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Establishing ecosystems for disruptive innovation by cross-fertilizing entrepreneurship and the arts

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ABSTRACT

The article explores cross-innovation between CCIs and SMEs. To enable such innovation, the DIVA project developed a set of tools and methods, based on an analysis of field-specific stakeholder requirements. By looking at specific cases of interaction between designers and artists on one side and business firms on the other, also leaning on the Cross Innovation project and considering a wide range of secondary research, the article captures both the existing mechanisms, as well as detects tacit potentials and new possibilities for deep cross-fertilization. Based on a theoretical reference framework presented in the first part of the article, the findings of a multi-stakeholder SWOT analysis carried out by the DIVA project indicate new innovative paradigms brought about by introducing art thinking next to the predominant paradigm of design thinking within traditional industry realms. Upon the empirical evidence of analyzed cooperation potentials, a Europe-wide selection of good practice cases and through focused interviews, the article digests a set of business-needs transformations that call for a profound cross-fertilization between art and entrepreneurship. These evidence-based guidelines present the potential of a new 'innovation catalyst' profile who facilitates the shift from unintentional spillovers to art-thinking based crossovers.

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Innovation; art thinking; cross-sectoral; cultural and creative industries; entrepreneurship; transformation

1. Framework

1.1. An introduction to the emerging crossfield

Creativity is an inherently human characteristic that has been reproducing through the history of human artistic expression and craft, starting from early ornamental pieces (e.g. Venus of Willendorf) to adorned utilitarian objects (e.g. ancient greek pottery), frequently merging craft with art, the utilitarian with the merely beautiful, and/or metaphoric, conceptually meaningful etc. This has over and over resulted in craftsmen practicing their craft as art (e.g. master katana sword makers). It is exactly in design where the merger between art and business has most flourished, which is not a surprise. We need daily objects, glasses, scissors, doorknobs, chairs, etc., but we also like to surround ourselves with meaningful things of aesthetic appeal. Thus

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companies have long employed artists or artisans to create design pieces in serial production. Iittala, a renowned Finnish company is a prime example on how good design incorporates daily lives, their line of glassware is of iconic value across the world, and in the Design Museum in Helsinki, a big portion is dedicated to their products, displaying them as more than just daily objects – making them akin to art pieces. Alessi In Italy employs hi-profile artisans in a much similar manner, and a much similar approach may be found in global superbrands like Ikea, where the designers are recognized for the smallest of the objects they create.

This affinity between design and products is not surprising at all, even companies like Apple invest ample effort in producing aesthetically pleasing objects. But artists have been influential upon many other aspects of our lives as well, some of them perhaps not apparent. Contemporary artists now often look at the daily and the ordinary with a critical eye, new perspectives and ways of thinking. With the world becoming increasingly digital it is not surprising that artists have been questioning the role of technology and the relations in our society. Even before the digital revolution artists were making socially engaging art, works that questioned the habitual ways of being or doing, the values and the relationships of social power. One such experiment was an artist-led restaurant in New York from the 1970s, simply named Food .[1] The endeavor was innovative in more than one way; firstly it was not a restaurant for the sake of business or profit, but it was primarily an experimental ground for artists to communicate their ideas through food and food related practices, however it had also involved an entrepreneurial side. Since the venture was conceived as an artistically directed restaurant it did not concern itself with the menu the same way the rest of the New York restaurants did. Only recently recognized as a kind of gastronomic avantgarde, Food was one of the earliest places to serve sushi, vegetarian food and going against the (then) grain by providing fresh and seasonal food,[2] things that one would find common or even trendy well after 2000.

1.2. Examples from the artistic realm involving entrepreneurship

A creative mind and artistic thinking provide an alternative thought process to a more analytical business decision and this is something that is being increasingly recognized in the entrepreneurial world. For example, the Burning Man event (which is known for radical expression and mindshifting experience) has recently also become recognized as beneficial for fostering the entrepreneurial spirit. As stated by Harley K. Dubois (co-founder of the event), at Burning Man "*an entrepreneurial spirit is going to come to the forefront very easily because there aren't a lot of rules, but there is opportunity*".[3] Burning Man has become the place to be also for cutting-edge global entrepreneurs like Sergey Brin and Larry Page (founders of Google), Eric Schmidt, (executive chairman of Google's Alphabet) and even Mark Zuckerberg (founder of Facebook).[4]

It is hardly surprising that artists also look at the economic aspects of daily life, as it is the case with the work New Eelam.[5] The installation takes inspiration from the startup culture and the issues with the real estate market, it creates a speculative solution, addressing the audience with ambiguity whether this is an artwork or a de facto venture. In a similar fashion artists take on the block chain technology and cryptocurrencies, as in the works of Sašo Sedlaček's work Om for Coin (2019–2021)[6]

and BITTERCOIN – The worst miner ever (2016),[7] or further their resemblance to real products with works like Quick Fix[8] and Vending Private Network (Oliver and Vasiliev 2018), both taking the form of a vending-machine servicing goods more akin to the 21st century: in these cases artistic objects operate much like regular vending machines, blurring the line between art and regular daily transactions even further. For the present article, the fascinating aspect of these artists' conceptual approach is how close their research-based, artistic and scientific introspections can be to actual (product, i.e. technological) innovation, innovative design and entrepreneurial ventures.

Regardless of this conceptual affinity between the artworld and entrepreneurial world one can recognize an important gap that calls for bridging: A big portion of interaction between SMEs (Small and Mid-size Enterprises) and the CCI (Creative and Cultural Industries) is based on the principles of design in a fairly shallow way, even if the above cases imply that a deeper connection between the realms can bring about more innovative results. A further and perhaps more disruptive approach can be seen in the artwork Dulltech,[9] where in a lack of media players that would serve artists in their endeavors, Dullaart started a Kickstarter campaign: apparently the entrepreneurial world has neglected or failed to recognize this need, or merely did not find enough market potential in it. This venture served a dual purpose and evoked both contexts, being exhibited as an artwork and a market product. In a similar manner the work Offshore Matters[10] has taken an artist intervention further into selling clothing in conjunction with protesting against and revealing the immoral nature of tax havens.

Upon the above presented cases it becomes evident that a deep shift in the thought process can be recognized when comparing an artistic approach to research venture, in contrast to that of the business world:

> Generally speaking, technical research focuses almost exclusively on new technical possibilities: What new things can be done? How can they be done faster or more efficiently? By contrast, artistic and design work tends to focus on the social and cultural meaning of the technology that is under development (Mitchell, Inouye, and Blumenthal 2003).

And it is this mindset shift that might prove particularly valuable for the business world. An early initiative that looked into such interactions across Europe was the Cross Innovation project funded under the INTERREG IVC scheme.[11] By contrast, the Interreg DIVA project[12] is more recent and tries to create a methodology to bolster innovation in SME through creative practices. Both projects are dealt with into more detail in Section 2.

1.3. The spillovers of art and creativity

Including people and practices related to artistic disciplines (Berthoin Antal 2012) within the corporate sphere could generate beneficial effects both for the company involved and for the users directly or indirectly from the processes and relations activated. It is there that the innovative process really starts to approach a different, more transformative if not profoundly disruptive quality. Here different ways of thinking as well as different (both entrepreneurial and artistic) tools for data analysis are combined to arrive at the synthesis of solutions that importantly include the entrepreneurial element. Cultural and creative spillovers have been defined as the

> process by which activities in the arts, culture and creative industries has a subsequent broader impact on places, society or the economy through the overflow of concepts, ideas, skills, knowledge and different types of capital (European Commission 2012).

Three different kinds of spillover have been identified so far (Poprawski et al. 2017): knowledge, industry and network. The spillover effects (Vickery 2015) analyzed so far in the realm show that the exchange of knowledge (Institut für Innovation und Technik 2014) between people, businesses and the social sphere is capable of amplifying the transformative impact on the user (who is considered in social context) by a creative process that leads to new services, processes, and product development. But often these spillovers are rather accidental and do not permeate deeply or permanently into adjacent sectors. With CCIs this effect can be obtained by summing up the benefits deriving from the activities of the firms and non-governmental organizations that include artists and creative professionals as self-employed individuals, and which find positive effects on other sectors of the economy or society (KEA and URBACT 2015). These positive externalities derive from processes based on art and culture, through which creativity spreads from CCIs to other sectors and economic industries, helping to generate innovation in local economies. Creative spillovers[13] allow for creativity based on art and culture to interact with other forms of innovation and with different processes (scientific, technical or commercial) to break the boundaries between disciplines, introducing intuition and imagination in business and organizational processes, helping companies to innovate (Tom Fleming Creative Consultancy 2015).

The innovation generated by the creative industries can help companies differentiate themselves from competitors by improving productivity (KEA and URBACT 2015); it consists in the development of networks, in collaboration opportunities, in the exchange of knowledge, in organizational learning and is expressed in all those advantages offered by cross-innovation (Santoro, Bresciani, and Papa 2020) through the development of new connections between sectors and disciplines. These connections can sometimes be improved by fostering organizational interchange between different types of enterprises (micro-level). As demonstrated (Comunian 2010), the incorporation of the creative sphere in the corporate sphere can have effects both on the internal corporate area (Manufacturing, Research and development, Human Resources) and on the external area (Marketing, Communication, Corporate Social Responsibility).

Collaboration between the creative industries and SMEs therefore operates at a micro level, and only when this collaboration gives rise to new ideas that can be transferred internally, can we speak of a real 'creative impact' of art on the company. In order to make this impact transferable in some way to the macro level (as in the Cross-innovation project) it is necessary to involve nuclei of companies (or entire areas) where creativity has played a key role in the development of the company. In these terms, the DIVA project appears to be more oriented towards the creation of 'creative nuclei', i.e. its main objective is the creation of collaborative projects between the two types of enterprises (CCIs and SMEs), whereas the Cross-innovation project appears to be fundamentally oriented towards the dissemination of creative content from micro to macro level.

The interchange between the two levels, taking into consideration CCIs has been conceptualized by the combined model for creative industries development, involving 4 Rings of Mega-, Macro-, Meso- and Micro-Factors (Jancoras et al. 2015). In this model, both factors on the higher level have an effect on the factors of the lower level and vice versa. Investigations on this topic reveal that the transfer for the realm of CCIs is facilitated by the results and progress of a single work team at business level, influenced by an interesting (genuinely challenging) team task, the team's openness to ideas and learning from experience.

While the Cross-innovation project focuses on observing the macro impact of creativity on individual areas, locations and sectors, the DIVA project is based on individual business collaborations between SMEs and CCIs. So, considering both projects, cross-innovation can be understood as the management of an innovation process that facilitates the learning of complementary knowledge (Institut für Innovation und Technik 2014) through the transfer of similar technologies and solutions between different sectors, as well as through the promotion of cross-sector collaboration between different kinds of industries. The latter is one of the main actions envisaged by the DIVA project, presented into detail within the following two sections.

1.4. Cross-fertilization through art thinking

Many of the most important production tools for digital media artists – but no less perhaps for business or industry – used today are not the results of for-profit companies, but collaboratively designed using the ascending methods of free/open non-proprietary software and other technologies, as well as horizontal coordination of work and such management models. Art and design training contributes to business, while art and commerce have always had a productive tension – bringing closer together and occasionally intertwining sectors of CCI and SME in more or less successful blends and collisions. Rather than to ignore this tension, the addressing of it includes not only expanding the business culture and its models, but more broadly developing progressive organizational techniques and (human resource) profiles – such that shall be presented in the concluding parts of this article. In particular, there is a need to explore and model (or operationalize) the ways that art, science, and technology crossover may be grown into an ecosystem that stimulates both economically as well as socially impactful collaboration.

The key methodological novum – developed through a collaboration of two DIVA project partners (University of Nova Gorica and Kersnikova Institute with a topical curriculum development project *MAST, Master Module in Art Science and Technology)*[14] – is the consistent introduction of Art thinking as a core stage in the innovation process. The key objective for the student is to be(come) able to apply Art thinking methods and tools, combining them with Design thinking (as the subsequent stage of the innovation process), in order to develop critical and unconventional breakthrough processes, services and products. In the first step, the so-far broadly accepted Neri Oxman's Krebs Cycle of Creativity (Oxman 2016) is transformed in the following way (Figure 1) (Oxman 2016):

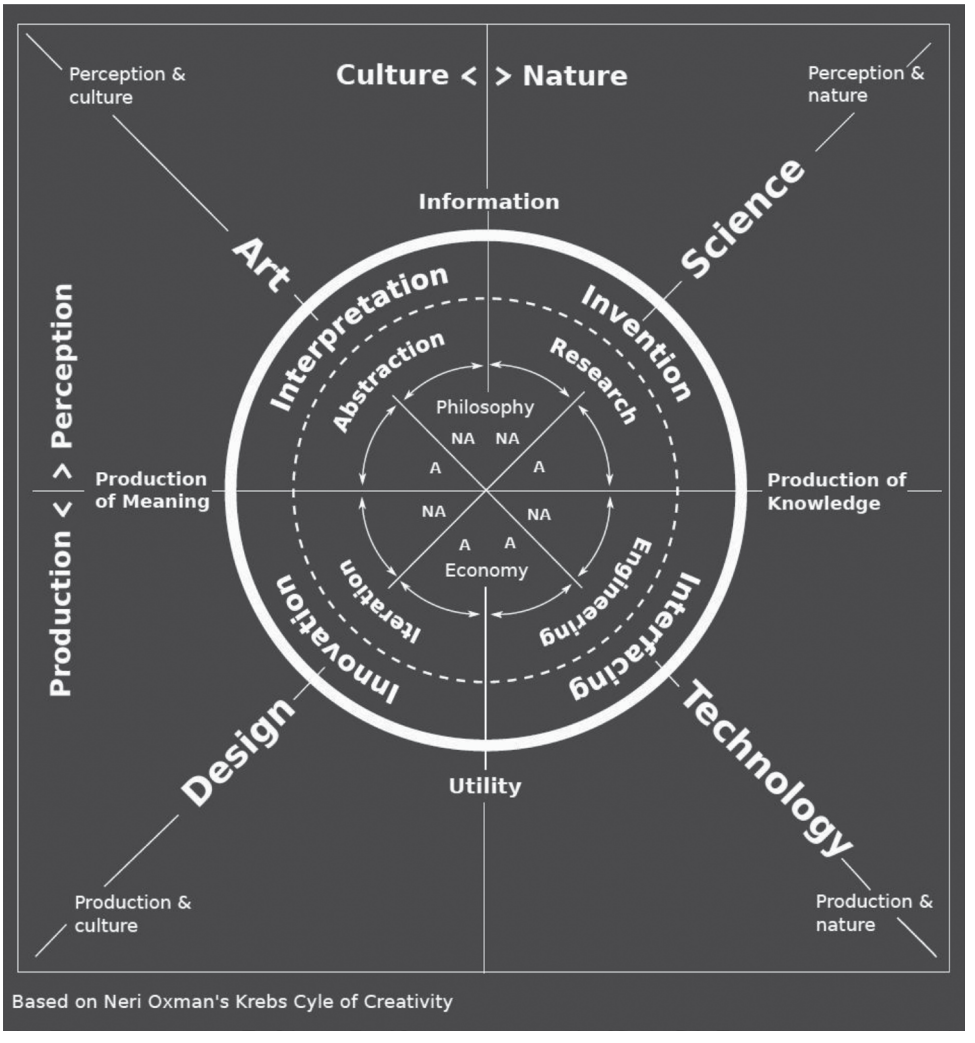

Figure 1. An expanded cycle of creativity.

In order for the Art thinking to be inserted as the key stage of innovation, Abstraction serves as the 'thinking-away' of the unimportant or irrelevant from the artistic perspective, which is inherently pluralistic and can sustain internal difference and diversity in terms of a rigorous intellectual process: the methods and tools used in the artistic practice are those elements of the innovation process that bring about radical, positively disruptive innovations based on plural views and approaches, they principally consider the individual experience and viewpoint, while remaining holistic in terms of the systemic approach. Art thinking thus provides a much needed pendant to design thinking – if not an obligatory pre-stage within the innovation process – since it "*spends more time in the open-ended problem space, staking out possibilities and looking for uncontested space*" (Robbins 2018).

Thus Art thinking may be securely inserted as a key stage of the innovation cycle process, such that was developed in the MAST project, to serve as a methodological

and training basis in the here discussed DIVA project. It was devised by Jurij Krpan in his contribution "Process Road Map: The Nonlinear Topology of Innovation in 10 Steps" (Krpan, Castillo-Rutz, and Purg 2021) featured in the novel *MAST Manual*, aimed at educational applications of the Art-Science-Technology mix with particular potential in innovation.

By ways of closing the introductory section of the article, it is necessary to point out that such a model only relates to a certain macro level perspective, however the article shall show at how merging of art and design applies to some of the cases presented in the following section, on a smaller scale. Such an expanded cycle namely offers itself as a tool for explaining the transitions that take place at the disciplinary boundaries.

2. Research method and case analysis

In order to test and verify what happens when creative disciplines meet the corporate sphere in a more or less ecosystemic context, the article compares the empirical experiences deriving from two large-scale interreg projects (Cross Innovation and DIVA) in order to arrive at conclusions on which factors or principles affect positive and deep cross-innovation. This is done in a way that allows tracing a line of research and a methodological outline for the future study of the role of applied, intermedia, investigative and similar artistic practices in conjunction with entrepreneurship.

2.1. Case study approach and field analysis

The research method adopted in the DIVA project served as predominant and primary source of data, with which some examples from the Cross innovation project were combined. DIVA stands for 'Development of ecosystems and innovation value chains: supporting cross-border innovation through Creative Industries'. The research in this project was designed to further on stimulate virtuous connections between the various project activities (including an open call for funding twenty such cross-fertilizations), thus based on theoretical and empirical research. The results achieved in the project emerged from direct research experience in the territories (users considered in their social, i.e. entrepreneurial and creative context) of the regions involved and derive from a precise analysis methodology. It involves three central elements: an analysis of users'needs, a SWOT analysis, and the construction of a cooperation model capable of drawing virtuous connections between art and business, between CCIs and SMEs. These stages were depending on the following data sets:

- Best practices relating to the three territories (Veneto Region, Friuli-Venezia Giulia, and Slovenia);
- Interviews for the SWOT analysis;
- Interviews in case studies of collaboration that took place in the three regions between CCIs and SMEs.

The latter have been put in direct relationship with the theoretical framework[15] which for over a decade now has devoted ample space to the interaction between

these so distant worlds (Darsø 2004) and placed within an economic, legislative and strategic context, consisting of the main actions to support the cultural and creative sector and its interaction with the wider business system.

The tools and supporting actions complemented each other in the following way:

- The field interviews were conducted to understand how to structure the qualitative survey for the regional SWOT Analysis;
- The interviews carried out for the realization of the regional SWOT analysis indicated the needs of the companies;
- Because of the needs that emerged and the opportunities deriving from the collaboration between CCIs and SMEs, the track was structured for the interviews that supported the setting of the DIVA cooperation model and the subsequent recommendations for improving cooperation.

The examples brought in focus from both the DIVA project and the Cross Innovation project have been selected on a qualitative basis, and according to both topics as well as method and transformative impact (on organizational, social and business levels). They were chosen against their suitability to highlight those interactions that feature the most impactful inter-sectoral collaboration and promise to bring novel approaches to the cross-discipline paradigm. In this case incubators and co-working spaces have been left out as they do not pose a novel proposition in the present context, also they are not based on cross-sector collaboration processes.

If looked at from the perspective of innovation management research, especially due to its focal use of case studies, the DIVA-based approach needed to come up for the common deficiency of case-study research (Goffin et al. 2019), since the methodology used in DIVA features a more complex approach than mere descriptive data interpretation. An evaluation template for the case studies was applied that also partly included the theoretical sampling criteria. An attempt was made along the entire data gathering and analysis to develop an argumentation from which the conclusions could be clearly drawn. They were thus based on the data that was evaluated for reliability to the utmost extent by keeping within a joint structure of interviews (as primary data), combined with the SWOT analysis and treatment of secondary sources.

The aim of the Cross Innovation project[16] appears very similar to that of the DIVA project: to identify and share innovative experiences emerging from the territories involved and, above all, to let creative industries and industries from traditional sectors interact somewhat deeply. The main difference between the two projects concerns the involvement of eleven European cities from several countries in the former project, and three European regions (covering a coherent area) in the latter. The methodological approach in Cross innovation included the following steps (Oliveira et al. 2016):

- *Collaboration spaces* (spatial cross collaboration): spaces where intersectoral innovation has special conditions to occur: incubators, FabLabs, coworking spaces;
- *Mediation* (brokerage): mediation services that can bridge the gap between sectors of the economy, for example a sector of the creative industry and a startup;

- *Innovation based on culture* (culture based innovation): processes through artistic and creative practices generate innovation in companies in the private or public sector;
- *Smart Incentives*: Innovative funding models that promote intersectoral innovation;

The methodology used in the project was based on (Oliveira et al. 2016):

1. Identification of the *potential of cities* in terms of creative and growth industries, through data collection;
2. Sharing of existing *best practices* related to the four themes (Spaces, Mediation, Cultural projects and Incentives);
3. Workshops for the *implementation of innovation policies*;
4. Definition of an *interaction matrix* between the sectors involved;
5. Local *implementation plan*.

Similar as in DIVA, best practices and SWOT analyses were preceded by a mapping of CCIs in the regions, and all actions included workshops to share and identify business needs, especially those of SMEs.

In the following, the article presents some of the case studies under analysis in order to shed light on the complex relationship between creativity and business, the Cross Innovation project examples being followed by the DIVA project cases. Later on in the following section, one field interview and case study in particular will be focused on as it arguably – and not least to complement the overall qualitative research approach presented above – represents the highest complexity and probably the most impactful cross-over of art and entrepreneurship, within the present treatment.

2.2. Examples of fruitful cooperation from the Cross innovation project

The *Cross Innovation project* mainly aimed to stimulate economic development through the interaction between two sectors which, by combining their expertise, can potentially contribute to generating innovation. Partnering with industrial sectors in this respect proved to be very fruitful, since, in general, creative industries need to enhance their business skills (Oliveira et al. 2016). As part of the Cross Innovation project, cities should have learned to think about policies to promote open spaces that facilitate interactions between different types of industries. Cooperation was considered an important factor in the search for innovation between companies but there were obvious difficulties found for companies to identify other companies that are able to cooperate (whereas DIVA was looking for crossovers of businesses particularly with arts & culture NGOs, author groups or individuals) (Oliveira et al. 2016).

It is also important to be able to correctly identify company needs and problems in order to find the best way to promote cross-fertilization between different sectors. It is on this basis that the DIVA project, later on in this article, reconstructs the company's needs through SWOT analysis and field interviews and promotes mutual exchange through the building of local HUBs.

The following cases were selected from the Cross Innovation project portfolio:

2.2.1. Native instruments

The company was founded in 1996 and has been since then producing products that enabled sound synthesis on standard computers. They manufacture software and hardware for computer based audio production. Amongst other software they develop Traktor and Reaktor, two powerhouses of contemporary audio production and DJ-ing. They complement their software line-up with their own hardware that enables producers to interact with their computers in a more intuitive way. The company is based in Berlin and as such positioned in one of the European centres for electronic music. Their operation is set in such a way to integrate during the developing process not just the technicians but also the end users. They have been tightly collaborating with the music scene (including big names like Richie Hawtin and Jamie Lidell[17]), showing that including the artist (the end users) produces a more robust product. Native Instruments structure their production around each product line instead of focusing on the professional fields. They claim to work with 'high class professionals from different fields of expertise' and among these fields they highlight 'product design, hardware manufacturing, electrical engineering, software development and interface design'.[18] The work and research for each new product is further reevaluated through the collaboration and feedback from musicians and music producers, which allows them to keep the products market-relevant through time, serving the end users needs and expectations and therewith creating a stable community. In terms of the above mentioned expanded cycle of creativity (Section 1.4) the present case shows the emergence of the skills and knowledge within the artistic realm that, through processes of engineering, crosses over to Technology via innovation activities within Design – and eventually returns back to the Arts by involving (with their original interpretation) new acclaimed artists.

2.2.2. Planet Modulor

Planet Modulor started off around 2013 as an original association of small and medium-sized retail companies, including crafts and cultural organizations. The original idea was to surpass the consumer-oriented shopping centers with a sensual quality of the presentation that focuses on superb craftsmanship and technical perfection, with an added value of good design. The visitor was originally intended to experience the making process, and become himself creatively encouraged to do so, thus becoming a customer to the retail. The initiator of the project was Modulor Material Total, the company and its partners offer a wider range of materials, products and services for professional creatives on more than 11,000 square meters at a prime location (Moritzplatz) in Berlin. The original plan was to establish a place where trade, handcraft and services can be meaningfully combined with creative, cultural and social projects. As it presently seems, the project has developed primarily into an arts and crafts store with a truly broad assortment and high quality service, including an ambitious web (shop) presence. A small promotional collaboration can be noticed between ArtConnect's Magazine and Modulor's own magazine for creatives, giving small prizes to art students in the form of shopping vouchers. Originally however, Planet Modulor was intended to

> experiment with the prototype of a new place where merchandising, crafts and services are productively joined and create innovative, cultural and social projects. The space was to acts as a broker for creativity and innovation.[19]

It was to include workshops for laser cutting, milling, wood, textiles, synthetics and metal; manufacturers of mosaics, wallpapers, interior furnishings, audio systems; model making, goldsmith and studios; photographers and labs, a printing business, bookstore, cafés and restaurant as well as a kindergarten on the roof, even a youth integration and training center. But it seems that the original community energy bound into a redevelopment project, fueled also by European funds, had gradually been spread around the wider 'Aufbau Haus' area that now hosts a diverse arrangement of cafes, shops and cultural venues (niche and local types of gallery, library and theatre), including a night club and a Sinti and Roma cultural spot, a kindergarten, and not least a small private university of applied sciences. Eventually, there is no evidence of a coherent program or orchestrated activity in the spirit of the original hub idea.

In this sense it seems that a lack of integrating a wide view with a vision did not produce the desired outcome. The artistic contribution has not been fully integrated and as such turned into 'a for artist' space – shop, rather than art centered space.

2.2.3. AWS

The Austria Wirtschaftsservice Gesellschaft (AWS) is a federal development and financing bank for the promotion and financing of companies. They provide around 1€billion for funding, aid, grants, loans and guarantees to finance projects. In 2013 the bank on behalf of the Austrian Federal Ministry of Economy, Family and Youth developed a system to bridge cooperation between the creative sector and companies from other industries and in such way bolster cross-innovation, At that time they introduced the Austrian Kreativscheck which was a sort of cultural voucher with an initial run of €300, each valued at €5000. The demand was soon met and exceeded, for that reason in just 9 days the minister doubled the budget to 3 million euros. In less than a month another 930 applications have been received. The project has been repeated in 2014 and 2015. This was claimed to demonstrate that the networking abilities of regional stakeholders are a key success factor. AWS seems to have retained at least part of this type of funding even further. In 2020 a new initiative seems to have taken its spot, AWS Creative Impact is a funding scheme targeted at the development of new products and services. The funding volume is now set to up to €200.000 for projects lasting from 1 to 3 years. Funding is divided into 3 phases: Pre-foundation phase (up to 1 year before foundation), Foundation phase (up to 6 years after foundation) and Growth phase (6 years after foundation or more). This case definitely shows that development investments into the creative sector can develop into a sustainable ecosystem.[20]

All this points that projects integrating art and design in their conceptual phase are very competitive in the economy.

2.3. Virtuous Interactions as identified in the DIVA project

Similar to Cross Innovation, the DIVA project initially identified a range of good practices on institutional level, two most relevant of which are here presented in brief, and in some contrast to the above mentioned cases:

2.3.1. Centre for creativity

The Centre for Creativity is the first large-scale Slovenian business development accelerator for CCI professionals, run by the Museum of Architecture and Design. In conjunction with a range of open calls by the Ministry of Culture the Centre is bound to form a support framework for the Slovenian creative sector. Aimed at strengthening the social and economic value of the sector at large, also including cultural industries, the program builds and intensifies ties with other sectors and the economy in general, thus engaging both selected big names of the trade as well as broadly attracting SMEs. The project is funded by the European Regional Development Fund, but the funding is further distributed towards actions that are planned throughout the entire duration of the funding. The actions systematically aim at accelerating, incubating, educating and funding further businesses in the creative sector. A big focus of the Center of Creativity is the development of the interdisciplinary, cross-sector ventures, therein they promote intersectional projects, bringing together art, culture, business and other sectors such as product and service design, fashion, architecture, gaming industries etc.[21]

The ultimate goal is to support the creation of a large number of new start-ups, products or services that will be commercially viable and through these actions develop an economically sustainable creative industry in Slovenia. The relatively small market in Slovenia is additionally challenging for certain aspects of the cultural sector and with such actions a new kind of balance is attempted between the culturally progressive and commercial creative products or services. The project is being implemented under the Operational Programme for the implementation of the EU Cohesion Policy in the period 2014–2020, its total value of the investment 2017–2022 is worth almost €11 million.[22]

The premise of the initiative is to introduce creative practices at the center stage of new ventures. The project has been conceived in an open ended manner, meaning that the ways in which Art or Design are incorporated in new projects are not predefined, even if fostering (also business) Innovation within the CCI sector remains the high aim of the initiative, its impact on Science or Technology as such however are minor. The Slovenian creative community has shown great interest in it, with numerous projects being incubated or scaled up.

One of the relevant offshoots of the Centre is the Made In platform[23] which positions itself as a research, design and heritage platform that seeks to support and instigate collaboration as well as knowledge exchange between traditional crafts and contemporary design

2.3.2. BioTehna and Kambič d.o.o.

Gallery Kapelica in Slovenia has been an internationally relevant nexus of progressive artistic practice for three decades now, in the last decade it frequently hosts artists working in bio-art and other investigative art fields. Between the year 2015 and 2018 three different artists working together with the gallery in their production lab (BioTehna) have been independently using incubators to grow cellular cultures for their various art pieces. Some of the artists' projects would require the growth to be monitored around the clock, and the main engineer taking care of BioTehna realized that such incubators did not exist on the market, neither it seemed possible to

transform, rebuild or hack existing incubators. The engineers at the BioTehna approached the Slovenian company Kambič that produces laboratory equipment and through a gradually deepened collaboration they developed a professional incubator with an embedded camera. This artist driven innovation, created in the first place to satisfy the need that the artistic research brought to light, has proven to be useful also in traditional research environments and as such found commercial success.[24] This clearly exemplifies the transitions within the expanded cycle of creativity as presented in Section 1.4 where art-thinking based (re)conception of the problem finds its application in Science (crossing the boundary to Technology) by producing new knowledge, which in a further step brings about a new (market-ready, if not even disruptive) Design which is then applied onward iteratively to refine the product and its usability.

2.4. Case study: Marko Peljhan, an artist and an entrepreneur (part 1)

Marko Peljhan presents the most complex and advanced case in the entire first stage of the DIVA practices mapping, especially since he represents both a practicing and world-renowned artist (currently in chair professorship at UCLA, USA as well as the 2019 artist representative of Slovenia at the Venice Biennial) on the one hand. While on the other he has two CEO roles (or at least can be considered founder) of an internationally successful cultural non-governmental organization (NGO), profiled in media arts, as well as co-founder of a technology firm building hi-end light unmanned aircraft.

In the interview for DIVA[25] he describes the beginning of his institutional operations when the 'Project Atol' (www.projekt-atol.si) was founded in 1992 – he describes it as a 'phantom' organization, since the legal framework was missing in the then transitional period, being the second of nonprofit character in Slovenia. Officially one person was enough to start an organization back then, with the Ministry of Culture of Slovenia registered as a supporter, which enabled them soon to implement bigger scale projects and an eye-level partnership in both national and international projects. Peljhan points out that the Atol NGO was used as a vehicle to equip other important cultural initiatives at that early stage (e.g. Random Logic's studio, a notable avantgarde duo in electronic music of post-transitional Slovenia).

When asked about the business model, Peljhan departs from the semi-independence model, but soon arrives at complex art production and research projects, still to this day including a music label (RX:TX), a program for young artists and a supporting mechanism for (mostly media art) producers. The public money influx was staggering in the first two decades, however in the recent years it gradually consolidated on the public part since the Ministry of Culture as well as the Ljubljana city Cultural Department consistently support the programs and projects of Atol. Apart from minor incomes from selling artistic work, the EU project money is becoming an increasingly important pillar of Atol's operations, however they still do not see themselves as operating on the market.

When in 1999 they started to work artistically with robotic and unmanned technologies, they noticed certain potential in this realm to fund the artistic activity, since

the fields of potential business and artistic exploration were at least partly overlapping. A proposal to the Slovenian Academic Research Agency was made through partnering with the University of Nova Gorica (Department of Physics) and Pipistrel (Slovenian light aircraft manufacturer established in 1989) and got supported by public money, as a kind of seed funding for the initial proposal. This presents a case where art-based (even activist) work and thinking brought about a potent business result: C-Astral[26] was founded 2007 as a company, after it had been initially incubated at the university. Peljhan claims that the NGO's organisational conception, their human resources and their pool of knowledge in fact 'incubated the for-profit' (exact quote from the interview), since the first 3–4 years of its operations were co-dependent on Atol. But the for-profit (C-Astral) already very early supported the artistic productions of the non-profit (Atol). While Atol is based in the country capital of Ljubljana (in a joint space 'Osmo/za' with two further NGOs of similar profile) mostly due to its relevance for media-artistic production, C-Astral is based in Ajdovščina since there was, next to the cutting-edge research and support by University of Nova Gorica, also massive regional support for such start-ups, especially in terms of available office and laboratory space.

In C-Astral the research is a staple and is conducted along a strategic line of activities, but currently this research is mostly technical, while at Atol the research is primarily artistic. Peljhan claims that C-Astral has now consolidated as a business and is in a couple of years to return back to the creative applications, leaving open whether this means operating as a creative business itself or rather funding creative practice externally. This also shows that at a certain stage of development the artistic research or thinking have receded from the initiative, and while cutting-edge Design remains their distinctive quality, Art has been put in the background (or rather left over to develop in the NGO). Being the founder of both Atol and C-Astral, Peljhan claims there has not been a generational changeover yet ("*It's just me – the roles are fluid. Sometimes I am artist, teacher, salesman, r&d meeting lead…*"). With Atol he claims to have removed himself from a lot of decision-making, since there are now other people who can take care of it and new partnerships are emerging. C-Astral similarly is looking for strategic partners (selling products in 70 countries), which puts less stress on him personally. Besides the STARTS ('Science, Technology & the Arts')[27] program of artistic residencies, Peljhan also feels that the DIVA project opportunities (such as working within the hub or as a partner in pilot projects) could be relevant esp. for C-Astral's possible refocusing (back) onto the cultural field. It may be claimed that the presented narrative exemplifies how an art phase can (if not should) be added to increase value and inventive qualities to the business-minded innovation cycle, especially when Art, Design, Technology and Science are combined with each other in a dynamic and non-linear (circular, see Section 1.4) way.

The entrepreneurial sector in which C-Astral operates (light unmanned aircraft) in terms of innovation potential is assessed as high by Peljhan, but also the potential in case of Atol is fairly high in terms of growth, especially in providing cutting-edge artistic productions and nurturing or enabling young artists and practitioners. Atol tries to prevent hyper-production and keep up the quality, while C-Astral as a high tech company operating under a specific set of constraints (market size, niche, specific

clients, highly customized products). Internal R&D is integral for both, while C-Astral is bigger (over 20 people) and has a department that is the core of the company, concerned with research. Large EU projects are thus an important source of external funding for C-Astral, while Atol is engaged in smaller EU funding projects for arts and research, less so in innovation – apart from the large-scale project, supporting research-based arts; *konS, Platform for Investigative Arts (2019–2022)*[28] featuring a massive work package that develops concrete business and social-innovation applications of art-thinking based methodologies which spring from artistic practice alone. Upon a representative and competent alliance of ten Slovenian NGOs and a university, the konS project builds a comprehensive system of three media-artistic laboratories (for artificial life, robotics, and signal processing) that will gradually lead up to establishing an innovative solutions lab to work on most complex challenges shared by CCIs and SMEs in deep collaboration. This is supported by a framework of 300 capacity-building workshops for a broad range of stakeholders, as well as strategic awareness-raising campaigns. Beyond foreseeable spillover effects into the business and the educational sector, konS seeks to establish a stable framework where the artistic practice remains a central source of inspiration for innovation.

3. Findings and discussion

This section of the article blends all the key findings with the most important emergent discussions to arrive at the key novel points of contribution – the role of the *innovation catalyst* (Section 3.5) acting within *art-thinking* based *frameworks* that encourage true art-business crossovers (Section 3.6). These are argued for and summarized after initially presenting the cross-innovation potentials (Section 3.1), upon which the DIVA-specific regional approach to detecting possible value (Section 3.2) has been combined with several relevant aspects of the above analyzed cases (Sections 3.3 and 3.4).

3.1. Potential cross-sector innovation between industries

One of the most important results achieved within the Cross Innovation project is above all the Crossing Matrix (Oliveira et al. 2016) that was created to identify, in each partner city, the different sectors of cultural and creative industries and the sectors of other industrial economic activities present in each of them (Table 1) (Oliveira et al. 2016):

The purpose of this matrix is to identify possible crossings and approaches between sectors, i.e. the potential for cross-sectoral innovation to materialize.

Each city presented its matrix: from this cross-fertilization, it was found that the sectors most closely related between CCIs and SMEs are design and environment; social media and environment; design and industrial production. Sectors that have nothing in common or are weakly compared to others are: open data, contemporary art, advertising and fashion. In reality, it is clear that these affinities occur mainly at the level of the business model, since design is by its nature close and akin to industrial production, whereas the visual arts are clearly not. Is it this distance, instead, that creates virtuous discrepancies?

Table 1. Cross innovation.

Sectors	Involved areas	
Creative industry	Design	Architecture
	Social media	Fashion
	Games & web	Music
	Visual Arts	Advertising
	Open data	Contemporary Arts
Traditional or in Growth Industries	Growing Environment and Energy	Health
	Production goods industry Retail and leisure	Manufacture
		Education
	Financial Services	Tourism
	Social Environment	Construction
	Public Patrimony	Technology
	Information and Communication Technology (ICT)	Restoration
		Public Administration
	Logistics e transportation	

Source. Crossing Matrix. Cross Innovation. (2014). Oliveira et al. (2016).

One of the main results of the project is the understanding of the companies involved that it is possible to cooperate to develop new applications or improve existing technical solutions. To improve cooperation, it is suggested to[29]:

1. Support the transfer of specific technologies;
2. Organize regular events where there is interaction between the different sectors;
3. Implement managerial support to segment brokerage and mediation events between parties;
4. Reduce the lack of qualified human resources.

Among the biggest obstacles to the Cross Innovation process is the difficulty in identifying other sectors that can effectively solve the problem of generating innovations in existing products.

Another problem lies in the difficulty of networking on the ground: there are difficulties for companies to identify other companies that can cooperate. It is necessary to establish higher levels of trust and communication, as these are essential for the success of cross-innovation processes.

The main recommendations of the project results are to create a political agenda that encourages a cross-sectoral innovation culture, with incentives, seminars and tools. It also calls for the creation of spaces, joint work between sectors, between universities and industry and, above all, the building of trust between different industrial sectors.it is also considered essential to[30]:

- Create strategic programs in order to stimulate the creative economy in cities;
- Promote internationalization;
- Financing creative events;
- Promote the development of creative neighborhoods and territories;
- Promote creative entrepreneurship;
- Set up workshops and residencies for artists.

3.2. Social, cultural and economic value for innovation across three regions of DIVA

The information collected through the DIVA project field interviews (30 in total, similar to the one presented above) was linked to each other and to the regional SWOTs; the analysis revealed important research indications about CCIs and SMEs involved in the data collection. Different data sets related to direct research have been used to understand the different case studies and best practices related to the territories of Slovenia; Veneto Region and Friuli-Venezia Giulia in Italy.

It is possible to conceive an emergence of a new model for entrepreneurship, in which SMEs recognize that they are not only challenged by a highly complex market situation, but that the user needs and the social contexts in which their products or services are applied can be grasped, described and solved by including creative, both design-based and also artistic methodologies. Artists are beginning to play a key role in the companies as crucial partners within innovation teams. In the following table detecting weaknesses, sources of positive implications for art and design as well as a deep integration of research have been highlighted by bold text (Table 2):

As the data analysis within the DIVA project confirms, the first fundamental difference between the conformation of SMEs and CCIs concerns their organizational structure. SMEs are often organized in various functions and departments and often feature an integrated research and development unit. CCIs, on the other hand, do not have a real organization chart, are generally of micro dimensions, and all the staff is assigned to multiple activities, with poorly specialized roles, but thus high flexibility to respond to opportunities.

Both CCIs and SMEs are oriented towards mutual collaboration, but the real opportunities are few. As noted, in daily practice CCIs act mainly as providers of creative services for SMEs, and this does not generate innovative processes, as it mostly involves the appearance of products and services or is limited to applied marketing aspects. Collaborations geared towards deeper mutual exchange, however, and experimentation, when they occur, find fertile ground for mutual hybridization. There are two main reasons why collaborative experiences remain isolated: the lack of knowledge of CCIs and their potential by SMEs as well as the limited opportunities for them to meet each other. On the other hand, the lack of opportunities for collaboration depends on the diversity of perspectives. For SMEs, the CCIs reveal that they do not know much about the company and are not oriented towards the market; instead, the CCIs consider SMEs too focused on business goals and unable to grasp the values, even immaterial and experiential, as inherent in a collaboration with the cultural sector.

As could be recognized from the SWOT analysis under the headings of Design Thinking and Art Thinking, SMEs have not yet codified these practices within their organization and are often unable to grasp their real value. This dichotomy could be bridged, in both directions, by providing the cultural and creative industries with more management and entrepreneurial tools. On the other hand, this may be done by enabling small and medium-sized enterprises to formalize the processes of Design thinking and Art thinking by increasing or instigating connections with the creative industries as well as replicating their main methodologies linked to creative thinking and innovative practices. If, in fact, the practices and real potential

Table 2. SMEs – SWOT analysis – weaknesses.

	Friuli Venezia Giulia	Slovenia	Veneto
Essential biography	The company's organizational chart does not include a *research and innovation department*.	Limitations regarding innovative implementation of processes; most employees work on everything; short-term goals and projects that generate revenue immediately are more important.	One weakness can be identified in the level of formal education and knowledge. Generational change could also be an issue as traditional firms tend to be managed by the founder.
Research & Innovation	The company carries out R&I projects/activities internally, with *no cooperation with external players*.	Enterprises have different perspectives and attitudes towards innovations; they must provide a certain added value or financial benefit from the very start if they are to be pursued.	Innovation is key but very often not formalized. One of the weaknesses is the low level of patenting and consequently of the protection of intellectual property.
Art & Design Thinking	The company does not know DT nor AT or, in some cases, *has no codified methodologies or processes to carry out R&I projects/activities*.	Companies are not familiar with Design Thinking and Art Thinking methods and presume that they *will not bring any added value to their company*.	*Art and design thinking are not very well-known*.
Collaboration & cross-fertilization	The company has never cooperated with companies/ organisations from CCIs.	*No contact with the local community, incomprehension and ignorance of cultural differences, language. Lack of time to cooperate with CCIs*.	Culture and creativity professionals are not fully perceived as potential collaborators unless it is for a very specific and functional service such as for instance *communication or design of new products*.

Source. Deliverable ATT7, DIVA project.

linked to artistic thinking are not very well known (and consequently little applied by SMEs), it is only by multiplying the opportunities for encounters between these two different parts of the economy that a true cross-innovation process can take place.

All three regions assume the role of mediator as necessary to support the meeting between traditional companies and CCIs organizations, improve their cooperation and act as guarantors of the skills and reliability of the organizations involved. To strengthen cooperation, companies should develop less episodic and more medium-long term-oriented experiences, which is reflected in the way the strengths of the SWOT are highlighted, as follows (Table 3).

The cultural and creative industries of the three regions appear to be familiar with the tools of creative thinking and, even if they do not codify it as a 'service' to be made available to traditional industries, they seem to be aware that design thinking and Art thinking are a way to convey new ideas and mutual learning opportunities.

Table 3. CCIs – SWOT analysis – strengths.

	Friuli Venezia Giulia	Slovenia	Veneto
Essential biography	The company's organizational chart includes a research and innovation department.	Can make decisions faster, are more flexible. Simpler monitoring of processes (one person can oversee all phases).	Their organizational structure is extremely *flexible* as they often operate by *mobilizing networks of other creative professionals*. The number of *university graduates* is significant.
Research & Innovation	The company/ organization *invests considerably in R&I* projects/activities and cooperates with external players (e.g. universities, end users, etc.) in R&I projects/ activities	Collaboration with partners (different disciplines, business areas, etc.)	Among the CCI, innovation is not only central but also the essence of their role and *presence in society*. *Projects are often unique, and custom made* and, therefore, highly innovative.
Art & Design Thinking	The organization applies traditional R&I instruments/ methodologies; does not know *Design Thinking and Art Thinking*, but in fact applies it.	Design Thinking: methodology focused on understanding and solving a specific problem. *Art Thinking: increased opportunity to address social needs/problems*; more possible solutions.	CCIs are *naturally familiar with the idea of art thinking*. This is also the case when they do not know the tools from a technical point of view but they know very well how to implement the principles in practice.
Collaboration & cross-fertilization	The company/ organization has successfully cooperated with a traditional company.	Collaboration with SMEs: acquiring *different opinions, perspectives, new experiences*.	CCIs are curious and perceive the need to build stronger relationships with the rest of the economy and society.

Source. Deliverable ATT7, DIVA project.

Furthermore, the opportunities linked to cross-fertilization between SMEs and CCIs, studied in the DIVA project, highlighted how the transfer process linked to the acquisition of new skills is possible, especially thanks to the experimentation of artistic residencies in companies.

By comparing the SWOT analysis of SMEs and CCIs carried out in the three regions, and in particular by comparing what are the main weaknesses of SMEs and the main strengths of the CCIs, it is possible to understand how the creative industries can, in part, solve some of the business criticalities that have emerged.

The lack, often, of a proper research and development department as well as collaborations with other external entities in SMEs opens up important opportunities for CCIs to contribute to development opportunities for the industrial sector by expanding possibilities of collaboration, or at least their perspectives thereof. There is also often a lack of contact between SMEs and local communities, especially in terms of dissemination of knowledge and good practices. Often collaboration with the creative industries is seen only as an opportunity to contribute to specific external communication and new product development, without considering that creativity

could also and above all provide development in terms of shared value and new knowledge.

The creative industries have a very flexible organizational structure and are made up of highly qualified staff. There is a high level of investment in R&D and this is mainly expressed in the development of projects linked to territorial development. Art thinking is seen as an opportunity through which contents can be conveyed through artistic practices, especially with regard to issues related to the territory and the dissemination of values. Collaboration with industrial sectors is seen as an opportunity to acquire new perspectives and languages.

The main business-needs transformations, oriented towards collaboration between CCIs and SMEs, that emerged from the research are the following:

1. Increasing flexibility in businesses;
2. Investing in human capital;
3. Equipping companies with better management and technological infrastructure;
4. Improving research and enforcing the protection of intellectual property;
5. Stimulating organizational learning;
6. Expanding networks with other sectors;
7. Providing training courses for businesses & internships for students;
8. Formalizing the methodologies of Art thinking and Design thinking;
9. Encouraging collaboration opportunities between CCIs and SMEs;
10. Formalizing the professional figure of an intermediary;
11. Clarifying the aims and objectives of the collaboration;
12. Encouraging experimentation and research.

In terms of opportunity, SMEs recognise a great challenge in collaborating with CCIs, especially if they are part of R&D projects with universities, which is in line with the presently discussed case of Marko Peljhan. Art thinking and Design thinking appear to be useful tools to improve competitiveness and study new solutions, also related to environmental sustainability and circular economy. Collaboration with creative industries is considered important especially in terms of activities linked to the social and cultural development of the territory.

Quite clearly, a deeper interaction between SMEs and CCIs is to be aimed for. But there is also an important need for CCIs to find collaborations and new funding opportunities by partnering deeply with not only the actors from the business sector, but also among each other. Networking with other CCIs could be a useful and even safe way to grow by developing a flexible but at the same time more structured business model that reaches across sectors and disciplinary domains. Art thinking is perceived as a challenge to discover new market opportunities and to trigger learning processes also thanks to its cross-disciplinary nature.

Creative industries are able to offer new topics and tools that bring about new value solutions, which certainly represents an opportunity especially for traditional industries, due to a now wide-spread visibility and support of their openness and capacity for collaboration. Actors from both the business and arts realms need to strategically (re)set their operational models that enable the adjustments of both

capacity and attitude in a way that enables a deep blending of different ways of thinking, so that manifold tools and methodologies may be tuned onto each other.

3.3. Artistic and entrepreneurial knowledge combined to generate innovation (Marko Peljhan case study part 2)

The main research question that the present contribution, based on the DIVA project may answer is: how can the needs of businesses be met through art – while at the same time these needs should be transformed by a mutual understanding, and acceptance? And secondly, how can artists and the cultural and creative industries equip themselves with an organizational and communication competency that is able to respond effectively to these needs?

In order to respond to the business needs that emerged in the SWOT Analysis, in-depth field interviews were carried out and case studies of cooperation that directly involved CCIs and SMEs were analyzed. One of the most emblematic case studies of how art can crucially inspire and enrich the entrepreneurial sphere is certainly that of Marko Peljhan as already analyzed in the Section 2.4 above. As an artist, an activist and a founder, he has been able to combine creativity with entrepreneurial knowledge, bringing together his managerial skills in different backgrounds, fuelled by his ardent critical engagement with surveillance, navigation and other military technologies, among others. In terms of collaboration and cross-fertilization potentials of his work as both a tactical media artist, and a co-founder of a company, Peljhan assumes that C-Astral will soon start to participate again in artistic research activities, which confirms a positive dynamic between Art and Technology (via Design and Science) along the expanded cycle of creativity as presented in Section 1.4.

On the other hand, the nature and the developing profile of Project Atol's work is such that it principally enables incubation of potential SMEs or startups, so he claimed in the DIVA interview. Understanding the culture among the SME community, which is 'the hardest nut to crack – up to education and policy-making' according to Peljhan, is not the actual criticality. To solve this issue, the interviewee claims that a certain maturity of the capital-owning environment is needed, since (apart from some enlightened individuals) the corporate sector does not understand that creativity needs to be invested in as well. Erudition and 'crazy examples' do not appear attractive and true investments in the realm happen very rarely in Slovenia – while he points out the paradox that artists are taking the risk all the time, both in work and life!

Peljhan eventually claims that artistic thinking approaches are key at Atol, while at C-Astral design thinking is still most dominant: 'Even C-Astral's optical design is perfect and that is important when creating a product'. One of the partners was specifically involved as a designer already in the onset of C-Astral and ever since they are producing everything in-house. In Peljhan's opinion,

> innovation needs a fertile basis. In order to happen you need people with different knowledge to come together, and project into the future. It is a logical progression, a progressive activity in time, and should run in an orderly fashion, including constant reflection.[31]

3.4. Fostering crossovers between new creative and traditional industries

But how can artistic and entrepreneurial knowledge generate innovative processes? And above all: how to ensure that these processes are sustainable in the medium to long term? Many of the virtuous connections found in the here presented case studies proved to be the result of isolated episodes, so the question arising is: how to foster stable and deep relationships between creative and traditional industries?

One of the main answers to these questions concerns the utilitarian recognition by the business world of the need to acquire new skills from the creative and cultural domain. If the enterprise recognizes the need for new skills that cannot be acquired elsewhere and also appreciates the artistic and creative world as the holder of such skills, then the encounters between these two worlds can be more frequent, deep and fruitful – which however still does not guarantee the benefit for the artistic 'side' of the partnership!

The case studies selected from the projects Cross Innovation and DIVA have made it possible to evaluate the quality of the collaboration between CCIs and SMEs and derive useful indications to strengthen and improve them:

3.4.1. Respecting the point of view of both sides

Many interventions are focused on the benefits that creativity can bring to the corporate sphere, as well as to the advantages that the collaboration with the business sector can provide to CCI. Both points of view are important and fundamental for the creation of an effective and fair cooperation (as shown, for example, in the above presented case of BioTehna and Kambič, Section 2.3.2). Moreover, the technological and the marketing competencies may enter creative alliances and build the community with a range of creative skills and knowledge of the humanities, which often represents a wide range of profiles that may enter such crossovers. They should be empowered to participate in and influence the innovation process in an immediate way, so as to reflect the actual needs of the end beneficiary, such as proven by the above presented case of Native Instruments in Section 2.2.1.

3.4.2. Improving organizational learning through the arts

Companies are more focused on generic dimensions of cultural and creative products and events, but do not seem to fully grasp the potential of learning or researching through the arts (Darsø 2004). The impacts are mainly aimed at the development of the organizational infrastructure; they are hardly people-oriented, and the diffusion of an art-oriented organizational culture seems weak. In the short and medium-term, however, the effects on the organization are difficult to measure, while those on people are more direct and immediate. The dimension linked to learning and development could be further explored, while that relating to reputation (Schiuma 2011) already appears very relevant. The above Planet Modulor (Section 2.2.2) case shows how the artistic point of departure and the CCI-profiled setting brings about a value added to both the location as such and the partners involved in developing it into a cross-sectoral venue (adjacent NGOs and companies).

3.4.3. Encouraging bottom-up approaches and dissemination of knowledge at all organisational levels

With respect to frameworks for art-based collaborations[32] in the dissemination and creation of value through interactions, the approach is usually top-down as regards the organisational sphere both in CCIs and SMEs. It is often poorly planned at strategic level, involving the management area without truly including the lower-management employees and thus failing to empower the entire body of workers in the organization. The collaboration effect however very often immediately reaches the areas related to performance and the achievement of objectives, therefore it is possible to easily highlight impacts on external communication and the strengthening of the brand. However it commonly occurs that the process stops too easily and thus features an overly superficial layer of the company, rarely reaching the internal organizational structure, let alone transforming the dissemination of knowledge. It would instead be preferable to use a bottom-up approach[33] for the planning of artistic and creative intervention in companies, to also involve other company areas and spread the value created also in the production chain and innovative creation. The results and recommendations from the DIVA project clearly support the encouragement of deeper cross-sectoral interventions, such as those presented earlier in this article. They act in accordance with the framework developments and promotional activities in recent years by the Center for Creativity in Slovenia and its Made In platform (see Section 2.3.1), or projects such as the above mentioned *konS, Platform for Investigative Arts*, and not least the present DIVA, *Development of Ecosystems and Innovation Value Chains: Supporting Cross-border Innovation through Creative Industries.*

3.4.4. Creating interventions and investments in arts on medium to long-term

In accordance with the framework outlined in the DIVA Cooperation Model (in particular, with respect to the framework originally outlined by Comunian 2010), all the main impacts noted above in the SWOT and across most of the DIVA interviews were in the marketing and public relations realms; long-term investments were made in the form of financing collaboration linked to the development of new company products, creation of an art collection, strengthening of communication and profit orientation. Investing in the arts is important, especially for creative companies, but using methodologies from the creative sector as an important part of the business or investment plan appears to be greatly missed, even if it proves fruitful, such as in the case of C-Astral presented above. A model is needed that would more consistently support artistic research, similarly as this was done in the case of the AWS (Section 2.2.3) initiative for CCI driven innovation/development.

3.4.5. Expanding the role and presence of the intermediary

The figure of the intermediary proves essential for good collaboration, however in practice such profiles are not established as expected or planned roles in teams, and are rarely present in practice. Such a person will have the role of an intermediary consultant (often referred to as catalyst or mediator) working alongside artists, engineers, scientists and managers (Berthoin Antal and Strauß 2016). Such a hybrid-skilled figure should be able to bridge the two worlds, the artistic and the entrepreneurial,

including values, codes, and practices of both realms (Berthoin Antal 2012). In the research so far it seems that the main task of this profile lies in creating a suitable environment for the interaction between artists, creatives and business, promoting the dissemination of what has been achieved, and, possibly, documenting and reflecting upon the added value created by mutual interaction (Johansson, Ulla, and Berthoin Antal 2016). Cases such as Native Instruments and (Section 2.3.1) BioTehna NGO lab along with the Kambič company (Section 2.3.2) show that intermediary elements that facilitate the transitioning between Art, Design, Science and Technology realms in the process of innovation eventually secure both the disruptive edge and the marked viability of the prototypes and products, as long as Art thinking is considered to be one of the key stages in innovation.

However, the 'Innovation Catalyst' profile developed within DIVA is integrated deeper into the innovation process and, as explained further below in Section 3.5, combines Art and Design thinking with a broad knowledge of topics across management, understanding and translating also between realms of Engineering and both Natural as well as Social Sciences, and not least Humanities.

3.4.6. Implementing scientific research

The entire design thinking paradigm has been thoroughly researched and documented so far with regard to its use in business management practice: the methodologies have been in constant use by startups and many bigger (at least tech) companies and this trend could be even intensified in the next few years. Implementing scientific research in the field of cooperation and mutual exchange between CCIs and SMEs could provide companies with a further opportunity for development and innovation, featuring positive effects on regional territories. Artists are increasingly joining scientists in their research facilities, and the tools and methodologies used by artists and designers have begun to radically shift the way research questions are conceived and the way problems are discussed and articulated. These unorthodox methodologies often lead to unorthodox solutions, providing inspiration not only to the teams they are part of but also to society at large, which was proven in the recent discussion between Marko Peljhan and Monica Bello, head of CERN Arts on 'Art & Science: How can Art Innovation Serve Business and Science?' (Bello, Peljhan, and Purg 2020).

3.4.7. Offering real possibilities for creative people in businesses

The case studies explored in DIVA (some of which relate also to the SMATH project[34]) have shown virtuous connections in which the artists involved in the company have triggered new and different mechanisms for conceiving of the company itself (e.g. the case of D20 Art Lab and Electrolux), or for involving the company in an artistic project (the Kambič company involved by the Kersnikova Institute NGO, see Section 2.3.2). Compared to the artistic and creative reality, there is little evidence that by and large this is being done in any systematic or quantitatively relevant way. The creative and cultural world has not yet fully approached the possibility offered by residencies in companies, such as those supported by the STARTS program, for example. This gap could be bridged with greater communication oriented towards reaching channels linked to the art sector. Exposing artists to the attractive possibilities offered

by collaboration with other industries could greatly expand the opportunities for the whole sector, especially if artists would not feel to be 'artwashing' the company public image, but rather contributing to the transformation of their internal processes of communication and creativity, if not business models as such.

3.4.8. Disseminating cultural value in organizations

The real challenge is, therefore, to make sure that the value generated by the collaboration can permeate the company structure, to the point of being able to continue manifesting its effects even after the end of the collaboration, through the continuous generation of innovation and shared values. For this purpose, it would be a key issue to encourage artistic collaboration and to consider creative industries as a new gateway for economic and social change (Komorowski 2019), which calls for a holistic, ecosystemic approach. It is also important to both improve and anchor the knowledge of Art thinking and Design thinking within companies, making it a fundamental tool for a disruptive attitude oriented towards cross-innovation.

3.5. The innovation catalyst as a novel profile enabling cross-fertilization

References linked to some of the most important innovation laboratories in the world, such as the Ars Electronica Futurelab or the MIT Media Lab, bringing culture closer to science and technology, provide rich evidence of a need for establishing a central coordinating profile within the process of cross-domain innovation. Furthermore, European policies have been increasingly recognizin the power of artistic ideations in encouraging radical production, service and social innovations in the digital and post-digital age. This is why, along with the aforementioned projects MAST and konS; the DIVA project has developed the profile of the 'Innovation Catalyst' – an intermediary, who has active knowledge of the theories and practices of artistic creation and is on the other hand also acquainted with the various concepts of the economy of social and product innovations. Beyond delivering mere consultancy or mediation service, an experienced innovation catalyst will systematically help develop innovative culture by connecting the most creative individuals, who will critically analyze, intuitively, and systematically research, and ultimately create on the very limits of the possible. As has already emerged in literature (Berthoin Antal and Strauß 2016), the role of a mediator such as the Innovation Catalyst who preserves the identity and characteristics of the artist and meets the specific needs of the company, is therefore crucial.

The innovation catalyst is thus not the most enthusiastic employee (as regards innovations) within the company, but rather a special kind of mid-management profile equipped with all of the necessary professional ethics and attitudes, mastering theory that includes numerous practical cases and displaying a fitness for coordinating activities that will lead to a more thorough, sustainable, secure and ethical innovation. Such a person who aspires to lead (or at least coordinate) the collaborative innovation process has to be familiar with different cultural, scientific, technological, social, and production activities that are shaping the contemporary world. Even if the Innovation Catalyst should be able to navigate through both technological and social innovation,

the latter might be the primary field of meaningful progress, especially if innovation is to be considered in its transformative potential for both social and technical realms, preferably combining both. Within the last decade, it is increasingly assumed that foremost technological progress is to be applied in the interest of a truly future-oriented, ecologically and culturally balanced social reform, especially es regards the development of new pedagogical profiles in both formal and non-formal education.[35]

The future of (electronically supported, digitally dominated) work should belong to profiles who are able to think about future independently and freely, in trans-disciplinary manner, inserting and transforming existing solutions and products into new scenarios that would be solved or transferred to industry realms, ranging from CCIs to high technologies, and not least social services. The ideal profile of an Innovation Catalyst was in the DIVA project named 'hub coordinator', a person (with a specific role in the emerging regional ecosystem of hubs) who seeks to integrate different realms while remaining in positive (if not utterly creative) control over her or his (and common) digital tools and creative platforms, both virtual and analogue. In the DIVA cross-fertilization model, the profile of the coordinator is put in position to train (transfer skills and knowledge to) local 'operators', who are working in hubs or other forms and realms of art-business collisions, facilitating this nexus in the everyday. The DIVA operators thus represent actors on the ground that connect the SME and CCI context, while the DIVA coordinator also designs the hub programs and strategically coordinates work in inter-sectoral levels, reaching out to public and private stakeholders, attracting new investments or resources etc. This multi-skilled and widely knowledgeable person competently switches among different professional realms, interconnects and develops new paradigms, finds unconventional, art-thinking based solutions, as well as provides necessary translations among realms. It might be assumed that the above analyzed cases (Section 2.2. and 2.3) could greatly benefit from including such a profile into their innovation process, such that would safeguard an even inclusion and still rapid, goal-oriented progression towards the emergence of a new technological or social solution.

3.6. From unintentional spillovers to frameworks for crossovers through art-thinking

Digital technologies, including trans-sectoral collaborations with the artistic realm (such as e.g. game industry or fashion), have influenced the transformation of business models that can be observed as potent particularly in the sector of CCI. The crossing of the propulsive creative sector with the traditional modeling of business processes brought about new concepts, opened up new domains (partially in the beginning of the Modulor project, see Section 2.2.2) and kept fostering the emergence of new fields with unprecedented depths of impact to both industry, and society at large (as is the driving force of the Center for Creativity, see Section 2.3.1). The CCI sector in particular shows how different creative products or services (developed within one business or collaboration) may get re-combined as new products or services, improving (but also developing from-scratch) opportunities in order to develop a wide range of new niche products or services by monetizing different stages of the work-in-progress. A deep intertwining of artistic thinking (such as proven in the cases explored above, in particular the one of Kambič and BioTehna (see Section 2.3.2) as well as the

organizational founding curriculum of Marko Peljhan (see Section 2.4) within the otherwise (or previously) design-thinking dominated business process management is needed. This is supported by the claim that it is especially the portfolio business models which can significantly enhance a firm's financial sustainability and stakeholder credibility:

> By maximising revenues from different market niches, different stages of work-in-progress, or multiple sides of the market, the portfolio model reduces the reliance of the firm on one particular source of income, therefore reduces risks and increases the overall resilience of the firm. In some cases, when previously insignificant market grows in volume and the traditional market declines, the nature of the business is transformed (Feng 2020).

The portfolio model appears compatible with several of the above-mentioned crossovers of the CCI and SME sector that feature a diverse range of emergent products and services, often spilling over (in both directions) between different sectors. However in order to achieve a long-lasting positive effect, these deep entanglements should take place within stable frameworks (such as e.g. the cross-fertilization oriented hubs of DIVA) that are gradually intertwined into an ecosystem. These (possibly guided or facilitated) interactions may and should happen on many levels such as skills and knowledge sharing, resource investments, bottom-up inclusion, and interdependence with cutting-edge engineering and science. Thus this manifold complexity calls for a novel intermediary profile who facilitates the multi-layered iterative cross-innovation process, such as the Innovation Catalyst presented above.

The interim results emerging from the DIVA project and largely exemplified by the case of organizations founded by Marko Peljhan, and in particular the companies and NGOs analyzed by means of the SWOT analysis show that there are ample possibilities for cutting-edge innovation, if the collaboration is brought to a level playing field that suits both the CCi and the SMEs. But for that both must be well-prepared not only in terms of tools, skills and mindsets, or approaching a clear framework of conduct, but they should be ushered in as well as coordinated by trustworthy and competent profiles. Apart from the rather accidental spill-over effects of involving an artist (group) at the core of the innovation process, strategic crossover benefits are more likely to emerge from finer business-model and operational capacity tuning on both sides. This may be not least exemplified by the DIVA open call for funding twenty such cross-fertilizing partnerships, to which no less than 123 applications were submitted (selection for funding takes place during the publishing of this article), showing at a most positive response from the presently emerging art-business ecosystem in the Italy-Slovenia cross-border region.

Are artists and CCIs really prepared for this new challenge, are they motivated to equip themselves with tools and ready to undergo an organizational transformation to meet the needs of companies and the market? Key innovative challenges of tomorrow will be articulated in terms of such complexity, to which perhaps only art (along with a broad range of social sciences and humanities) is able to respond fully and in a radically new way. But while the responses to the business needs of SMEs are being transformed through their increased cultural awareness and growing

cross-connections, can a truly level playing field be established so that art essentially inspires innovation in the business realm, but still keeps its own cutting-edge?

The present research, within DIVA and supported by a plethora of above-mentioned other projects and publications, proves that a sustainable impact may only be achieved in stable partnerships and safe environments such as creative hubs or innovation laboratories, embedded in safe networks and supportive ecosystems. There both the creative and the entrepreneurial side share equal stakes in terms of risk as well as benefit. Cross-discipline interaction should not rely on random spillover effects, but should be guided and intentional by installing stable frameworks of collaborations that are based on a broad cultural awareness, a growing cross-sectoral competency and a structured inclusion of intermediary profiles such as the Innovation Catalyst.

Notes

1. Justin (2018).
2. Kennedy (2007).
3. Clifford (2014).
4. Peterson (2017).
5. Kulendran Thomas (2020).
6. Kulendran Thomas (2020)
7. Andaluz (2019).
8. Depoorter (2019).
9. "DullTech (2016).
10. Depoorter (2019).
11. Cross Innovation (2020).
12. DIVA (2020). The authors of this paper are involved as researchers in the DIVA project.
13. KEA (2015).
14. MAST project (2020).
15. Comunian (2010).
16. Cross Innovation Project (2014).
17. "Native Instruments," (2020).
18. Native Instruments (2020).
19. Planet Modulor (2020).
20. Aws Creative Impact (2020).
21. Ivi, p.123.
22. European Commission (2020).
23. MadeIn Platform (2020).
24. DIVA Project, Deliverable 3.1.4. ATT9, DIVA Cooperation Model.Interreg Italia Slovenia, December 15, 2020. https://www.ita-slo.eu/en/diva
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29. Oliveira et al. (2016, 6).
30. Oliveira et al. (2016, 8).
31. Marko Peljhan, Interview conducted within the DIVA WP3.1 activity, on 14.12.2019 by P. Purg and J.Č. Gerbec, in an online connection between Nova Gorica, Slovenia and Santa Barbara, CA (USA).

32. Such as the "Arts Value Map" outlined in Schiuma (2011).
33. Schiuma (2011).
34. Interreg Mediterranean Project, SMATH – Smart atmospheres of social and financial innovation for innovative clustering of creative industries in MED area, https://smath.interreg-med.eu/.
35. STEPS: "Soft Skills ; Training ; Enabling ; Progression & Sustainability," \.

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