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Exploring collaborative digital heritage communities: A quantitative assessment of Wiki Loves Monuments in Italy

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Abstract

The debate on the digital transition of cultural heritage has often focused on the opportunities and challenges faced by cultural institutions, but in recent years a growing attention has been devoted to understanding the role of grassroots and collaborative initiatives in contributing to this process. In this article, we study the Wiki Loves Monuments (WLM) contest in Italy, one of the largest and most widespread collaborative projects contributing in documenting cultural heritage through open access tools. Using quantitative and qualitative evidence collected from ten editions of the initiative, the paper investigates the contribution of collaborative digital communities in the production and sharing of

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knowledge about cultural heritage on the Internet. In particular, our findings point out to systematic differences in the rate of documenting monuments across regions and types of municipalities, as well as peculiar patterns of the WLM community in the modes of contribution and re-use of images in Wikimedia projects. The analysis adds insights into the opportunities and challenges that collaborative projects through open access and re-use of digital content can offer for the enhancement of cultural heritage.

Il dibattito sulla transizione digitale del patrimonio culturale si è spesso concentrato sulle opportunità e le sfide affrontate dalle istituzioni culturali, ma recentemente una sempre maggiore attenzione è stata dedicata alla comprensione del ruolo delle iniziative di massa e collaborative nel contribuire a questo processo. Il presente contributo studia l'esperienza italiana di Wiki Loves Monuments (WLM), uno dei più ampi e diffusi progetti collaborativi capace di documentare il patrimonio culturale attraverso strumenti open access. Utilizzando dati quantitativi e qualitativi raccolti in dieci edizioni del concorso, l'articolo esplora il contributo delle comunità digitali collaborative nella produzione e condivisione di conoscenza sul patrimonio culturale su Internet. In particolare, i nostri risultati evidenziano differenze sistematiche nel tasso di documentazione dei monumenti tra le regioni e i tipi di comuni, così come modelli peculiari della comunità WLM nel contribuire con immagini ai progetti Wikimedia e nel riutilizzo di queste immagini. L'analisi contribuisce al dibattito sulle opportunità e le sfide che le iniziative collaborative attraverso l'accesso aperto e il riutilizzo dei contenuti digitali possono offrire per la valorizzazione del patrimonio culturale.

1. *Introduction*

The growing importance of digitization has brought about a profound change in the enhancement, preservation and protection of cultural heritage, as well as the need to understand which resources, tools and methods are necessary to facilitate its documentation, enjoyment and accessibility. However, while much of the digital transition of cultural heritage discourse has focused on the opportunities and challenges faced by cultural institutions, a growing attention has been devoted to understanding the role of grassroots and collaborative initiatives in contributing to this process.

Among these initiatives, the Wiki Loves Monuments (WLM) photo contest represents a case study of particular interest, both because of the size of the community involved and of the cultural assets documented, and because of the use of its contribution to open knowledge through tools that allow to understand the dynamics of knowledge production and sharing on cultural heritage. In fact, since 2010, with the involvement of more than 98,000 participants from 93 countries and more than 1.5 million monuments photographed, WLM has been a unique opportunity to disseminate, promote and protect participating countries' cultural heritage through images shared under free licenses.

This article aims to document through quantitative metrics the Italian experience of Wiki Loves Monuments, to stimulate "evidence-based" insights on how collaborative digital heritage communities can contribute to enhance cultural

heritage. At least until the Covid-19 pandemic, digitization of cultural heritage in Italy was relatively limited or characterized by fragmented initiatives. For instance, according to data from the Italian National Statistics Institute (ISTAT), as of 2019 only 42% of museums and archaeological areas had undertaken digitization activities of their collections, consisting in many cases only of digital catalogues and inventories. In 2022, a national plan for digitizing cultural heritage was launched by the Italian Ministry of Culture, which envisages more investments and a more unified strategy, but whose results have yet to be realized.

Using data on monuments covered by the WLM contest at the municipal level and the use of images on Wikimedia projects, our analysis addresses three main questions: *i)* How many monuments have been documented through the WLM contest?; *ii)* Which regions and municipalities have been most active in documenting monuments?; *iii)* How WLM fosters the production and sharing of knowledge about cultural heritage on the Internet?

In particular, to answer the first two questions, we exploit the difference in participation in the contest by municipal authorities given by a peculiar norm of the Italian Code on Cultural Heritage and Landscape, which requires explicit authorization for the dissemination of photographic reproductions for commercial uses, as in the case of open licenses. Our findings point out systematic differences in the rate of documenting monuments across regions and types of municipalities, as well as differentiating effects in the production and sharing of knowledge related to monuments. Finally, we document peculiar patterns of the WLM community in the modes of contribution and re-use of images in Wikimedia projects. The paper concludes by discussing the opportunities and challenges that collaborative projects through open access and re-use of digital content can offer for the enhancement of cultural heritage.

2. *Toward a conceptualization of collaborative digital heritage communities*

With the spread of the digital revolution, an extensive body of scholarship has focused attention on collaborative online communities as new models for the production and dissemination of knowledge and information resources, exploring several key aspects: governance and organizational models[1], the profile and motivations of contributors[2], the composition of participants and inclusivity of the communities[3], the nature of the decision-making process[4], the patterns of user-

[1] Demil, Lecocq 2006; Faraj *et al.* 2006; O'Mahony, Ferraro 2007.
[2] Malinen 2015; Begin *et al.* 2018.
[3] Hill, Shaw 2013.
[4] Black *et al.* 2011.

generated content production[5] and the value and impacts of the knowledge produced[6]. Collaborative online communities have also been the subject of ethnographic investigations that highlight collaborations and conflicts, bureaucracy, control systems and the aspects that bring them closer to online video game players[7].

Most of the collaborative online communities rely on commons-based peer production[8], an emerging model of knowledge production and organization where the inputs and outputs of the process are shared, freely or conditionally, in an institutional form that leaves them equally available for all to use as they choose at their discretion. Wikipedia, Wikimedia projects and OpenStreetMap represent some of the largest and most established collaborative online communities that rely on commons-based peer production. These communities are based on free and open content and infrastructures (commons-based communities). The licenses and free tools adopted on all content produced or uploaded on those projects are essential for the functioning of communities and their collaborative nature. They allow the creation of derivative works (essential to modify content, enrich, correct, and build it collaboratively) and are always open to re-use, including commercial re-use. Moreover, open online collaborative communities such as Wikipedia are socio-technological systems characterized by the active involvement of human users but also by the presence of software (bots) that yields a sophisticated automated system of content management and defines Wikipedia's ultimate success as a knowledge instrument[9].

Online collaborative communities dedicated to cultural heritage have also blossomed in the last two decades as platforms that harness the collective intelligence and human expertise to safeguard, disseminate, and engage with digital heritage content. These experiences have emerged from the convergence of needs and attitudes expressed by cultural institutions, heritage professionals, and individuals sharing interests and passions for heritage. For example, digital public history initiatives[10] epitomize online collaborative communities that bridge the divide between historians, heritage professionals, and the wider public. By embracing digital technologies, they foster accessibility, participation, and co-creation of historical content. Similarly, in addition to the collaboration through experts' communities of practice that involve representatives of institutions and professionals, several cultural institutions have started adopting a participatory approach, triggering their audience's involvement, activation and expansion[11]. The use of digital technologies has amplified the op-

[5] Aaltonen, Seiler 2016.
[6] Erickson *et al.* 2018; Vincent *et al.* 2018.
[7] Jemielniak 2014.
[8] Benkler 2006.
[9] Niederer, van Dijck 2010.
[10] Noiret 2018; Paci 2021.
[11] Roued-Cunliffe, Copeland 2017.

portunities for participatory processes through new forms of interaction with audiences[12], enabling communities of people and organizations to participate in defining or revising the representation of heritage and territories operated by museums through co-design and co-curating of exhibitions[13], or by using and creatively reinterpreting the heritage of institutions through hackathons, crowdsourcing initiatives, storytelling and online campaigns[14].

Furthermore, the fact that cultural institutions preserve public domain documentation and are often public entities that produce open public data has fostered the collaborative and participatory trend in access and reuse of cultural heritage data and public domain works along several trajectories[15]. A first trajectory stems from the sharing of digital cultural heritage by institutions to activate collaborative communities. This is illustrated for example by the Europeana project, a public sector-initiated platform that aggregates the digital archives of numerous museums, libraries and archives. The primary contributors in Europeana are heritage professionals, while user participation is often in the form of exploring, using, and engaging with the digitized content. The platform encourages collaboration by allowing users to contribute metadata, add annotations and embrace a community-driven approach to curation. The platform offers tools and functions that enable users to curate their own collections, create exhibitions and share curated content with others.

The second trajectory is instead represented by online communities of individuals and volunteers that have been increasingly interested in using such resources to produce and share free knowledge. For example, the ability to upload free documentation that is interoperable with Wikimedia projects and OpenStreetMap gave rise to the first "GLAM cooperation", that is, cooperation with galleries, libraries, archives and museums, a term that began to spread in the late 2000s to focus attention on the homogeneity of the digital content of these institutions. The GLAM-Wiki cooperation started thanks to the initiatives of single individuals, where an active contributor to Wikipedia and the Wikimedia projects has been involved in facilitating collaboration between the institution and the open online collaborative communities through training sessions, events, and uploads of images, documents, and data. This cooperation became known as "Wikipedian in residence"[16]. This type of collaboration often helps match the demand and supply of two key resources for knowledge production in the cultural field: open digitized heritage resources and contributors. On the one hand, cultural institutions supply open digitized heritage resources demanded by audiences and users sharing interest in heritage. On the other

[12] Simone *et al*. 2021.
[13] Grincheva 2013.
[14] Ciolfi *et al*. 2015; Bonacini 2018.
[15] De Rosnay 2020.
[16] Rey-Bellet 2016.

hand, online communities can offer a critical mass of users and contributors that cultural institutions demand as they can hardly build from scratch.

In sum, while collaborative digital heritage communities may encompass a wide range of initiatives that arise in different heritage domains, vary for extension and scope, it is possible nevertheless to identify some key analytical dimensions to characterize and describe them:

1. Content Creation and Curation, which addresses how community members contribute, curate, and enhance the digital heritage resources through their collective efforts.
2. Participatory Processes: central to the concept of online collaborative communities is the active participation of individuals and institutions. This dimension focuses on how community members participate in decision-making, content contribution, data annotation, and the co-creation of knowledge.
3. Knowledge Sharing and Access: while online collaborative communities aim to make digital heritage resources accessible to a broad audience, there can be different degrees of openness across digital heritage communities. This dimension accounts for the mechanisms through which knowledge is shared, such as online platforms, repositories, and digital archives, and how communities ensure accessibility and inclusivity in their dissemination efforts.
4. Community Governance: this dimension explores the governance structures, policies, and mechanisms that facilitate community coordination, decision-making, and long-term sustainability. It encompasses issues like community guidelines, intellectual property rights, and the roles and responsibilities of community members in the control of authoritative content.
5. Technological infrastructure also matters in defining online collaborative communities. Through this dimension it is possible to characterize communities according to the tools, platforms, and digital technologies employed to facilitate collaboration, content creation, curation, and knowledge sharing. It includes considerations of data storage, metadata standards, user interfaces, and the integration of emerging technologies like artificial intelligence and virtual reality.

3. *Wiki Loves Monuments: the contest*

Wiki Loves Monuments (WLM) is an international photography competition, held annually in September. Considering the knowledge gap related to cultural heritage on the Wikimedia projects, the initiative was created to document monuments[17] by sharing freely licensed photographs on Wikimedia Commons,

[17] Within WLM, the definition of a monument varies according to the national context. When

which is one of the most extensive archives of freely usable multimedia resources on the Web. The first edition of Wiki Loves Monuments was held in the Netherlands in September 2010. With more than 12,000 photographs of historic monuments collected, the Dutch initiative was so successful that it expanded to 18 countries across Europe the following year. Since 2012, the contest has also spread to other continents, covering 35 countries, including Canada, Chile, South Africa, and the Philippines and Antarctica. In 2013, the competition finally established itself internationally with 53 countries participating and, to date, editions of the contest have taken place in more than 90 countries.

Between 2010 and 2021 Wiki Loves Monuments has helped document through photographs 1.5 million monuments, with more than 2.6 million images uploaded by more than 98,000 participants – averaging more than 10,000 participants per year. Over time, the contest has consistently had more than 7,000 individuals per year participating and 2013 was the year that saw the highest number of photographs uploaded, 370,000, and then stabilized in subsequent editions consistently above 200,000 photographs.

Wiki Loves Monuments has also been organized annually in Italy since 2012. In aggregate between 2012 and 2020, more than 7,900 participants have contributed to the Italian edition of the contest by uploading more than 155,000 photographs to Wikimedia Commons. As shown in Figure 1, after a start-up phase in 2012-2013, the level of participation remained relatively stable at around 900-1000 participants per year until 2019, and with the number of uploaded images increasing until 2018 peak year (with more than 25,000 entries).

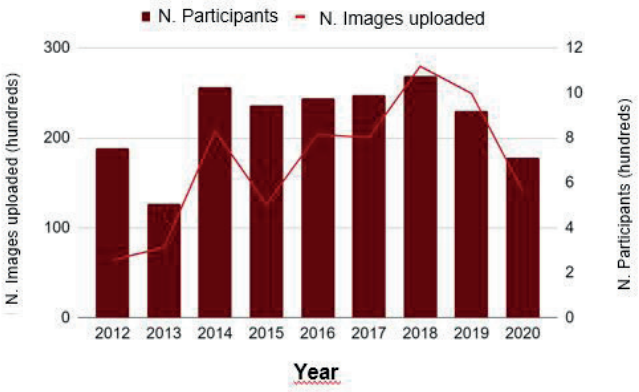

Fig. 1. Participants and image uploaded, WLM Italy, 2012-2020

existing, the contest is based on the official lists of cultural heritage; if there are no official lists, the lists are drawn up by the organising institutions. In the case of Italy, the list of monuments includes historic buildings, castles and fortifications, religious buildings, museums, archaeological sites, works of public art, WWF oases, monumental trees, commemorative plaques, stumbling blocks and war memorials.

As documented by a survey conducted in 2019, it is possible to outline some distinctive traits of the participants, and their motivation for contributing to the Wiki Loves Monuments project. Participants are generally adults (40 percent between 35-54 years old) who learn about the contest because they already visited Wikipedia pages or other Wikimedia projects, or because they were already involved in previous editions of Wiki Loves Monuments. The motivation indicates how Wiki Loves Monuments attracts photography enthusiasts, but also individuals primarily interested in the enhancement of cultural heritage, who contribute to Wikipedia by sharing freely accessible and reusable content. The contest also provides an opportunity to discover local cultural heritage.

Wiki Loves Monuments is not simply a photo contest, but an important collaborative tool for the digital documentation of monuments. As illustrated in Figure 2, before a monument can be photographed and its images uploaded online for the purposes of the contest, two essential preparatory steps are required. First, it is necessary to identify monuments that can be the subject of shareable photographs through free licenses (Phase 1). Through this work, the organizers of the contest create a public list of monuments. Equally important is the presence of a digital interface, which is necessary to associate the photographs with the profiles of the cataloged monuments, thus enriching the content related to the cultural property with metadata (Phase 2). This interface is the Wikidata repository.

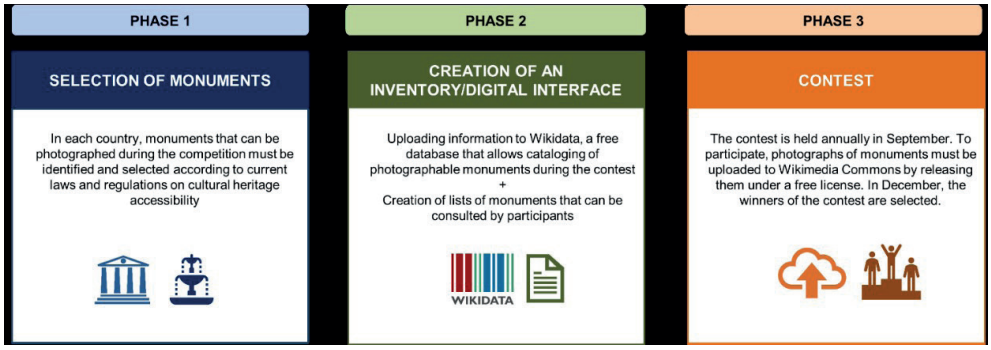

Fig. 2. Phases of Wiki Love Monuments projects

4. *Assessing WLM Italy experience*

4.1. *Patterns in documenting heritage*

In Italy, the Code of Cultural Heritage and Landscape (Legislative Decree No. 42 of January 22, 2004, as amended) regulates photographic reproductions of cultural property. This regulation subjects the reproduction of cultural

property in the custody of ministries, regions and other territorial public entities to obtaining authorization from the entity guarding the property. Although amendments to the Code in 2014 and 2017 now allow free reproduction for dissemination activities by any means of images of legitimately acquired cultural property (thus including online), this exemption applies only for noncommercial purposes. It explicitly excludes the possibility that images can be further reproduced for profit. In contrast, the free licenses commonly requested in Wikimedia projects always allow for commercial purposes. The dissemination and re-use of cultural heritage images through free licenses is therefore subject to the permission free of charge of the owning and managing entities.

We exploit the information on the authorizations given at municipal and regional levels to analyze Wiki Loves Monuments' patterns in documenting and sharing monuments and cultural sites in Italian municipalities. We explore two main analytical dimensions:

– The rate of participation in the contest through permissions on the properties;
– The level of coverage on the assets in terms of images taken and uploaded.

Table 1 provides a first aggregate perspective[18]. In 2021, Wikidata repository has 69,030 objects identified as monuments and cultural heritage located in Italy. Of these, only 23 percent have obtained permission for reproduction with free licenses in about 2,130 Italian municipalities. In aggregate, more than 6,200 monuments have been documented with at least one photograph taken and uploaded as part of the contest, corresponding to 39 percent of the properties authorized, but only 9 percent of the total number of Italian monuments recorded in the Wikidata repository. At a national aggregate level, these data indicate how wide the margins are to extend the documentation and sharing of images of Italy's historical-architectural heritage with the involvement of the Wikimedia communities.

Cultural heritage items recorded on Wikidata repository	69,030 in 6,677 municipalities
Cultural heritage objects with WLM permission	15,908 in 2,130 municipalities (27%) - 23% of all the cultural heritage items
Cultural heritage items with at least one photo shot and uploaded within WLM contest (2012-2021)	6,223 - 39% of the total amount of items with permission - 9% of all the cultural heritage items
Number of photos shot and uploaded within WLM contest (2012-2021)	133,334 - About 21 photos per item with WLM permission

Tab. 1. Coverage of WLM Italy, aggregate national data, 2012-2021

[18] Data have been collected on May 2021.

The aggregate data at the national level are already informative of the reach of the collaborative digital heritage communities in documenting Italian cultural heritage, but they do not provide sufficient insights into the Wiki Loves Monuments experience at the territorial level.

Figure 3 provides a regional perspective into the coverage by WLM of the Italian cultural heritage. Looking at the average number of assets per municipality and the percentages of authorized assets in Figure 3a, two main trends can be identified. First, there are marked differences in authorized assets between regional territories, with, for example, 74 percent of monuments authorized in Basilicata compared to 11 percent in Abruzzo. These differences may indicate either diverging sensitivities of institutions in regions to issuing authorizations or different efforts by the Wiki Loves Monuments communities to raise awareness and obtain authorizations. Second, regions with the highest number of documented cultural properties per municipal area (such as Tuscany and Umbria) have a lower percentage of authorized properties than the national average. A higher number of cultural properties in a territory may imply a higher number of entities holding cultural properties, making the application process more burdensome.

Figure 3b illustrates differences in the photographic coverage of properties across regions. The horizontal axis expresses a measure of the activism of contest participants in terms of the average number of photos taken and uploaded per authorized monument. On the other hand, the vertical axis indicates the extent of coverage in terms of authorized properties that were photographed. The point size indicates, at the regional level, the percentage of authorized assets per regional territory. Again, two main trends can be observed. There is a clear positive relationship between the measures on the two axes, which signals that the coverage of authorized assets increases in territories where participants are more active. At the same time, except in cases such as Basilicata, no positive relationship is observed between the percentage of authorized assets and the percentage of authorized assets photographed.

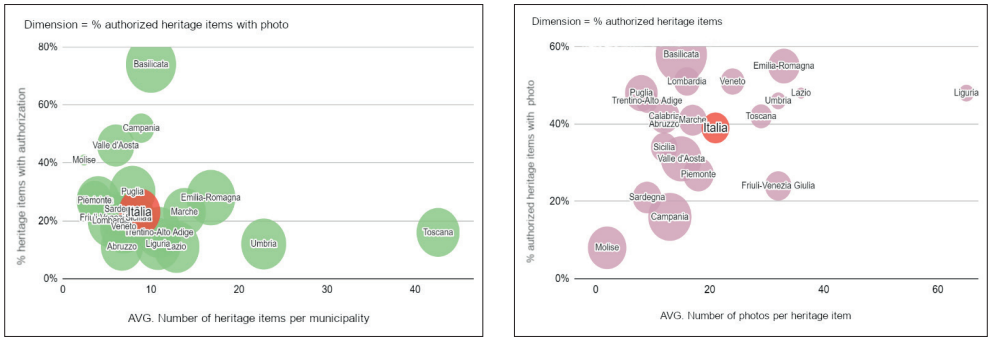

Fig. 3. Regional variation in monuments authorized, with photos and number of images

Finally, the analysis at the level of municipal territories allows for a more detailed assessment of differences in the results of Wiki Loves Monuments, also considering that many municipal administrations are often the administrations issuing authorizations on the assets to be photographed for the contest. In particular, for this analysis, we chose to classify municipalities by population size and tourism vocation type, a typology developed by ISTAT to classify municipalities according to tourism density[19].

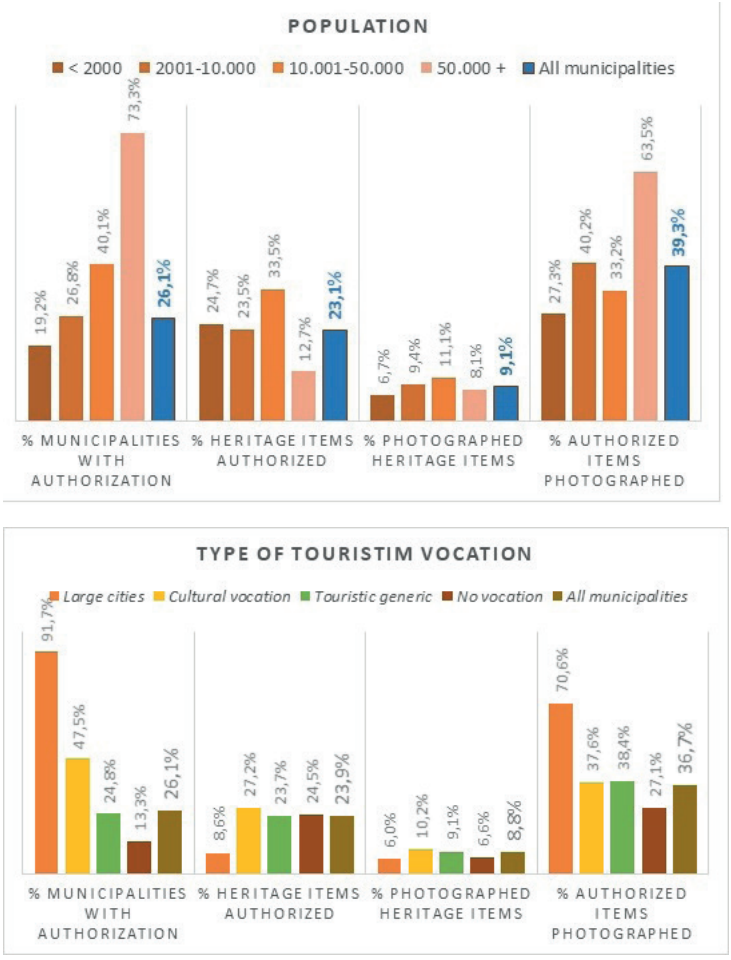

Fig. 4. WLM coverage per type of municipality

As illustrated in Figure 4, the share of municipal areas where authorizations have been issued increases with population size and the cultural tour-

[19] <https://www.istat.it/it/archivio/247191>, 27.07.2023.

ism vocation, with 73 percent of municipalities with more than 50,000 inhabitants and 91 percent of large tourist cities that have issued permits. In contrast, municipalities with less than 2,000 inhabitants or those with no tourism vocation are significantly below the national average. However, the percentage of authorized assets is markedly lower in the largest municipalities and large tourist cities (12 percent and 8 percent, respectively). Photographic coverage of the competition also increases as the size and tourist vocation of the municipality increases. Compared to a national average of 8 photos per authorized asset, only municipalities with more than 50,000 inhabitants or those with cultural vocation and large tourist cities have a higher number of photographs. Similar results are observed when considering the percentage of authorized assets with photos.

4.2. *Production and sharing of knowledge on cultural heritage*

For many Wikimedia projects, one of the primary purposes of collecting, systematizing, and making images and other multimedia resources available on Wikimedia Commons lies in the opportunity for the re-use of knowledge on Wikipedia, that is, to enrich Wikipedia articles with this content by improving the quality and detail of the information provided.

In the case of Wiki Loves Monuments, it is plausible that Wikipedia articles related to municipalities are most affected by the possibility of using photographs uploaded as part of the contest. Indeed, the articles of municipalities on Wikipedia in Italian have a section dedicated to the area's historical heritage and cultural assets.

The size of Italian municipalities' Wikipedia articles has generally grown over the 2012-2021 period. However, as illustrated in Figure 5, the Wikipedia articles of municipalities where assets have been authorized and photographs uploaded show significantly greater growth in size, as measured in bytes of textual information. On average, articles of municipalities for which no photographs were uploaded grew by 50 bytes per month, compared to 100 bytes per month for articles of municipalities that benefited from Wiki Loves Monuments shots. It is also interesting to note that this difference is present, albeit with different values, for each size class and tourism type of municipality.

Although the data do not allow us to determine the direction of the causal link, it is undoubtedly possible to say that the municipalities whose Wikipedia articles have been most expanded and enriched with information are the same ones that have joined Wiki Loves Monuments and their monuments photographed and shared on Wikimedia Commons.

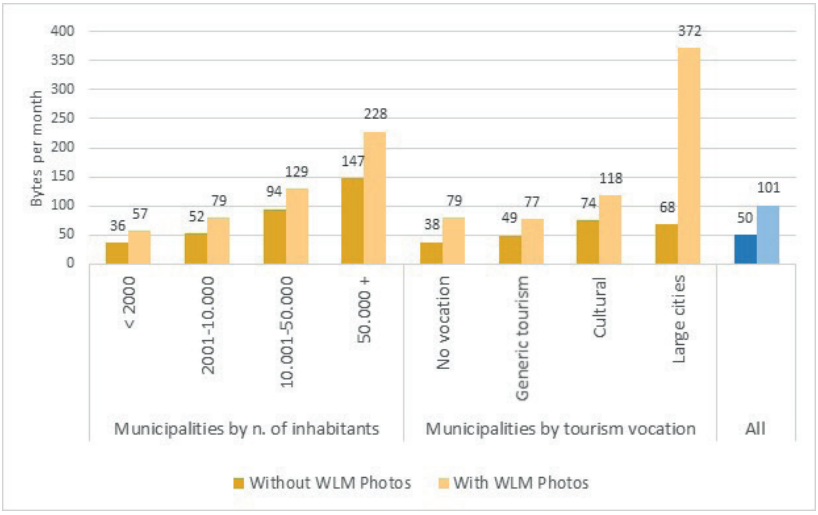

Fig. 5. Length of the Wikipedia article of Italian municipalities, 2012-2021

Period of analysis: September 2012 – May 2021; 1 byte roughly corresponds to 1 character of text on Wikipedia articles.

For the articles of municipalities for which no photographs were uploaded as part of WLM (Without WLM photos), the change was measured from September 2012 to May 2021. For articles of municipalities for which photographs were uploaded (with WLM photos), the change is included from September of the year in which the first upload occurred until the end of the period.

A second dimension chosen to measure the impact of Wiki Loves Monuments on the Wikipedia articles of Italian municipalities is the number of views these pages have received over time.

The data collected allows us to analyze the period between July 2015 and May 2021, a time frame of less than 10 editions of the contest. Compared to the growth trend observed in the length of Wikipedia articles, the number of views has not had noticeable increases over the period considered, while page views are instead susceptible to seasonal or monthly variations.

Given these limitations, it is not possible to make a synthetic comparison as in the case of the length of Wikipedia articles. However, as illustrated in Figure 6, it is clear that there are marked differences in monthly Wikipedia page views between municipalities whose monuments have benefited over time from the uploading of photographs as part of Wiki Loves Monuments (WLM photos) and those that have not been enriched with images taken of monuments (No WLM photos).

Again, for each size class, the articles of municipalities whose monuments were photographed have systematically more views than those whose cultural assets were not photographed.

While considered with caution, this result reinforces the evidence already found on article length.

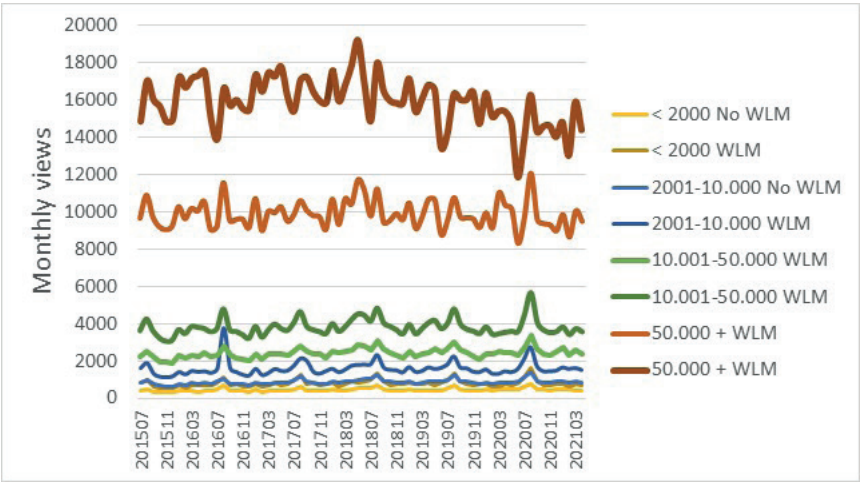

Fig. 6. Average views per month of Wikipedia articles of Italian municipalities, 2015-2021
WLM indicates municipalities with uploaded photographs as part of WLM; No WLM indicates municipalities for which no photographs were uploaded as part of WLM.

So far, we have analyzed how Wiki Loves Monuments has contributed to document Italy's cultural heritage at the municipal level. We now analyze the effects and dynamics of Wiki Loves Monuments by taking images as the main unit of observation. In particular, we study the dynamics of the Wikimedia communities, such as participants' contributions and the use and re-use of photographs.

In order to more objectively assess the results obtained by Wiki Loves Monuments organized in Italy, we have conducted a comparative analysis that includes the images of Wiki Loves Monuments implemented in France and Spain. These two countries present similar characteristics to Italy in terms of socio-demographic factors, the importance of historical and artistic heritage and the number of editions of the contest. Table 2 reports the main metrics adopted.

With more than 155,000 images taken from 2012 to 2021, Wiki Loves Monuments organized in Italy has the highest levels of contribution in terms of number of photographs uploaded online. This result can be appreciated, especially when compared to the other two countries where the contest has been organized since 2011. Looking at the number of photographs taken by participants, in all three countries we see that the number of images uploaded depends on the contribution of a small number of very active participants, with some singular differences. In France, the weight of the most active users in contributing to the project is relatively lower. The images uploaded by the first most active user is 8% of the total, while if the first 5 most active users are considered, it reaches 29%.

With 43% of photographs uploaded by the top 5 users, the Spanish case is emblematic of how a few extraordinarily passionate and active individuals

make essential contributions to document monuments. In this comparison, Italy stands out for the highest contribution made by a single participant, Sailko, with more than 35,000 photos uploaded to Wikimedia Commons accounting for 22% of the total contributions.

	Italy	France	Spain
N. of photographs	155,000	145,000	133,000
% of photos uploaded by 5 most active users	36%	29%	43%
Number of images re-used	15,000	30,000	28,000
% of images re-used	9	20	18
Number of Wikimedia projects	210	247	242
Number of Wikipedia articles enriched	26,000	107,000	84,000
% of Wikipedia articles in local language	34%	40%	59%
% of Wikipedia articles in other languages	66%	60%	41%
Number of views (year 2019)	145 million	275 million	207 million
% of views top 10 images	8%	5%	9%
Gini index	0.88	0.91	0.93

Tab. 2. Metrics on Wikimedia communities uses of WLM photos from Italian, French and Spanish editions

Once images of monuments are uploaded to Wikimedia Commons through a free license, they can later be used on the Internet, fostering the re-use of collected and documented knowledge about cultural heritage. Since the first edition of the Italian contest, more than 15,100 photographs taken as part of Wiki Loves Monuments have been re-used in 210 Wikimedia projects, enriching more than 26,000 project pages. This data offers for the first time a quantifiable metric to assess in objective terms the extent of image re-use within one of the largest collaborative knowledge production and sharing communities. However, although positive, the re-use of images produced within Wiki Loves Monuments Italy is lower than that of France and Spain, especially in relation to the number of images re-used and the number of articles enriched. A possible explanation for this result may be sought in the different size of the language communities in the three countries, a fact that may be related to a different number of actors active in Wikimedia projects.

The data presented in the table further elaborate on the metrics of image re-use. As pointed out earlier, Italy with 9% of re-used photographs appears to be far from the re-use levels of Spain and France (18% and 20%, respectively). Beyond the total numbers, the collected data allow us to observe in which Wikimedia project the images were re-used. Interestingly, for Italy, photographs of monuments are used to enrich about 7,500 articles on Wikipedia in Italian (accounting for 35% of enriched Wikipedia articles), but over 13,000 articles

in other language editions (such as German, English, and French). In other words, the re-use of Wiki Loves Monuments images has a superior effect in producing knowledge of Italian cultural heritage in languages other than Italian. This trend can also be seen for France. In contrast, the more pronounced linguistic diversity characterizing Spain results in greater re-use of images in Wikipedia articles in the languages spoken in the country (Catalan, Castilian and Basque), compared to those in other languages.

To analyze the attention generated by Wiki Loves Monuments images, the number of views in 2019 was examined. For all three countries considered, considerable numbers are reached, signaling the value and potential of sharing cultural heritage in Wikimedia projects. The table also presents some metrics regarding the distribution of views per image. In all 3 cases, the Gini index, an indicator of inequality in views is very high (around 0.9 out of a maximum of 1), clearly indicating a dynamic of attention polarization, which is relatively common on the web.

5. *Discussion*

The approximately 8,000 people involved, the 6,200 monuments photographed, and the 155,000 images taken and shared on Wikimedia Commons demonstrate the peculiar nature of the Wiki Loves Monuments project, supported by communities of volunteers active and determined in documenting and disseminating Italy's cultural heritage through a participatory content creation project. In the field of digital heritage enhancement, it is difficult to find similar initiatives in Italy in terms of the scope and involvement of participants.

Interestingly, the Wiki Loves Monuments project can be interpreted in light of the Council of Europe Framework Convention on the Value of Cultural Heritage for Society (Faro Convention), recently approved by the Italian Parliament. Indeed, the Convention recognizes the concept of a heritage community as a group of people who value specific aspects of cultural heritage and wish to sustain and pass them on to future generations as part of public action. However, to date, the debate on the role of heritage communities has mainly focused on geographically circumscribed groups of people and cultural and landscape resources in their immediate area[20].

In this perspective, the Wiki Loves Monuments community can be conceived as a heritage community experience, built through the more fluid links of the digital sphere, but whose very nature makes it even more innovative and pioneering in participatory processes of cultural heritage enhancement at a global scale.

[20] Sciacchitano 2020.

The second element of reflection proposed by the results of this study concerns the effects that free access and re-use of images of monuments can have on the promotion of cultural heritage and places. The data previously illustrated show that more than 26,000 Wikipedia articles were enriched with images of monuments uploaded as part of Wiki Loves Monuments in Italy. At the same time, Wikipedia articles related to municipalities enriched with photos from the contest received more views and appeared to have more detailed information.

As difficult as it is to establish a causal link, these pieces of evidence point to Wiki Loves Monuments's potential to contribute to the cultural promotion of Italian territories, including tourism. Today more than ever, the web and digital content represent gateways to learning about and exploring the richness of Italian territories' historical and artistic heritage. A recent study[21], developed through a controlled experiment of Wikipedia article enrichment on a sample of Spanish cities, suggests precisely how the informative quality of Wikipedia articles about cities can have positive effects on tourist arrivals. This result can be explained considering that Wikipedia and other Wikimedia projects are among the most consulted resources or first in search results for information about places and cities. Small municipalities with fewer resources for digital promotion of their territories could be the ones to benefit most from making images of their monuments available through free licenses.

Against the positive results, analysis of the Italian Wiki Loves Monument experience also suggests some potential limitations:

- Only 40 percent of the monuments for which authorization was obtained were photographed;
- At the territorial level, there are marked differences in the photographic coverage of authorized properties between regions;
- Re-use in Wikimedia projects of images taken in the Italian competition is lower than those taken in competitions in other European countries.

These findings underlie potential internal operational challenges within the Wiki Loves Monuments communities and the need to identify strategies to extend the results achieved so far. Such strategies will necessarily need to address the following issues:

- How to incentivize or raise awareness of contest participants to photograph monuments that have not yet been photographed?
- How to stimulate volunteer involvement and promote the contest in regions and territories where participation has been lower?
- Is it possible to incentivize more meaningful use of photographs to document cultural heritage in Italian territories through Wikipedia articles and Wikimedia projects?

[21] Hinnosaar *et al*. 2021.

In this context, it is worth noticing that the Wikimedia Italia association, partly prompted by these findings, has undertaken new initiatives to cope with these challenges. In 2022, visualizations have been created to monitor the cultural heritage data on Wikidata, the cultural heritage entered in the competition and the available images[22]. An app has been enhanced and advertised to allow participants to easily identify monuments in the competition that have already been photographed from those that do not yet have photographs[23]. A contest was organized alongside and after Wiki Loves Monuments to promote the re-use of images and the improvement of their categories and metadata[24]. The competition also experimented with a thematic approach focusing on castles and fortifications: a list of assets selected by the Istituto Italiano Castelli – co-organizer of Wiki Loves Monuments in Italy in 2022 with Wikimedia Italia – have been included among the monuments following the principle of an authorization by default with an opt-out option. Furthermore, an event in Calabria was organized by Wikimedia Italia and with its financial support to produce images of one of the least documented regions on Wikipedia and the Wikimedia projects and the event produced around 2,000 images of 320 monuments located in 50 municipalities[25].

Finally, an additional point should be made about the knot represented in Italy by the rule of the Cultural and Landscape Heritage Code that requires explicit authorization in the case of disclosure of photographic reproductions for commercial uses, as in the case of open licenses. In the 10 years of the competition, only 26 percent of public administrations and local authorities have granted authorizations, and 23 percent of the more than 69,000 monuments surveyed have obtained authorization for the dissemination of images through open licenses. It is hard to imagine that the institutions that have not granted permissions are entirely opposed to free digital sharing of cultural heritage to avoid lucrative re-use. This argument can also be supported in particular, considering that income from concessions for the use of the cultural property is known to be a residual part of the income of cultural institutions.

A more likely explanation can be found in the procedural costs that the rule imposes on both citizens and institutions. As documented in the Wiki Loves Monuments experience, these costs relate to:

[22] Visualizations of Wiki Loves Monuments in Italy and Italian cultural heritage, <https://data.wikilovesmonuments.it/>, 27.07.2023.

[23] App Wiki Loves Monuments, <https://www.wikimedia.it/news/la-nuova-app-per-partecipare-a-wiki-loves-monuments-italia/>, 27.07.2023.

[24] Contest to promote the improvement of content and data related to the Italian cultural heritage, <https://it.wikipedia.org/wiki/Progetto:Wiki_Loves_Monuments_2022/Concorso_miglioramento_contenuti_patrimonio_culturale_italiano>, 27.07.2023.

[25] Wikigita Calabria 2022, <https://it.wikipedia.org/wiki/Wikipedia:Raduni/Wikigita_Calabria_primavera_2022>, and report, <https://www.wikimedia.it/news/quel-che-succede-in-calabria-rimane-su-commons/>, 27.07.2023.

1. The costs bore by the organizers in the identification of entities that have one or more cultural properties in their care, the work and time required to submit requests formally, the outreach work to obtain permissions on time if the entity agrees, and the work of verifying that the uploaded images correspond to the authorized properties;
2. The time required by institutions to assess the appropriateness of the requests and the work required to manage the permissions paperwork;
3. For participants in the competition, the information costs involved in identifying in the territories the assets that can be photographed and the images shared versus those for which there is no authorization.

From the data and interviews conducted, it emerges that small municipalities and those with lower tourist-cultural vocation are those where it is more challenging to obtain authorizations due to less awareness or competencies to assess the opportunities offered by the free sharing of digital images of publicly displayed assets. The number of authorizations in larger cities with a higher density of cultural assets is relatively higher. However, the fragmentation of ownership over cultural assets makes the process of applying for and obtaining authorizations more burdensome, with the result that in these areas the percentage of authorized assets is lower on average.

6. *Conclusion*

The article has used the Italian experience of Wiki Loves Monuments to explore the role of collaborative digital heritage communities in documenting and enhancing cultural heritage. While collaborative digital heritage communities are a flourishing phenomenon in the cultural field, their characteristics may vary depending on various factors, from the type of participatory processes, the level of decentralization in collaborations, to the level of openness in the use of digital content. The case of Wiki Loves Monuments, aiming at crowdsourcing the documentation of monuments and making available the images through open licenses in the Wikimedia Commons repositories, represents to our knowledge one of the largest and most open collaborative communities in the digital realm.

The results of our investigation make it possible develop empirically based considerations regarding the opportunities and challenges that free access and re-use of digital content can offer for the valorization of Italian cultural heritage. In fact, this study represents a pioneering case in which an attempt has been made to document the practices and measure the effects of a collaborative digital heritage community to enhance cultural heritage through the production and dissemination of digital content, collecting data and developing metrics that can stimulate a debate that goes beyond pure qualitative analyses.

While the study has mainly focused on the inner dynamics of the communities and on the outputs reached in documenting cultural heritage and sharing the digital reproductions, it leaves open several avenues of research that are worth to be explored in the future. First, the recognition of the diversity of participatory initiatives in content creation and sharing in the heritage field suggests that a more extensive comparative analysis can be conducted to better characterize the phenomenon of collaborative digital heritage communities. Second, the data collected on the WLM Italy experience do not allow for a definitive answer on the impact that documenting cultural heritage with open tools can have for society, such as for tourism spillovers on territories. In this perspective, a future avenue of research may be to test with statistical techniques whether in the Italian municipalities where monuments have been documented by the competition there have been statistically significant changes in tourist flows. Finally, this paper indirectly touches upon the debate on the benefits and costs of making digitized cultural heritage open access. This issue seems to be more relevant for museum collections whereas the Wiki Loves Monuments experience is mainly focused on the digital reproduction of monuments and buildings. To address these issues, more focused studies on the museum sector comparing different models in digital collection management are needed. In this perspective, this study can provide some insights into the development of metrics on image re-use by online collaborative communities.

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