Concept and tool for cultural asset evaluation

Deliverable D.T1.2.1

Activity A.T1.2. Set up of methodology for the evaluation of cultural assets and prioritization of securing & salvaging interventions

Conceptual document on ev**A**lua**T**ion **T**ool for **A**lpine **C**ultural **H**eritage (ATTACH) design and technical annexes for its testing

Version 1.0

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The CHEERS project

General information on the project (a summarized project summary)

Project specific objective (p. 55; AF): A sound methodology for local communities all over Alps for the recognition and identification of cultural heritage stock at risk in need of foremost safeguarding interventions.

Activity A.T1.2.1 (p. 44; AF): The value of assets at risk (identity, historical value, income generation potential) is one of the main drivers in orienting decision making on safeguarding interventions. Based on a comparative review of available methodologies, the activity will synthetize a reference concept and a tool for cultural heritage evaluation and consequent prioritization of safeguarding interventions. The tool will be produced in a prototype version, tested on pilot areas and made available for Alpine communities.

Deliverable D.T1.2.1 *Concept and tool for cultural assets evaluation*

Gathering relevant up-to-date knowledge, involved PPs will synthetize a tool, based on a multi-criteria approach (identity, historical value and potential income), for cultural assets evaluation (major contributions PP 2, 9, 6, 8).

Why do we need a valuation tool?

The evaluation tool will serve in one of the phases of CHEERS implementation, where it will provide information on asset's value which is an important attribute for prioritization of salvaging actions in case of emergency. However, this is not the sole goal as valuation tool can play a role in overall project conceptual framework. It might also be used for determining the value of the cultural heritage asset not only for prioritization for salvaging but for assessing vulnerability as well.

Combined with evaluation of hazards (of a natural disaster) it provides a key element for risk assessment, which is relevant in later stages of CHEERS. This fits into the overall project concept, which is built upon four main work packages/tasks. The first two of those are very much connected as the outputs from T1 feeds into the T2 and both provide a toolbox for efficient disaster management planning (and also relate to T3), which is then practically implemented/tested in work packages T4. Obviously, CHEERS is designed as a sequence of interconnected tasks, which complement each other and provide practical tools for communities in the Alps and policy makers on regional and national level.

Starting from the idea of identifying cultural heritage assets at risk as one of the project specific objectives, it can be established that CHEERS relies on notion of risk as primary element for tackling with the issue of management of cultural heritage in the Alps. Concept of risk is also broadly applicable when a large number of assets need to be screened for preliminary assessments and identification of cultural heritage. It can be applied to any type of hazard, any type of cultural heritage being threaten (Romão et al. 2016) and it enables the managers to plan and implement risk mitigation measures, which are to support conservation. If, and usually this is the case, funds and human resources are limited, prioritization must be done so to allocate resources to those assets of cultural heritage, which are it highest of risk.

In the following sections we try to align work packages and individual tasks of CHEERS with a general framework of risk assessment, which is drawn from several, what we believe to be relevant references, and then compiled into a general framework. This can be seen as a recap of risk assessment concept being related to actions of CHEERS while trying to guarantee the applicability to both different natural hazards and cultural heritage. Practically, we highlight the project tasks, which are relevant for specific step in the overall risk assessment framework.

Risk is commonly defined as a function (i.e. product) of hazard (physical and statistical characteristics in a specific environment) and vulnerability of exposed asset (Wisner et al. 2004; Apel et al. 2009; Vojinovic et al. 2016), although alternative views (Fig. 1) exist as some define risk with a triangle in which hazard, exposure and vulnerability contribute independently (Dewan 2013). We will rely upon the latter concept - ‘three-factor’ definition.

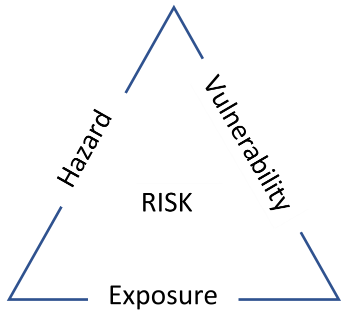


Figure 1: Risk triangle (Crichton 2002)

<u>Hazards</u> can be established upon probabilistic representation based on past events and are exhibited by simulations of their characteristics – an example of presentation are hazard curves, eventually leading to hazard maps. Hazard curves and maps play a fundamental role in the design and dimensioning of mitigation structures, in land planning and in the definition of risk and hazard management policies. (Lari et al. 2014). Hazard maps allow both, recognition of areas affected by the hazard with different levels of intensity, given a certain probability, and to establish the presence of hazard hot spots.

Relation to tasks in CHEERS: hazard analysis is covered by at least two tasks in work package T2. Available methods of hazard mapping will be investigated and comparative analysis upon juxtaposing different approaches will be provided to local communities within D.T2.1.2 and D.T2.1.3. Further on, D.T2.2.1 will deliver a geo-referenced database on assets of cultural heritage in test sites across the Alps, and D.T2.2.2 is to provide information on characterization of those cultural heritage assets, which will be used in T1.2 and valorisation of cultural heritage and T2.4 in risk assessment.

<u>Vulnerability</u> refers to conditions and capacity to make an asset susceptible to harm as an effect of a hazard (Vojinovic et al. 2016). Theoretical construct of vulnerability can be related to one of three major premises, however in case of CHEERS project the one deriving from risk and hazard paradigm seems to be most suitable. It is based on human-nature interaction and is viewed as an outcome of the hazard and is determined by exposure, sensitivity and potential consequences of a hazard (Dewan 2013). Consequences are demonstrated as harm occurring in form of physical, social, institutional, economic and environmental effects.

There are a few types of causal structures of vulnerability, which then be ‘parameterized’ by either qualitative or quantitative indicators, which suggest the extent of potential damage. For example (Pelling 2012) suggested three factors upon which vulnerability depends: exposure (location relative to hazard), resistance (livelihood), and resilience (adjustments, preparations), while McCarthy et al. (2001) defines vulnerability as a function of exposure, sensitivity (likely effect of the hazard) and adaptive capacity (ability to cope).

Parallel to causal structure, there are various ways to assess vulnerability (Dewan 2013), which usually duffer in terms of scale used in the study (Adger 2006; Eakin & Luers 2006; Birkmann 2007). However, in general two basic approaches exist – biophysical and social (Ford & Smit 2004). According to the first one, vulnerability is conceptualised as a pre-existing condition, which is determined by exposure and sensitivity to hazard, and is similar to risk, but differs in the absence of probability as a function (Adger et al., 2004). In the second one, vulnerability depends upon social, political and economic factors, which determine resistance and recovery – i.e. adaptive capacity. Several authors combine both aspects, and one of those exemplary cases (Daly 2014) is also presented below and suggested as an alternative protocol, which could be implemented in CHEERS.

<u>Vulnerability assessment framework proposed by Daly (2014)</u> grounds on previously developed approaches by Schröter et al. (2005) and Woodside (2006) and is designed as a six-step protocol for assessing vulnerability of cultural heritage in case of climate change but I argue that it is sufficiently general to be implemented for other types of natural hazards as well. Six steps are:

1. define the heritage values
2. understand exposure, sensitivity, and adaptive capacity of these values over time
3. identify likely hazards for each value under future projections
4. develop indicators for the elements of vulnerability
5. assess overall vulnerability
6. use stakeholder review to refine and communicate results

The **first step** is to assess the importance of values of the cultural heritage asset, which might be defined as a combination of different types of value. Set of values need to address different aspects of role cultural heritage asset has in society, being either key for running business and creating jobs or having significant evidential content for local community. Information is needed for the next steps of vulnerability assessment as it helps to define 'what is at stake' if natural hazards do occur. This also guarantees that assessment if specific for each culture heritage asset. These values are in some cases already determined by existing conservation plans or designation documents and need to be accounted for.

In order to establish the presence of such national-level cultural heritage management systems CHEERS consortium has collected data on already available value typologies. The overview has indicated very different approaches, where systems in Austria and Slovenia seem to be very similar, both grounded on a set of different types of values and a weighting approach. Italian case the set of criteria is quite different and is applied – like in Slovenia – to decide whether an asset is registered as a cultural heritage or not. Regulation in two German states – Bavaria and Baden-Württemberg – is somehow more general, defining what cultural heritage is.

Relation to tasks in CHEERS: in fact, developing a tool for cultural heritage valorization was to be developed in the CHEERS as deliverable D.T1.2.1, which should derive from already developed approaches by synthesizing available knowledge/know-how and would provide communities in the Alps with a decision-support tool. Obviously, it fits into the first step of the conceptual framework for assessing vulnerability we are presenting here.

Considering the variety of approaches in terms of detail and also context, we suggest a uniform system of valorisation in CHEERS project, as only this will enable cross-country Alpine-unified approach to test prioritization approach in case of natural hazards in relation to cultural heritage management. If valorisation exercise is done in a harmonised manner PP will also be able to compare results, make conclusions as in how suitable the approach is for different Alpine communities and provide recommendations to decision makers on how to implement the approach. A decision tool based on common grounds was also envisioned on a project level.

Thus, we suggest valuation tool (D.T1.2.1) is designed upon an AHP based approach (Saaty 1980), grounded on seven (7) types, with an additional aspect of the fact whether cultural heritage asset is already under UNESCO protection status or not:

- *evidential value* (it derives from the potential of the cultural heritage unit to yield evidence about past human activity (physical remains, written records, archaeological deposits, etc.))
- *historic value* (it derives from the ways in which past people, events and aspects of life can be connected through the cultural heritage unit to the present)
    - *illustrative* (the extent to which it illustrates something particular or distinctive)
    - *associative* (the extent to which it is associated with a notable family, person, event or movement)
    - *historical value* (to which period of time the CH is attributed (0=not applicable/unknown;1 = 1950 and younger; 2=1800 - 1959; 3=1500 - 1800; 4= 400 - 1500; 5= before 400AC [covering prehistoric times and antiquity]))
- *aesthetic/artistic value* (it derives from the ways in which people draw sensory and intellectual stimulation from the cultural heritage unit (either as a result of conscious design or the seemingly fortuitous outcome of the way in which the cultural heritage unit has evolved and has been used over time))
- *communal value* (it derives from the meanings of the cultural heritage unit for the people who relate to it, or for whom it figures in their collective experience or memory)
    - *symbolic* (the meanings of a place for those who draw part of their identity from it, or have emotional links to it)
    - *social* (places that people perceive as a source of identity, distinctiveness, social interaction and coherence)
    - *spiritual value* (emanate from the beliefs and teachings of an organised religion, or reflect past or present-day perceptions of the spirit of place)
- *economic value* (it derives from the potential of the cultural heritage unit to produce financial dividends for society as a result of direct or indirect economic activities connected to the use and function of the cultural heritage unit)
- *in-use/fruition (it derives from an asset (or item) being open to community and used*
- *scientific/educational* (it derives from an asset (or item) having information or data that (might) contribute in a significant way to scientific research and academic studies).

AHP approach is to be used for assigning relative weights to types of values. Additional technical details on the methodological approach and on how to practically implement valuation are given in Annexes 1 and 3.

Second step covers <u>understanding exposure, sensitivity and adaptive capacity</u> as three main elements determining vulnerability. *Exposure* combines both statistics (frequency, extent, associated impacts, etc.) on past events and future projections predicting natural hazards to come. *Sensitivity* is commonly evaluated by indicating impacts a natural hazard even has on cultural heritage, like erosion, which is causing e.g. foundations to be exposed to frost and/or heat. *Adaptive capacity* includes assessment of four strategic areas, which determines the extent of the natural hazard event to which the community managing cultural heritage can act to preserve the asset. Four topics are:

- policies and programmes (e.g. management structures, visitor management, legislative protections),
- information and knowledge (e.g. climate change, human resources, population),

- implementation (e.g. conservation and maintenance),
- monitoring/feedback.

Relation to tasks in CHEERS: one of characteristics of cultural heritage dealt within D.T2.2.2 is exposure to natural hazards, so this task fits here in the overall framework, and so does D.T3.3.1, where essential elements of the policy framework for protection of cultural heritage will be investigated – this indirectly indicates aspect of adaptive capacity, as it defines the community's ability to recover after natural disasters also in terms of salvaging cultural heritage.

The next, **third step**, is to combine information on likely impacts of the natural hazard event given previously determined sensitivity and exposure. In this step we need to define 'which asset is vulnerable to what natural hazard' and to be able to envision possible future impacts according to projected conditions. An 'impact matrix' can be used as a help.

Question of likely effects of natural disasters is to be dealt with in D.T3.1.1, where potential impacts of specific natural hazards on cultural heritage assets will be collected. This will later on serve as a reference for juxtaposing protection/salvaging techniques, especially in D.T3.2.1.

Indicators for assessing elements of vulnerability are defined in the **fourth step**. Indicators need to be spatially specific and must relate to at least one key element of vulnerability of cultural heritage; exposure, sensitivity or/and adaptive capacity. Quantitative indicators are commonly preferred as they are easier to comprehend, might hold less bias and enable relatively straightforward replicability of the assessment.

Indicators of vulnerability are to be identified and then tested on pilot sites of the CHEERS project (D.T2.4.1), which is very much in line with the conceptual framework we represent here. Indicators will be used to estimate factual vulnerability to selected natural hazards, however the process will be collaboratively designed and will include relevant stakeholders.

In the **fifth step**, an overall assessment of vulnerability needs to be determined by summarising indicators' values for sensitivity, exposure to hazard and adaptive capacity into an aggregated value. An example of such an approach was developed by Daly (2008) (cit. by Daly (2014)), where numerical values of indicators are summed up on a 1-3 scale, where 1 indicates low vulnerability and 3 means high vulnerability. However are several different ways how to create a general assessment of vulnerability – e.g. Dewan (2013).

The final, **sixth** step is to revise the assessment by interacting with other stakeholders and discussing the complete procedure of data collection, assessment of reliability, estimating the indicators and calculating the overall measure of vulnerability. In this way we can provide credible and relevant results.

Risk assessment

As stated in the beginning, risk is a function of hazard and vulnerability, so we can employ this simple equation to derive assessment of risk:

$$Natural\ hazard\ risk = hazard \times vulnerability\ \times exposure$$

Ideally, hazard and vulnerability metrics are normalized on a common scale indicating the level of each one, and then both can be overlaid as two GIS information layers. Each spatial unit, being either polygon or a raster cell, need to have numerical information on hazard and vulnerability so that those can be multiplied, and the resulting value then indicates risk. Values can be further reclassified into classes, and a map can be used to visualise of risk in the area of interest.

The last step of this conceptual framework of risk assessment fits with D.T2.4.2 of CHEERS where maps of assets of cultural heritage potentially effected by natural hazards will be overlaid with the grid of values of vulnerability indicators. In this way a factual level of risk that natural hazards pose will be estimated and graphically presented.

Probabilistic risk analysis allows a cost–benefit analysis based prioritization of mitigation strategies aimed at minimizing damages and danger for people, buildings and infrastructures. Moreover, risk analysis could be extremely useful for insurance purposes (Lari et al. 2014).

Annex 1: Conceptual scheme of the v**A**lua**T**ion **T**ool for **A**lpine **C**ultural **H**eritage (ATTACH)

The concept of proposed valuation tool (hereafter ATTACH) in generally follows the ABC method (Michalski & Pedersoli 2016), which provides a five-step framework for risk management:

1. establish the context
2. identify risks
3. analyse risks
4. evaluate risks
5. treat risks

The first also includes assessing values ('building the value pie') of the cultural heritage, which is a key information with risk being defined as a 'expected fractional loss of value to the heritage per unit time'. Valuation in the ABC method follows six general phases,

- establish the boundaries of the heritage asset being assessed,
- identify the main groups within the asset,
- identify the value subgroups within each group,
- draft a value pie table,
- define items in each value subgroup and count them,
- determine the relative values,

which we adopt for the CHEERS project, however not completely. We adjusted this approach by introducing three novel aspects.

First, we defined a *wider set of types of value*, which we believe reflects a more comprehensive assessment and provides a broader context convenient for application in different settings. Referring to the latter, it enables combination of valuation within CHEERS with already established valuation approaches in different Alpine countries (already set curatorial values), which encompass nationally defined and specific system of values.

The second novel aspect is that *relative weights* for different types of values are to be set by an *AHP approach* and also, weights can vary according to categories of cultural heritage. It is an approach that enables high consistency in weighting.

Finally, our approach is *highly inclusive (participatory)* as it allows to involve a broad variety of stakeholders not only cultural heritage professionals. This is one of the premises of CHEERS project and specific workshops are to be organized in pilot areas, where weighting/valuation task will be carried out.

By introducing all novel elements we defined the ATTACH implementation protocol, which is illustratively presented below and in a more step-by-step format in annex 3. Both, conceptual scheme and technical guidelines will be shared with CHEERS stakeholders/observers from fields of cultural heritage, natural hazards, civil protection/firefighters, municipal services, local residents etc. This is to guarantee prudence in implementation of the valuation approach in pilot areas and potentially other areas of the Alps.

Summary outline of the implementation of ATTACH

First, we need to select the assets of cultural heritage we wish to asses. As discussed within the document 'CHEERS definitions and boundaries' drafted by AIT (Jung 2018) attached to this document in Annex 2, asset "is a dedicated tangible object of cultural heritage, irrelevant of it being mobile or immobile (e.g. one painting, one statue, one building or otherwise)”. Then, the asset can be further-on divided into groups (e.g. buildings, archaeological sites, collections etc.) and moreover into so called value subgroups, which contain individual items of equal or close-to equal values. This is a key step to set valuation framework in terms of objects being assessed.

As all contributing values were hitherto defined creating a common valuation scope, the following step is to assign relative weights to those types of values. Weights can vary from 0 to 1 with zero meaning that an asset has no value of specific type whereas one indicates that an asset possesses only one specific value. Relative weights between zero and one, which all sum to 1 indicate a combination of values paramount to the asset. The weighting process needs to be collaborative bringing together relevant actors from fields of cultural heritage management and protection against natural hazards.

Third step is to define a quantitative scale, by which we assign value. Higher the level more of specific value the value subgroup (or individual item) has. Alike the weighting process scoring values is to be collective effort where competent stakeholders are reaching a consensus on valuation. Existing curatorial information is also to be considered as it holds very relevant indications crucial for consistent valuation.

Finally, weighted sum for each value subgroup is calculated indicating its relative value within the asset. Additionally, relative values of individual items can also be deducted.

Occasionally results may not correspond to the true state of the cultural heritage asset

Annex 2: CHEERS definitions and boundaries (prepared by AIT)

Definitions and boundaries

1. **Spatial boundaries:**
    a. A **cultural asset** is a dedicated tangible object of cultural heritage, irrelevant of it being mobile or immobile (e.g. one painting, one statue, one building or otherwise).
    b. A **site** is a spatial location of one or more assets who might, but not necessarily build up a group, based on common attributes.
    c. An **area** is a particular extent of space or surface of geographically distributed (not necessarily adjacent) sites that belong to the same governing unit (NUTS-Hierarchy: LAU-2 or municipality).
    d. A **region** can consist of one or more (not necessarily adjacent) areas, but it is NOT included in the scope of the project.

2. **Chronological boundaries** - The project scope timeline includes:
    a. suggestions on **preventive measures** to mitigate the negative effects of natural disasters that affect cultural assets
    b. course of action in the event of a natural disaster pertaining to the **rescue** and/or **evacuation** of cultural assets
    c. **safe storage** of the evacuated cultural assets, WITHOUT regard to the continued storage and/or return of the assets to their original location.

3. **Content boundaries**
    a. The project only focuses on **tangible, mobile and/or immobile** cultural heritage.
    b. The **mobility** of the cultural assets is a major point of investigation in the project and is dependant on the type of natural hazard that affects them, and therefore the lead time in the event of a natural disaster and the human resources available at the time of the hazard. Any assets that can be made mobile by various interventions (e.g. cutting a painting out of a frame to make it easier to carry) are also investigated. This is a pragmatic view which takes human safety as a first priority of the emergency response services into account (pragmatic view on mobile cultural heritage communicated by Austrian Observers: “portable by two people and transportable through a standard door”).

4. **Methodology and Implementation**
    a. A **methodology** specific to the cultural assets of the Alpine region will be developed, but with a regard to existing (successful) methodologies.
    b. One of the project aims is to deliver a **set of guidelines** that could support the development of national and international **legal documents and frameworks** on risk management and cultural heritage protection if no such guidelines exist. These guidelines are meant to have a transnational transferability and validity.
    c. **To be discussed: Trainings** of emergency services on the subject of protection and evacuation of cultural assets in the event of a natural disaster will be included in the project, because a lack of such knowledge has been identified in more than one country of the Alpine region.

Annex 3: Technical note on implementing ATTACH

The following text is to lay out a general protocol on how to implement and test the ATTACH tool within pilot areas of the CHEERS project and provides a template for reporting. The protocol is designed upon assumptions identified in the conceptual scheme from Annex 1 and is organised in a series of steps, which are to be followed in the testing of ATTACH. Additionally, a very simple tool is constructed, which is to help in documenting all key steps of implementation of ATTACH and afterwards to ease the assessment of the testing and preparation of the report. It is a spreadsheet composed of four sections (i.e. tabs) to which responses need to be provided by those coordinating the testing (a separate file attached to this report 'valuation_tool_D121_spreadsheet.xlsx').

1. **The pilot area**

The first step is to provide pilot area profile information for each of the areas you plan to conduct the test. This data is to be recorded in the first tab of the spreadsheet. This data will help organizers of the workshop, stakeholders attending the workshop and project partners discussing results to clearly orientate their mindsets within the context of the pilot area.

2. **Managing stakeholders**

In order to assure successful stakeholder involvement and management of their relationships we need to address a few key steps (Bourne 2009):

- Identifying relevant stakeholders,
- Understanding their expectations,
- Managing their expectations,
- Monitoring the effectiveness of stakeholder engagement activities,
- Continuous review of the stakeholder community.

Covering all these phases increases the chances of having results of valuation implemented in practice or at least having relevant decision makers considering their further investigation. Knowing your stakeholders provides you with information on how to approach different types of stakeholders so that they can aid in testing the tool, suggest improvements and indicate possibilities for its implementation. It is also helpful to manage risks of potential conflicts either among different stakeholders or stakeholders and the project team.

All five steps listed above are important, however for the sake of planning of workshops first three phases need to be elaborated on in more detail. Those are crucial for developing a better understanding of the unique characteristics of stakeholder community and the relationships. Several different methodological approaches exist to address this, however a more general term of 'stakeholders' mapping' is related to identification of both stakeholders and their expectations. This can be done fairly simple as listing classes of stakeholders in relation to organisation they represent; by indicating their typology and relationships between them and activities; or by presenting relationships with specific stakeholders, where several dimensions may be considered:

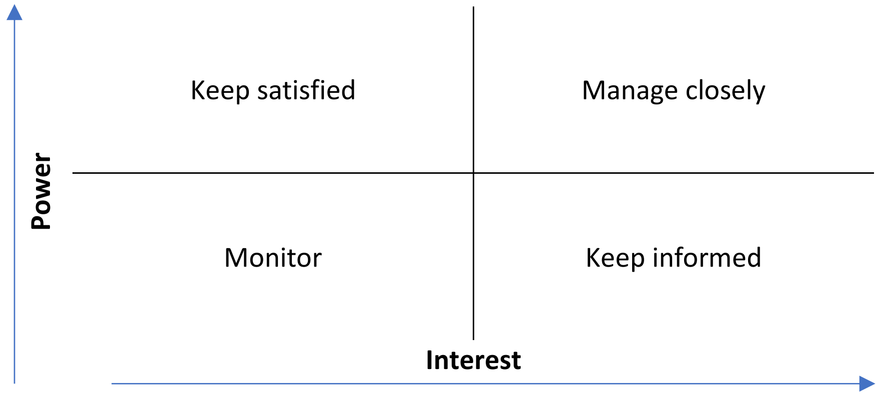
Dimension	**Definition**
Attitude	will the person help or hinder their work?
Hierarchy	where in the organisation's structure is the person positioned?
Influence	how well connected is the person?
Interest	does the person have an active or passive interest, or does she have any interest?
Legitimacy	does the person have some level of mandate to be consulted?

Power	what is the person's ability to impose change?
Proximity	how closely is the person involved in the relevant work?
Receptiveness	how easy it is to communicate with the person?
Supportiveness	does the person support or oppose the project?
Urgency	does the person have time constraints or does the person perceive work as important?

Whether you address all the aspects listed above or only a subset, various mapping methodologies can be used to systematically record data on stakeholders and to effectively approach individual groups. Due to a 'reasonable' level of complexity pursued in the development and test of ATTACH and to have a harmonized analytical approach, we suggest using three dimensions:

- interest (from very active to completely passive),
- power (from strongly influential to insignificant),
- attitude (from total supporter to blocker).

The data on individual stakeholder is to be recorded into the second tab of the spreadsheet, where one of five possible levels of each dimension is assigned to individual stakeholder (1-none, 2-very low, 3-medium, 4-high, 5-very high). This will assist you to approach your stakeholders properly and efficiently. With this information on individual stakeholders one can manage individual stakeholders differently but still include everyone – just the level of involvement is different (see fig. below).



It is obvious that you need to focus your efforts mostly on stakeholders with high level of interest and power as those are 'key players' that introduce changes and make your project success or failure. Having those stakeholders in your workshop will enable you to estimate realistically the potential of D1.2.1 tool to be implemented. However, others should not be neglected. Stakeholders with high interest but low power (residents, some NGOs etc.) need to be involved too as one of the key assumptions for developing valuation tool ATTACH is also to broaden the group of stakeholders as having only professionals or officials might produce biased valuation outcomes. We wish to omit this bias as much as possible.

3. Designing hazard scenarios

This step is very much case-specific and will depend upon the pilot area set-up, types of natural hazards and cultural heritage asset being assessed. It is also related to available data and analytical approach however we try to provide some very general framework, which might assure some level of harmonization among PPs. In this way it will be feasible to draw conclusions from different pilot areas in a comparable manner.

Hazard scenarios usually combine information on possible extent and intensity of the natural hazard event and relate this with the probability of the event (Apel et al. 2009; Dewan 2013; Lari et al. 2014). The expression of extent of the event depends upon the type of natural hazard being assessed and is exhibited by the e.g. flooded area, size of the landslide etc., whereas the intensity (severity) is related to depth of inundation, kinetic energy of rockfall, fire intensity and so on. Probability is commonly expressed by return periods of events of different magnitude. Combining those data provide information on the level of hazard.

PPs are asked to provide basic information on the design of scenarios on tab no. 3. The description is comprised of two parts. First general information on type of natural hazard is to be indicated, no. of different scenarios needs to be given, and characteristics by which scenarios differ among each other have to be specified. Additional narrative information on scenario specifics (how and by whom it was designed, how the reliability was assessed, etc.).

4. Identifying cultural heritage assets being assessed

Assets of cultural heritage, which will be a subject of valuation were selected prior to designing the ATTACH, thus it might be redundant to describe it in this document. However, if assets are selected specifically upon scenarios developed in previous step, a list of assets at risk is to be provided within step no. 3.

Note: this step is related to actions in WP2, where vulnerability is to be addressed in more detail and actual level of risk of individual assets will be defined. Also, in relation with hazard scenarios.

5. Weighting of value types

The set of values was agreed upon in the project group and consists of seven types:

- evidential value;
- historic value;
- aesthetic/artistic value;
- communal value;
- economic value;
- in-use/fruition value;
- scientific/educational value.

Note: in previous versions of the valuation tool design an additional aspect of cultural heritage asset having a UNESCO protection status was also considered. After several rounds of discussion among PPs a decision was made that adding information on protection status might bring bias as some types of values listed above may also be considered in deciding upon UNCESO classification. This would introduce the effect of double counting.

The relative weights are to be assigned to each of the value types. This step needs to be highly participatory thus an event bringing together stakeholders identified in the second step would probably be the best way to obtain their preferences over importance of different values. An Analytical Hierarchy Process (AHP) was decided to be the best approach, where each participant is to make 21 pair-wise comparisons between to individual types of value using the standard Saaty 1 to 9 scale. In this way relative importance of types of values can be expressed and AHP allows to aggregate this information on a group-level in a consistent and comprehensive way.

Technically, this step can be facilitated by one of several AHP on-line tools, which are freely available even for group assessments. One of such tools is e.g. https://bpmsg.com/ahp/ (already used by PP UCSC). Further on, it was adopted that individual weighting is aggregated by employing 'balanced-n scale model' (Goepel 2018), which is option made available in on of final steps when using the above mentioned on-line tool. For this you need to use the 'AHP group session' (option no. 4). Make sure that you are familiar with the tool prior to having a workshop – test it yourself.

Set of weights is to be the same for all assets/objects within one pilot area and does not differ among different types of cultural heritage assets. Set of weights is to be indicated on tab no. 4 (one set alone for the entire valuation on one pilot area).

Note: one can refer to more exhaustive on-line references for theoretical underpinnings of the AHP and practical guidelines for implementing it.

6. Valuation of the assets

The final step is to assign score of each type of value for each asset (or items of an asset) being valued. The scale for scoring is a geometric scale (i.e. geometric progression), which shows exponential growth as opposed to linear growth and is very suitable to accommodate very high values by keeping the ratio between neighbouring points on scale equal throughout the complete scale. This is beneficial also for valuation, when some assets/items have extremely high values. The scale we propose to use has seven scores (points) on the scale (table below). Each asset/item (identified in step n. 4) needs to be assigned with a score for each type of value. The scores are to be used considering only assets/items in the relevant pilot area. Please make sure you record scoring from all individual attendees of the workshop as we wish to investigate how different approaches for aggregating the scores effect the final ranking. (in our pre-test we have found differences)

This information is to be provided on tab no. 4. Pre-defined formulas are integrated into the spreadsheet, which enable quick calculation of the attendee-level individual scores for each asset/item.

You might find web-based survey platforms (e.g. SurveyMonkey, GoogleDocs, etc.) useful to collect scoring of larger groups of stakeholders who are attending the workshop. Those work well on either PCs or smart phones and enable you to gather information almost instantly during the event.

Score	Definition of the score
0	The item does not possess the contributing value
1	The occurrence of this contributing value in the items is very small.
3	The occurrence of this contributing value in the items is small (of the order of 3 times greater than that corresponding to the score "1").
9	The occurrence of this contributing value in the items is medium (of the order of 9 times greater than that corresponding to the score "1").
27	The occurrence of this contributing value in the items is large (of the order of 27 times greater than that corresponding to the score "1").
81	The occurrence of this contributing value in the items is very large (of the order of 81 times greater than that corresponding to the score "1").
243	The occurrence of this contributing value in the items is exceptional (of the order of 243 times greater than that corresponding to the score "1"). This score indicates the maximum intensity of the occurrence of this feature throughout all components of the heritage asset.

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