ECHOES

Enabling Cultural Heritage Oriented European Strategies

Open discussion (topic 3):

Developing and disseminating innovative decision-support tools to promote exploitation of advanced/enabling technologies in cultural heritage prevention, conservation and restoration

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NanoRestART

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Why promoting innovation in cultural heritage prevention, conservation and restoration

*"**A scientific approach** is essential for the conservation of the cultural heritage, as a preliminary basis that will ensure **effective planning** of ordinary and extraordinary maintenance works, as well as to assure their **efficacy and durability**"*

Business Plan, CEN TC 346 – Conservation of Cultural Heritage

*Although the conservation of cultural heritage involves a different **code of ethics**, it can be compared to medicine, where artifacts are analogous to patients and conservators are similar to doctors*

Position Paper, Echoes Cluster

An evidence and ethics based approach
is needed for decision-making in innovation in the cultural heritage field

Challenges to introduce innovations in the cultural heritage sector

- Wide diversity in terms of substrates, methods and techniques, ways of applications
- Stringent ethical requirements (“Conservators need to be conservative”)
- Need to work on a case-by-case basis

- Long experienced professionals, working with their own consolidated techniques
- Strong preference for well-known products & skepticism or lack of knowledge on new technologies
- Lack of “quality” certifications
- Labour intensive activity

- Limited production volumes
- Fragmented sector in terms of needs and players (e.g. having different missions, targets and size)
- Strong impact of the socio-economical context
  (on choices for prevention, restoration and conservation)

Complexity of evaluation criteria
(examples from NanoRestart)

Economical

Feasibility
Costs/affordability
Cost effectiveness
Intevention time reduction
Performance/efficiency
Market size
Durability

Technological

Performance/efficiency
Selectivity
Removability, reversibility
Reliability
Sensitivity
Long term impacts
Technical bottlenecks

Social/Ethical/Legal

Compatibility
Reliability
Reversibility, re-treatability
non-invasivity
Ageing of the treatment
Long term impacts
Need for training
Users and consumer perception

Safety/ Environment

Operator Health and Safety
Safety risks (e.g. workers, users)
Environmental impacts

An innovation value chain perspective: a variety of actors and needs

Actors:

- Researchers
- Tech developers/producers
- Museums
- Professionals (e.g. conservators)
- Companies (diagnosis, equipments, retail, etc)
- Scientific bodies
- Policy makers, authorities
- Users, society
- ..

Knowledge/support needs (examples):

- conservation challenges, substrates
- tech solutions, materials
- technical, ethical, safety, legal, economic requirements
- (long-term) testing method
- Safety and sustainability procedures
- Quality, advantages compared to benchmarks
- …

An intervention value chain perspective: a variety of competences

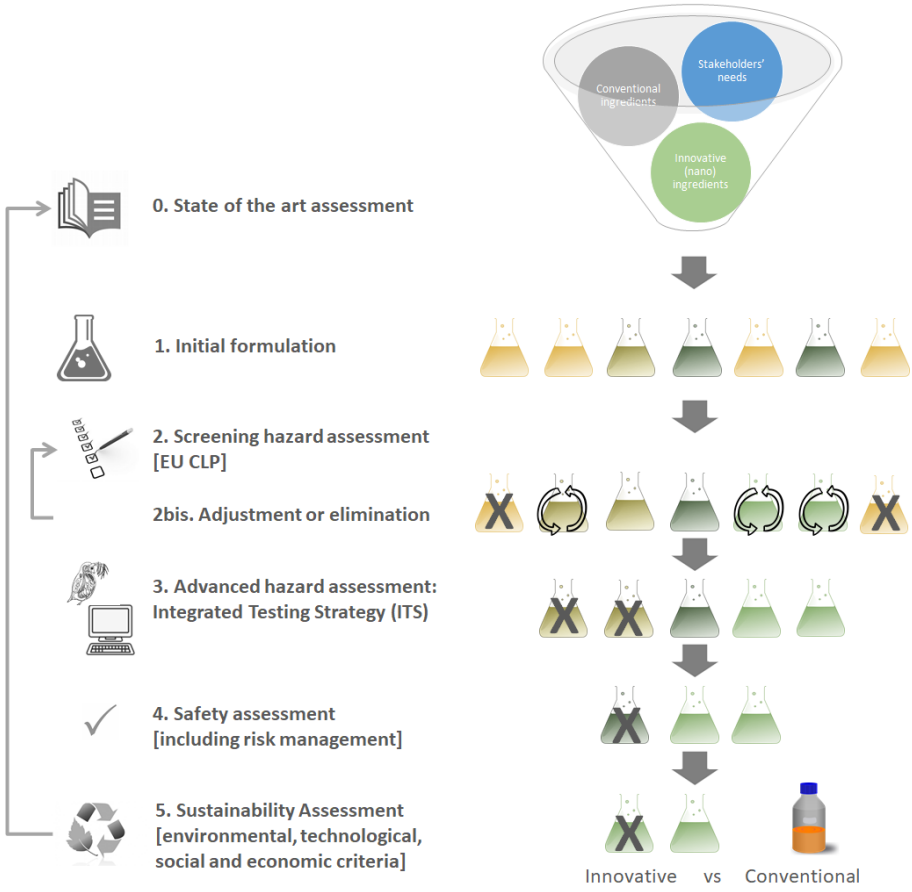
- **Diagnosis** of the works of art characteristics and degradation
- **Definition of requirements** (technical, ethical, legal, safety, environmental and economic criteria)
- **Design of the intervention strategy**: analysis, selection of tech, development of solutions, ways of application and use, selection of mock-ups, product optimization, etc.
- **Customization of the tech solutions**
- **Validation & Testing**
- **Benchamrk, monitor** of quality, feasibility, reliability of intervention
- **Training** to professionals and value chain actors
- **Exploitation**, introduction into the market and making it accessible to the wide community

Generally no transparent, structured and reproducible processes in intervention

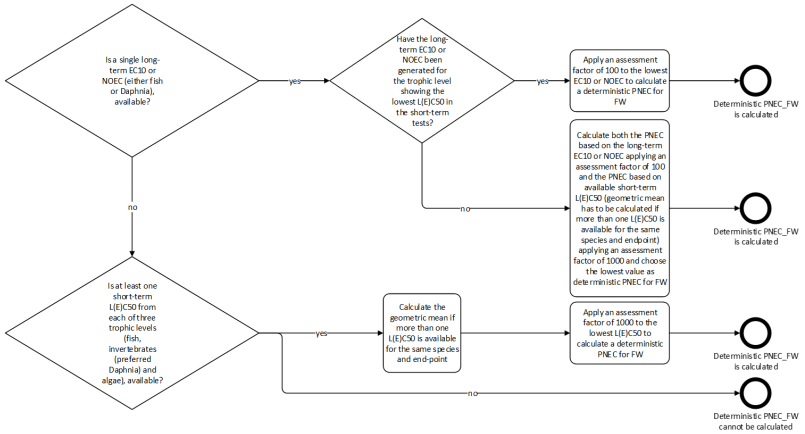
→ Need to guide the process

Decision-support tools: some practical examples

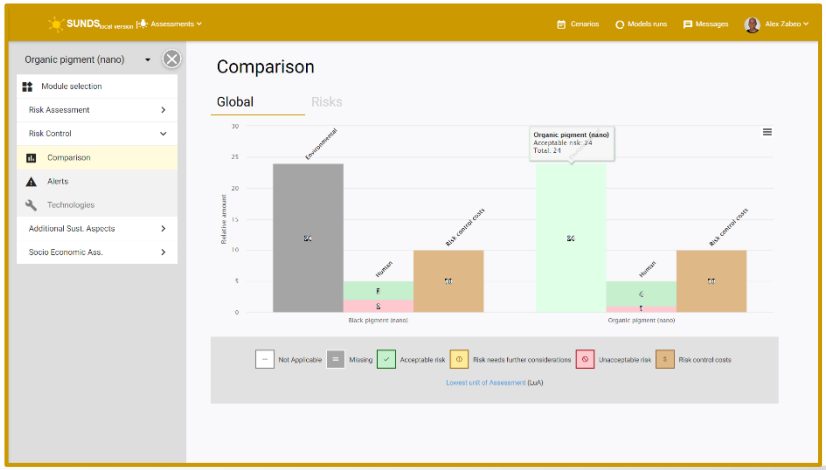
Decisional frameworks



Decision trees

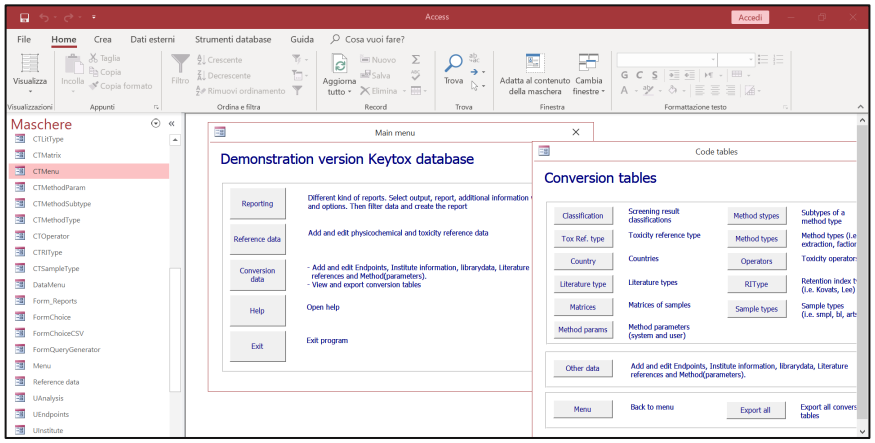


Software-based Decision Support Systems (DSS)

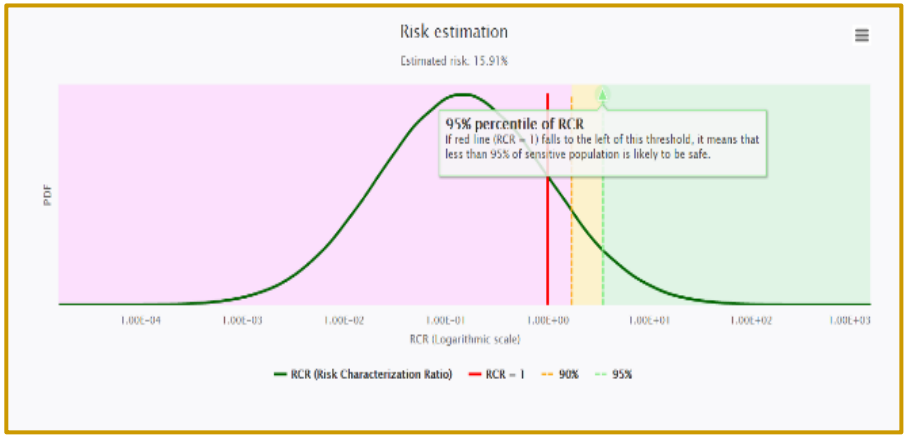


Decision-making tools: some practical examples

Databases/open repositories



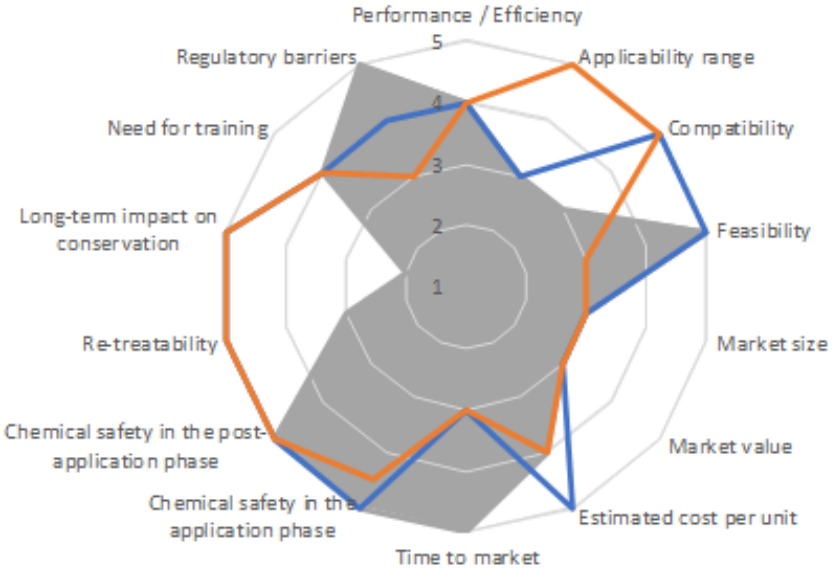
Quantitative approaches/tools



Decision-support tools: some practical examples

	Helpful	Harmful
Internal Origin	**STRENGHTS** • New/breakthrough properties for cleaning, consolidation, protection and sensing • Customization capabilities • Environmental sustainability and chemical safety	**WEAKNESSES** • Some products address very specific challenges • Additional testing needed for some products
External Origin	**OPPORTUNITIES** • Better performances than existing solutions • Applicability on a wide range of substrates • Matching ethical principles in Cultural Heritage (re-treatability, removability, long-term conservation…) • Tech development aligned with EU tech roadmaps/priorities • Potential applications beyond Cultural Heritage conservation	**THREATS** • Need to increase awareness and confidence on these new technologies

Qualitative/Semi-quantitative approaches/tools



WPX		HAZARD				
		0	1-2	3-4	5-6	>6
EXPOSURE	negligible					
	low					
	medium					
	high					

LEGEND
excellent
very good
good
moderate
scarse
poor
bad

Why decision-support tools?

A model for decision-making in the field is urgently needed. It should provide all actors along the value and supply chain ***reliable ways to assess the feasibility and viability of these solutions compared to existing benchmarks****.*

NanoRestart Exploitation Plan

Open issues

Developing and disseminating innovative decision-support tools to promote exploitation of advanced/enabling technologies in cultural heritage prevention, conservation and restoration

What priority areas: prevention, conservation, new materials for CH?

What purpose: knowledge base and awareness (e.g. repositories), scientific analysis (e.g. modelling), strategic decision (e.g. tech assessment), consensus and confidence building (sharing, dialogue, standards), market analysis, cultural assets management…

What tools (and good practices) along the innovation and “intervention” value chains?

What targets: harmonization, quality (and minimum quality/reliability requirements), ….

What actors: researchers, conservators, museums, scientific organizations, artists, ...

What (infra) structures: experts (e.g. consultancy), policy & normative (e.g. local authorities, standard bodies), public- private partnerships.….

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