INTERDISCIPLINARY STUDIES IN CULTURAL AND ENVIRONMENTAL HERITAGE: HISTORY, PROTECTION, VALORIZATION, MANAGEMENT

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1. Introduction

The aim of this paper is to evidence the numerous related topics that overlap and interact with each other in the study and research of the cultural and environmental sector. The list below represents a synopsis of the interdisciplinary themes relating to this particular sector, which involves technical-conservative, historical-humanistic, economic-managerial, social-legal aspects.

At the same time the same topics constitute a solid basis that provides information and room for discussion among scholars and experts; a platform where ideas can be exchanged and interdisciplinary competences relating to current and future developments can be integrated and thus become part of a specific scientific preparation for those planning a future in the cultural sector. The list, with a corresponding synthetic description of each distinct topic, also briefly looks at issues that determine consequent interest in the sphere of the new cultural, technological and financial scenarios present in today's globalized world.

Table 1 lists the main topics dealt with in the cultural and environmental sector.

2. The holistic value of art work

The holistic value of art work represents the fundamental innate character found in the different forms of art expression. It sees the integration of the human sciences and experimental sciences, essential for the study and research of art work, involving a methodological path which includes the following steps: knowledge, interpretation, conservation, valorization.

This methodological path necessarily needs the evaluation of:
• historians: providing a 'subjective' evaluation based on human competence and expertise;

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- technicians: providing an 'objective' evaluation based on the use of available technologies.

From these two different types of evaluation derives the concept and meaning of the "holistic value" of art work and consequently the integration of the various scientific areas and corresponding experts (Figure 1) [1-6].

Table 1. Main topics in the study and research of cultural and environmental heritage.

1. The holistic value of art work
2. Interdisciplinarity in the sector of cultural heritage for education and research
3. Internationalization in culture and research
4. Protection and valorization of cultural heritage and human safeguard
5. Ecosustainability, ethics and aesthetics
6. Training and research in cultural heritage
7. Various artistic expressions and activities: music, theatre, dance, fashion, design
8. Visual communication: graphic and digital arts, cartoon, animation, cinema, photography
9. Virtual and augmented reality
10. Cultural heritage as economic heritage: value and price of art
11. The management of culture and tourism
12. Cultural and Creative Industries (CCIs)
13. Cultural heritage as globalized heritage
14. Final considerations

3. Interdisciplinarity in the sector of cultural heritage for education and research

Interdisciplinarity in the sector leads to a positive result not only deriving from the study, learning and successive training of qualified young people, but also from research in the field of heritage protection and valorization based on subjective and objective evaluations [7-21].

It is important to note that the study of the various and integrated scientific experiences and competences are fundamental for the «good of cultural goods». In this manner, the answers to the many-faceted and complex problems related to the protection and valorization of cultural heritage are exhaustive and correct.
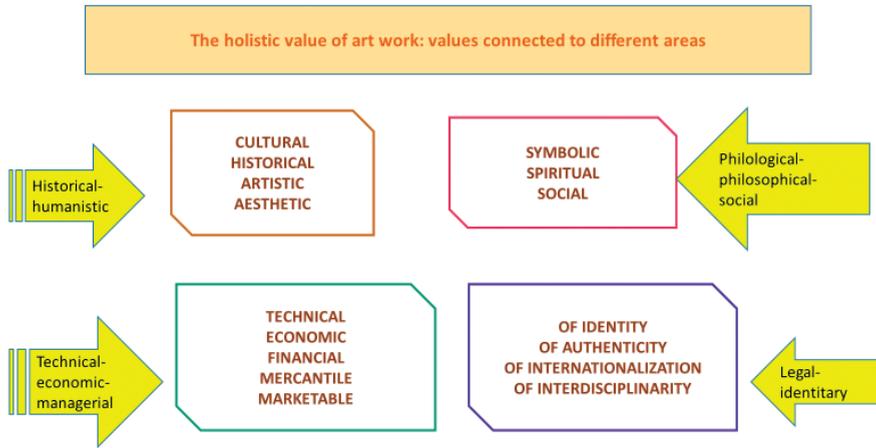
Figure 1. The holistic value of art work

At the same time, interdisciplinarity is necessary not only in teaching and learning, it is also needed in the training and education of the professional figure in this sector enabling them to be competitive both at a national and international level.

4. Internationalization in culture and research

There are two aspects to point out connected to the concept of internationalization [22-24].

The first refers to the evaluation of scientific products at international level. Since evaluation is based on different criteria, the situation determines different judgements. It is therefore necessary that these products are evaluated by experts with a qualified interdisciplinary background to obtain a final univocal judgement (Figure 2).

The second refers to the meaning and significance intrinsically present in the art work conceived and realized by the author that naturally emanate different messages and values to the viewer, as well as different emotions and sensations. Works of art are therefore able to transmit joy, sadness, contemplation, enjoyment, pathos and numerous other sensations. These characteristics have no territorial confines, they go beyond them.

The internationalization of culture and research is therefore implicit in art works and is an inseparable element.
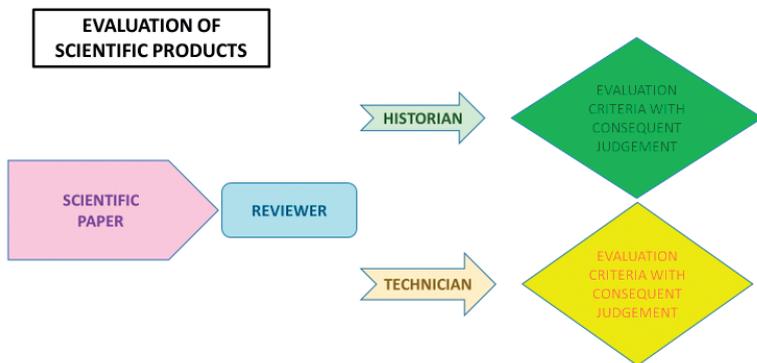
Figure 2. Different judgement based on different evaluation

5. Protection and valorization of cultural heritage and human safeguard

Figure 3 shows the various operative steps included in the methodological path for the protection and valorization of cultural heritage.

In the case of human safeguard, it is essential to highlight the need to consider the entire system: artifact of historical-artistic interest – environment of conservation – biota. In other words, one must consider the system as one, as there is a close relationship between artifacts and their environment, whether they are outdoors or in confined areas, with the aim not only of protecting the artifacts themselves, but also of safeguarding human health.
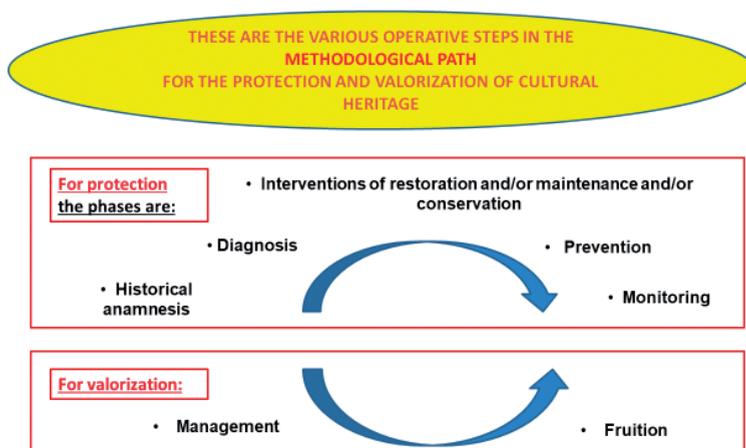

Figure 3. Steps in the methodological path

A consequent aspect is represented by the relationship between art and eco-sustainability, ethics and aesthetics, without considering the many legal and ethical aspects involved, where issues of human safeguard and respect of the environment are concerned.

The topic thus implicates the importance of education in the system: artifact – environment – biota, and the necessity to view this system, which is a result of the close interrelation between artifact and environment, from all angles.

There are two aspects to consider when speaking of environment:
- the first refers to the protection of the environment as a preventive intervention aimed not only at the conservation of artifacts, but also at human safeguard;
- the second is inherent in what is called "natural capital" comprising air, water, earth, the natural resources of a territory and its nature, including the bees and insects.

The question arises: "Is there a monetary value capable of expressing this so-called natural capital?". There is, of course, even if it is extremely difficult to determine it precisely. This assessment is based on a broad analysis of the cost-benefit ratio and the concept of sustainability as the sum of the three types of capital: physical (inhabitants and raw materials), human (value of training) and natural, linked closely to the green economy and to the concept of the circular economy: repair, reuse and recycle. These then, are the ethical, social and economic aspects of the environment [25-34].

6. Ecosustainability, ethics and aesthetics

In the course of their life, people work on the basis of the above-mentioned ethical, social and economic aspects and nurture aspirations and dreams. Science can explain them, modify them, manipulate them, but it is always human beings who decide in the end. This is what the World Wide Fund for Nature (WWF) asserts, pointing out moreover, that "*Nature does not support the human footprint*".

This is especially true if one refers to the Code of Cultural and Landscape Heritage issued in Italy in 2004 by the Ministry of Cultural Heritage and Activities, which comprises "*all buildings and areas expressing historical, cultural, natural, morphological, aesthetic values of the territory*".

Hence the importance of overcoming the "dichotomy between the economic sphere and the socio-cultural one" through ethics by respecting others and the environment in its entirety, which naturally leads to ecosustainability. In the past these aspects were not seriously taken into consideration, as in the case of the present economic crisis where ethics and values have frequently been put to one side or even ignored.

Thus, if one passes from this perceptual process to the expert's evaluation of the conservation state and authenticity of an artifact, a subjective evaluation must necessarily be accompanied by an objective evaluation. The former comes from a comprehensive knowledge of style, iconography, aesthetics and a participatory, emotional understanding that emanates from the work, while the latter is based on the use of diagnostic and analytical equipment that supports or confutes the former. Here, one of the key words is authenticity, whether it be an artifact of historical-artistic, archaeological, archival-library or music interest. It is this aspect that gives a real dimension to *cultural education* and *personal ethics* [35-37].

Two interconnected issues arise from these terms:

- the need to complete and integrate different skills for the "protection of cultural heritage";
- setting limits for technical interventions in compliance with a higher instance, in reference to the "ethics of conservation and restoration".
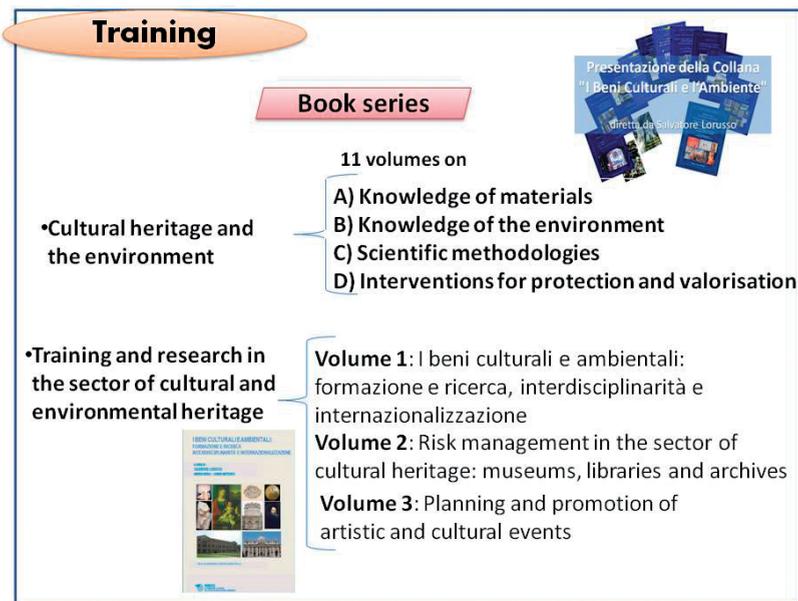
7. Training and research in cultural heritage

Training and research in the field of the protection and valorization of cultural and environmental heritage must be carried out in relation to the numerous issues concerning the various operational phases involved in the methodological approach that is applied to the artifacts under examination [38-52]. Figures 4a) b) c) and d) briefly illustrate how much has been achieved in the work that has been done over the years, in the Department of Cultural Heritage of the University of Bologna (Ravenna Campus).

Didactic accomplishments include the opening of two book series and a Master's program which provided a basis for interdisciplinary training and was also able to relate to the territory and its corresponding needs.

In the research field, the founding of the Diagnostic Laboratory for Cultural Heritage in 1998 was another successful action and has been defined an "Institute of Excellence" in Italy. The application of diagnostic-analytical technologies present in the laboratory has experimentally contributed to the resolution of the aforementioned issues concerning the protection of artifacts and the safeguard of the environment and biota.

The last twenty years has seen the internationally recognized historical-technical Journal "*Conservation Science in Cultural Heritage*" represent a concrete testimony of the above issues and a valid bibliographic reference by publishing works by researchers with interdisciplinary skills and from interdisciplinary backgrounds.

Training

Book series

Presentazione della Collana "I Beni Culturali e l'Ambiente"

diretta da Salvatore Lorusso

11 volumes on

A) Knowledge of materials
B) Knowledge of the environment
C) Scientific methodologies
D) Interventions for protection and valorisation

• Cultural heritage and the environment

• Training and research in the sector of cultural and environmental heritage

Volume 1: I beni culturali e ambientali: formazione e ricerca, interdisciplinarità e internazionalizzazione
Volume 2: Risk management in the sector of cultural heritage: museums, libraries and archives
Volume 3: Planning and promotion of artistic and cultural events

a) Training

Master:

"Planning and promotion of artistic and cultural events"

Objetives
- Analysis, control and monitoring of the system: environment-artefact-biota
- Planning, conservation and organization of internal control systems and support in decision-making
- Analysis of the efficiency of managerial processes
- Verification of correctness and efficiency in communicating - technical, economic, and financial, as well as the reliability of information systems
- Fund-raising activities within the context of internationalization
- Assessment of the costs and risks connected to the market and financial resources
- Analysis of the context and reorganization of human resources

These activities involve:
- Cultural Units: Universities, museums, libraries, archives, foundations
- Business Units: Banks, companies, firms, associations
- Ministries: MIUR - university, education and research, MIBACT - cultural heritage and activities and tourism

All occurring in the area of taught lessons and internships/job placements

b) Master

Historical-technical journal
"Conservation Science in Cultural Heritage"

Research

Edited, hosted and maintained by:

Dipartimento di Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche Università degli Studi di Palermo, Italy

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Istituto Italiano di Cultura, Kracow, Poland

Chalmers University of Technology, Gothenburg, Sweden

Università Pontificia Salesiana Facoltà di Filosofia, Rome, Italy

Aims
- Scientific aspects related to the use of correct scientific methodologies
- Institutional aspects to promote the coordination, progress and diffusion of the sciences and their application to the field of cultural heritage
- Communicational aspects: the quality of information must reflect the "truth" of science and "clarity" of communication

c) Research

Diagnostic Laboratory for Cultural Heritage

Study and experimentation on the system: artifact-environment-biota

•Non-manipulative, non-destructive, non-invasive instruments

•"Institute of excellence" indicated by:

MIBACT – Ministry for cultural heritage and activities and tourism
ICE – Agency for promoting and internationalizing Italian businesses
Change Performing Arts – Company organizing cultural events worldwide

d) Diagnostic Laboratory for Cultural Heritage

Figure 4. Training and research in the cultural heritage sector

8. Various artistic expressions and activities: music, theatre, dance, fashion, design

Music, theatre, dance

Performing arts, often intangible cultural heritage (ICH), is an art expression that reflects human creativity, just as in the visual arts, i.e. paintings, sculptures, photography, engravings.

Today, many performing arts have a 'market value' and are considered economically viable, as they attract large numbers of people; their planning and promotion play an important role in the management of artistic and cultural events.

An innovative aspect regards the use of performing arts in museums. This can include the presentation, enjoyment and perception of art works that stray from the usual offer: e.g., music or dance used as a support, as well as perfumes or relaxation points to enhance sensations and recreate a more engaging experience for visitors.

During a visit to a museum, dance, music, fragrances and so on, can be used to provide a sensory experience - an area studied by neuroscientists. Thus art, and consequently museums, can together play a central part in people's lives where exhibitions help to stimulate cognitive systems in order to capture their attention [53].

Fashion

Many are the interdisciplinary connections between fashion, art and cultural heritage. They can be seen from several points of view:
• from tradition to innovative creative inspiration (museums and exhibitions illustrating the history of fashion and costume through the ages, traditional skills such as weaving, needlework, decorative arts, etc.);

- from the social and economic development of the past to today's global fashion industry (use of new materials and technologies, designer names, marketing and branding, fashion houses) [54].

Fashion is not just the result of a strategy of style and merchandising, it is also sharing. Indeed, current trends and intents involve viewers-customers directly, becoming themselves protagonists, as in trunk shows. Trunk shows are special events, sometimes with the participation of the designer, where clients can view the latest fashions, order their chosen designs, have them made and then delivered. This form of selling is particularly popular in the bridal industry and luxury sector, with online and virtual trunk shows already attracting the fashion-conscious public [55].

Currently, enlightened entrepreneurs are also viewing the market ethically, addressing not only production numbers, but also man, culture and history.

Design

Frequently used associated terms include fashion design, industrial design, graphic design (often grouped together under the term 'applied arts' or decorative arts or minor arts), car design, building design, urban project design, interior design, etc.

Design is:
- considered to be a fundamental factor for the success of any product, in addition to its functionality;
- connected to the concept and meaning of creativity, as a result of utility and innovation;
- CAS technology – Computer Aided Styling – intervenes not only in the executive design process, but also in design creativity;
- within the context of cultural heritage, a 'systemic process' which can transform strategic choices concerning protection, valorization and management, into concrete actions relating to heritage knowledge, organization and experience and its contemporary contextualization [56].

Some examples of design applied to different fields:

Product design – physical objects surrounding the biota and all architectural and urban spaces.

Interior and urban design – connected to architectural and urban planning.

Communication design – connected to technical systems through images (TV, internet, virtual, etc.)

Interaction design – connected to planning of interaction between users and mechanical or computer systems.

9. Visual communication: graphic and digital arts, cartoon, animation, cinema, photography

9.1 Graphic and digital arts

Digital art or computer art (included under the term 'new media art'), refers to art forms made using digital technologies or presented on digital technologies - it merges art with technology. It is a modern means of expressing creativity. Two or three-dimensional graphics are created through drawing complex images from geometric shapes and other forms. They are then used to create realistic 3D dimensional shapes, objects

and scenes that can be used in different media such as film, television, prints, and visual effects. Today, graphic and digital art is used in most art forms: cartoon, animation, cinema, photography, especially in commercial design as mentioned earlier [57].

Computers are also used to help create music, especially electronic music, as they provide an easy, but significant way to arrange and create sounds. In this field, computer and digital technologies are an aid to composers who employ their creativity to produce and then perform their music. However, computer-generated music, i.e. music entirely generated (and even performed) by a computer also exists and is produced using algorithms (algorithmic composition) [58].

Nevertheless, digital art still has to gain acceptance and respect in the field when compared to historically established forms of art such as sculpture, painting and drawing. This is generally due to the fact that people believe it is computers that produce works of art. However, the creative element comes from the digital artists themselves and how they use the wide range of technologies to express themselves artistically. The debate is a topical one. Nevertheless, the impact of digital art on museums and art galleries is growing steadily and positively.

Over the centuries works of art have been reproduced by both the authors of the works themselves and at the request of commissioning clients. In attributing a work of art to a particular artist there are different degrees of certainty linked to the attribution. There are, correspondingly, different terms used by experts to distinguish between these degrees of certainty (Figure 5).
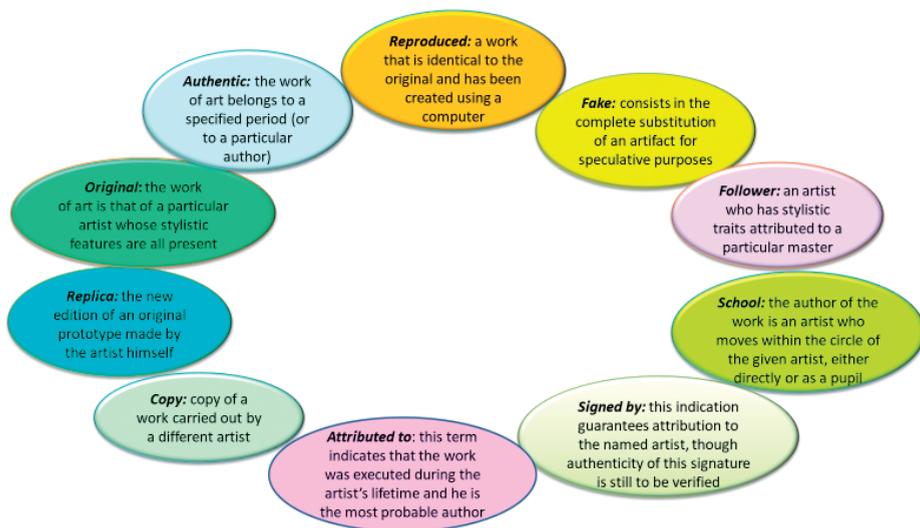
Figure 5. Terminology used by experts in the sector to distinguish between different degrees of certainty in attributing a work of art.

In this field of art, computer technologies have been used to produce excellent results. Reproducing works of art that are identical to already existing ones has become an easy feat through the use of digital technologies. An emblematic example is the digital reproduction of Paolo Veronese's "*The Wedding at Cana*" (1563), an oil on can-

vas housed in the Louvre Museum in France. Another is the digital reproduction and scaled-down reconstruction of the "Porziuncola of Assisi", the small 13th century stone chapel where St. Frances converted and founded the order of the Friars Minor which was inaugurated in 2008, in San Francisco, California (USA) [59].

However, for the reproduced work of art which is, nevertheless, a result of creativity, a number of problematic aspects arise. They are described below.

For reproduced works that are the result of an already existing authentic work, ethical aspects of uniqueness, authenticity, irreproducibility and economic-financial values are missing. In this case, the integration of a subjective evaluation - that is, of the historical, artistic, stylistic, aesthetic, iconographic - and objective evaluation - based on the use of diagnostic-analytical technologies - are essential for the purpose of correctly distinguishing the reproduced work from the already existing authentic one. Such research is currently an open and non-definable issue.

For the digitally reproduced work of art, for which there is no precedent, and which is however authentic, the consequent evaluation is to be considered in a quite different way and will, correspondingly, have its own value.

9.2 Cartoon, animation, cinema, photography

Definitions and applications in culture
Cartoon
A cartoon today is a term that brings to mind an illustration or a film that uses animation and is very often humorous. While the specific definition has changed over time, modern usage refers to:

a typically non-realistic or semi-realistic artistic style of drawing or painting;

an image or series of images intended for satire, caricature, or humour;

a motion picture that relies on a sequence of illustrations for its animation.

in the field of traditional art, a cartoon (from the Italian *cartone* and the Dutch *karton*, terms describing strong, heavy paper or pasteboard) is a full-scale preparatory drawing made on thick paper as a study or model for a painting (stained glass, tapestry, etc.). In the case of frescoes, cartoons were used to accurately reproduce the parts of the composition which were to be painted on damp plaster, an operation which lasted many days [60].

Animation
Animation is the process of producing the illusion of motion and change by displaying a rapid succession of images that differ from each other only minimally. It is used in films, advertisements, television, video clips and games, and a variety of other forms [61].

In the field of culture, animation focuses specifically on stories that preserve culture through computer animation. For example, it can be used to express, and so preserve stories and legends, in order to transmit their wisdom, knowledge, socio-cultural values and identity to future generations. Two aspects can be distinguished in the use of this form of art expression: the technical/digital and the socio-cultural.

Cinema
Cinematography is the science or art of motion-picture photography by recording light or other electromagnetic radiation, either electronically by means of an image sensor, or chemically by means of a light-sensitive material such as film-stock.

The word used to refer to the art, process, or job of filming movies, but later its meaning was restricted to "motion picture photography." [62]

Animation and cinema can be applied by institutions to promote and manage culture for the aim of diffusing, informing and educating. In particular, for example, uses, customs and traditions can, thus constitute a wealth of knowledge for future generations.

Photography

Photography is the science, art, application and practice of creating durable images by recording light or other electromagnetic radiation, either electronically by means of an image sensor, or chemically by means of a light-sensitive material such as photographic film [63].

Photography is employed in many fields and disciplines, such as the arts and sciences, industries and business, particularly marketing, as well as in the more traditional, such as films and videos, as a leisure-time hobby and today, for mass communication.

9.3 Popularity and attractiveness

Why are these art forms so popular and attractive?

In the case of cartoon, animation and cinema it is because they appeal to and hold the imagination of people of all ages, from young children to the elderly. One global example that people are familiar with is Disney's famous mouse, whether it comes in the form of a comic strip or cartoon film, it has become a part of popular culture and is a brand name in itself. Cartoon, animation and cinema present a magic world that stands between fantasy and reality, where anything can happen, it is an escape from the real world; it can engage people emotionally, it can convey a message, it can teach and you can learn from it.

As well as being an art form, photography has known an unprecedented role since the spread of social media which, over time, has also become cheaper and therefore accessible to a great number of people. Today, digital devices make it easy to take photos which are instant and can be sent to anywhere in the world. The reasons are many and varied: they contribute to the latest news, both good and bad, they form a personal archive of our memories and experiences, they record achievements, etc.

10. Virtual and augmented reality

Virtual reality (VR) is an artificial, computer-generated simulation or recreation of a real-life environment or situation. It is usually delivered to the user through a head-mounted or hand-held controller. When you view VR, you are viewing a completely different reality than the one in front of you (Figure 6a).

Augmented reality (AR) is an enhanced version of reality created using technology that adds digital information. It takes our current reality and adds something to it – it does not move us elsewhere (Figure 6b).

In short, in VR the user is immersed in a specific place by simulating or re-creating or creating artifacts or environments that existed or exist or will exist. In AR the user can be anywhere and add something that in reality does not exist.

Their corresponding application in cultural heritage [64-66]:

- helps keep alive the past and / or revives and brings it to life;
- helps museums and other cultural units adapt to the digital age and to renew themselves, so they can offer public up-to-date services in line with modern technologies;
- improves their visibility online at a global level;
- can reconstruct what has been destroyed, from small artefacts to whole sites;
- is of great educational value and is a valid teaching instrument because users themselves can experience the richness of global cultural heritage through immersive virtual and augmented reality (Figure 6c).

a) Simulation in augmented reality

b) Simulation in virtual reality

c) Immersive environment in virtual reality interface

d) Simulation software user

Figure 6. Virtual and augmented reality; a) VR; b) AR; c) immersive environment in virtual reality; d) simulation software user interface (source: CSCH N.17-2017)

Within the context of VR and AR, the term *edutainment* is often used in association with the above topic and refers to a blend of education and entertainment. It is used to describe various forms of entertainment that also educate, i.e. the process of entertaining people at the same time as you are teaching them something (Figure 6d).

11. Cultural heritage as economic heritage: the value and price of art

Since an artwork is made of material or a composition of materials, it has a value

and can be considered in economic terms: economic heritage. An art work can therefore be defined in the following ways:

SCARCE, because it is unique and cannot be reproduced;

USEFUL, because it satisfies the enjoyment and need for culture of the individual and / or community;

DURABLE, because it remains through time;

MERITORIOUS, because it justifies public and private support;

A REFUGE, because it represents an alternative investment, particularly in the current international decline.

The use of the term *decline* and not *crisis* is a subtle one, since a *crisis* is when the lowest point is reached and then there is an ascent; *decline* on the other hand, refers to a gradual downward trend which never reaches the lowest point.

In referring to the above points, the question is: "How can the economic, financial, commodity and market aspects of a work of art be ignored without considering its price?" Today in fact, a work of art always has a price: whether the artefacts be antique, modern or contemporary, they have a specific quotation. However, it is important to discern the meaning of the following: "The price is what is paid, the value is what is obtained" [67-70].

12. The management of culture and tourism

Culture

The previously mentioned research themes relating to the protection and valorization of indoor and outdoor cultural heritage and human safeguard involve:

- the importance and significance of CULTURE which is at the basis of its valorization, i.e. connected to MANAGEMENT: economics, law, communication, heritage enhancement;
- the DIFFUSION and communication of research results for experts, scientists, political representatives and also for the general public;
- the TRAINING of human resources to shape heritage professionals able to deal with the various problematic issues relating to CULTURE;
- the knowledge of the TERRITORIAL FORCES, i.e. CULTURAL (museums, libraries, archives, art galleries, etc.) and BUSINESS (banks, industries, companies, enterprises, etc.) UNITS.

If the above aspects are implemented, INTERVENTION by the territorial forces in the production, promotion and valorization of cultural heritage, generates VALUE not only for CULTURE, but also for the TERRITORY ITSELF.

Tourism

The conceptual term "management" is synonymous of territorial forces and, in particular, together with the intervention of the territorial forces, local, regional, national and international bodies – i.e.: restoration, hospitality industries, transportation, restaurant services, etc. As a result, the following direct and indirect returns are obtained:

- creating awareness of the importance of cultural heritage and its preservation;
- job creation in various sectors related not only to the valorization of the excellences present in the territory, but also in research and management (research-

ers, administrators, marketing and communication professionals, gardeners, guardians, etc.), hotel and tourism industries;
- expanding tourism centered on heritage, both cultural and natural, thus boosting potential for local, regional, national and international economic development;
- tourist development represents a potential source of many types of financial gain: entrance fees to sites and museums, guided tours and visits, sales of handcrafted products, documents and photos, an increase in local craft industry, the use of innovative technologies, e.g. scientific, research, digital, etc. [71].

13. Cultural and Creative Industries (CCIs)

Cultural heritage represents an important productive sector in CCIs. Historical-artistic heritage in Italy, which includes museums, libraries, archives, sites, monuments, as well as artistic representations, cultural conventions and fairs, plays an important role in the nation's tourist industry. It represents a significant economic support to economic growth.

The reasons which determine positive economic trends comprise:
- the attractiveness generated by the richness of the historical heritage;
- an expanding market that is increasingly concerned with cultural activities. This is evidenced in the "Report on the Cultural and Creative Industry in Italy" presented by ERNST&YOUNG. It includes: radio (going digital), newspapers and magazines, advertising, music, books, cinema, visual arts, performing arts (sector of great excellence), architecture (in search of sustainability), video-games (great potential for the future), television and home entertainment;
- the need to better know, communicate and enhance Italian cultural heritage more effectively and efficiently;
- the use of social media as a tool for communication between museum institutions and users.

In spite of these positive trends however, there are difficulties:
- non-compatibility between websites and mobile devices;
- low response rate to reviews, publications, etc. by museums and visitors alike.

14. Cultural heritage as globalized heritage

Technological progress has determined many changes in society, which has led to a shift in the economy, from one based on the production of material goods to an economy based on innovation and knowledge. From this has come a growing interest in cultural heritage worldwide which can be defined as a kind of globalization of this heritage.

In particular, the themes of culture and environment, as the expression of a set of values and traditions of a specific situation and a specific nation, have been influenced by communication systems that have permitted the circulation of capital, products, ideas, people, losing their national connotation and acquiring that of "world heritage of humanity".

Therefore, cultural heritage has become global because:

- global demand has grown leading in turn to an increase in the number of end-users;
- agencies for international protection have increased in number, many being linked to the United Nations for Educational, Scientific and Cultural Organization (UNESCO);
- the art market has grown as well as the number of art works in circulation;
- national institutions have adjusted to the present-day situation and have themselves become 'global'.

This globalization of the artistic patrimony has led to significant repercussions on conservation, circulation and end-user policies regarding works of art, as they represent a leading sector in the economy of different countries. Italy in this respect is the country with the highest number of heritage properties inscribed in UNESCO's list of protected sites, with a total of 54 (49 cultural properties and 5 natural) (Figure 7), in addition to another 8 elements of intangible cultural heritage (ICH): this represents a cultural record at planetary level, according to the different statistics attributable to approximately 70% - 80% of cultural assets throughout the world.

As is known, the EU and UNESCO have promoted culture-oriented development models using design with the objective of enhancing the historical, civil, symbolic, social and functional value of cultural heritage. The aim is to build a more solid relationship between the territory and the community through the various areas: culture and knowledge, tradition and innovation, public and private. In this regard, the valorization of cultural assets through design is a strategic objective for the international image and competitivity of *Made in Italy*.

Within this context, the afore-mentioned historical-technical Journal "*Conservation Science in Cultural Heritage*" has, since 2001, played an important role in the field of communication, training and research.

15. Final considerations

To sum up, some brief considerations deriving from a number of truths based on the meaning of "creativity", a conceptual term that can be transferred to the sector relating to the protection and valorization of cultural heritage.

The definition given by Henri Poincaré: "*Creativity is putting together existing elements with new connections that are useful*", introduces the transcendence of existing rules (new) by instituting another shared rule (as it has proven useful).

Figure 7. Italian heritage under UNESCO's protection

At the same time, the "*White Paper on Creativity*" (Ministerial Decree 2007), issued by the Italian Ministry of Cultural Heritage, Activities and Tourism (MiBACT) states that: "*Creativity and culture are inseparable, a mechanism for success that can place the Nation in a strategic position in the international process of globalization*".

Therefore, creativity is the basis for a profession in a sector which is undergoing profound change. The field of heritage protection and management of artistic and cultural events requires increasingly more specialized multi-faceted figures able to design

strategies for promoting and preserving art and heritage and to operate on diverse media platforms effectively using languages and potential.

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tablished in 1839). He is Direttore Generale of the Accademia della cultura enogastronomica. His biography appears in the 2016 Marquis Edition of Who's Who in the World. He is the founder and director of two book series on specific issues pertaining to the sector of cultural and environmental heritage. He is the author of over 420 publications in national and international journals and of 22 volumes and monographs covering commodity science, cultural heritage and the environment. In 1997, he founded the Diagnostic Laboratory for Cultural Heritage at the Ravenna Campus of the University of Bologna and remained head of the Laboratory for eighteen years. His scientific work deals mainly with the study of the "system: artifact-environment-biota" and the diagnostic, analytical, technical and economic evaluation within the context of the protection and valorization of cultural and environmental heritage.

Summary

An overview of the various and numerous themes relating to cultural and environmental heritage gathered together in one article represents, at an international level, a rare peculiarity. As a result of the research and teaching activities carried out over the decades at the Universities of Rome, Tuscia (Viterbo) and Bologna, integrated with the fundamental relationship and involvement of the Cultural and Productive Units scattered throughout the territory, I was led to synthetically describing, insofar as was possible, the different problems that involve the various scientific areas of a historical, technical, economic, managerial nature, within the context of interdisciplinarity and in respect of the holistic value of cultural heritage.

Riassunto

Una panoramica delle varie e numerose tematiche che si riferiscono al Patrimonio Culturale e Ambientale raccolte in uno stesso articolo rappresenta, a livello internazionale, una particolarità più unica che rara. Quale risultato dell'attività di ricerca e di insegnamento svolta nel corso di alcuni decenni presso le Università di Roma, Tuscia (Viterbo) e Bologna, integrata dal fondamentale rapporto e coinvolgimento delle Unità Culturali e Produttive presenti nel territorio, sono state trattate sinteticamente, per quanto possibile, le differenti problematiche che coinvolgono le varie aree scientifiche di carattere storico, tecnico, economico, manageriale nell'ambito della interdisciplinarità e nel rispetto del valore olistico del bene culturale.