The Innovation System in Transformation

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Abstract
In the light of the pressing global challenges, our need for innovation has dramatically changed. Instead of technical innovation alone, we need solutions on a much larger scale as well. The text analyses the transformation of the discourse on innovation in the last two decades, trying to illustrate the progressive shift of meanings, actors and tools involved in the process and what caused it. In the last decade, a slow mutation has occurred from the concept of creative and critical practice in the hands of creative individuals to creativity-driven innovation brought by the whole Cultural and Creative Sector and Industries (CCSI), and promoted by the establishment of the new EIT Culture & Creativity Knowledge Innovation Community in 2023. Nowadays, the debate on how to improve innovation and competitiveness must shift the attention from subjects and objects to support structures and ecosystems. Thanks to the analysis of case-studies, four possible contemporary design approaches to innovation have been identified: advanced design innovation, responsible innovation, knowledge innovation, cross-sectoral innovation. The selected case-studies and an interview with a Swedish artist illustrate the role of universities, research centres and public labs as structures supporting cross-sectorial innovation including CCSI in their research since the beginning.

Keywords
Cross-sectoral innovation
Cultural and creative
sectors and industries
Support structures

Introduction

Innovation has long been defined as the strategic stimulus of our economic society. In this context, innovation concentrated mainly on new technical solutions, and reaching a new market was defined as the final aim of this process (Schumpeter, 1961). Support structures for this understanding of innovation have focused on the promotion of research and development (in research institutions as well as in companies) and have later expanded to other (non-research based) innovation support structures such as, for example, start-ups with programmes such as business incubators and accelerators. These innovation strategies all have in common that they were set up with the clear aim of financial growth, mostly aimed at a single company, sometimes a specific sector.

However, since the emergence of the digital and creative economy, the question arose of how immaterial values such as the ability embodied by the creative communities to imagine and design services (not just only products) could increasingly determine material value and innovation. In light of the pressing global challenges we are confronted with today, our need for innovation has in fact dramatically changed. Instead of technical innovation alone, we additionally need material and immaterial design solutions on a much larger scale. The COVID-19 pandemic for instance has demonstrated how fast and flexible we must be to react on various societal levels at the same time. Climate change or the energy crisis brutally show us that our complex societal structures make it imperative to realise that our challenges cannot be solved by a single organisation or one sector alone. These urgent needs require experts from different fields to interact with each other to be able to achieve change and find new solutions. Collaboration and co-creation are the two fundamental elements in this situation.

On the European level, the Cultural and Creative Industries and Sectors (CCIS) have lately been acknowledged as drivers for innovation and societal transformation. The president of the European Commission, Ursula von der Leyen, with her concept of a New European Bauhaus, clearly sees design, architecture, and the whole creative sector as the centre of a sustainable, beautiful, and commonly built future society. The European Institute of Innovation and Technology (EIT) has also acknowledged the CCIS as a driver for innovation by supporting a new Knowledge and Innovation Community (KIC) for this sector.

One of the first mappings that was carried out by the European university network Una Europa for the EIT Culture & Creativity points out that the CCIS "need to be repositioned at the centre of cross-domain industry innovation and green transition, by designing creative bridges that enable empowerment processes and collaborative responsiveness in relation to existing and emerging societal challenges" (Una Europa, 2023, p. 17).

Another research topic concerns the autonomy of the CCIS in repositioning at the centre of cross-domain industry innovation, or their "dependence" on fundings and alliances with support structures.

Today, innovation support structures at the national, regional and local level follow the European Union's example in exploring the

innovation potential of CCIS. This also shows that the perspective on innovation must be broadened and enlarged with support structures on how to unlock the innovation potential of the cultural and creative industries (CCI) and how to foster innovation support through cross-sectoral collaboration.

The Concept of Cross Innovation with Cultural and Creative Industries and Sectors

Tech alone will not be enough to make Europe more sustainable or more competitive (Contrast II Study, 2023). Today's challenge is to implement technical and other innovative solutions within complex structures which often consist of a range of different companies (often from different sectors), public institutions or governmental bodies as well as academia and sometimes even civil society. But what methodologies could be applied to achieve these objectives?

There is an ecosystemic gap in how to manage and fund these multi-stakeholder innovation processes. New organisations are needed to act as bridge builders between the different stakeholders and to combine expertise from different companies, sectors and parts of society as a neutral part, with no special interest in the process, while at the same time offering signficant know-how and understanding for the experts and the process as such.

Furthermore, new legal frameworks which shape safe innovation spaces where various stakeholders can co-create new products, services, processes, and business models are key to encouraging new forms of innovation. It is a difficult task, but there are key tools and approaches from the creative sector that can be put into play to initiate a transformation. CCI have a large variety of professional methods and skills to create the new and often unexpected (out of the box-thinking), or to develop scenarios and alternative futures. Designers for instance can think creatively across materials, methods, sectors and professions (Skibsted & Bason, 2022).

Also, the practice of participatory art, a common art practice which includes public participation in the creative process thus allowing the public to become co-creators, editors or observers, is a method that can be of great importance in complex multi-stakeholder challenges in which many stakeholders must be involved and be able to co-create solutions (Kelly, 2014).

Furthermore, the creative industries have a deep know-how in applying digital tools or adapting them to new circumstances. The integration of big data, cloud computing, the internet of things, digital platforms and other new digital solutions allows for a rethinking and reshaping of existing business models that can encompass market-driven solutions and expand existing audiences (Abbasi, Vassilopoulou & Stergioulas, 2017). This collection of different areas of expertise can be key for multi-stakeholder innovation processes, but until now the sector is fairly seen as a driver for innovation and its impact both on innovation and societal transformation is seldom measured.

In innovation support structures on the national, regional or local levels, the potential of the CCI is still largely untapped. The main research question in this context is: how can support structures strategically unleash the potential of the CCI for innovation processes in other industries or for society at large?

There are a variety of research questions connected to this main question:

- What are the special competences in the CCIS that make them drivers of innovation? How are the creative processes and their methods linked to this potential?
- How can different companies collaborate in open- and cross-innovation processes on high level? What does a legal framework for these processes look like?
- What do innovation support structures need in order to adapt their structures to these new innovation systems?

Designing Innovation Driven by Culture and Creativity

Innovation, as a strategic stimulus, is characterised by elements of exceptionality that authors of different disciplines (economics, management, design) have tried to categorise in models. Over the years, literature on innovation has described the phenomenon analysing the process through which a change has become the result of a specific "type" of innovation. Not all innovations bring as result incremental changes based on existing technologies and processes. Indeed, the exceptionality of impact has been defined through the concepts of radical innovation which involves high technological risks and market uncertainty (McDermott & O'Connor, 2002); disruptive innovation driven by the ability to intercept a market segment in a new way; or breakthrough innovation which highlights the impact of important discontinuities on innovation management (Hacklin et al., 2004).

In the design perspective, innovation is the effect of an intentional transformation. It is therefore necessary to investigate the nature of the causes that produce different types of effects and impacts, with the aim of intervening on causes for designing and steering innovation. Nowadays, the increasing fortune of the concept of design-driven innovation (European Commission, 2013) opens up to new dimensions through which we can read innovation as a result of multiple processes and multiple human and non-human agents. Thanks to the analysis of case-studies uploaded as part of the CCSI mapping project for the EIT C&C KIC, led by the eleven universities belonging to Una Europa Alliance, four possible contemporary design approaches to innovation have been identified: advanced design innovation, responsible innovation, knowledge innovation, cross innovation. Their common denominator is that they are all driven by culture and creativity. The case-studies selected illustrate the role of universities, research centres and public labs as structures supporting cross-sectorial innovation, including CCSI in their research from the very beginning.

Advanced Design Innovation

"Advanced design is a practice that imagines future perspectives by envisioning future products and processes. It deals mainly with extensive projects, extended in time, space, uncertainty and complexity" (Celaschi, Celi & Mata Garcia, 2011). The processes of advanced design are based on speculative processes, oriented towards investigation, to long-term perspectives, and through user involvement: the innovation can be both continuous and radical as result.

Case 1: Development of Conceptual and Practice-Based Models for User Experience and Interface Design of Products and Services Based on Artificial Intelligence

The three-year doctoral research project by Virginia Vignali aims to explore and define new paradigms and models of human-machine relationships and interaction based on Artificial Intelligence (AI) technologies, in order to create a smart user experience conscious of basic logic and potential cognitive biases, following a more democratic and accessible approach. The proposals and output originated from the research should lead to the generation of human-in-the-loop processes capable of placing the end-user at the centre of the design processes using technological systems and creating multi-agent collaborative contexts. The approach that the research aims to propose is a multidisciplinary methodology based on the discipline of collaborative design in which all stakeholders involved in the process of designing and using AI-based and related usability systems can collaborate and define their needs for the creation of more inclusive and usable tools. The research delves deeper into the themes developed within the Human Body Interaction project of the Advanced Design Unit, Department of Architecture (University of Bologna), which presented its first results during the *International Symposium of Future Design for Human Body Interaction* and published case-histories and tools on the Human Body Interaction (HBI) open database **Fig. 1**, to improve collaborative processes in knowledge development (Zannoni, Montanari & Succini, 2022).
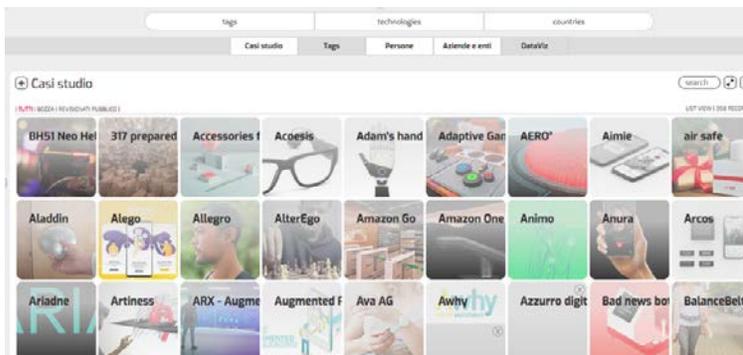

Fig. 1
Human Body Interaction (HBI) open database, by Advanced Design Unit, University of Bologna, Italy. https://adu.unibo.it/hbi/

Responsible Innovation

In the perspective of responsible innovation, design assumes an ethical role, empowering people to take care of themselves, their communities, and the environment (Succini & Ciravegna, 2022). Driven by the attempt to respect the Sustainable Development Goals, the impact of these contemporary approaches and visions can be assimilated to a breakthrough innovation. But the highlight in this case is the creation of new forms of collective knowledge through collaborative methodologies and the adoption of new meanings.

Case 2: Observatorio de Emergencias en Patrimonio Cultural

The online Observatory of Cultural Heritage Emergencies (OEPC) is the main output of a competitive research project with long-term collaborations between Governmental Agencies, NGOs, museums, SMEs, and universities[1]. The OEPC platform Fig. 2 is an open access university research resource service, to respond to the challenge posed by the risks affecting the cultural heritage. The Observatory is a laboratory for sharing activities and experiences, learning and training, and has been developed to become a global network for disaster and emergency risk management and prevention in cultural heritage. It is a platform of connection between university and society and its aim is to create a community, to raise awareness, responsible innovation and citizen science. The project results affect the full range of the Quintuple Helix Innovation, based on the intersection between academia, civil society, government, industries and the natural environment. The expectation is that the benefits could directly generate economic, social and environmental impacts in a longer term for stakeholders and society as a whole.

Fig. 2
OEPAC – Observatorio de Emergencias en Patrimonio Cultural: the online website is the result of a project developed by the Complutense University of Madrid Research Group in Risk Management and Emergencies in Cultural Heritage (GREPAC). https://oepac.es/en

Knowledge Innovation

The current and relevant themes linked to innovation in knowledge and organisational learning practices reflect on the new relationship between material and immaterial spaces and contents, and on how technologies can change the learning experience. The learning dimension shifts from being an individual capability to a systemic feature of organisations. Knowledge innovation therefore involves the transformation of models, sense and meanings of learning, leading to the deep transformation of culture and society and producing new creative heritage.

Case 3: metaLAB (at) Harvard & FU Berlin

metaLAB is a community of scholars, artists, designers, technologists, curators, and thinkers, committed to ideation, debate, speculation, and theorization across the disciplinary grid, with affiliations and practices distributed worldwide. Rooted in the arts and humanities, straddling scholarly, critical, and creative practice, the community's aim is to model new forms of cultural communication, creative and critical practice, and knowledge production. It defines itself as a knowledge design lab that translates concepts into practical expressions, experimental books, museum installations, participatory events, software platforms, artworks, exhibitions, workshops, data visualisations, and curatorial projects which all involve multi stakeholder partnerships.

Cross-sectoral Innovation

Cross-sectoral innovation seems to be a prerogative of artists, designers, and all the actors belonging to the multiple CCSI, and seems to be the "revealed innovation" today, as a driver of great change. Little more than a decade ago, the report titled *Hidden innovation in the creative industries* (Miles & Green, 2008) sought to investigate the process of innovation within the creative industries, and how waves of innovation from elsewhere impacted upon them. The answer to the question seems to lie in the very nature of the creative process which is expressed in unregulated spaces, is triggered programmatically outside of predetermined rules, is nourished by experimentation, and is not based on a priori methodologies. Creative processes feed on disciplinary boundaries, and that could be one of the reasons why they can produce cross-sectoral innovation as a response to the search for new senses and meanings. Creative processes are able to establish new ethical relationships between us and the world, to investigate new connections between science and technologies. The creative processes are by their very nature triggered by the unexpected and by crises. This aspect can be the reason why *cross-sectoral innovation* can be assimilated to a breakthrough innovation, unexpected and breaking broadly with the technological trends of the past.

Case 4: Uniarts Helsinki Research Pavilion

The Uniarts Helsinki Research Pavilion is an international and cross-institutional platform for processes, discussions, and collaborations in the field of art and artistic research Fig. 3, Fig. 4. Originally organised in connection with the Biennale in Venice, the Pavilion hosted a series of artist and artist-researcher residencies during spring 2023 thanks to the cooperation with Helsinki International Artist Programme (HIAP) and the Saari Residence maintained by the Kone Foundation, and culminated in an on-location event in June 2023. The Pavilion offers a platform for a series of exhibitions and activities for critical art and thinking. The aim is to present artistic research to a wider audience, introducing visions of a reality that has not yet been materialised in theory or practice. The contents relate to a variety of aesthetic, scientific and political interpretations and perspectives on current issues through the methods of artistic research. The Uniarts Hub provides a pre-incubator programme twice a year, lasting 12 weeks, which gives participants a comprehensive understanding of entrepreneurship in artistic and creative businesses Fig. 5. The programme introduces participants to different business models and experts in creative industries and the arts, and builds a community of peers and colleagues within the participating group. The program consists of workshops and lectures both onsite and online, to leverage the entrepreneurial skills of teams and talents with an artistic professional background. Participants may take time during the programme to plan their career options and design the business model for their own company.

Fig. 3
Health Narrative Arts residence at Uniarts Helsinki Research Pavilion, 2023. © The University of the Arts Helsinki. https://www.uniarts.fi/en/research-pavilion/

Service path: Pre-incubator programme

Cross-sectoral Innovation Case

Interview by Jenny Kornmacher to Elin Frost (artist), who took part in a cross innovation process in autumn 2022 in Southern Sweden.

JK   Can you describe the cross innovation process that you took part in, in a few sentences?

EF   It was a rather short, intense innovation process that took place over a couple of months in autumn 2022. The process was designed and organised by the Skåne region and the Blekinge region. They put together cross-disciplinary teams. I was teamed up with an industrial designer and a business leader in the steel industry and we were asked to collaborate on the steel companies' challenges. In total, I believe I put in 14 or 16 hours of work. The process was partly facilitated externally and partly based on individual effort.

JK   As an artist, why did you take part in a cross innovation process?

EF   There is a short and a long answer. The short answer is that I got paid and felt that I could contribute with my broad experience. The longer answer is about a curiosity to co-create with

others without a monetary exchange creating power hierarchies: when I, as an artist, work with clients who want me to do creative work, I always work with the client's vision and goal. Of course, it's based on my personal style and preferences, but a significant part of the work is about listening to what the client wants for their money and delivering just that, based on their values, goals, and opinions. To put it bluntly, I am a consultant delivering a product although with a creative touch. For me, the artistic process is about being in a completely different place, whether I'm there alone or with others. It's about being in a completely honest, safe, and value-free space where anything can happen and with no strings attached. It's unusual for me as an artist to be able to be there, in that artistic space for extended periods, without simultaneously having to worry about how I am going to pay my bills. It's part of being an artist and belongs to the life I've chosen to live although that is not always easy. I guess that's why this process was so special for me personally. I felt that our small team managed to create that collective co-creation space between us without the subtle service-provider hierarchy between us. We worked on eye-level. This thanks to the unique situation that I was paid from another source where no reciprocation was required other than me contributing my body and my thoughts and that we had signed a legal framework for our collaboration being transparent about possible IP and ownership of results.

JK   What were the results of the process?
EF   Together we made basic changes for the steel company by developing a new circular business model for the company (based on a leasing model instead of mass production). We also launched a new subsidiary company that among other things, repurposes production waste. In addition, we developed and implemented a new digital marketing strategy for the company and together we also established a local cultural scholarship. So we had several and very concrete results that were, thanks to a CEO who was inclined to changes, all implemented during or shortly after the process. We were incredibly effective regarding resources used during the innovation process and the results that we achieved.

JK   What did you take out of this experience?
EF   The friendship with my two co-creators in the team. And a very strong sense that it is possible to achieve incredibly amazing things in a very short time. It was so transformative when I realised that personal chemistry does not initially need to be there. Personal chemistry can develop over time. And if there is some drive and a lot of curiosity, people can do amazing things together across borders of any kind.

Conclusions

From the EIT Culture & Creativity, there are huge expectations for the capacity of the Culture and Creative Sectors and Industries (CCSI) to generate sustainable economic growth.

However, the European economic system needs a creative redesign which could be driven by the entire creative sector at the centre of a sustainable, beautiful, and commonly built future society as desired by the New European Bauhaus movement.

Since 2008, in the *Hidden innovation in the creative industries*' report (Miles & Green, 2008) and in the Green Paper *Unlocking the Potential of Cultural and Creative Industries* (European Commission, 2010) the reading perspective of the phenomenon focused on the full potential of creative communities to exploit creativity and design to increase innovation, but this capacity was undefined, and considered hidden and locked.

Over the past decade, a slow mutation has occurred from the concept of creative and critical practice in the hands of creative individuals to *creativity-driven innovation* brought by the whole CCIS. Indeed, to improve European competitiveness through design, culture and creativity, the entire process of cooperation must be redesigned.

Thus, the debate on how to improve innovation and competitiveness has to shift the attention from subjects and objects to support structures.

So the question about how these support structures can strategically unleash the potential of the cultural and creative industries for innovation processes in other industries or for society at large, finds a possible answer in the design of balanced ecosystems in which all actors have differentiated roles.

However, a connected question arises: if the entire creative sector is ready to collaborate in open- and cross-innovation processes and if the entire sector understands the value of giving up margins of autonomy in favour of accepting a systemic creativity-driven innovation led by complex ecosystems, such as the new Knowledge Innovation Communities on C&C.

In fact, the concept of creativity-driven innovation could be read as a paradox based on an oxymoron: imagination and creativity expand through unlikely associations and an openness to the unknown, whereas innovation flourishes thanks to a systemic network of support structures.

In this respect, the concept of cross-sectoral innovation, as the selected case-studies seek to demonstrate, could be the most suitable one to adopt to define the special skills of people and communities working in the CCS, who have the capacity to anticipate and to identify much-needed new perspectives on the renewal of our society, who are able to question current ways of working and the values behind them, and dare to look beyond social norms and across borders.

As stated in the first part of the contribution, the contemporary perspective on innovation should be broadened and enlarged with support structures that should however act as neutral agents of mediation and be supported by an innovative legal framework. The role of universities as Breakthrough Labs in the cultural and creative international ecosystem (Una Europa, 2023) could be relevant to develop this awareness of the shift from hidden innovation to a cross-disciplinary innovation to achieve real common innovation, that is co-designed and collaborative.

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Jenny Kornmacher
has a demonstrated history of working with creative industries and innovation in different European countries. Her area of expertise is to promote innovation both within the creative sector but also to make use of the sector's innovation potential through collaboration with other industries or areas of society: cross innovation. It is her great passion to develop new methods and processes to promote sustainability and innovation through cross-sector collaboration. In these processes, companies from various industries open up to work together with experts from the creative industries on ideas for innovative products and services.
As a policy maker, she has worked for regional and national governments as well as the EU on the topic of cultural and creative industries and innovation.

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