

# COVID-19 Effects on Cultural Heritage: The Case of Villa Adriana and Villa D'Este

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**Abstract** – The paper aims to provide a clarification of assessing insurance risk related to an asset owned by a subject under public law and, more specifically, to an economic cultural asset. This study is aligned with key aspects proposed by the EU for the protection of the cultural heritage from natural disasters. In the first place, given the peculiarity of the material inherent to cultural heritage, a motivation underlies the search for the correlation between the latter and the commonality. Secondly, it appeared necessary to verify the differences, similarities and importance of the economic management of cultural heritage in order to understand the social, economic, material and intangible importance of an asset managed in an economic way within a social axis (municipality). The third reason relates to the general severity and the risk and subsequent damage that a hazard, such as a pandemic outbreak (COVID-19), can cause on one or more cultural heritage. In the final analysis, perhaps the most meaningful aspect underlies the verification of the possible consequences in the analysis of summations of losses generated by a hazard in order to allow a prospect of what could be the consequences of such a catastrophic scenario.

**Keywords** – Covid-19; cultural heritage; losses; natural hazard; risk assessment

## 1. INTRODUCTION

### 1.1. *The Organization and Protection of the Cultural Heritage in Italy*

It appears prodromal and necessary to carry out a brief analytical and temporal excursus on the political measures that have affected this broader concept in the context of the Italian Republic. Then, the authors would proceed to an examination of the ontological concept relating to nature referred to in the sub appropriation of the material and intangible asset [1] belonging to and derivation of publications corresponding to cultural heritage [2].

A department responsible for the protection of cultural and environmental heritage will only find its formal entry into the country's institutional landscape in 1974/1975.

The most significant publication of the Department is attributable to the acts of the Investigation Commission for the protection and enhancement of the historical, archaeological, artistic and landscape heritage, established by law No. 310, known as the Franceschini Commission, named after its President [3]. The authors describe the legislative and legislative implementation that has taken place and has affected the sector of cultural heritage. In the following, in the drafting of the text, the authors explain the qualitative

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connotation of the term ‘cultural heritage’, highlighting universally recognized, objective and subjective distinctive features.

Starting from the chronological excursus of the Italian Law in the Cultural Heritage field, the Ministry, which will take the name of Ministry for Cultural and Environmental Heritage, was born by decree law 14 December 1974, No. 657, converted into Law 29 January 1975, No. 5, will then find complete organizational articulation with the Decree of the President of the Republic (D.P.R.) December 1975, No. 805. The responsibilities relating to Antiquities and Fine Arts, made the competent public body to decide to postpone the transfer of competences in the field of entertainment (3<sup>rd</sup> paragraph of article 1 of decree law 657/1974).

The following events seen in 1998, by the legislative decree of 20 October 1998, No. 368 and subsequent amendments and additions, the Ministry assumes the name of Ministry for cultural heritage and activities, following the transfer of competences in the field of sports and sports facilities and in the field of entertainment, (i.e. cinema, theatre, music, travelling shows and dance); with the decree law 18 May 2006, No. 181, the competences in matters of sport are attributed to the Ministry for youth policies and sporting activities. In 2006, the organizational system by Departments was replaced by a system that still includes a general secretariat and general management, and Italy moved from a horizontal organizational model to a pyramid system. Given the D.P.R. 26 November 2007 No. 233, a new organizational model is issued which sees the birth of seventeen general managers with the function of regional directors, while in 2009 with D.P.R. 2 July 2009 No. 91, a new regulation for the reorganization of the Ministry is issued. In addition to statements of rationalization, efficiency and economy, sees the birth of a general direction for the enhancement of cultural heritage. In 2013 with law no. 71 the Ministry assumes a new name of Ministry of Cultural Heritage and Activities and Tourism [4], MIBACT, on 21 October 2013 the Office for Tourism Policies passes from the Presidency of the Council of Ministers to MIBACT. During 2014, a further reorganization of the Ministry took place following the provisions made by the so-called ‘Spending review’, by reason of which each Ministry was required to reduce its workforce, will thus lead to the issuance of the Decree of the President of the Council of Ministers 29 August 2014, No. 171 containing: ‘Organization Regulations of the Ministry of Cultural Heritage and Activities and Tourism in accordance with Article 16, paragraph 4, of Decree Law April 24, 2014, No. 66, converted into law No. 89 [5]. It is evident that the cultural heritage system has undergone significant organizational and institutional changes over a few decades, highlighting critical issues and operational difficulties. The new Regulation intends to pursue broader objectives whose effects are difficult to predict over time, with the awareness of the possibility of having to make further changes and additions. During last years the fragile ministerial structure has encountered difficulties that cannot always be overcome, with serious damage to the entire protection system.

The new Regulation is developed in seven Heads and 41 articles plus two tables A and B relating respectively to Organic Endowment of Management and Organic Endowment of the Areas. The design sets itself a number of goals that aim to integrate culture and tourism, the overcoming the multiplication of command lines, the lack of autonomy of the Museums, and a new attention towards contemporary art and creativity [5].

Cultural heritage is a wealth that has its own resources inherent in the innate objective meaning, to be exploited even if sometimes new ones have to be added, in terms of people, skills and money or in the form of capital contributions for maintenance or, again, for substantial changes in content and form.

Cultural heritage contributes to identity, image, education, landscape, land management, housing heritage, the satisfaction of religious and cultural needs, tourist attraction, etc.

First, it is necessary to define the subject of the discussion or clarify what is meant by 'cultural property', *pars pro toto* of the wider concept of cultural heritage [7].

The expression made its debut in the Convention for the Protection of Cultural Property in the Event of Armed Conflict, signed in The Hague in 1954 [8] From there the notion 'cultural property' entered the internal legal language, with initially sporadic references, in the Statutes of the ordinary Regions and in the very first regional laws, and then was used 'officially' with the aforementioned law establishing the Ministry of the sector, which was called, as already highlighted, precisely 'Ministry of Cultural and Environmental Heritage'.

The aforementioned Commission's work ended with a Concluding Report, accompanied by a series of Declarations, which could already very well be considered an organic proposal for legislative modification.

What emerged was not only the result of a superficial analysis of the state of the cultural heritage, but a careful research, without rhetoric and poor in summary judgments. The Commission brought out a general state of precariousness and decay of the Italian archaeological, artistic, historical, environmental, book and archival heritage that could not (and cannot) be attributed only to 'funding deficiencies, but to the very idea that one has of cultural heritage 'and the tools that the legislator makes available to protect it. It is appreciated only in parts or only as an artistic value, often ignoring the importance that this has as a testimony of history.

The Commission in Declaration I used the expression 'cultural property' and made explicit two meanings. In the first place, a very broad notion of 'cultural heritage of the nation', since it included 'all assets referring to the history of civilization'; secondly, and this will be the definition that will acquire greater notoriety, a defining criterion was introduced residual and general, for which 'any other good that constitutes material testimony having the value of civilization' is a cultural asset. This expression broke into social consciousness and represented a fact of modernity, since the idea of recognizing cultural value only to things with a certain artistic and aesthetic value was still pregnant. The way was also paved for what are defined as 'minor goods', meaning by such goods that do not have the required requirement of 'unrepeatability' [9].

Since then, the proposed formulation has been at the center of many debates or doctrinal interventions on this point, for which Giannini himself has discussed and deepened the notion of cultural heritage as a 'material testimony having the value of civilization'.

Although contained in an official document, this notion does not rise to a definition having a normative character and at the time it remained without recognition at the theoretical and hermeneutical level.

The notion was first introduced in national legislation with art. 148, co. 1, Legislative Decree No. 112/1998, which defined 'cultural assets': 'those that make up the historical, artistic, monumental, demo-ethno-anthropological, archaeological, archival and book heritage and the others that constitute evidence of civilization value'. This standard reflects the echo of the notion developed at the time by the Franceschini commission, which contained the following definition of cultural property: '*good that constitutes material testimony having the value of civilization*'

The art. 148, lett. a), Legislative Decree No. 112/98 has accepted a mixed notion of cultural property, which appears to be a middle way between the non-mandatory listing of the things subject to protection and a reference to new assets that the law it can identify as a 'testimony having the value of civilization'.

From here the essential characteristics of the cultural asset are derived: the 'materiality' and the 'value of civilization', which seem to echo in the same art. 10 of Legislative Decree 22 January 2004, No. 42 (Code of cultural heritage and landscape), when cultural goods are

defined as ‘immovable or movable things’ of an author who is no longer living, produced for at least fifty years, which must have a particular legal qualification. The first character, the material consistency, is also for the 2004 legislator a trait that must distinguish the assets capable of being declared cultural.

It does not seem easy to hide the perplexities aroused by the choice of identifying a distinctive feature of cultural property in materiality, which seems to have emerged ‘strengthened’ by the Code, which seems to be very clear in stating that non-material goods cannot be attracted to the category cultural heritage. On closer inspection, the T.U. of 1999, had provided a definition that revealed the idea that even non-material goods could be included in the sphere of cultural heritage. The majority doctrine [10] in this regard has expressed itself in a very unanimous in believing that the legislator had also intended to refer to ‘intangible’ or ‘volatile’ goods [11], in the sense of goods that are not ‘things’ but an expression of popular culture. According to the Council of State, a ‘*reality character in the broader sense of the term must be found in the regulatory data: in other words, the good in its materiality must constitute the central element of the case regulated by the standard and its cultural and environmental value must inform the ratio of the content*’ [12].

Another character that emerges from the analysis of the legislation is the dimension, so the ‘cultural’ character can consist of both ‘individual’ goods and ‘universality of things’ (collections, collections, series).

The third character, on the other hand, concerns the registry of the property, since it must be the work of an author who is no longer living and that the realization has taken place for at least fifty years, for it to be considered cultural. This is established by art. 10, co. 5 of the Code. The Code of cultural heritage and landscape, approved with Legislative Decree 22 January 2001, No. 42 has brought news in relation to the identification of cultural assets, specifically those belonging to the public. The expression ‘ascertainment of the qualification of cultural property’ is intended to refer to the activity that the Public Administration undertakes in order to identify the assets subject to protection and enhancement, that is to ascertain that a certain ‘thing’ possesses the characteristics ‘intrinsic ‘required by law, so that an asset can be considered worthy of protection and safeguarding and therefore be defined as a’ cultural asset ‘. Art. 12 of the Code entitled ‘Verification of cultural interest’ dictates the procedures for identifying cultural assets in public ownership.

Therefore, once the qualitative and connotative value of the cultural asset as a whole has been etymologically outlined, the cultural heritage, as a whole, can be understood as, ‘*a broad concept and includes the natural as well as the cultural environment. It encompasses landscapes, historic places, sites and built environments, as well as bio-diversity, collections, past and continuing cultural practices, knowledge and living experiences. It records and expresses the long processes of historic development, forming the essence of diverse national, regional, indigenous and local identities and is an integral part of modern life. It is a dynamic reference point and a positive instrument for growth and change. The particular heritage and collective memory of each locality or community is irreplaceable and an important foundation for development, both now and into the future*’ [13].

This definition of heritage enunciated in 1999 at the XII International General Assembly on the management of tourism in Mexico turned out to be the main object for the International Council on Monuments and Sites to focus on to develop strategies relating to the presentation and interpretation of historical places and cultural diversities. In this assembly the concept of heritage was discussed as a set of cultural materials that an individual or one community shapes in a determined phase of its historical becoming.

To integrate the above in a strictly national context, it seems appropriate to take a look also at the supranational level and, in particular, another definition of heritage, not different from

that enunciated by ICOMOS in 1999 but recognized worldwide, is that given by UNESCO (United Nations Educational, Scientific and Cultural Organization) to the Convention ‘concerning the protection of the world cultural and natural heritage’ adopted by the XVII General Conference held in Paris in November 1972, which distinguished cultural heritage from natural heritage. The first, the only one of interest in this scientific paper, was proposed in these terms: ‘the following shall be considered as’ cultural heritage’: *monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science; groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science; sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view* [14].

It is understood how the reflections addressed to this theme are heterogeneous in the specifications of heritage but univocal with respect to the concept that it can be understood as a historical, cultural, artistic, natural, intangible heritage inherent in every civilization. What these definitions have in common is the consideration of heritage as a social process that draws life and motivation from the present and that involves power, tradition, memory and identity: it implies a precise selection of reference values through which to identify what is important to preserve. of the past. Most scholars agree that heritage is linked to the past, that it represents a sort of legacy to be preserved and passed on to the present and future generations, both in terms of traditions and material objects [15].

The diversity of views on the meaning and breadth with which the term ‘heritage’ [16] has been used depends on whether it could have acquired various dimensions: it is considered synonymous with vestiges of the past of any kind, or the product of modern conditions attributed to the past and influenced by it, or the entire cultural and artistic production of the past or present, and also a significant commercial activity, generically identified as a heritage industry, based on the sale of goods and services related to it [17].

### ***1.2. The Effects of a Hazard on Economic Cultural Heritages. The COVID-19 Case in 2020 as a Negative Projection of Losses from Missed Incomes***

The cultural and creative sectors, worldwide, are very important since their impact on the economy and employment [7]. Furthermore, they develop innovation in a multitude of economic forms and help to implement a general positive social impact. These sectors are among the sectors most affected by the pandemic, with most of the employment system at risk concentrated in large urban centers. The relevant dynamics. in the consequences, many sub-sectors range and involve, with the activities linked to physical events and places (venue-based) and the related supply chains that are among the most affected by social distancing measures. National and supranational policies to support public and private enterprises during the covid-19 pandemic may not be adequate for non-traditional business and employment models that characterize the cultural heritage sector. In addition to short-term support for artists and businesses, which comes from both the public and private sectors, the policies put in place for recovery and revitalizing local economies can also leverage an economic and social impact generated by culture [17]. Health concerns related to the pandemic have led to unprecedented closures of museums and heritage sites. Around 90 % of the world's museums (more than 85 000 institutions) were temporarily closed during the crisis and the remaining 10 % may not reopen until 2021 due to significant economic difficulties. The sharp reduction in revenues (3 out of 5 museums in the survey by the Network of European Museum

Organizations – NEMO reported losses [18] of an average of € 20 300 per week due to the inability to travel and the obligation to close) of charitable contributions and sponsorships for cultural sites, including public and private museums jeopardize the financial sustainability of cultural heritages, especially of the smallest ones. This has led to falling wages and layoffs for a number of workers (temporary staff, external contracts including brokers, seasonal workers, exhibition-related jobs, publication of catalogs, exhibition and educational materials, events and other commercial activities). According to a survey conducted by the International Council of Museums (ICOM) the contract of 6 % of temporary staff referred to in museums and cultural heritages has not been renewed or has been terminated, while 16.1 % of museum freelance professionals he was fired. In the medium term, and if social distancing measures continue, the ticket sales and planning will be slow and difficult to return to pre-crisis levels. Any further decline in income will lead to a reduction in cultural activities. This represents a structural threat to the survival of businesses operating in the cultural economic system, which will affect other subsectors that rely on these professionals for creative content as well. In a short-medium term perspective, cultural sites, especially Italian ones, where the outbreak has been extremely severe, will have fewer resources and capacities to contribute to the social and economic development of their local communities [18]. Over the last few decades, the proceeds from cultural heritage have become an engine of local development and a point of reference for many communities. The cultural sector has always increased the attractiveness of cities, towns and communities as places to visit, to live in and to invest in, and are increasingly seen as vital centres for the community, at the centre of urban regeneration efforts [14]. The lockdown measures have led to an abrupt shutdown of cultural sites and museums from local development projects and the cancellation of cultural, social inclusion, wellness and educational programs, only partially replaced by new digital offerings. In the aforementioned time frame, it appears that the cultural sector will have less capacity to contribute to local development projects if there is no need for new regulations regarding the reduction of individual freedoms.

## **2. RESEARCH METHODOLOGY**

The methodology of the paper is divided into four sections.

Prior the in-depth analysis of the two main aspects described before the research methodology was considering two main implementing stages.

The first relates to the legal/regulatory dissemination of the implementation of provisions that have affected the matter of cultural heritage at national level in order to highlight the peculiarities and salient features inherent in the framework above. In particular, the first methodological section involved the analytical study of the rules that concerned the theme of cultural heritage up to a national application scope of the binding law.

The second methodological section concerned the cross-search on the Unesco database and on the Italian national database of cultural sites managed economically, directly or through tenders, with economic and social significance. The second methodological section was conducted by the authors on the UNESCO web portal in order to research the Italian cultural heritage, which, as has been highlighted, is located in one of the geographical areas most affected by the pandemic outbreak, capable of supporting a financial analytical study. The study was carried out by cross-referencing the data available on cultural heritage sites with the UNESCO list.

The third section, after the identification of the Cultural Site, was directed to the analytical and economic study of the balance sheets, which can be found on the relevant website, at least in the last three years, so as to have a scalar projection of the most relevant indicators between

costs and incomes. The financial study methodology was carried out through the qualitative and quantitative analysis of the last three-year period available, highlighting the most significant balance sheet items and comparing the annuities to obtain a progressive historical analysis.

The fourth section concerns the analysis, through research for statistical data and reports, of the effects of the pandemic outbreak referred to Covid-19, on cultural activities in general and particularly on the national territory sites.

The last methodological declination concerns the quantitative analytical processing on the mathematical projection of possible catastrophic scenarios and related economic consequences (losses).

### **2.1. Case Study An Italian Example of Economic Cultural Heritage. The Case of Villa Adriana and Villa D'Este in Tivoli**

The cultural compendium of Villa Adriana and Villa D'Este in Tivoli [16] is one of the most important cultural sites in Italy, recognized by Unesco.

Indeed, although the Cultural site is nowadays understood as a whole, *ab initio* the assets were divided and Villa D'Este was 'declared a World Heritage Site by UNESCO in 2001, the villa grounds include a masterpiece of Italian garden design with an amazing concentration of fountains, nymphaea, grottoes, water themes and a organ which produces audible effects created by water', while Villa Adriana was 'declared a World Heritage Site by UNESCO in 1999, the Villa was built between 118 and 138 A.D. by the Emperor Hadrian in a lush and verdant oasis near Tivoli, the ancient Tibur'. The choice of the site of the two Villae underlies a multiplicity of factors and motivations, the first of which is inherent in the inclusion of the Cultural Heritage within the recognized UNESCO list, and therefore, qualitatively, this ruling asserts the importance of the site to the within the national and international framework. The second motivation underlies the management methods of the assets that are conducted in an entrepreneurial and economic way like any private company, through its own management or public contracts in favor of third parties, and this ruling perfectly responds to the qualitative and quantitative criteria set out in the premises. The third reason concerns the ease of retrieving the fiscal, economic / accounting balance sheets for the years of exercise under consideration (2017–2020) of the company of the cultural site as well as the accuracy of the same data. The fourth and final reasoning relates to the geographical location of the site and the unfavorable economic situation conditioned by the very severe pandemic outbreak (Covid-19) which highlighted in the 2020 budget the possible losses from current revenues as well as the increase in costs for extraordinary maintenance of the site.

As better outlined in the rest of the paper, the analysis focuses on the dissertation and verification of the possible catastrophic effects (losses) of any hazard on the cultural heritage in question. In particular, as per Table 1, on the basis of the 2017–2020 extracted financial statements (the latter only provisional), the macro-data examined concern some budget items that underlie four areas: fixed, in the sense of mandatory payment and not in the recursive quantum, and variable costs on the one hand and fixed and variable revenue on the other.

In Table 2, the authors examine the most relevant values of the indicators referred to in Table 1 over the last three years in order to allow an assessment of any negative impact of a hazard.

TABLE 1. MOST SIGNIFICANT BALANCE SHEET ITEMS

	Costs	Revenue/Incomes
Fixed	Tax charges; Charges for active workers of service;	ministerial and state grants; concessions on assets
Variable	Purchase of goods of consumption and services; Recovery, restoration, adjustment and maintenance; extraordinary of real estate	ticket sales

TABLE 2. RELEVANT INDICATORS 2017–2019 [16]

	2017	2018	2019
Tax charges, €	316 491.81	31.500.00	55.905.12
Charges for active workers of service, €	229 136.30	215.000.00	161.517.36
Purchase of goods of consumption and services, €	710 067.95	801.500.00	1.209.335.69
Recovery, restoration, adjustment and maintenance of the immaterial assets (software/hardware) and material movable and immovable assets, €	1 237 997.60	975 000.00	1 343 449.73
Ministerial and state grants; concessions on assets, €	200 000.00	400 000.00	199 744.81
Ticket sales, €	3 350 822.12	4 000 000.00	4 869 535.94

At the bottom of this section, in Table 3, it seems appropriate to report the several government provisions that have limited or prevented the opening of the Cultural heritage, exacerbating its economic condition.



TABLE 3. NATIONAL PROVISIONS THAT AFFECTED VILLA ADRIANA AND VILLA D'ESTE

	Closed	Open with restrictions	Open without restrictions
<b>DPCM (decree of the Prime Minister) 09.03.2020</b>	Binding from 10.03.2020 to 03.04.2020		
<b>DPCM 01.04.2020</b>	Binding from 01.04.2020 to 10.04.2020		
<b>DPCM 10.04.2020</b>	Binding from 10.04.2020 to 03.05.2020		
<b>DPCM 26.04.2020</b>	Binding from 04.05.2020 to 17.05.2020		
<b>DPCM 17.05.2020</b>		Binding from 18.05.2020 to 14.06.2020	
<b>Repeal of the DPCM 17.05.2020</b>			Binding from 15.06.2020 to 06.11.2020
<b>DPCM 03.11.2020</b>	Binding from 06.11.2020 to 03.12.2020		
<b>DPCM 03.12.2020</b>	Binding from 04.12.2020 to 15.01.2020		

## 2.2. Quantitative Model for Estimating Losses Deriving from Catastrophic Scenarios

The occurrence of a catastrophe that can have a different nature, such as environmental (in the sense of climatic events and their consequences, such as a flood), or seismic, or due to fire, or health (such as the pandemic outbreak that actually registered last year, 2020, and which will also have repercussions in the current one, 2021), could or should be subject to an economic risk assessment for the cultural asset, such as Villa Adriana and Villa d'Este in this case. The various types of catastrophe have a different impact on some budget items, on the revenue side and on the expenditure side. Just to give an example, the pandemic impacts the proceeds from ticketing (reducing it) but not it has consequences in terms of the costs of restoring the structure, net of some health care costs (thermoscanner for example) that could be considered necessary. On the contrary, a fire or a flood of some spaces of the structure would probably result in the temporary closure of the site and therefore negatively impact the ticketing as in the case of the pandemic, but, unlike this, it would presumably also require considerable costs to restore the full efficiency of the structure. Obviously, as a small positive compensation of the days of closure of the site, there could be reductions in costs such as

those of utilities and also related to the salary of employees, perhaps taking advantage of some flexibility in existing employment contracts. To evaluate the impact of these costs and / or lost earnings and also of the cost reductions as just mentioned, both engineering-structural prospective analyzes are needed, for all costs related to the restoration linked to events never recorded previously, and serve historical data series from which to extrapolate the estimate of the economic risk relating to the various balance sheet items that would be impacted by a catastrophic scenario. Just by way of example, given that the reduction of the ticket revenue occurs in each of the catastrophic events, from the daily average of daily incomes ( $b$ ) (assuming a constant flow and without seasonality) recorded in previous years, obtainable by exploiting the data of the annual total of receipts  $B(t)$ , with  $t = 2019, 2018, \dots$  until the availability of the data. Assuming having ( $m$ ) annual revenue figures, it is possible to obtain the following

$$b = (B(2019) + B(2018) + \dots + B(2019 - m + 1)) \cdot \left(\frac{1}{m}\right) \cdot \left(\frac{1}{365}\right), \quad (1)$$

and therefore, by estimating the days of forced lockdown which can lead to a predetermined catastrophe, whether they are  $n$ , the expected loss of collection would be ( $bn$ ). A verification of this estimate can be obtained with the data of the 2020 budget, counting the number of days of forced lockdown of the sites in 2020 that can be deduced from the calendar of closures illustrated in Table 3, and comparing the estimate of the reduction of the collection from the ticketing sales illustrated above, with the actual reduction of 2020, compared to the 2017–2019 average.

Just to concretize with a numerical example what has just been said, with the data available in Table 2 relating to collections for the years 2017–2019 it is possible to have that

$$b = (3350822 + 4000000 + 4869535) \cdot \left(\frac{1}{3}\right) \cdot \left(\frac{1}{365}\right) = 11.160 \quad (2)$$

and that the number of forced lockdown days in 2020 (optimistically considering the days of partial closure with a regular ticketing flow) was  $n = 130$ , there would be an estimated loss of

$$11160 \cdot 130 = 1450818$$

which will be compared with the difference between the average 2017–2019 takings, or 4 073 452 and the total 2020 ticketing incomes.

2020 data on losses of daily incomes from ticketing is available also on opening days, compared to the average of previous years, which could be a further element of evaluation to implement a model for estimating losses from catastrophes, more in-depth than that proposed by the applied methodology.

### 3. RESULTS AND ANALYSIS

The results of the paper can be summarized as follows.

First of all, the paper highlights the precariousness and the economic/financial instability of the cultural site in relation to a possible fluctuation of the cash flow due to a natural hazard, as it happened in 2020 due to the Covid-19.

In particular, by setting the average of the three-year period 2017–2019 as the average value of the receipts and using as a hypothesis a constant flow of visitors throughout the year, by

reducing and dividing this value by the sum of the days in which the cultural site was closed to the public, the authors have obtained the abovementioned mathematical equation that delineates the average losses from incomes.

The second result relates to the evidence of the extremely expensive management of the cultural site, even though it is forbidden to be visited by tourists, regarding current expenses.

The third result concerns the ease of exposure of the cultural site to any hazard which highlights the absolute lack, as per balance sheets, of any risk mitigation program, even merely insurance capable of calming the effects of losses deriving from missed incomes.

The fourth result pertains to an in-depth analysis concerning the case in which the topic treated and the research that derives from it is not studied in depth in scientific publications.

The fifth and last result, from a quantitative point of view, derives directly from the mathematical analysis referred to in the previous section and concerns the case study for which, the forecasts of annual decrease in incomes, for the analyzed cultural site, are realistically in a average line from 29.79 % to 43.3 %.

#### **4. CONCLUSIONS**

The conclusions can be divided into three parts.

The first conclusion underlies the observation that the public administration, including the cultural heritage examined, is the total reward of the hazards, *latu sensu* intended. The hazard called Covid-19 highlighted the total lack of preventive and remedial countermeasures to stem the effects and risk exposure of the assets to the hazard which, in the intrinsic negativity of hazards, in any case, did not cause direct damage to the assets and to people.

The second conclusion concerns the total inconsistency of the provisional balance sheet drawn up prior to the pandemic outbreak and the impossibility highlighted, both in general and in particular, to remedy at an entrepreneurial level. In fact, hypothetically, when the final 2020 balance sheet is deposited, the latter will show a significant loss, in line with the above function that is difficult to stem in the next financial years.

The third conclusion, in line with the results highlighted above, concerns the total or almost total absence, as per balance sheets, of any insurance coverage related to natural events, not merely limited to the reconstruction of the real estate, but, as experienced in other business areas and highlighted in some papers, an insurance able to keep the flow of money unchanged, in the form of liquidation, in order to avoid the aggravation of direct and indirect consequences that, mostly at a private level, occurred last year (2021), including, it seems appropriate to remember, the level of employment, the loss of purchasing power and the contraction of the market.

The aforementioned conclusions highlight the peculiarity of the paper which involves, not as a primary aspect the *ex se* risk or, at most the cost of reconstruction of the damaged asset, but, and this is the key aspect, inherent in the systematic classification of a economic asset, outlined as a cultural heritage, and the economic, social, labor (employment), political and financial consequences tout court deriving from the hazard. In fact, too often, it is customary to think of catastrophic damage as purely direct effects on the material structure of the asset without investigating the plethora and the social-economic spectrum that surrounds it.

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