<sup>10</sup> EMSR177: Earthquake in Central Italy <http://emergency.copernicus.eu/mapping/list-of-components/EMSR177> e EMSR190: Earthquake in Central Italy <http://emergency.copernicus.eu/mapping/list-of-components/EMSR190>.

#### 5. Summary of results

Table 3 shows the comparison of results yielded by the completed form proposed in the analysis paragraph. With regard to the Transparency, Open Data and “Monitoring of public policies” variables, the Italian National Statistics Institute (ISTAT), TerremotoCentroItalia and the National Institute of Geophysics and Volcanology (INGV – National Earthquake Centre), were the most strongly oriented toward the opening and public sharing of data. On the contrary, Di.Coma.C seems to be less inclined to public sharing of data. Even Copernicus (EMS Mapping) paradoxically looks less oriented to an opening and public sharing of data, than would be expected of its institutional mission.

With regard to the Horizontality, “Symmetry of powers” and “Institutionalization of the collaborative Governance Dimension” variables, Open Street Map played the most readily active interaction with user-citizens, while as previously mentioned Di.Coma.C., by its very nature, achieved a much poorer interaction with citizens. ISTAT also shared a similar position, as it is a highly specialised and self-referential institution and rather distant from citizens.

Overall the Open Street Map experience seems to be the more open and collaborative one whilst the Di.Coma.C. is less open and more institutionally self-referential.

Summing up our considerations, the results shown on Table 3 seem to underline the distance or gap between the bottom-up non-institutional initiatives implemented by citizens and the top-down ones operated by the central and regional institutions. This consideration regards the methods of application of Open Government principles, regarding the Open Data variable of Transparency and the participation and collaboration levels of citizens in the training process and use of data.

By contrast, the same results produced by the case study under analysis show relevant examples of data opening (including geographic data), by scientific institutions such as ISTAT and INGV (although limited to seismic monitoring activities), besides bottom-up projects like TerremotoCentroItalia, with similar expected results. It should also be mentioned

that INGV is part of the National Service of Civil Protection and carries out monitoring activities according to a specific agreement with the Civil Protection Department, as it is in fact a DPC Competence Center<sup>11</sup>.

In the case of Di.Coma.C. however, the survey has not been able to highlight the complexity inherent in the definition of data “quality” in terms of the degree of uncertainty such definition entails. Quality generally refers to a set of standard features, such as documentation, update level, accuracy, and certification. The latest Guidelines on Open Data (Agenzia per l’Italia Digitale, 2017) have strongly emphasised this aspect. In the survey carried out, only the presence of metadata, i.e. the documentation of the dataset and dataset update standard, was considered as a quality indicator. Nevertheless, the quality factor is also closely linked to the data publisher’s degree of responsibility, which often turns out to be a decisive element in the publication of a dataset. From this point of view, the data publishers examined are not all similar. Di.Coma.C. is a particularly complex system aimed at ensuring effective coordination and accurate communication of information pertaining to an ongoing crisis or emergency. The system is liable to face many difficulties in publishing datasets that can ensure the above-described level of quality within the degrees of responsibility attributed to the same body; this is a problem that often slows down the dataset publishing process.

If, however, the assessment of the exchange of information at inter-institutional level and not between institutions and citizens is limited, the outcome framework would change drastically. The activities carried out by the Support Functions operating within the Di.Coma.C. are indeed fully grounded in the principles of exchange and data sharing within a clearly defined institutional framework that upholds the principle of subsidiarity<sup>12</sup> as its founding constitutional value. Nevertheless, the fact that institutions communicate between each other in

<sup>11</sup> <http://istituto.ingv.it/1-ingv/progetti/allegati-convenzioni-dpc/allegati-convenzione-quadro-2012-2021/accordo-quadro-2012-2021-allegato%20A.pdf>.

<sup>12</sup> Legislative Decree No. 1 of January 2, 2018: Code of Civil Protection, art. 3, paragraphs 1 and 3.

an effective and cooperative manner could not be taken for granted.

## 6. Earthquake Story Maps published by DPC

In addition to the results of the analysis shown above, it is important to highlight an initiative undertaken by the Civil Protection Department in August 2017, to commemorate the first anniversary after the first earthquake that struck on 24 August 2016. A series of interactive maps<sup>13</sup> concerning emergency management issues are published on the institutional website of the Department, announcing periodic updates for two of them. The topics to be updated concern the state of progress of the projects related to the road system and infrastructure recovery operations and construction sites set up for the realisation of Emergency Housing Solutions.

The understanding of phenomena through the use of maps on the Web is a now widely established practice (Kerski, 2013). Furthermore, the use of Geographic Information Systems and online platforms as an important tool in the subsequent phases of the occurrence of disastrous events is widespread (Baiocchi and Pesaresi, 2015; Potts et al., 2015). Interactive maps created by the Civil Protection Department are created using the ArcGIS online platform (Figure 4)<sup>14</sup> and also provide the releasing of high quality Open Data of the data shown in them, by the addition of the related metadata in standard format of the National Repository of Territorial<sup>15</sup> Data.

<sup>13</sup> [http://www.protezionecivile.gov.it/jcms/it/mappe\\_interattive.wp](http://www.protezionecivile.gov.it/jcms/it/mappe_interattive.wp) and for the road network map see also [http://www.anas-sisma2016.it/index.php?/content/index/arg/menu\\_mappa](http://www.anas-sisma2016.it/index.php?/content/index/arg/menu_mappa).

<sup>14</sup> <https://www.arcgis.com/home/index.html>. For a description of the platform see Marta and Osso, 2015, p. 63.

<sup>15</sup> <http://geodati.gov.it/geoportale/>.



			Data producers during Central Italy Earthquake 2016							
			Copernicus	OSM	TerremotoCentroItalia	Regions	Revenue Agency	ISTAT	INGV	Di.Coma.C
Transparency	Open data	Open datasets	0,5	1	1	0,5	0	1	1	0
		Format	0,5	1	1	0,5	1	1	1	0,5
		License	0,5	1	1	0,5	0	1	1	0
		Update	1	0,5	1	0	1	1	1	1
		Metadata	0	0	0	0,5	0,5	1	0	0
	Monitoring public policies	Open data reuse	0,5	0,5	0,5	1	1	1	1	0,5
		Communication policy objectives	0,5	0,5	0,5	0	0	0,5	0,5	0
		Reports	0,5	1	1	0,5	0,5	0,5	0,5	0,5
	<b>TOTAL Amounts</b>		<b>4</b>	<b>5,5</b>	<b>6</b>	<b>3,5</b>	<b>4</b>	<b>7</b>	<b>6</b>	<b>2,5</b>
Collaborative Governance	Horizontality	Legitimacy output	1	1	0,5	0	0,5	0	1	0,5
		Accountability	0,5	1	1	0	0,5	0	0	0
	Intitutionalization	Presence of legal / institutional devices	0	1	0	1	0	0,5	1	0
		Mutuality of legal/ intitutional devices	0,5	1	0	0	0	0	0	0
	<b>TOTAL Amounts</b>		<b>2</b>	<b>4</b>	<b>1,5</b>	<b>1</b>	<b>1</b>	<b>0,5</b>	<b>2</b>	<b>0,5</b>

Table 3. Summary of results given by the compilation of forms reporting analysis of data produced in the course of the seismic emergency that hit Central Italy. Source: Author’s elaboration.



Figure 4. Story Map on image comparison of Amatrice’s historical centres before and after the three phases of the seismic sequence.

Source: images from Copernicus Emergency Management Service (24 August 2016) and Servizio Centrale TAS-Topografia Applicata al Soccorso of National Fire Corps (26-30 October 2016 and 18 January 2017). Story map from <http://opendatadpc.maps.arcgis.com/apps/MapSeries/index.html?appid=d2c4cd9a006142a1b552deefc355c124>.

Map planning and design involves many different aspects: the strictly technological element includes communication and graphics and above all the commitment to the decision-making process expressed by the executive roles of the organisation and the consequent shaping

of an adequate organisational model, as well as that of the data model construction. These last are the two “critical” factors. Without the strong and determined support from the organization’s decision-making summit and the linking of working groups in the operational processes of

the organization itself, the initiative would not be able to guarantee its duration in time.

The public as well as all subjects involved at different institutional levels responded very well to this initiative undertaken by the Department of Civil Protection. This helped facilitate the sharing of information and also promote the population's active participation in the ongoing emergency management process. In particular, the actual update announced for some maps proved to be quite effective and popular, as confirmed by the consistent attention recorded during the various releases. Thus, the accountability principle implemented by a public authority towards citizens was tested in a particularly complex context (i.e. during a state of emergency), where the effective implementation of public interventions takes on a crucial role for the safety and livelihood of citizens, especially those directly affected by disaster (Figures 5 and 6).

A further outcome of the publication of these interactive maps went on to establish a fruitful collaboration with a few active citizenship

associations that led to the publication of a special web page indicating useful and practical ways to increase the availability and reuse of data published by the Department of Civil Protection for the benefit of citizens and interested communities.

The publication of the story maps on the earthquake aims at strengthening one of the main features envisaged by Open Government programmes, that is, collaborative governance (Bingham, 2010). This is a new way of exercising public authority by public bodies and institutions, which, by applying this paradigm, aim at involving the community, businesses, companies, organizations and single citizens in the decision-making process. It is evident that the perspective of a real collaboration between the public authority and citizens, like the one theorised by Benington and Moore (2011) is still far remote, despite this first experiment during the management of such a major national crisis.

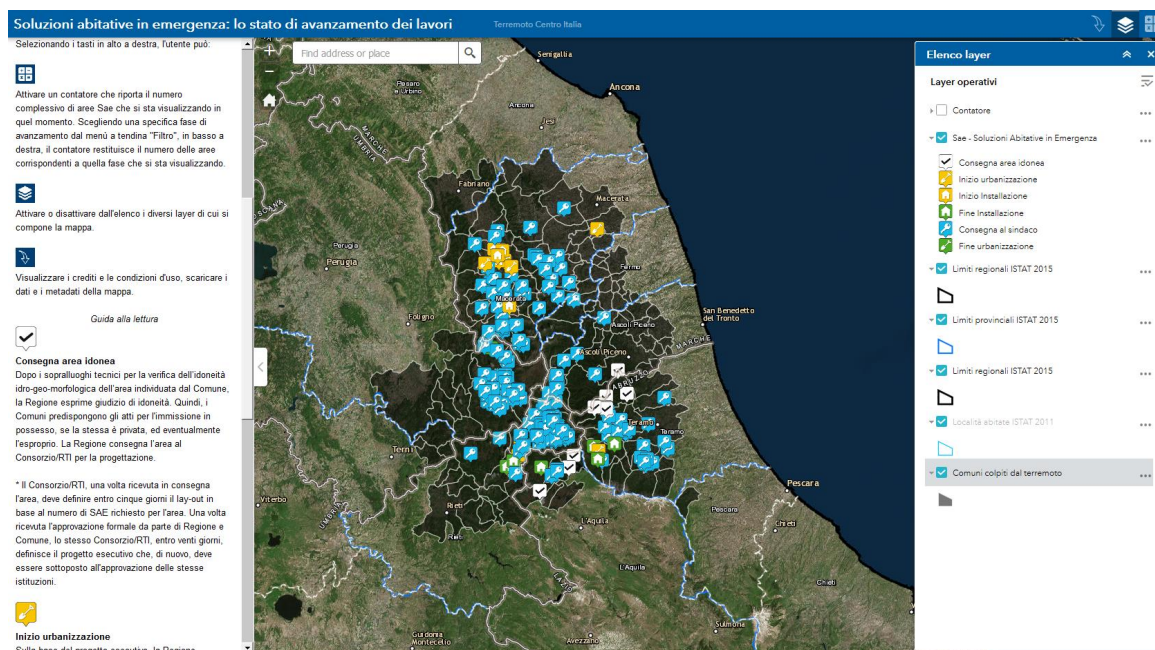


Figure 5. Story Map showing the progressive state of works of the Emergency Housing Solutions “Soluzioni Abitative in Emergenza” (SAE). This map has been updated on a weekly basis since its publication. Source: <http://opendatadpc.maps.arcgis.com/apps/webappviewer/index.html?id=d5cdb0dba50342aba4aeae1644db1f11>.

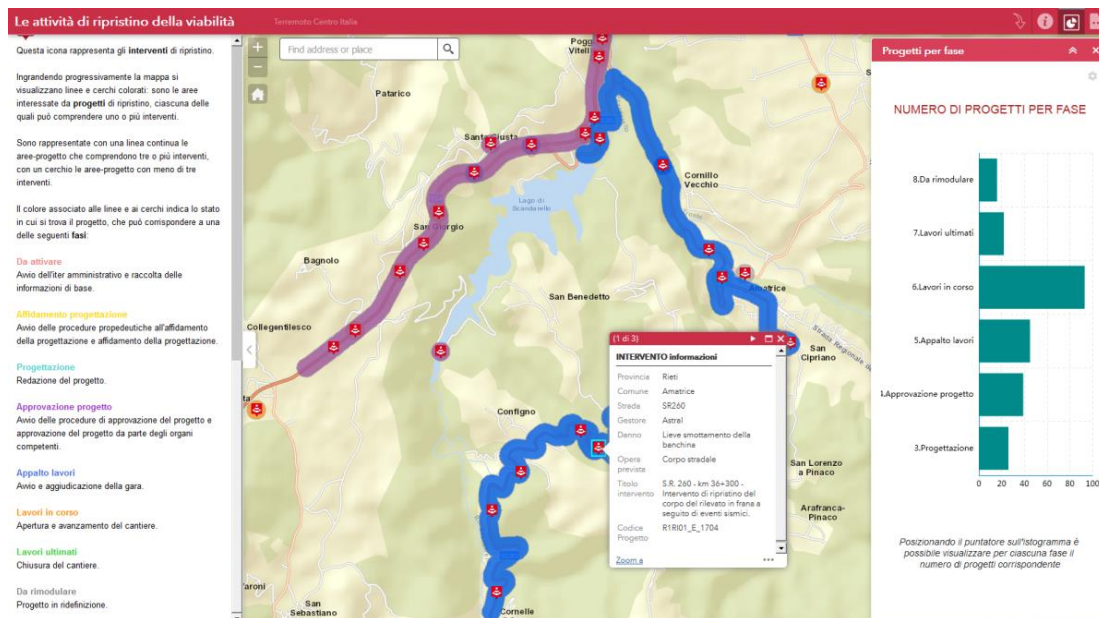


Figure 6. Story Map showing the progressive state of works on the Road Network damaged by the earthquake. This map has been updated on a monthly basis since its publication. Source: <http://opendatadpc.maps.arcgis.com/apps/webappviewer/index.html?id=f16d75957adc4485a3b1a11f58767fb5>.

## 7. Conclusions

While conducting response operations after a major earthquake calamity, the main objective is to prioritise search, rescue and assistance operations thus stressing citizens' demands as the "needy subjects", as opposed to citizens in an ordinary situation that implies a proactive and capable citizenship in terms of participation, collaboration and co-decision. Surely, in the next phase of "reconstruction", after overcoming the state of emergency, everyone will be called in a joint effort to work in the recovery phase and the gap created by the catastrophe will probably be reduced and perhaps even filled. The dynamic activity conducted within the Di.Coma.C. on the data, suggests however that all the conditions exist for a review of the experience carried out at the end of the emergency phase in order to further stimulate data opening initiatives. This will contribute to turning around the actual focus on the application of transparency related only to the legality of the use of public resources for

reconstruction<sup>16</sup> or in the implementation of the obligations of publicity, transparency and dissemination of information<sup>17</sup>.

Referring back to Carlucci et al. (2016), geographical data (and not only) can play an important role both in the immediacy of the event, in support of those relief operators called to intervene, throughout all emergency response operations leading up to the recovery of ordinary activities.

It is easier and more effective to make decisions using geographical data and this becomes even truer if these are easily accessible, with non-restrictive conditions of use, if they are well documented and high in quality, in open formats and accessible from the greatest number of platforms possible. Data needs to become more readily accessible, starting from the

<sup>16</sup> For more information regarding this subject see Chapter IV "Provisions on the matter of legality and transparency" of Act No. 229/2016 of conversion of Legislative Decree 17/10/2016 "Urgent measures in favor of populations affected by the seismic events of 2016".

<sup>17</sup> For more information regarding this theme see Legislative Decree No. 33/2013, as amended by Legislative Decree No. 97/2016.

dialogue between different administrations, until their complete publication. The path to the application of Open Government paradigms must be built through the dialogue and collaboration between administrations and citizens, but also by imposing a deep organisational rethinking. The full adoption of the new Guidelines by all public administrations (Agenzia per l'Italia Digitale, 2017) could represent a decisive stepping stone to the beginning of this process.

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