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Cultural Heritage Open Laboratory System

The CHeLabS System:
Vision
Inspiring Principles

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A territory, with its distinctive cultural patrimony effectively linked to the technological capabilities and grounded in the socio-economic context, constitutes a territorial system seemingly to a large-scale facility.

This work illustrates the vision statement of a new model of territorial system, the Cultural Heritage Open Laboratory System (CHeLabS), aiming at the construction of this favorable context. The cultural asset (CH) is at the centre of this system, that addresses the challenge of a CH-driven development in science and technology.

CHeLabS is thought as a scalable and distributed laboratory based on the Open Access and Sharing culture.

The implementation of its current phase, consisting in a participated survey, is here described.

Keywords: Cultural Heritage; Territorial System; Safeguard; Innovation Processes; Multidisciplinary; Open Access; Sharing.

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I. VISION

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The CHeLabS system is intended to become a model of distributed laboratory, attracting competencies and generating excellence, built on the Open Access and Sharing culture.

Sites and monuments, historical centres and collections are at the centre of this system, becoming the nodes and the places of a dynamic integration among people, different expertise and capabilities. This process is realized by implementing the access policies, the most advanced technologies, and the activities encompassing research, training and dissemination actions within the patrimony itself, as shown in Fig. 1.

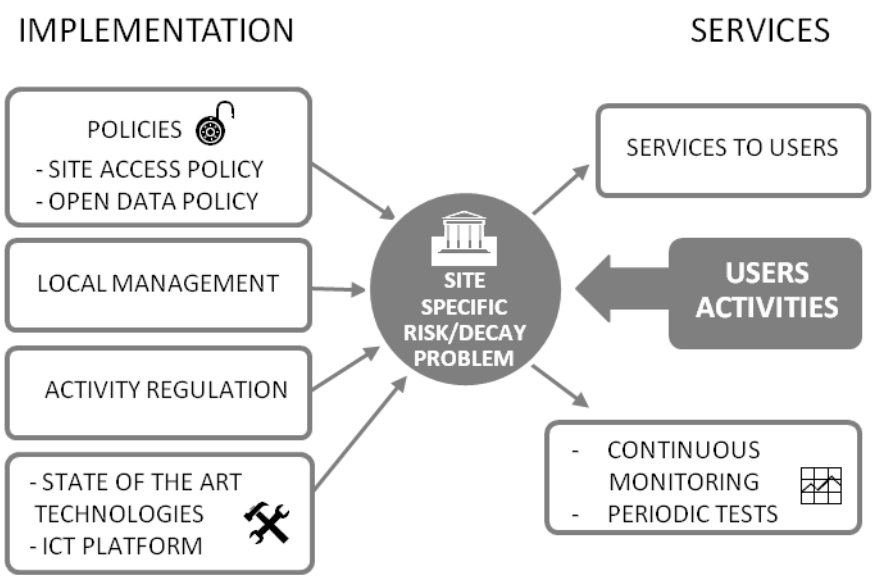

Fig. 1. Configuration of a site of heritage interest when is integrated into the CHeLabS system.

The envisioned CHeLabS structure, as shown in Fig. 2, accounts for a Coordinating Team, a Sites Management composed of the Leaders of the Local Units, and these last involved in the management of each single site. An Advisory Board is appointed to give support for defining the goals and the policies, the harmonization of the sites, the best practices exchange, the standardization of methods, the quality assurance, and the data sharing validation.

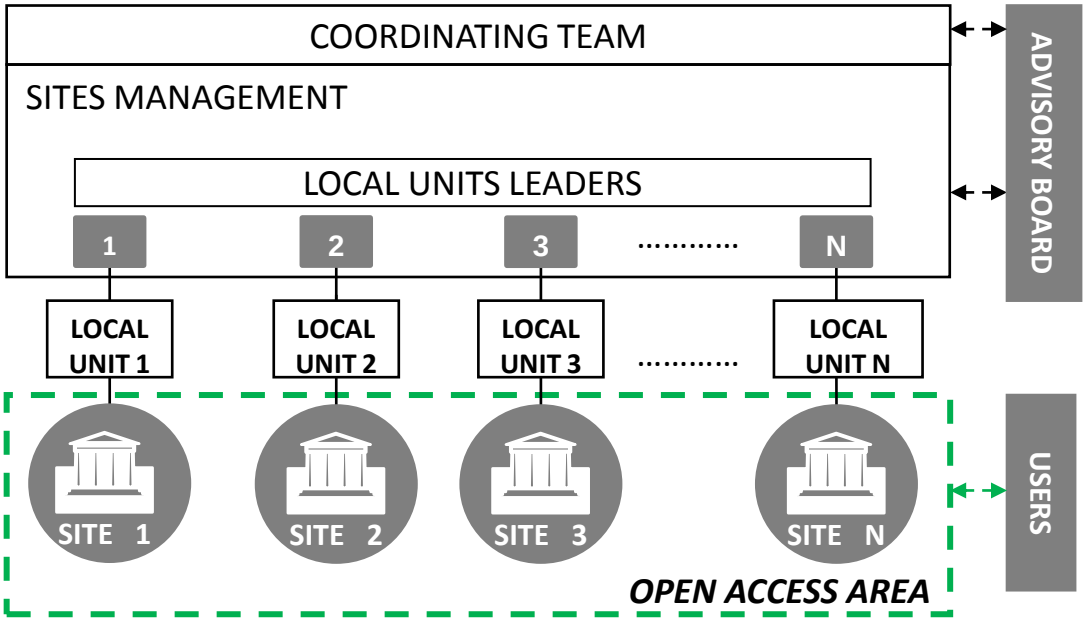

Fig. 2. Structure of the CHeLabS system.

The system of sites, with their distinctive character, constitutes an Open Access Area accessible, for on-site investigations, to the local units and to the external users who propose their activities.

This system is a scalable and harmonized network involving different actors in a multidisciplinary context, stimulating those dynamics that trigger events favourable to creativity and innovation.

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II. INSPIRING PRINCIPLES

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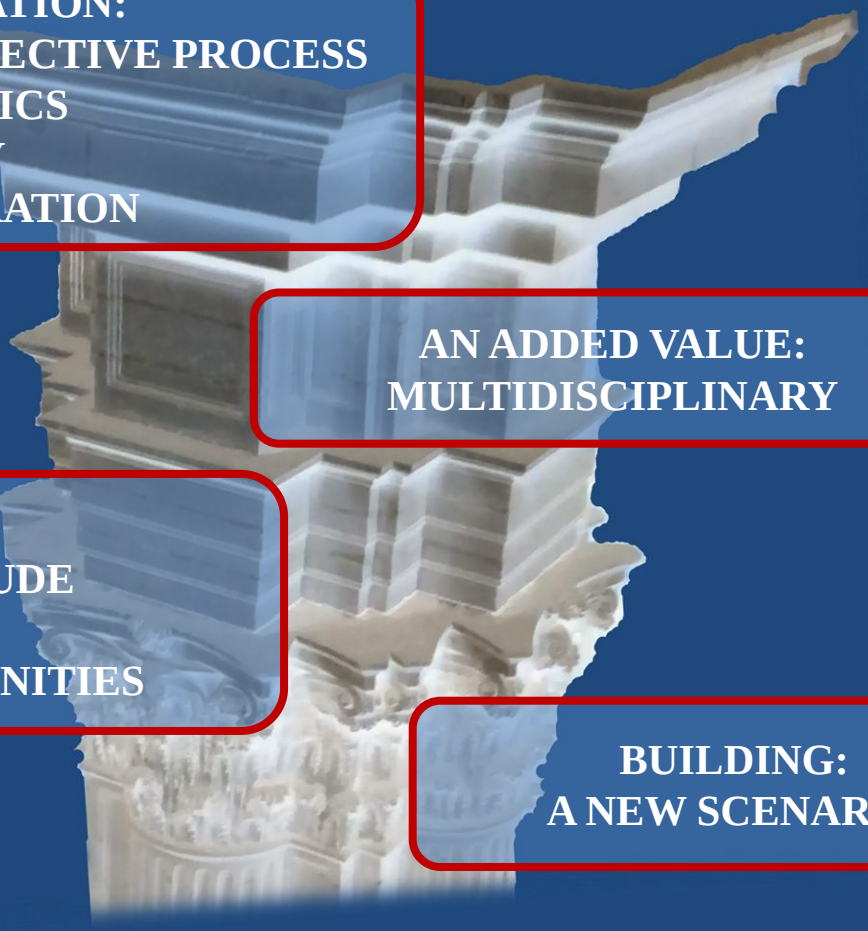
In many fields of science, as in everyday life, the comprehension of the dynamics of innovation is essential for facing challenges and exploring new solutions to open problems.

The following principles constitute the pillars of the CHeLabS approach:

TRIGGERING INNOVATION:
KNOWLEDGE CREATION = COLLECTIVE PROCESS
COMPLEX DYNAMICS
CONNECTIVITY
KNOWLEDGE INTEGRATION



AN ADDED VALUE:
MULTIDISCIPLINARY

SUSTAINING:
THE SHARING ATTITUDE
A SHARED SPACE
THE SPACE OF OPPORTUNITIES

BUILDING:
A NEW SCENARIO

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INNOVATION

CONNECTIVITY – COMPLEX DYNAMICS KNOWLEDGE INTEGRATION - INNOVATION

In our vision, the innovation dynamics based on knowledge creation is an essentially collective process, oriented by the environment in which it takes place. In the domain of social psychological science, also related to the economic science, complex dynamics of the relationships characterize the high performance working teams [1-3].

Connectivity, complex dynamics, and knowledge integration are key factors of the most suitable contexts for triggering innovation.

[1] M. Losada, "The complex dynamics of high performance teams", Mathematical and Computational Modelling", vol.30, 1999.

[2] O. Caridi-Zahavi, A. Carmeli, and O. Arazy, "The influence of CEOs' visionary innovation leadership on the performance of high-technology ventures: the mediating roles of connectivity and knowledge integration", Journal of Product Innovation Management, vol.33, No.3, 2016.

[3] A. Carmeli, P.B. Paulus, "CEO ideational facilitation leadership and team creativity: the mediating role of knowledge sharing", The Journal of Creative Behavior, vol.49, No.1, 2014.

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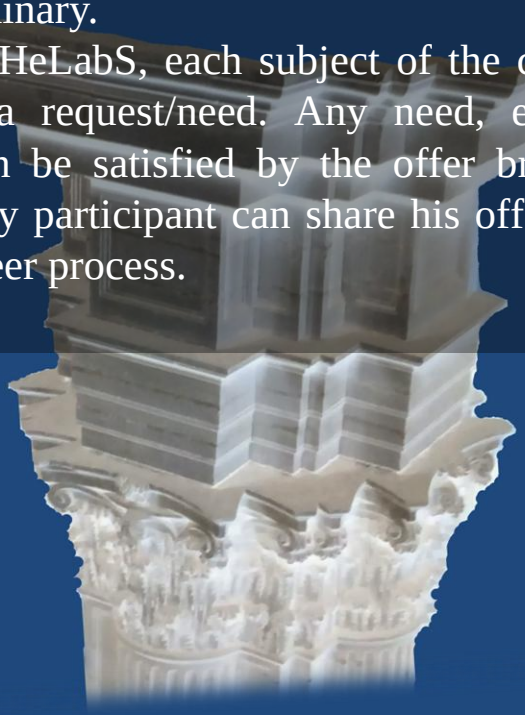
MULTIDISCIPLINARY – RECIPROCITY

The heritage science domain has an added value in the multidisciplinary.

Within CHeLabS, each subject of the community has an offer and a request/need. Any need, evidenced by one subject, can be satisfied by the offer brought by another subject. Any participant can share his offer and explicit his need in a peer process.



MULTIDISCIPLINARY

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SHARING

A SHARED SPACE – THE SPACE OF OPPORTUNITIES

The access to data and previous knowledge, the experimentation facing open problems, and also the meeting of stringent practical requirements, of constraints and of challenging issues lead the whole community towards innovative solutions.

A shared space, where the interaction of the experts' community with these factors is supported, becomes a place where any new piece of knowledge opens up the opportunity to reach other regions of knowledge still unexplored.

In the domain of complex systems science, mathematical models are purposely studied for predicting the dynamics of novelties both in social, biological and technological systems [4].

[4] V. Loreto, "Unfolding the dynamics of creativity, novelties and innovation", White paper of the Kreyon project, 2015.

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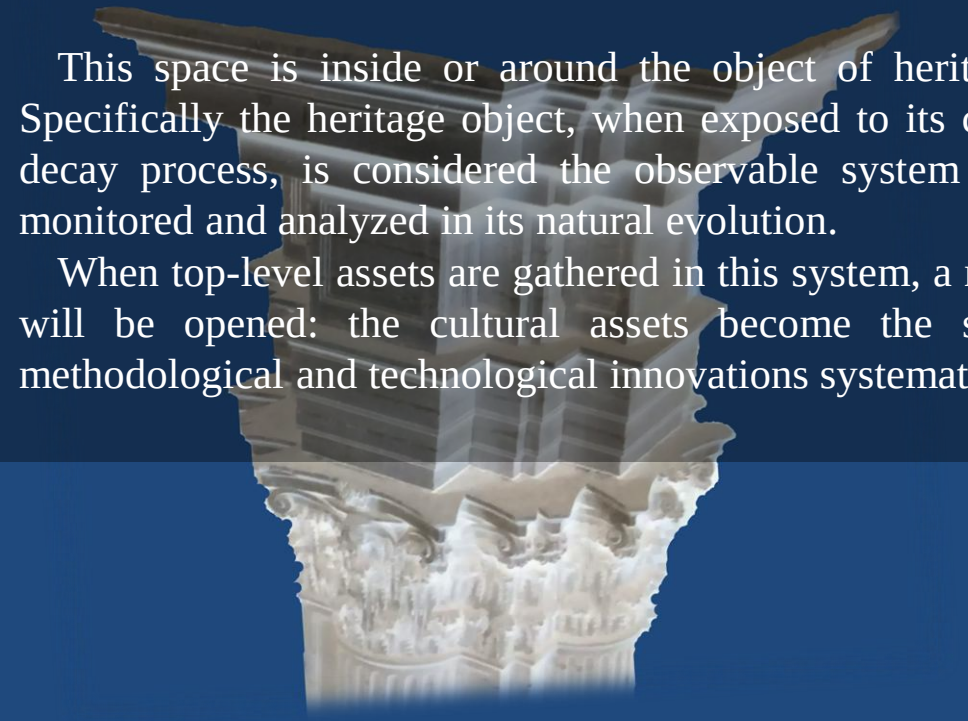
HERITAGE ASSETS – OBSERVABLE SYSTEMS

This space is inside or around the object of heritage interest. Specifically the heritage object, when exposed to its characteristic decay process, is considered the observable system that can be monitored and analyzed in its natural evolution.

When top-level assets are gathered in this system, a new scenario will be opened: the cultural assets become the space where methodological and technological innovations systematically occur.



A NEW SCENARIO

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CONCLUSIONS

The CHeLabS is intended to become a sort of distributed laboratory, attracting competencies and generating excellence, built on the Open Access and Sharing culture.

The effectiveness of the CHeLabS model does not depend on the state of the art technologies that, in a specific period of time, are available on the sites. In this way the implementation of the system is continuously renewed with innovative technologies. The adoption of the open access policy on the sites, combined with accessible advanced technologies and data sharing, amplifies and accelerates the knowledge creation process.

The added value of the CHeLabS approach consists in building the proper context that naturally attracts the major experts who face the challenging issues. This triggers innovation processes in the long-term and the achievement of new solutions to still open problems, not necessarily predictable and planned in the implementation phase. This aspect recalls the well known experience of all the large-scale facilities that, in few decades, have strengthen the growth in many research fields.

Today, the bottom-up character of the participated survey is inspired by these same principles, inviting the heritage science community together with the citizens to configure a new scenario that will guide the CHeLabS system in its future operating phase.

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GLOSSARY

LARGE-SCALE FACILITY: large scientific and technical installations, on a single location or distributed over a territory or virtual.

TERRITORIAL SYSTEM: in this framework, it is intended as a group of entities presenting elements characterized by complex and dynamic interrelations.

COLLECTIVE PROCESS: process done by a community, i.e. acting as a group.

CONNECTIVITY: the quality, state, or capability of the elements of a system of being connected or interconnected.

COMPLEX DYNAMICS: in this framework, it is intended as the occurrence of complex patterns of interaction between the elements of a system, leading to chaotic dynamics. Chaotic dynamics is related to the behavior of dynamical systems that are highly sensitive to initial conditions. So that very little differences in initial conditions lead to very different evolutions/trajectories making impossible any long-term prediction. Beyond unpredictability the positive aspect is that, when exploring slightly different initial conditions, the space of possible evolutions is filled. In these terms, chaotically complex context seems to provide the optimal learning landscape.

THE SPACE OF OPPORTUNITIES: the space, populated by a number of elements, where a novelty may occur.

SIMPLIFICATION, SHARING, HARMONIZATION, OPEN ACCESS, INNOVATION, CENTRALITY OF CULTURAL HERITAGE

A PLACE FOR SHARING

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